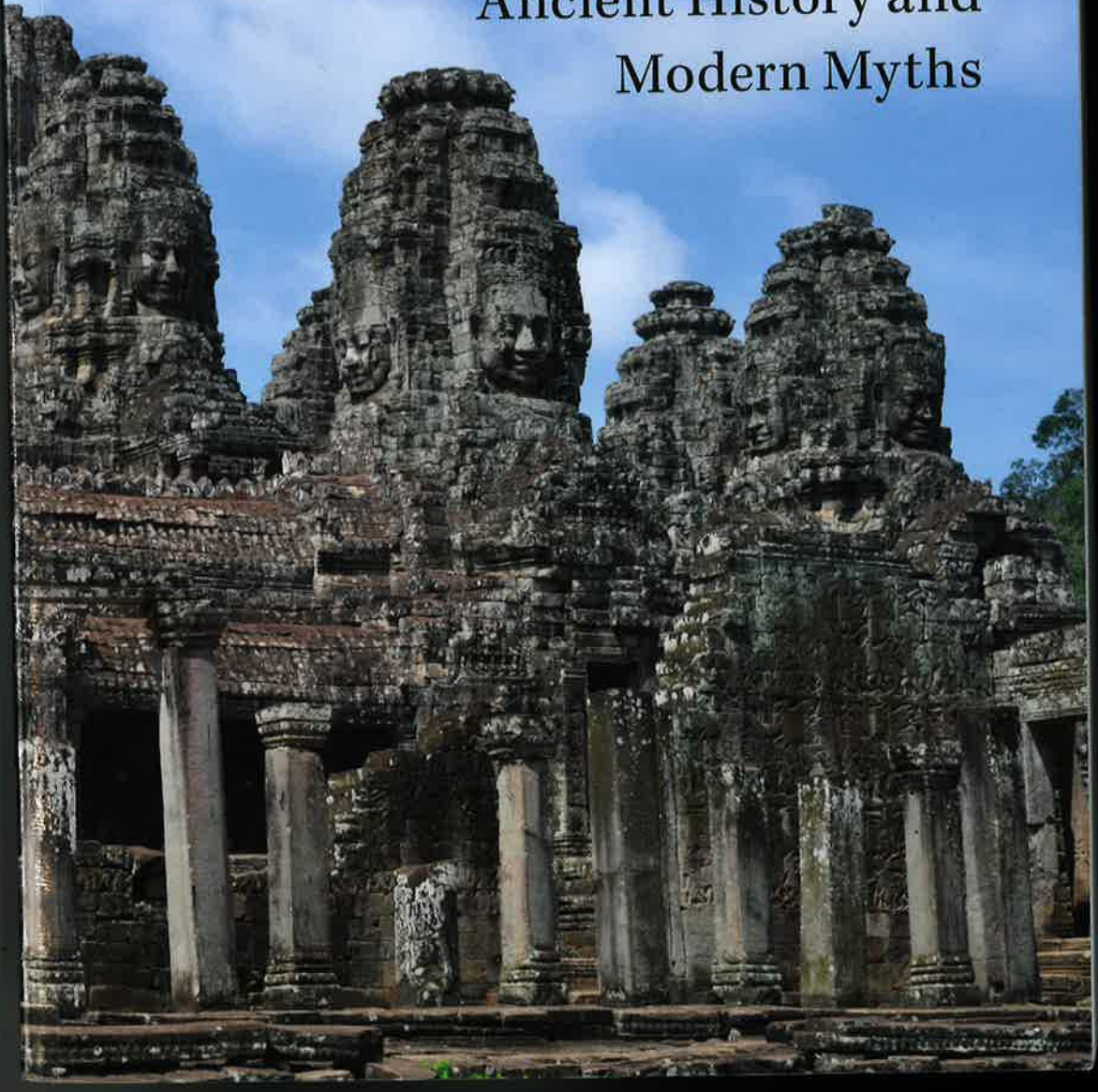
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GUY D. MIDDLETON

Understanding Collapse

Ancient History and Modern Myths



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1

Introducing Collapse

The fall, like the rise, of a civilization is a highly complex operation which can only be distorted and obscured by easy simplification.

Mortimer Wheeler[1]

CLIMATE APOCALYPSE IN THE NEWS

As I sat down to work this morning with Radio 4 on in the background, I was intrigued to hear the BBC's newsreader announcing that the riddle of the mysterious Classic Maya collapse had finally been solved.[2] I waited with baited breath to hear what the latest explanation would be, thinking it must be a slow news day for ancient history to have made it into the news mix. A moderate drought, she explained, was enough to cause the collapse of Maya civilisation around 1,100 years ago, which, she added, led to the Maya cities and pyramids being swallowed up by the rainforest. The announcer confided that, although solving the Maya collapse had long been a problem, archaeologists generally now preferred drought as the cause.

The whole report probably lasted no more than two or three minutes, an impressively short time in which to explain the fate of a long-lived and complex civilisation that had existed for hundreds of years, several times longer than modern nations like the United States or Australia. It was a problem that, as she rightly pointed out, had puzzled archaeologists and the curious for years. But I wondered what exactly I and other listeners were supposed to understand by 'collapse' and by 'Maya civilisation' – dramatic images of lost and abandoned cities reclaimed by nature were evoked, but would we all

be imagining the same thing? I was curious too about which archaeologists she was referring to, and who had decided that 'most' of them preferred this conclusion. I briefly wondered whether I would no longer be obliged to complete this book about collapse ...

So, I diligently looked up the original paper that the news report was based on, just published in the journal *Science*.[3] The paper was somewhat less definitive than the news report, but its argument was still clear enough. I found that the authors, two oceanographers, had studied the existing palaeoclimatic data, drawn from physical samples taken from three locations in northern Yucatan, Mexico. Like other researchers before them, they suggested that chemical analysis of cores taken from lake bottoms and from stalactites ('speleothems' – stalactites and stalagmites or cave calcites) indicated periods of reduced rainfall in Late Classic Maya times (the eighth and ninth centuries AD). This, they said, would have reduced the carrying capacity of the land, the amount of food that it could produce, which would in turn have caused the population to fall catastrophically, triggering 'significant societal disruptions'.

Rather than a new solution, this sounded like a well-known story of collapse due to some kind of environmental change with which human society could not cope, the main difference being that the authors were claiming that a more moderate reduction in rainfall could be blamed, rather than the massive droughts suggested by others. If a modest reduction in rainfall could have this effect, it suggested that the ecology and hydrology of the Yucatan Peninsula, the home of (some of) the Maya people, were particularly sensitive to change; a plausible hypothesis. But, given the long history of research on the problem of the Classic Maya collapse, and the number of publications, scholarly and popular, as well as television documentaries and even films on the subject, was that it? Rainfall slightly reduced, Maya collapsed and disappeared?

I was still left wondering what the authors really thought the Maya collapse was, and if this moderate reduction in rainfall could be enough to explain it. The news story had suggested a point of collapse around 1,100 years ago, *c.* AD 900, and the disappearance of the Maya, whereas the authors of the paper actually noted, quite rightly, that 'the disintegration of the Classic Maya Civilization was a complex process' taking two centuries. But their account still seemed very much to imply some kind of terrible event that would have involved a lot of death and unpleasantness. Did they imagine that many Maya

simply died at once, that it was ultimately a kind of Malthusian population collapse? And what were these 'societal disruptions'? Their statement that the collapse 'involved a catastrophic depopulation of the region' seemed clearly enough to indicate that it was an ecological collapse they were thinking of, of the kind biologists might identify in any species or ecosystem.

I was left with an image of an empty landscape, and a population wiped out by a terrible natural disaster, yet it is difficult to square this with the idea of a complex two-century process of change, which the authors had introduced. Two centuries is a long time, time enough for significant changes in ways of life and attitudes, in political geography, and in material culture to occur. Admittedly, it can be hard to conceptualise past periods of time; as George Orwell said 'when you look backward things that happened years apart are telescoped together'.[4] The stories implied some kind of 'back to square one' blow, from which the Maya, the few who survived, would have to start again amongst the ruins of their former glory. In this account, a fairly typical story of apocalyptic collapse involving a terrible disaster and death with a handful of survivors eking out a living in a post-apocalyptic age, the ancient Maya were helpless victims of circumstance.

The Maya are not the only ones to receive this treatment, although they are a perennial favourite – enigmatic, exotic, mysterious. In 2012, for example, *The Times of India* proclaimed that 'Climate killed Harappan civilization', a story also based on a research paper published in the *Proceedings of the National Academy of Sciences of the USA* (*PNAS*).[5] The paper argues that a reduction in monsoon rainfall affected the complex river flows of the Indus basin, with rivers getting smaller, becoming seasonal, or even drying up completely. The agricultural basis of the Harappan urban sites was undermined. Yet there was no sudden ending, no killing stroke executed by the climate; the authors state soberly that: 'since approximately 3,900 y ago, the total settled area and settlement sizes declined, many sites were abandoned, and a significant shift in site numbers and density towards the east is recorded'.

Another similar story, entitled 'Climate change: The great civilization destroyer' appeared in the *New Scientist* in 2012, this time about the Mycenaean Greeks of the Late Bronze Age, *c.* 1200 BC.[6] This article, again based on a research paper, wanted to add the Mycenaean collapse to the list of peoples, societies, and civilisations supposedly brought to an end by climate change.[7]

These stories, and others like them, seem to represent the public image of collapse in the early twenty-first century and the cutting edge of archaeological and historical research. They tie in with our concerns over current climate change, and also with the vivid images we have of drought and famine. What these stories remind me of, and presumably others, are the graphic images of the victims of the tragic droughts and famines in Ethiopia in the 1980s. These came to international attention through the harrowing television reports shown around the world, which many in developed countries, seeing such things for the first time, found so shocking. Those images, and more recent ones that still appear regularly on television, seemed to show people stricken and emaciated, in abject poverty, with no food, water, or hope, people for whom circumstances were intolerable and for whom normal functioning society had ceased, people who would, without international aid, die where they sat, starving and thirsty. Would the Classic Maya, Harappan, and Mycenaean collapses have looked like this?

STORIES AND COLLAPSE

Probably not. The problem with collapse in the news and in many popular articles is that the stories they tell are grossly oversimplified, offering a caricature of history, a mythic version of historical change for our sound bite society; they are infotainment at its best. As we have seen already, one issue is the way that scientific research is transformed into news. In the first place, certain kinds of scientific research are more likely to get published in high-profile journals, and thus to catch the attention of news services. Journals such as *Nature*, *Science* and *PNAS* choose to publish novel and especially interdisciplinary research, research that has definitive results and conclusions – hard science style. Thus stories about new climate change linked to the fate of ancient societies are much more likely to reach a wide audience than a more circumspect paper in an archaeological journal.

Then the headline language used to describe collapse in popular sources (in the press as well as in documentary films) frequently serves to obscure the complex historical processes that were at work, turning them into cataclysmic events, and presents the peoples, states, or societies (and peoples) in question as static two-dimensional entities

that could be wiped out in a blip. Too often, such reports, and th science papers on which they are based, fail to really conside what they are saying. What do we mean by collapse and what do w mean when we talk about the Classic Maya, the Harappans, or th Mycenaean Greeks, their cultures, their societies, and their civilisa tions? If we frame the questions simplistically, we are likely to ge simplistic and unsatisfactory answers.

Despite their lack of substance, these stories have a great and understandable appeal, and it is worth thinking about this a little What such stories really represent is a kind of quest romance, a kind of story as ancient and appealing as the oldest stories we know which historian Ronald Hutton explains is 'one of the most popular and effective modes of expression for historical or archaeological research'.[8] Researchers are heroes on a quest, who undergo a journey in which they apply their knowledge and skills, and eventually, and triumphantly, solve a seemingly insoluble historical conundrum.

Collapse stories appeal to our narrative desires in other ways too. They can be seen as both tragedy and parable. Tragedy originated as a specific kind of theatrical performance in ancient Greece, and tragic stories dealt with big and serious themes; plays were not simply 'art', but actively mirrored the politics and society of contemporary life and functioned 'as a powerful medium for the communication of ideas'.[9] They had a standardised plot in which the hero's journey is followed, his actions leading to a climax and then finally to a resolution, often the death of the hero.[10] Read 'ancient civilisation' for 'hero' and we have a story of rise, zenith, and fall – stories of collapse which are blamed on human degradation of the environment seem to fit this pattern.

In tragedy, the hero usually makes a mistake, which leads to his fate; sometimes these errors are brought about by outside factors, such as divine intervention, but at other times there is some fatal character flaw. So in collapse we can see external factors blamed or errors made by the society that collapsed. Just as in tragedy, where the *mechane* allowed gods to enter the stage through the air, revealing the act of violence that resolved the play, collapse is often 'explained' by *deus ex machina*.[11] Just as tragedy was a social art, witnessed and consumed by ancient audiences, our stories of collapse are spectacles, shared and consumed by modern audiences.

Aristotle thought tragedy served an emotional or psychological purpose. He suggested that 'through pity and fear' there would be catharsis, an emotional purging in the audience.[12] Nietzsche, thinking of tragedy, wrote of 'that lust which also involves the *joy of destruction*'.[13] Others have suggested that tragedy provokes *Schadenfreude*, that in fact audiences enjoy the horrors of tragedy and the sufferings of its fictional hero, a kind of enjoyment which, however morally questionable it may be, seems real and commonplace.[14] Does our witnessing of apocalyptic collapse, whether in print, on television, or on film, somehow fulfil us emotionally? Do we enjoy the spectacle and revel in stories of the destruction of others?

Perhaps. Nowadays this may be most evident in popular blockbuster films that project views of apocalyptic collapse with causes that reflect contemporary concerns. In recent decades, we have been treated to global disaster threatened by colliding comets in the 1998 film *Armageddon*, where disaster was narrowly averted through technology and guts, and also by the film *Deep Impact* where the ending was much more bleak, with millions perishing. In 2004 there was *The Day After Tomorrow*, a film which depicted a sudden climate change and the onset of a new ice age almost overnight. In 2009, *2012* focussed on global disasters such as earthquakes and tsunamis, which killed millions, caused by the heating of the Earth's core by solar flares – a select few humans were able to save themselves in a number of 'arks', built in secret in China. The 2011 film *Contagion*, in more of a documentary style, explored the effects of a global pandemic, which caused the breakdown of social order; the film reflected real contemporary fears about possible pandemics such as SARS and H1N1 flu.

Other myths of apocalyptic collapse too come to mind from our shared past culture. The flood myths shared by numerous cultures around the world are often taken to suggest that floods had a profound effect on people in the past, strong enough to warrant being passed down in stories, although floods, like other themes can have metaphorical rather than literal meanings.[15] The flood myth recounted in the Mesopotamian Epic of Gilgamesh, and later the Christian Bible, have even inspired people to search for a real catastrophic geological event that may underlie the story – some suggest the flooding of the Black Sea.[16]

Also from the Bible we have the story of Sodom and Gomorrah, recounted in Deuteronomy 29:23. The cities were destroyed by God in his anger at the wickedness and vice of their inhabitants. But other kinds of destruction were also foretold. In Isaiah 17:1–2, a prophecy of the destruction of Damascus is given, in which it is predicted that the city will become a heap of ruins. The destruction of the mercantile city of Tyre by Nebuchadnezzar was also graphically prophesied in Ezekiel, which describes the utter destruction of one state by another. Destruction is a consequence of wrongdoing – a precursor to our modern environmental stories of collapse.

The Atlantis myth is a story of catastrophic and apocalyptic collapse *par excellence*. It has been a part of Western culture since Plato composed it in the early fourth century BC; we know it from his *Critias* and *Timaeus*.[17] However, it is probably better known now than ever before; Alan Cameron notes it as the inspiration for over 20,000 books.[18] A Platonic myth rather than a Greek myth, invented by a man devoted to exploring order, a crafter of ideal societies, and political utopias, the story relates how Atlantis, a fictional ideal state located on an island in the Atlantic, fell from grace as its once blessed and virtuous people grew corrupted and greedy over time, eventually trying to enlarge their empire and conquer the world. For this hubris Zeus wanted to punish them, and the ancient Athenians, who in contrast to the Atlanteans were still virtuous, defeated them in war, freeing all the conquered and enslaved peoples, and averting the threat from the invaders. Afterwards, 'there were earthquakes and floods of extraordinary violence, and in a single dreadful day and night all your fighting men were swallowed up by the Earth, and the island of Atlantis was similarly swallowed up by the sea and vanished'.[19]

Interpretations of the Atlantis myth abound as people make the story conform to their desires, but it seems clear enough that Plato, in the fourth century BC, was teaching his fellow Athenians (and others) to be mindful of their ambition and their priorities.[20] They had been embroiled in the creation of an empire and had had a major conflict with Sparta, which led to defeat at the end of the fifth century BC. He perhaps wanted them to recall their ancestors in the earlier fifth century who had, somewhat against the odds, defeated the enormous might of the invading Persian king. Athens was the focus of the story; Atlantis represented an undesirable, avoidable fate. The

story elaborates the age old aphorism that pride comes before a fall – much like the story of Croesus and the Delphic oracle.

Alan Cameron notes that 'it is only in modern times that people have taken the Atlantis story seriously; no-one did so in antiquity'.[21] Indeed, many have 'believed', including the British prime minister and Homeric scholar William Gladstone, and have tried to associate the Atlantis myth with 'real' history.[22] K. T. Frost in 1913 wrote that 'The search for Atlantis has given rise to so many conflicting views (most of them palpably absurd) that few scholars are prepared to take it seriously', before offering his own view, about which most modern scholars would express equal scepticism, that the story represented Minoan and Mycenaean history.[23] Frost noted that while 'it seems ... futile to seek for the geographical or geological site of a huge island now submerged. On the other hand a political and national disaster, a cataclysm in the usual instead of in the literal sense of the word, can destroy an ancient civilisation as completely as any flood'.[24] But despite his comments others have continued to look, and to make associations with the archaeological, geological, and historical evidence of the Late Bronze Age Aegean, in particular the eruption of ancient Thera and its effects on Minoan Crete.

An interesting example of an apocalyptic story from the pre-Hollywood blockbuster days that ticks the same boxes, and shows that our modern disaster discourse is no new thing, is the volcanic disaster narrative.[25] This was a type of entertainment devised by pyrotechnical entrepreneurs, who produced 'volcano entertainments', spectacles with painted backdrops and sound effects, which became popular in the nineteenth century, but which originated in the eighteenth. They reflected increasing interest in geology and the natural processes of the Earth combined with excitement over the excavation of the buried city of Pompeii, which began in the 1740s.

In the 1880s, one such show, called *The Last Days of Pompeii*, was toured by the Pain family, who were fireworks manufacturers (Figure 1.1). It visited New York and London, among other places. In its first performance at Manhattan Beach, Coney Island, the show attracted more than a thousand spectators, with later shows attracting up to 10,000. In June 1889, the Pains put on a modified version of the show, announced in the *New York Times* (9 June 1889):



FIGURE 1.1. Graham Charles. Fireworks at Manhattan Beach – 'The Last days of Pompeii'.
Source: *Harper's Weekly* 25 July 1885, 476. General Research Division, The New York Public Library, Astor, Lenox and Tilden Foundations.

> Beginning next Saturday night, 'The Last Days of Pompeii' will be presented nightly by Mr Pain at Manhattan Beach. It is not to be a revival of the show which he gave under the same name in 1885, but a much more elaborate and magnificent affair. There will be 400 people on the stage, a ballet of 36 dancers trained by Batiste Cherotte, master at the Metropolitan Opera House, a male chorus from the same place, soldiers, acrobats, jugglers, tumblers, wire-walkers, and others to assist in making the picture of a fete day. The display is to culminate in the destruction of the city by the fires of Vesuvius.[26]

In addition to their romantic and tragic appeal, stories of collapse are ideal fodder for the creation of modern parables for our time – especially parables of human relationships with the natural environment. Examples of this are not hard to find, and they are frequently repeated in the literature, becoming factoids that purport to be straightforward historical facts. One noted environmental writer, Lester Brown, for example, in his book *World on the Edge: How to Prevent Environmental and Economic Collapse*, used as examples ancient Sumer and the Maya. The former collapsed because their successful

irrigation systems eventually led to high salinity, resulting ultimately in food shortages and collapse. The latter chopped down too many trees, leading to soil erosion, and again, food shortages. Brown draws an explicit parallel between past and present: 'for us it is rising carbon dioxide concentrations in the atmosphere that are raising the global temperature, which could ultimately shrink grain harvests and bring down our global civilization'.[27] The lessons we are to learn from the past are clear.

None of this is to say that there is only one 'correct' version of collapse that exists to the exclusion of all others, nor that the academic archaeological version (not that there is 'one' single version) is the best – in doing history there are many stories and perspectives that can be usefully brought into play. But it is important that we recognise the constructed nature of our ideas about collapse. I think Stephanie Moser puts it best:

> The notion that researchers are solely responsible for creating meaning about the past is a false assumption that diverts our attention from the fact that representations have their own unique conventions and ways of communicating. Thus knowledge is not simply created by researchers and then diffused into popular culture (i.e. a one-way process); it is also created by many other kinds of discourse which in themselves shape the ideas of researchers.[28]

Our thinking on collapse, and the stories we tell of it, popular and academic, are reflections of our own times and concerns. As we read back through accounts of collapse from different times, we can see this influence clearly.[29] But we must beware of over simplifying or skewing our accounts of past collapses just to turn them into lessons for modern society.

What I hope to have shown so far is that we often see collapse in very particular ways, which are structured by how we share knowledge – through stories or narratives. Collapse stories often bridge information and entertainment, fulfilling our needs on a variety of levels. Scientists are problem-solving heroes, societies are tragic characters, destined to fail, and collapse is a lesson to be learnt from. There is nothing inherently bad about this – it is human nature to make everything into a story. But if we really want to know about collapse, we have to begin by trying to see past the popular stories. A result of this, and one that many might find unsatisfying, is that we

may end up without straight answers or simple plausible-sounding storylines; we might have to admit that sometimes (or a lot of the time) we do not know what happened or who or what was to blame for something that we think was going on.

WHAT IS COLLAPSE?

Before we get too far along, we should think about what collapse actually is and what kind of things can collapse. Assumptions about and lack of definitions of collapse are two of the problems in how it is represented. Very often, the implication is that collapse is some kind of apocalyptic event – everyone starves and the monuments of a civilisation decay and are lost only to be rediscovered much later on, posing a riddle to explorers and archaeologists. As Joseph Tainter suggests, many 'authors assume that we know what it means, without individual, cultural, or temporal variation'.[30] However, there is no guarantee that we are in fact all sharing the same idea of what collapse is.

Describing the Maya collapse, archaeologist Arthur Demarest takes the problem a step further, blaming controversies over interpretation not only on assumptions about what collapse is, but also on confusion over what is collapsing:

> Recent discussions of the collapse of civilizations have demonstrated that terminological ambiguity creates much of the controversy regarding comparative issues, including differences in the interpretation of specific cultural historical episodes. The meanings of terms such as 'collapse' and 'decline' are far from obvious. Furthermore, ambiguity about what precisely is 'collapsing' (e.g. 'civilization,' 'state,' 'kingdoms,' 'tradition,' 'society') generates more disagreement than do problems of historical or archaeological interpretation.[31]

But there are definitions of collapse, and of what it might apply to, and I shall introduce and discuss some of those next.

Joseph Tainter's 1988 book *The Collapse of Complex Societies* is still probably the most referenced book on collapse; the author has written much about collapse, complexity, and sustainability. His definition of collapse goes like this:

> Collapse ... is a *political* process. It may, and often does have consequences in such areas as economics, art, and literature, but it is fundamentally a matter

of the socio-political sphere. *A society has collapsed when it displays a rapid, significant loss of an established level of sociopolitical complexity.* The term 'established level' is important. To qualify as an instance of collapse a society must have been at, or developing toward, a level of complexity for more than one or two generations. The demise of the Carolingian Empire, thus, is not a case of collapse – merely an unsuccessful attempt at empire building. The collapse ... must be rapid – taking no more than a few decades – and must entail a substantial loss of sociopolitical structure. Losses that are less severe, or take longer to occur, are to be considered cases of weakness and decline.[32]

Tainter sees collapse very specifically as a political process connected to the degree of complexity of a society. Human societies become more complex as a response to the problems and opportunities that they face, and through collapse they become less complex.[33] Collapse then is a rapid process of simplification – where rapid means not instantaneous, but perhaps a few decades. Importantly, in Tainter's way of thinking, collapse itself is an adaptation not simply a failure.

What does this definition apply to? In his main examples, Tainter writes about the Western Roman Empire, the Classic Maya, and the Ancestral Puebloans of southwestern North America. These are three quite different entities, operating at different scales. The first was a large empire; the second a group of independent but competitive states of varying size making up what we could call a 'culture zone'; the third is a smaller single culture. So in Tainter's view, political collapse can happen to a range of 'things'. We might wonder, however, whether all of these are really comparable.

George Cowgill and Norman Yoffee discussed what collapse applies to in another key publication from 1988, *The Collapse of Ancient States and Civilizations*. They suggest that we should 'clearly differentiate between *state*, *society* and *civilization*, and use the last term in a specifically *cultural* sense'.[34] Collapse occurs within civilisations, which are the 'cultural tradition[s] in which the state is embedded,' consisting of 'literature, customs, languages'.[35] To some, this may seem like academic semantics, but it is important. Often we read or hear about the collapse of civilisations, but Roman, Maya, and Ancient Puebloan civilisations did not collapse at all – all three survive, transformed, to this day. It is specific political regimes that collapsed, social systems that changed, and religious and ideological systems that were transformed and/or rejected.

Take another example – Mesopotamian civilisation. Jane Rempel and Norman Yoffee asked the question, 'did Mesopotamian civilisation end?' They emphasised that while politically Mesopotamia contained many different states and empires over the years, which rose and fell, and eventually the whole region fell prey to even bigger empires passing through Persian and then Macedonian and Greek hands, 'Mesopotamian civilization did not undergo a similar collapse.'[36] That is not to say it did not change, it certainly did – it transformed over long years, but it did not collapse in the blink of an eye. The cuneiform writing tradition could be taken as an index of the presence of Mesopotamian civilisation and its disappearance as late as the third century AD could be said to mark the end of Mesopotamian civilisation.[37] But this single indicator is an arbitrary one – a civilisation is a set of features that transform at different rates (and with different implications for the people and societies in question).

There is no need to see such transformations as decline – the value of cultural items and practices such as writing changes, as do the ways people seek to construct their personal and cultural identities. Likewise with the end of the Western Roman Empire. Its political system collapsed in the fifth century AD, its territory fragmenting into multiple independent states, but Roman civilisation did not collapse. It had always been changing, and this did not end abruptly with the death of the last Western emperor; the Roman heritage remained alive, being reused, reinterpreted, and transformed by the people who inherited it – in the twenty-first century the Americans still place importance on the concept of liberty, and retain senators and a senate.

What about famous examples of collapse such as the Greenland Viking communities, or the lost city of Roanoake, or Rapa Nui? In the former case, we have two communities that were eventually abandoned – but these did not collapse in Tainter's sense, and the latest research suggests they were abandoned by their inhabitants in good order rather than that they fell into chaos and calamity with everyone starving to death or killing each other.[38] With Roanoake (the City of Raleigh, on Roanoke Island, Virgina), the English settlement founded in North America in 1587, we have an example of a mystery – another settlement abandoned – but again not a collapse

in the view of many.[39] And what about Easter Island? Whether there was a collapse – a simplification of Rapa Nui society – at some point before Europeans arrived is controversial, as we shall see later on. In all these examples of supposed collapse, what probably happened is far less dramatic than the apocalyptic stories we are often presented with.

Many authors who write about collapse cite Tainter in their own lists of references, but not everyone strictly follows his definition of collapse. Jared Diamond, one of the most well-known popular writers on collapse, gave a definition in his 2005 book *Collapse* that is clearly drawn in part from his reading of Tainter and other thinkers on collapse, but it differs in key respects:

> By collapse, I mean a drastic decrease in human population size and/or political/economic/social complexity, over a considerable area, for an extended time. The phenomenon of collapse is thus an extreme form of several milder types of decline, and it becomes arbitrary to decide how drastic the decline of a society must be before it qualifies to be labelled as a collapse.[40]

The first thing we should note is that, unlike Tainter, Diamond emphasises 'drastic' decreases in population over a wide area and long period of time. This reflects not only the common view of apocalyptic collapse, but also Diamond's background in ecology and biology, where collapse is something that happens to populations in ecosystems (think of the mysterious 'colony collapse disorder' that has affected bee populations in recent years). This focus on population and disaster also follows from Thomas Malthus' influential *An Essay on the Principle of Population*, published in 1798, in which populations grow until they are checked by some kind of catastrophe. The focus on population in Diamond's definition is almost the opposite of Tainter's view that collapse is primarily a political process.

It is easy to imagine that a demographic collapse would be a terrible thing – something that would by its very nature have to be brought on by plague epidemics or famines caused by extreme droughts or climate change or damage to a society's supporting environment, which reduced its carrying capacity. Such a disaster would surely have serious repercussions for any society – even possibly bringing about its demise (though clearly the medieval European states survived the

massive disruption and population loss caused by the Black Death). Thus, Diamond envisions the Greenland Viking's collapse as:

> sudden rather than gentle, like the sudden collapse of the Soviet Union [the Eastern settlement was] like an overcrowded lifeboat ... famine and disease would have caused a breakdown of respect for authority ... starving people would have poured into Gardar, and the outnumbered chiefs and church officials could no longer prevent them from slaughtering the last cattle and sheep ... I picture the scene as ... like that in my home city of Los Angeles in 1992, at the time of the so-called Rodney King riots ... thousands of outraged people from poor neighbourhoods ... spread out to loot businesses and rich neighbourhoods.[41]

A focus on demographics conjures up a stereotypical descent into a dark age largely devoid of people and of the kinds of activity that comprise civilised life. Whereas for Tainter a political collapse could have repercussions in other areas of life and society, including being a cause of depopulation, for Diamond it is primarily depopulation that is collapse.

We have looked at two quite different visions of collapse, both drawn from works attempting to give general explanations of why collapse happens – one taking an economic perspective, the other an environmental one. But what about archaeologists themselves, how do they see collapse? In an important book about collapse and regeneration, from 2006, entitled *After Collapse: The Regeneration of Complex Societies*, Glenn Schwartz explains:

> In the archaeological literature, collapse usually entails some or all of the following: the fragmentation of states into smaller political entities; the partial abandonment or complete desertion of urban centers, along with the loss or depletion of their centralizing functions; the breakdown of regional economic systems; and the failure of civilizational ideologies.[42]

This broad description is different again. It does not necessarily describe the simplification of a given society, unless we see the fragmentation of empires or states as simplification, nor does it necessarily involve demographic collapse, although this can be indicated by the abandonment of sites (but this can also indicate the nucleation of population at a few sites or a shift in subsistence strategies). But rather than insisting on a single meaning, it gives us a number of descriptive features of collapse that we can tie to specific examples,

and these reflect well how archaeologists apply the term 'collapse' in practice.

A more recent definition from their 2012 paper is given by archaeologist Karl Butzer and environmental historian Georgina Endfield, who suggest that:

> Societal collapse represents transformation at a large social or spatial scale, with long-term impact on combinations of interdependent variables: (i) environmental change and resilience; (ii) demography or settlement; (iii) socioeconomic patterns; (iv) political or societal structures; and (v) ideology or cultural memory.[43]

Although there is some overlap with the previous definitions, this one is different again, since it defines collapse as large-scale transformation with a number of possible impacts on five interlinked areas. One problem with this definition is that there is no idea of the timescale of such transformation – are such transformations rapid? Does collapse as transformation have to be measured in a few years, in decades, or can it take place over centuries, in which case how does it differ from plain 'change'? Also, can we equate 'demography' with 'settlement' – that is, equate population with how populations are spread through the landscape?

Another problem (depending on your point of view) is that state formation or ideological changes, such as new systems or ideologies of power, may count, in this definition, as episodes of collapse. Was the pyramid age of Egypt an era of collapse because of its new centralisation and a new system of ruler-focused monumental propaganda? Can either the founding of the Roman Empire (from an oligarchical republican system), the Christianisation of Rome (or indeed Europe), or the extension of the franchise to women in the UK, as profound real and ideological changes, count as collapses?

Finally, let us include a definition from the sustainability literature, as given by Marianne Young and Rik Leemans:

> Let us define *collapse* as any situation where the rate of change to a system:
>
> - has negative effects on human welfare, which, in the short term, are socially intolerable;
> - will result in a fundamental downsizing, a loss of coherence, and/or significant restructuring of the constellation of arrangements that characterise the system; and
> - cannot be stopped or controlled via an incremental change in behavior, resource allocation, or institutional values.[44]

This definition is drawn from the results of a Dahlem workshop, published in 2007 as *Sustainability or Collapse? An Integrated History and Future of People on Earth*.[45] These authors, as with some of the others, do refer to timescales – since change is normal, collapse represents a change in its rate where certain effects are present, including simplification and 'socially intolerable' effects on human welfare. It is also seen as an unstoppable process – one that cascades from changed situation to changed situation, taking the unit considered further away from a particular first set of circumstances.

The definition is reminiscent of the idea of failed or failing states, an equally inexact concept popular since the 1990s, which is of clear concern to policy makers seeking to ensure that states become or remain sustainable and do not collapse. Of these, Cojanu and Popescu explain:

> There is a growing recognition of the threat to international security posed by failed and fragile states, often marred by serious internal conflict that also has the potential of destabilizing neighbouring states and providing ungoverned territory that can provide safe haven for terrorists.
>
> The inability of their governments to provide basic services is considered a significant contributory factor. Poorly performing developing countries are linked to humanitarian catastrophes; mass migration; environmental degradation; regional instability; energy insecurity; global pandemics; international crime; the proliferation of weapons of mass destruction, and, of course, transnational terrorism.[46]

Socially intolerable conditions can be quite a tricky concept to define. It may simply mean that living conditions become much worse – intolerably so, for a given period of time. They may, however, become tolerable as people's expectations and values change. For whom (and for how many) do conditions have to be intolerable? The slave miners in the Roman world, the child miners of nineteenth-century Britain, or other exploited or socially excluded groups surely lived in conditions that others might find intolerable … But these were normal features of 'successful' societies that were not collapsing. We might also, when we take society to refer to an identifiable social unit like an empire or state, think of circumstances that the system itself, rather than its people, is unable to bear.

Most reasonable people would expect there to be some leeway in language usage; after all, we usually adopt or create terminology to help us think about the thing we are trying to describe, and not as an end in itself, as Patrick L. Gardiner reminds us:

> Generalizations about revolutions, class-struggles, civilizations, must *inevitably* be vague, open to a multitude of exceptions and saving clauses, because of the looseness of the terms they employ … But this is not to criticize such generalizations provided that they are not expected to do more work than they are fitted for. The scientific model of precise correlation is misleading in any attempt to comprehend the role of these generalizations in history, where they function frequently as *guides to understanding*.[47]

Each definition of collapse brings with it different observations, ramifications, and repercussions. There is little of the apocalyptic to be seen, except perhaps in Diamond's and Young and Leemans' ideas, and the demographic definition is not one that archaeologists or historians usually use, except in specific cases such as collapse of native populations during instances of European colonialism. Much more frequently, collapse is used to mean the fairly rapid ending of states (including empires and much smaller entities), which itself can involve fragmentation into smaller units, simplification of political and social systems, change in urban settings, redistribution of population in the landscape, and changes in ideology made visible in architecture and the arts.

Many archaeologists agree that collapse often affected the elite members of societies most – or at least most visibly – and that those least affected (at least in some ways) would be the peasant farmers that made up the bulk of the population in pre-industrial societies. Thus collapse could be 'socially intolerable' to the elite but welcomed by 'middle classes' or others. But it is also true that collapse would have had effects that ran through a whole society to some extent. Fragmentation could bring instability and conflict, driving down agricultural production, trade, and exchange, all of which might affect the population levels, while the end of rulership, its specific ideology, and all that went with it would have had its own set of economic and social effects.

At any rate, whenever we think about collapse, it is a good idea to be critical – not for the sake of argument, but in order to grasp more fully what we (and others) actually mean and what we are really exploring.

WHAT COLLAPSED?

In Tainter's definition, collapse is something political that can happen to any established society – ones that are both more complex and less complex. But in practice, people apply collapse to many different kinds of 'units', and so I want to take a step back and consider the kind of units that collapse is said to happen to and to think about the implications of this. This is important because many authors take a comparative view of collapse, yet it is not always clear why some examples of collapse are thought to be comparable with others. To begin with, it may be helpful to consider the variety of entities that we encounter in the modern world, if only to remind us of some of the different categories involved.

Nowadays, we tend to think about the world as carved up into fixed territorial political units that we call countries, states, or nations, and which we often refer to generally as 'societies', owing to their nature as politically and socially defined in-groups in which people imagine a common identity. These may often be the biggest unit for which we have certain legally defined relationships and statuses, and a strong sense of identification. Some states, Switzerland, China, the United Kingdom, or Spain, for example, are multi-ethnic and multilingual, while in others, such as Korea or Japan, more stress has been placed, in recent times at least, on ethnic and cultural homogeneity.

Of course, there are also bigger entities like the European Union, in which many Europeans are voting citizens, but it is unclear whether this legal and political entity is also something with which many of its citizens strongly identify, in contrast with their other identities. There are other concepts that are made use of, such as 'westernness', 'Arabness', or 'Asianness', which are grounded in cultural or behavioural commonalities and sometimes in the idea of shared cultural heritages – sometimes equated with that loose idea of 'civilisations'. Much of Europe, and therefore the USA and other recent states, share an origin rooted partly in Roman and classical heritage. Some transnational identities and institutions are neither 'national' nor 'ethnic' and are based instead on religious or other affiliations – Catholicism

is a prime example of an enduring non-ethnic group identity, Islam is another.

'Nation' can also refer to people who identify themselves as a unit, on the basis of some (possibly imagined) shared descent, ethnicity, or 'national' identity, for example. Nations may be non-sovereign groups, or groups with a degree of autonomy either within one or several sovereign states – the 30 million Kurds who live in Turkey, Iraq, Iran, and Syria, for example, or native American groups, are nations. Tribal or aboriginal groups elsewhere, within states, may also sometimes be considered as nations. In the past, as in the present, states and nations do not necessarily overlap territorially – empires and states may incorporate different peoples in different ways. In classical Greece, the helots of Sparta, Messenian Greek slaves owned by the state, were part of the state only to the extent that the state claimed ownership of them, keeping them subjugated for centuries. Despite this situation, a Messenian identity continued to exist and the Messenian state was reconstituted after the battle of Leuctra in 371 BC.[48]

WHAT ARE WE COMPARING IN PAST COLLAPSES?

A brief glance at some of the examples rostered in comparative approaches to collapse shows that many different kinds of units are often considered together (Table 1.1). We can see empires, such as the Akkadian and Roman; cases that may be empires or states, such as Han China, Tiwanaku, and Wari; states like Uruk and Old Kingdom Egypt, and Axum. We can also see what may be best described as 'culture zones', including the Classic Maya, Crete and Late Bronze Age Greece, and Mesopotamia, which were made up of numerous independent states and other possibly non-state communities, which nevertheless shared a degree of cultural and sometimes linguistic similarity (probably the Harappan/Indus Valley societies fall into this category too).

Other units are included too – societies that might not be considered 'state level', such as the Ancestral Puebloans and Rapa Nui (Easter Island), and communities that were part of larger cultural groups such as the Greenland Norse. The very prehistoric 'Natufians' were not a people – the name refers to a more sedentary culture that appeared among hunter-gatherer communities in the Near East.[49]

TABLE 1.1. *Objects of study in works on collapse*

Tainter (1988)	Ancestral Puebloan, Classic Maya, Roman Empire (plus many other shorter case studies)
Yoffee and Cowgill (1988)	Classic Maya, Han China, Mesopotamia, Mesoamerica, Roman Empire
Weiss and Bradley (2001)	Natufians; Uruk; Akkadian Empire, Old Kingdom Egypt, Harappa IIIB; EBA III Palestine, LBA Greece, Crete; Moche; Tiwanaku; Classic Maya; Ancestral Puebloan
Diamond (2005)	Ancestral Puebloan, Greenland Norse, Easter Island, Classic Maya
Schwartz and Nichols (2006)	Angkor, Classic Maya, LBA Greece, Old Kingdom Egypt, EBA Syria, Tiwanaku, Wari
Redman et al. (2007)	Old Kingdom Egypt, China, Mesopotamia, Harappa, Bal He Kuk, Classic Maya, Hohokam
Costanza et al. (2007) (In the same volume)	Classic Maya, Western Roman Empire, Northern Mesopotamia
Butzer and Endfield (2012) (and others)	Akkadian Empire, Axum, Cyprus, Greco-Roman Fayum, Iceland, Greenland Norse, Islamic Mesopotamia, Old/New Kingdom Egypt, Norse Greenland, Classic Maya,

Source: Tainter, J. A. (1988). *The Collapse of Complex Societies.* Cambridge: Cambridge University Press; Yoffee, N. and Cowgill, G. L. (eds.). (1988). *The Collapse of Ancient States and Civilizations.* Tucson: Arizona University Press; Weiss, H. and Bradley, R. S. (2001). 'What drives societal collapse?' *Science* 291: 609–610; Diamond, J. (2005). *Collapse: How Societies Choose to Fail or Succeed.* London: Penguin; Redman, C. L. et al. (2007). 'Group report: Millenial perspectives on the dynamic interaction of climate, people, and resources.' In Costanza, R., Graumlich, L. J., and Steffen, W. (eds.). *Sustainability or Collapse? An Integrated History and Future of People on Earth.* Cambridge: Dahlem University Press and Massachusetts Institute of Technology, pp. 115–148; Costanza, R., Graumlich, L. J., and Steffen, W. (eds.). (2007). *Sustainability or Collapse? An Integrated History and Future of People on Earth.* Cambridge: Dahlem University Press and Massachusetts Institute of Technology; Schwartz, G. M. and Nichols, J. J. (eds.). (2006). *After Collapse: The Regeneration of Complex Societies.* Tucson: University of Arizona Press; Butzer, K. W. and Endfield, G. H. (2012). 'Critical perspectives on historical collapse.' *Proceedings of the National Academy of Science* 109(10): 3628–3631 - see also other articles in *PNAS* 109(10)).

It seems clear from the list that these are not all identical types of unit, but they are each supposed to have experienced some kind of collapse – the Western Roman and Akkadian Empires ended; the Easter Islanders descended into famine, violence, and chaos, losing their high culture; the Maya abandoned their pyramids and cities; and the palaces of Late Bronze Age Greece and Crete were burned and deserted. But are they really comparable, as some claim? To me they often seem to be very different, and so grouping them together, and even assigning the same causes to their collapses, as some wish to do, seems problematic. Imperial collapse – the fragmentation of a single unit into multiple units, seems different from a sudden depopulation, or to collapses that are said to happen across entire culture zones, which involve widespread desertion. An empire is a clear political unit, but a culture zone is not, even if states or units with a culture zone sometimes build bigger states (or empires) within it, as happened among the Classic Maya, Mesopotamians, and perhaps others.

Taking a cue from Arthur Demarest, I think we can divide up the units into five kinds, in a fairly arbitrary and approximate scheme, which may nevertheless help us to see things in a clearer light, and perhaps to understand problems in previous approaches to collapse where many examples are seen as straightforwardly comparable – an approach which helps generate definitions of collapse that are then necessarily very broad, and not necessarily very satisfying (Table 1.2). Any comparative account should surely pay attention to the nature and comparability of the units under investigation.

1. Individual Communities

Individual communities might include examples such as medieval British villages, or the two small medieval Norse communities in Greenland, as well as 'mysterious' disappearing colonies like the English settlement of Roanoke in North Carolina.[50] The latter two were not really self-sufficient or sustainable 'societies' in themselves, rather they were precarious and vulnerable outposts of established societies, which shared in an on-going parent culture. It can be noted that the constant and normal ebb and flow of British villages did not bring about, and does not represent, any widespread 'British' collapse.

TABLE 1.2 *Five units implicated in collapse*

1. Individual communities
2. Political units – empires, states, dynasties, chiefdoms, etc.
3. Cultural units, civilisations, ideologies, lifestyles ('archaeological cultures'? – Natufian types?)
4. Systems, including 'world-systems'
5. Populations, peoples

2. Political Units

By political units, I generally mean the kind of units that Tainter cal societies. Collapse is frequently associated with empires in which particular state or group come to dominate other people and group over a wider area. Empires are not simply nations but are processe that stitched together peoples and places often by force, setting i train numerous changes at home and in their provinces – recall th Roman poet Horace's famous claim that 'captive Greece took he savage victor captive, and brought the arts to rustic Latium' (*Epistl* 2.1.156).

Non-imperial (or not clearly imperial) states or 'kingdoms' als collapse (although a state can be considered as made up from smalle units, and is thus 'imperial' in a sense). Teotihuacan would be a example of this, but so would the Late Bronze Age Greek state such as the Pylos polity. Greek palace states seem to have been buil up from smaller units, pieced together presumably through diplo macy and violence – in which we might always find those people an groups resistant to state building groups. Some Classic Maya ruler too welded together bigger units from smaller independent ones gaining influence over other centres and over wider areas. Ever Egypt, often seen as a unified upper and lower state (pharaohs wor the double crown representing unity), could decompose into smalle constituent parts.

Another area that can cause confusion is the notion of dynasties In the history of some areas, such as China, Egypt, and Mesopotamia it is customary to speak of dynasties. A dynasty is commonly though of as a ruling family, or house, but the term 'dynast' really just mean a powerful person (think of 'dynamo'). Historically speaking, dynast is also a term used where we should really think of distinct politica

entities that were independent, rivalrous, and that effectively created new states or empires in competition with others. China from the Bronze Age Shang to the early modern Qing was really many different entities in the same way that the Ur III dynasty of Mesopotamia was different from the Akkadian Empire. Progressivists might think of the later states as 'evolved' from, or more developed versions of, the former, and of course there are connections, often deliberately made, between the later and earlier states. Nevertheless, it may be more helpful to remember that they were in some senses different entities and not simply earlier and later iterations of the same thing.

The Shang, for example, were only one 'dynasty' of ancient China, and the term Shang also refers to bits of material culture (bronzes in particular), a cultural complex, and even a people, their phase usually divided into three and based at perhaps successive sites including Erlitou, Erligang, and with the better known Late Shang at Anyang.[51] They were not alone in the area we know now as China – there were other polities with their own dynasties. Much later, the Qing dynasty in China, who originated among the northern Jurchen people, took around a century to incorporate its eventual territory into a single state.[52] Between Shang and Qing, during the Qin dynasty/state (221–210 BC), there developed concepts of unity in China, including the idea of *Zhongguo,* the 'Central Kingdom', of *tianming,* 'mandate of heaven', and *tianxia,* 'all under heaven', which could be adopted as principles of interaction, as ideologies, by subsequent diverse actors and ethnic groups, and the idea of a common cultural core was codified, preserved, and studied in literature.[53] Such notions of unity developed in Egypt and Mesopotamia too, to varying degrees – though it was stronger in Egypt.

3. Cultural Units and Lifestyles

Here we have to be careful as we enter the realm of type three, for type three units are not really solid political structures at all, rather they constitute nebulous categories that employ materials or other cultural features as the parameters of a definable unit. So although people have talked (and some still do) about Maya or Mycenaean Empires, neither the Maya nor LBA Greeks formed a single political society; they were connected, yes, and shared elements of material

culture that allow us to consider them, in archaeological terms as 'a culture' (which in archaeology never necessarily indicates 'a people'). But their inhabitants may never have shared a common ethnic identity, even if they spoke the same language, and likely they considered their identity in more local terms (as did the citizens of classical Greek city-states – and those Greeks did also eventually share a notion of common ethnic identity). Like Mesopotamia or ancient China, independent cities grew up together, converging to some extent through a process of mutual development and contact known to archaeologists as 'peer polity interaction'.[54] Colin Renfrew explains that this:

> ... designates the full range of interchanges taking place (including imitation and emulation, competition, warfare, and the exchange of materials, goods and of information) between autonomous (i.e., self-governing and in that sense politically independent) socio-political units which are situated beside or close to each other within a single geographical region, or in some cases more widely.[55]

What about civilisations? It is also common enough to find reference to Maya, Mycenaean, or Roman civilisations, and, like culture (or the culture of a particular people), for which it is sometimes a synonym, it can tend to imply a unity that, while real enough in some ways, can also distort our view of complex and diverse cultures. Although there may sometimes be a close fit between what we term a civilisation and a political unit – ancient Egypt, for example – this is not always the case. The many independent groups of Maya, spread across their landscape, shared sufficient aspects of culture, which we deem complex and sophisticated enough for us to see them as a 'civilisation' distinct from others. But cultures and civilisations in these terms seem to be difficult to consider as collapsible units in the same sense as a structured human society – though they are certainly prone to change and transformation and can be affected by the collapse of political units within them, which drive particular aspects of material culture (say literacy or monumental architecture, for example).

Here we should recall the difference between states, societies, and civilisations. It seems clear enough that collapse is something that can best fit political units, human social groups of whatever scale and complexity, but that culture and civilisation are different – the

are certainly capable of transformation that may sometimes be connected to collapse (and to state formation and increasing or decreasing complexity).

I mention lifestyles, which may seem an odd term to find here, because one of the key ideas underlying most ideas about collapse is that life and/or society gets worse, and becomes difficult or intolerable. This idea of things getting worse is inextricably linked with ideas of decline, and wherever literary texts touch on this subject, we have to consider the possible gaps between rhetoric and reality – discourses of decline are often found alongside what others categorise as growth, improvement, and progress. Young and Leemans include this 'discomfort' in their definition of collapse, with its implication that a previous way of life cannot be maintained even if it were desired; and this is perhaps in the forefront of our popular images of collapse as a forced and probably difficult or unpleasant change.

One example of this idea might be the Ik people of northeast Uganda, discussed by Tainter as a case of collapse. He based his discussion on anthropologist Colin Turnbull's dramatic and (in)famous 1972 account *The Mountain People*.[56] Elements of the Ik's seemingly extremely selfish and individualistic lifestyle and behaviour, such as allowing immature or elderly relatives to starve to death, shocked Turnbull; these aspects were built upon and discussed by scholars and playwrights, and attracted the attention of the reading public around the world.[57] The Ik appeared almost to be an anti-society, and to represent what could happen when a people were driven to extremes in order to survive, something along the lines of the boys' descent into savagery in William Golding's *Lord of the Flies*.

It has seemed to many that the Ik represented a classic collapsed society, one with potential to represent the future of humanity. However, this 'apocalyptic' and 'post-apocalyptic' situation came about not because of natural environmental factors, despite the fact that the Ik were affected by a two-year drought at the time of Turnbull's visit, but because they had been barred from their traditional hunting grounds and forced to change their lifestyle, and this left them much more vulnerable to the effects of any drought. Much about Turnbull's presentation of the Ik has been criticised, but the image of a spiral into savagery remains a popular image of collapse – one that now tends to be associated with Easter Island, amongst

other examples.[58] The Ik collapse – it seems to fit in with some of our definitions – was an unintended outcome of the changing laws of a modern nation.

4. Systems

Culture zones, as well as political, social, and economic ones, are really interconnected systems.[59] A system is a network of some kind, and for places that form part of a system their maintenance (in some form) may become dependent on the survival of the whole or part of that system or its functions. Historians and archaeologists sometimes refer to 'world-systems', because these systems can be regarded as 'worlds' in themselves.[60] As such, different cultures (or 'civilisations') can be regarded as parts of a system, as well as systems in their own right. The eastern Mediterranean at the end of the Late Bronze Age is an example of such a system, in which states from Greece to Egypt and beyond interacted with each other, with transfer of goods and materials as well as ideas and people.[61]

Systems can break down (i.e., stop functioning in the same way) in a number of ways and for many reasons, and this can affect the ability of other parts of the system to function or continue in the same form. We know this from our experience in the modern 'globalised' world. For example, if there is no longer a demand for goods from place B in place A, an economic specialism in place B may become redundant, damaging its order. If place B's ruler is dependent on a particular return from place A in order to maintain his position at home, such a change in place A may cause collapse in place B. Systems collapse is, to some extent, a useful way of thinking about collapse, however, it can be difficult to assess the levels of interdependency in world-systems. In the end, we must consider how any change in the system was responded to by a given part of it and whether and why collapse may have followed.

5. Populations

Finally, collapse is an idea that is often applied to populations and peoples, where it means a drastic and sudden reduction to very low levels, with consequent social and political effects. This usage is very familiar from ecology – well known now through collapsing

honeybee populations in colony collapse disorder, as mentioned earlier, but also from the study of population – demography – and from common usage.[62] Recently, for example, Steven Gray in *Time* magazine explained that 'The news this week that Detroit's population plunged more than 25 per cent to just 714,000 in the last decade shouldn't be surprising. The city's collapse is as well-documented as it is astonishing – the population peaked at nearly 2 million in the 1950s, driven in part by a post–World War II auto industry boom now long gone.'[63] But clearly the population of Detroit has not simply disappeared or been wiped out in any apocalypse, rather people have moved in accordance with their ability to make a living and their perceptions of opportunity. Should we expect anything different from past populations?

Although some anthropologists and archaeologists do focus on population-based or palaeodemographic issues – as in a recent volume edited by Patrick Kirch and Jean-Louis Rallu entitled *The Growth and Collapse of Pacific Island Societies*, for example[64] – it can be very confusing when collapse is used generally with the implication that it is primarily a matter of a catastrophic decline in population, as it may be in ecology. Even though conquests and political collapses can result in reductions in overall population in the longer term, and in the redistribution of people in a landscape – away from former capitals or central places – as well as changes in the visibility of people due to changing material habits, these are often effects of collapse or go hand in hand with it as a process. It may look like people are disappearing – but people then, just as now, were mobile and responded to what was happening around them. Population number and distribution can change without being a collapse or causing one.

Colonisation, on the other hand, has very clearly led to episodes of demographic collapse and consequent social collapse. For example, with a population of over three million Taino in 1492 when Colombus arrived at Hispaniola (now Haiti and the Dominican Republic), the population of the island soon crashed to a tiny fraction of that number within a few decades – the indigenous cultures, political organisation, and language largely disappearing too.[65]

There are many features of collapse that can result in population redistribution and decline – warfare uses up people, can reduce the number of elite people (which would affect the make-up, the material culture, and functioning of society), spreads disease, and can make it impossible

for life to carry on as normal, disrupting agriculture and trade. Defeats and failures in state organisations, or accidental disruptions, can also lead to failure to maintain established agricultural or other systems that contribute to the corporate system – both those that underpin an elite, or elite support of the system, or those that contribute to subsistence in general; without these, there can be famine or a failure of confidence in the status quo. Ideological change too can lead to people moving out from formerly important centres. Populations may, over time, spread out and shrink to fit the resources available, or respond in other ways, such as seeking to expand and commandeer resources elsewhere.

We sometimes have the situation where population collapse and other types of collapse can appear to be the same or be similar, and this can lead to further conflation of two distinct processes. Consider the contrast between the depopulation of Detroit, which we know to be due to economic changes, and the fourteenth-century Black Death in Europe, in which disease killed perhaps half the population of Europe. Both are visible demographic changes. But although to an archaeologist the evidence of abandonment, and limited use of sites, may look the same, the reasons for change in each case are very different. Population change can be both a cause and consequence of other forms of collapse and social change, but demographic collapse or decline, even if it happens suddenly, need not cause political or social collapse.

WHY DOES COLLAPSE HAPPEN?

There are, of course, a host of explanations that people have put forward to explain collapse, and these will be discussed in the context of the case studies throughout the book. But we can look broadly at some ideas before we start.

Tainter explains collapse by referring to an economic theory, that of declining marginal returns.[66] In this theory, when the quantity of a particular variable is increased, 'output' initially rises rapidly, but then slows and eventually may decrease.[67] He expresses this in four moves: (1) Human societies are problem-solving organisations, (2) socio-political systems require energy for their maintenance, (3) increased complexity carries with it increased cost per capita, and (4) investment in socio-political complexity as a problem-solving response often reaches a point of declining marginal returns.

In other words, societies can initially do well by becoming more complex; adapting to circumstances increases their complexity, which allows them to cope. But societies constantly face challenges, and so by constantly adapting and becoming more complex, they can eventually become over-complex, no longer delivering any benefit, at which point they collapse into more simple systems. What is interesting in this view is that collapse is itself an adaptation – the simpler societies that arise out of collapse are better adapted, and they may themselves start along the path of increasing complexity, suggesting a cyclical process of collapse and regeneration (on some level). However, this explanation still requires a cause – what problems was a given society facing that tipped it over into collapse?

Nowadays, many people associate past collapses with the environment. Indeed, the volume mentioned earlier, *Sustainability or Collapse? An Integrated History and Future of People on Earth*, based on the results of a Dahlem workshop that involved archaeologists, historians, and sustainability experts, focussed on climate change, environmental damage, and collapse, looking at what might have happened to past societies and the threats and dangers faced by contemporary societies.[68] These studies build on old ideas. Almost a century ago, in 1917, Ellsworth Huntington proposed that climate change had undermined the agricultural base of the Roman Empire.[69] Huntington, pioneering scientific methods still used today, used data based on tree ring records as proxies for climatic conditions and changes. More recently, in 2001, Harvey Weiss and Raymond Bradley published a famous and influential paper in the journal *Science*, where they argued that many ancient collapses were probably caused by climate change.[70] This view has recently been reasserted by Michael Marshall in his 2012 article in the *New Scientist*.[71] This environmental approach to collapse is common, indeed it seems dominant, and this is no surprise given our own contemporary environmental concerns.[72]

However, many, though not all, archaeologists remain sceptical about climate change explanations of collapse – certainly when they are applied as single cause theories.[73] This is not because archaeologists are ignorant of these theories (indeed, some have pioneered them), or because they have closed minds, or are unwilling to consider different kinds of evidence, but simply because they view collapse as a human story, one that is much more complex than the

equation 'climate changes = societies collapse'. Climate change, when it happens (as with earthquakes), can also have very different effects in different, even proximate, locations.

Another problem often pointed out is that it can be very hard to tie down climate changes with any chronological precision, therefore it is difficult to associate them securely with political and societal changes. In this vein, there has been a tendency among supporters of climate change explanations to see correlation as causation – that is, when evidence indicating possible climate change seems to coincide with collapse, it is assumed to have been a causal factor in that collapse. Despite doubts about climate change-based explanations, no archaeologist would deny that agriculture-based societies – all pre-industrial societies – would have been vulnerable to bad years – too much or too little rain, excess cold and frost, and so on, that would potentially cause social disasters and destabilise societies. Even so, complex societies are often geared to offset such problems, for example, by relying on polyculture rather than monoculture, which would reduce the chance of total crop failure, by storing produce as an insurance, and by arranging for imports of food. Often, there is also ambiguity over whether climate changes were sudden shocks (i.e., events that happened at a point in time) or less dramatic shifts over time (the average for a period differs from earlier and later periods' averages) – the former would clearly be harder to cope with.

Readers of environmental histories, such as Clive Ponting's *A Green History of the World*, originally published in 1991, will be familiar with the notion that ancient societies cause their own collapse by destroying their own supporting environments, perhaps by deforestation or over-intensive farming, or a combination of 'ecocidal' behaviour.[74] This has been a theme of Jared Diamond's work too, not only in *Collapse*, but also in his book *The Third Chimpanzee* (1992), and in a 1994 paper entitled 'Ecological collapse of past civilizations'.[75] He advanced the idea that 'self-destructive abuse of our environment, far from being a modern invention, has long been a prime mover of human history'.[76] Others, such as Sing Chew, have focussed on this, advancing the idea of cycles of societal development, environmental degradation, collapse, and environmental recovery.[77] This line of thinking is found in archaeology too – American archaeologist Charles Redman's book *Human Impact*