A Historical Social Science of Modernity's Climate Catastrophe

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We are Earth's Rogue Species

By

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Cambridge
Scholars
Publishing

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This book first published 2025

Cambridge Scholars Publishing

Lady Stephenson Library, Newcastle upon Tyne, NE6 2PA, UK

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

ISBN: 978-1-0364-4472-3
ISBN (Ebook): 978-1-0364-4473-0

For Enid,

my anchor in an ever-changing world

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PREFACE

I am confident in saying that this book is unlike any other you will have read. It is on a well-rehearsed topic - human-made climate change – that features regularly in our news feeds. This is a very important subject with massively serious implications for us all. So, the challenge is to write an informative book that is engaging whilst simultaneously respecting the dire implications of what is unfolding globally. My position is that the situation has gone beyond devising this policy or that, rather this subject matter becomes wholly global and political – we really are **all** in this **together**. Thus, collectively, we need to think anew in myriad different ways to find a politics up to the job of engaging critically with a rapidly changing climate worldwide.

My purpose is to inject alternative critical thinking into a subject with which we are all familiar because we are experiencing it. And yet most of us seem not to know what to do beyond 'don't panic'. I really can't help on that score. But I do offer an accessible text intended to get you rethinking. I provide a narrative of a possible historical journey before, through and after the climate catastrophe. Yes, that's right 'after' – I devise a possible human future derived from past and present happenings.

My purpose is to stimulate discussion and debate amongst students within and without their study courses – the book has critical academic roots. They can deploy it to challenge their teachers and professors. Hopefully, there can be an overflow to a concerned public – the book has radical political roots. It can be used in green political debates. The key input on offer is a thoroughly unorthodox approach to this most important of subjects. For instance, I am sure this book is the only substantial text dealing with contemporary climate change that does not mention the word that starts with 'car' and ends with 'bon'. However, there follows quite a lot of discussion about us humans being thoroughly modern, a condition in which we usually feel superior to earlier generations of humans. I offer an historical social science analysis in which it is modernity that is definitively placed in the dock.

This book has had a long gestation, and I must acknowledge and thank the many friends and colleagues who have read this text at various stages of its protracted development and have provided necessary encouragement.

FOREWORD

As my book's title indicates, current human behaviour marks *homo sapiens* out as the Earth's 'Rogue Species'. There are many rogue species across the world; they are typically invasive species that have disrupted the ecology of a local environment that they have recently entered. By disturbing the equilibrium of their host community, they interrupt its development and thereby threaten its existence. Through their current activities humans have invaded all environments across the world. For instance, human-made plastics are to be found in ecologies everywhere on Earth, both on land and in the sea. It is this pervasive presence that confirms humans as the whole Earth's Rogue Species

Humans are just one of innumerable species that populate the Earth. We stand out from the crowd because we are relatively large animals that have been astoundingly successful at the fundamental task of reproducing, sustaining, and thereby growing our population. But this has become a success too far. All the human sustaining - of our bodies, families, communities, nations, indeed all humanity - is turning into a global ecological disaster. From the perspective of Nature as a whole, humans are simply out of control. We are rampaging through the ecological foundations of our planet and the prognosis is not good. Put bluntly, we have become a real threat to all life on Earth. This is most clearly expressed in human-induced climate change. The Earth's climate has always been subject to change due to various natural causes but, uniquely and recently, global warming is a result of our species behaviour.

Admitting we are The Rogue Species is a minimal starting point for understanding our existential predicament. Despite the enormity of the situation, I have chosen to designate human behaviour as rogue rather than use a stronger term of censure such as exterminator species. This is because there is lack of direct intent: it has never been the overall purpose of humans to be the destroyer of our world. To be sure humans have historically had many psychopathic leaders, but most people just get on living their lives as best they can with minimal animosity towards other humans and other life. Collectively, we seem to fit the image of the 'loveable rogue' – bad but not all bad, possibly redeemable. The climate emergency is basically an unintended side effect of all our everyday consumptions. This is not good

news because it is very difficult for us all to change our ways even though we know the dire consequences. In other words, we are caught in a spiral of mass roguish behaviours: not always overtly bad, but there are millions of ordinary people living their individual decent lives whilst incidentally trashing the planet. One basic aim of this book is to help understand how we got ourselves into this extraordinary tragic situation.

Our role as the Rogue Species of Earth ecology has been developed and sustained in two self-defeating ways: we have created a particular economics – gross mass consumption – that threatens enormous ecological and climate changes, and a particular politics – toxic identity clashes – that thwarts us from coming together to combat the threat by correcting our ways. Both characteristics have been simultaneously positive and negative: the consumption economics has provided many people with better lives whilst the identity politics has righted many real injustices. However, between them they happen also to threaten the continuation of all life on Earth. It is estimated that we will need 3 or 4 additional 'Earths' (i.e. resources) to continue on our economic path, whilst our political future is equally problematic. Identity politics thrive at many distinct levels – from international conflicts to inter-personal disputes – but they all have similar modes of operation. The common way identity politics work is through people with superiority complexes stoking the grievances and fears of followers with inferiority complexes. Whether religious differences, national rivalries, gender wars, sexuality variances, and so on and on and on, the production of so many targeted hatreds, promoted by compliant and complicit media, is surely a human indulgence too far. The key question becomes: how might a climate-generated global crisis lead to a very different economics of consumption regulated by a politics that transcends multiple human identities?

The position I argue is straightforward: severe climate change will inevitably put pay to the dynamic economics when continual expansion of mass consumption hits the buffers of the Earth's declining sustainable capacity. And this economic collapse will have severe political consequences, initially stoking the worst of identity politics in brutal quarrels over access to declining consumptions, before an escalating mixing of peoples generates an overwhelming collective need for working together to achieve survival. Seemingly so unlikely today, how might this pan out?

We cannot know the future, but we can harness what we do know about the past and present to make credible scenarios of what could be waiting in store

for us. First the good news: we are not inherently 'rogue'. Humans as Earth's Rogue Species has a history. It is a fact that for nearly all of *homo sapiens*' existence – something like 200,000 to 300,000 years - we have not had the power to destroy all life on Earth. This ghastly capability is not our natural being, it is a relatively recent acquired attribute. Early in this century the renowned environmental scientist William Ruddiman confirmed this: he identified a fundamental shift in what causes worldwide climate to change. His research showed that there has been a move from 'nature in control' to 'humans in control' only in the last few thousand years.

There is an important corollary of Ruddiman overtly identifying that it is now 'humans in control'. Put simply, understanding recent climate change becomes primarily a matter of social science through studying its human causes, to be supported by natural scientists measuring and predicting the resulting physical effects. Curiously, this critical deduction of finding an order of purpose appears not to be widely understood or accepted. The bottom line is that current climate change is an immense complex process that is not soluble by technology fixes, even those based upon the most advanced natural scientific knowledge. There are 'Tech solutions' to all manner of problems but anthropogenic climate change is not one of them. Self-evidently, it requires understanding the perpetrators, we humans, and how we live our lives.

According to the natural scientists monitoring climate change, 2023 and 2024 are the Earth's warmest years ever recorded by a very wide margin. They are probably the hottest two years ever experienced by humans. From a climate perspective this appears to be the unfolding of a human scorched Earth agenda. From an ecology perspective, the Earth is simply not big enough to sustain current use of our planet for today's unprecedented levels of consuming and discarding. All this is the doings of humans and as a largely publicly funded enterprise, social science in its many guises should be at the forefront of working out how we might change this dire situation: we need to know how 'humans in control' can become part of a healthy world ecology. But this is not happening. There is a climate emergency but there is no matching emergency social science response. Will future generations look back at our current endeavours and dub us 'Lemming-ist social science'?

Social science is divided into multiple specialist areas of research – 'disciplines' - each of which is pertinent to understanding how we have got into this perverse state of danger. But 'discipline' means what it says –

discipling generates inward-looking bodies of knowledge with the climate change threat not always ignored, but it is largely left outside the core concerns of each subject silo. Thus social scientists seem to be content to leave the vast majority of research on understanding the climate emergency to the natural scientists. What to do? First, recognise that we are living through truly exceptional times. Second, focus our disciplined social knowledges much more on the human causes of global climate changes. Every subdivision of social science, all research specialisms, add to our knowledge of humanity and therefore they can make a contribution to understanding anthropogenic climate change. There are myriad known ways of changing human behaviours and social organizations so that humans can nurture rather than threaten world ecology. My specific social science discipline is human geography, but I have long since broadened my researches into historical social science. Fortunately, this has enabled me to extend my research silo so that it works specifically well as a means to broadly understand myriad ways in which humans are changing climate worldwide, past, present and, possibly, in the future.

But such intent alone is not adequate: quite obviously, humans changing Earth's climate is not just another topic to be added to social science syllabuses. The real elemental importance of this subject cannot be avoided. One obvious feature shouts out at us: current changes in climate are simultaneously an individual and collective responsibility. The personal and political are dangerously interwoven. Accepting Ruddiman's 'humans in control' of climate change demands a different overall take, not just on the content of social science, but importantly how social science should deal with this subject. Put simply, this cannot be academic writing as per usual. In my case this book is not some additional historical social science copy drawing on my personal expertise. Rather I explore how we might develop different kinds of knowledge for understanding a social catastrophe at a scale never previously experienced by humans. Hence fresh thought-provoking writing is the name of the game: I experiment with unorthodox ways of composing a historical narrative. I offer a specially crafted historical social science text customized for contemplating a future very different from our pasts and present.

My subject is, of course, truly huge. To bring the argument down to a manageable size I focus on two key themes of critical concern: (i) how climate change might pan out globally and (ii) how will humans respond to the resulting changes to world geography. In discussing the former theme, I show how humans might survive, but only just, in the only remaining

habitable regions as Polar communities, north and south. In discussing the second theme, the failure of humans to respond better to the climate catastrophe is linked to the widespread practice of identity politics, awash with fractious divisions of 'us and them' that negate any serious politics of climate. I argue that human survival depends on an empathy revolution recognising that 'we are all in this together'. My treatment of both themes will annoy a lot of people. I make no apology: we really do need shaking out of our comfortable complacency. The hallmark of this book is in its sheer unorthodoxy.

My text is a mix of non-fiction, fiction and prediction. In telling this human story I identify racism as the most widespread, enduring, and vicious of all identity politics. It commonly intersects with other identity differences to create double-based discriminations. Importantly, it is at the heart of development of our modern world that was built upon a presumed hierarchy of races. People are treated differently - some bad, some good - based simply on the colour of their skin. Originating in the Atlantic slave trade of black Africans to the Americas by and for white Europeans, racism evolved into a global classification of peoples across the world through grading them by skin pigmentation, specifically their degrees of 'un-whiteness'. In my retelling of the rise of our modern unsustainable economics and hopeless conflict politics I reverse the global racial hierarchy. Thus, I highlight the toxicity of deep-rooted racisms in both creating and addressing global climate change: racism is used as representative of all the other hate politics that set human against human. My approach requires a resequencing of History and turning Geography upside down.

There are three intentional errors in the following text: I have misplaced two continents and lost a century. What exactly do these manoeuvres entail? First, I have changed History by pushing back the 'discovery' of America a century to 1392. This gives me a hundred years to play with. Thus, it's now 2025 and catastrophic climate change has already happened: I am writing as a survivor living in the Arctic. Second, I have turned Geography upside down twice: it is West Africans who colonise the Americas to initiate the process that eventually creates a world superpower in the Americas, namely a continental-wide Amazonian state. In the process, white slaves are sourced from Europe, and it is this continent which becomes depopulated and severely 'under-developed', while North America remains a backwater, largely irrelevant in world affairs. Changing the History and Geography of humans is my way of confronting deep-rooted noxious perceptions of our real world.

And you readers have two parts to play in my stratagem: there is the present you in today's real 2025 and a future you in my fictional 2025. Starting with the 'future you', I need you to try and imagine being among the final population of survivors of the great climate catastrophe. Inevitably your mindset would not be the same as the way you currently think about yourself in today's world. Differences between people would still be important – diversity is necessary for the vibrancy of society – but the overriding sentiment would be one of human solidarity attached to a profound curiosity of how we ever got ourselves into a position of nearly destroying all life on Earth. Thus, I am with you: I write through a 'survivor's voice', which is a broad, inclusive, human voice, to construct my text below. After enduring decades of severe climate disruptions creating enormous mass migrations generating severe rivalries and myriad conflicts, people will ultimately move to a collective consensus – yes, we really are all in this together - as a basic rational reaction of survivors. To state this mindset more fully: we human beings are all part of this one and only world, living together, along with the rest of Nature. No longer being the Rogue Species, I conclude by finding mass empathy to be the defining characteristic of surviving humans on Earth.

Returning to the present, we are a long way from my future prediction. This will likely be exposed in your thinking about my overt departures from factual reality. A new narrative is created: I tell a story that broadly describes what did happen, just not when and where it occurred. This is intentionally provocative: I want the 'present you' to question their own first reaction. Is there a natural presumption that my new story could never really have happened? So, beware ideas tinged with tacit racism and crude environmental determinism (wrong people, wrong climate). The key point is that History is always contingent not predetermined. Why the modern world was activated in Western Europe is an immensely complex question that I do not cover in this text. But amongst the various credible contingencies that have been advanced, they will not include the advantages of having the specific skin pigmentation typical of Europeans. If your 'present you' initially flirted with determinist ideas, my text will help you think through the implications. We are a single species, all humans are humans.

As well as being provocative, my unorthodox approach also aspires to bring a little light relief into discussion of what is obviously a very forbidding subject. My new text may be used as a personal quiz. The narrative incorporates many puzzles to ponder: sometimes real people and institutions

appear, other times there are wholly made-up people and institutions, and very often fictional people and places are based upon real people and places! The latter, detecting my alternates of real people, real countries and real cities, is particularly challenging. A check list of these people, countries and cities is provided at the end of the narrative to translate the invented into the real. Hence, as well as probing readers' current political thinking, I have a further purpose to provide a little entertainment to help me, and hopefully readers, cope with the anxiety challenge we all face when thinking about the reality of human-induced climate change.

So, let's get going and reflect on the travails of our past, the challenges of our present, and hopes for a future of our species. My text begins with surviving humans living in a recently stabilised new environment. I report an urgent communication between the two leading cities in the world - Longyearbyen in the Arctic and McMurdo in the Antarctic.

HELLO, MCMURDO CITY

We are delighted to present you with a draft copy of our opening contribution to the proposed survivors' document: "A Warning to Future Life on Earth and Other Life in the Universe", generally known as the Warning Report. Written in Longyearbyen City, this text initiates the contract recently agreed by our two city communities. As the only functioning world cities on Earth - the urban centres of the northern and southern communities of migrant survivors from the recent immense climate changes - we have taken on the responsibility of charting the dual polar futures of humanity.

Quick reprise: the Agreement takes the form of a division of labour with Longyearbyen people focussing on human lessons to be drawn from our current predicament and McMurdo people providing scientific understandings of the catastrophe and its aftermath. To begin the joint endeavour, it has been decided to produce two very basic statements that lay out the overall parameters of the Warning Report, first a story of social change and second a register of environmental change. Underpinning the whole Warning Report, this first statement from Longyearbyen is an important test of our collaboration.

We are very lucky that we can take advantage of one of the few surviving human infrastructures: undersea cables. Although there are no longer any direct physical connections between our two cities - all satellite infrastructure collapsed long ago - but because electronic connections have survived through the resilience of innumerable marine cables laid in the century before the climate catastrophe we can look forward as one viable society on Earth. These provide the inter-polar communication that makes our ambitious project possible. The ultimate aim is for the Warning Report to integrate our respective social and scientific studies so as to comprehensively understand how and why we so nearly lost our planet. This first instalment from Longyearbyen sets out the historical background of how one of Earth's species, humans, developed their social behaviour in such a way as to endanger all life on Earth. This is the story of a grievous ecological abnormality called 'civilization'. With the working title "The Making and Unmaking of Catastrophic Progress", we focus our account on

the modern period, starting from the ill-fated year of 1392 when human activities began their path towards a single global society. Modern living was built upon an insatiable addiction to a process, ironically thought to be ‘progress’, whereby human impact on the Earth’s environment increased exponentially. A tragic story so very difficult to contemplate given our current situation, there are limited archival sources for reference so please excuse, and correct, any errors.

In accordance with the two-city agreement, this text is written in an English language; often patronised as ‘quaint’, it is a minor tongue from what had been a little-known people living in the Northeast Atlantic archipelago. The chief writer of this report was brought up speaking this language and has volunteered to write the first working draft while drawing on other linguistic sources of the limited historical writings available. This use of English is intended to act as a neutral conduit, a replacement medium for all the major human languages each of which are now implicated in stoking the calamitous human era of incessant conflict that led to the great social breakdown in the last century. It was a grave misfortune for humanity that the challenge of dealing with climate change coincided with a particularly venomous political era that focused on highlighting multiple differences between humans. All manner of personal and group distinctions were harnessed in a bewildering array of identity politics - literally anti-humanity through numerous politics promoting hatred of fellow human beings. Banishing these deadly blame games is the first rule of the Warning Report agreement: it was only in the later years of the climate catastrophe when humans eventually came to realise that ‘we are all in this together’.

But there is a small downside in our linguistic choice: using English, a language mostly known as an early slave speech, may create some cognition difficulties in both city communities. However, this is considered a relatively small price to pay for keeping in step with the final human reconciliation of the last decades, which led directly to the agreement on our grand project to produce the Warning Report. All places in our document are denoted by their English name at the time of their abandonment. It is hoped that this draft of the first part of our joint project using English syntax, names and times can create a narrative that faithfully reflects the new survivalist spirit of human unity in our now constricted world.

Finally, the fact that Longyearbyen’s first contribution is an exercise in writing ‘world history’, albeit reworked to focus on environmental changes, still requires justification for obvious reasons. Not surprisingly, creating

'world histories' - once a very popular genre of history - has not so much gone out of fashion, such texts have been effectively banished. Their typical narrative framed as a triumphalist sense of 'progress' has come to be viewed as more than simply ludicrous: a mix of human vanity and gullibility that elicited both rage and anguish before its literary extinction. Why revive this reviled genre? Obviously, as fellow survivors we understand and respect this attitude and have approached our writing assignment with much trepidation. But there really is no other way of beginning the Warning Report, hence our geohistorical contribution. The spirit of the whole project is to be totally honest about our awful predicament and this must include how we got to where we are today, no matter the shame we feel as humans for what we have done. As a species we are our collective history. And today, more than ever, we must learn from our past failings no matter how grotesque.

We at Longyearbyen greatly value our continuing connections and cooperation with our fellow human beings at McMurdo and know that this feeling is mutual. We look forward to both reading your comments on this first document of our grand joint project and to receiving your draft text of the second document due in June.

Longyearbyen Report Group
January 1st, 2025

Addendum

For continuing reference, here is the statement of purpose and method in the inter-city Agreement that guides our two opening contributions to the Warning Document.

1. *The texts should be written in a non-technical language to enable a wide readership, which is essential for its input to our ongoing survivor politics.*

2. *For the same reason, the texts should be succinct, readable in just one or two reading sessions.*

3. *At the same time, the texts should be as comprehensive of their respective subjects as possible – this is to facilitate their use in grounding curriculum development at a variety of educational levels.*

4. *Although written separately by writing groups in different cities, each text has to be agreed by both parties to the Agreement.*

5. *The matter is urgent; the timetable is for the social change text to be produced first, with the environmental change text six months later, and both reviewed and publicly available by the end of 2025 when we will call a joint meeting of both teams.*

MESSAGE FROM LONGYEARBYEN

WARNING REPORT

SECTION I:
THE MAKING AND UNMAKING OF CATASTROPHIC PROGRESS

Stages to Our Polar Present

Stage One: **The rise of civilizations**

Stage Two: **Modern origins: 1392-1499**
- Africans activating the Atlantic Maritime World
- The lost civilizational shift
- Creating a modern Atlantic world
- Outcome: economics into politics

Stage Three: **Modern triumphant: 1500-1924**
- Commercial union of the two great maritime worlds
- Industrialization creates West Africa's world dominance
- United Valleys of Amazonia produces corporate globalization
- Outcome: a global corporate world

Stage Four: **Modern disaster: 1925-present**
- Testament from the tendentious twenties
- Global pandemonium: a shrinking world of refugees
- Our turn to regeneration
- Outcome: a third type of civilization?

STAGE ONE

THE RISE OF CIVILIZATIONS

The one indisputable fact we know about humans is that they have the capability to destroy all life on Earth, because they nearly did so! This awareness, derived from our recent experiences, is an inversion of past human self-belief as being 'special' in a positive way, as superior to the rest of Nature. In modern society we were the purveyors of progress, supposedly changing the world for the better. Although this way of thinking seems absurd to us today, such human conceit had deep roots, built upon earlier religious teachings where humans were given lordship over all Nature. As 'the chosen species' we were deemed rulers of the Earth's ecology and, as modern humans, we used this power to meet our ever-increasing demands, ultimately causing the climate catastrophe.

Of course, all species are different, that's the nature of being designated a species. For most of our existence humans were hunters and gatherers, sustaining and reproducing their populations not unlike other large mammals. We were probably less environmentally destructive than some, for instance elephants trashing their immediate environment, but our capability for having a greater ecological impact was already apparent. Most commonly humans-as-toolmakers is cited in suggesting we are especially different, because of our problem-solving skills. But numerous other species have been shown to have this ability to solve problems. Rather than focusing on what individuals can do, it is more useful to consider humans collectively, what we do together as a society. And here we find something truly unique to humans.

Other animals rely solely on the resources of their local surroundings, where they are located when they consume. This enables them to reproduce their kind, hunting and/or gathering the food from their immediate environment. Some animals are territorial and have specific local ranges, others are more mobile following the seasons along specific paths of changing patterns of locally available food. The key point about humans is that we have broken free from this closely local limitation on our livelihood. Although largely

dependent on the environment around them for their sustenance, we do know that human hunter-gatherers utilized items from further afield. These included specific stones that could be converted into sharp cutting or scraping tools such as flints and obsidian flakes, and seashells and amber beads were used for personal adornment. These items could only have been sourced from specific places – in particular rock formations or along certain shorelines - and therefore had to have been collected by people from source areas and passed on to peoples living somewhere else. As this develops into regular trading it makes humans dangerously different from all other species because goods are brought from elsewhere for us to consume. Although making up only about 1% of the possessions of human hunter-gatherer groups, nevertheless these non-local items show humans utilising environments outside their local area. This was a first step in developing our capacity to use places away from the home base. But for humans to make a major impact on a wider environment required the development of more complex societies than hunter-gatherer bands. Enter the rise of civilizations.

Civilizations are defined as human societies formed by people living in cities. And the cities derive from intensification of non-local trading: every city depends upon both its local hinterland and having access to additional goods from beyond its hinterland. Thus, it was with the rise of early civilizations that non-local items began to become increasingly important to human development. Growing cities generated unprecedented new levels of consumption so that non-local items, notable metals – copper, iron, tin, gold, silver - formed the basis of large regional trading systems. Humans were trading these vital goods between places to meet their growing multifaceted needs. It is this connectivity between people to satisfy their needs that our modern civilization took to new levels, an economic system based upon mass consuming at a global scale. Modern living totally reversed our ancient forebears consuming 1% non-local with consumption becoming roughly only 1% local in the final years of modern ‘development’. Of course, nostalgia for our gross consuming ways endured. Memories persist: some older migrants from temperate lands can just remember fondly the very non-local fruits of tropical places - bananas, pineapples, and mangoes are still sorely missed. These past commonplace treats no longer exist, their growing environments have been annihilated. As lost fruits, they have become mythical, even mystical, curiously representing a world both missed and abhorred in equal measure.

The overall focus of this report is on catastrophic modernity, the specific form of social organization that has proven to be incredibly self-destructing.

Only about half a millennium old, for nearly all of its existence modern society was immensely self-regarding. It saw itself as essentially dynamic in contrast to past 'traditional' societies forever stuck in their customary ways. But the claim to be uniquely dynamic was to misread the achievements of previous societies, although it is the case that modernity generated social change at an exceptional and accelerating rate. While this incessant growth was self-evidently unsustainable ecologically, it was only relatively recently that the appellation 'catastrophic' has been universally applied. The fact is that modern civilization was catastrophic from its very beginnings, which we trace back to 1392 when the first substantial link between Africa and the lands across the Atlantic was initiated. But to begin to understand the lethal uniqueness of humans, we need to locate this modern world as both a continuity with, and a break from, the previous civilizations that were demeaned as traditional.

The world of humans in the millennia before 1392 was a world of regional civilizations. Each civilization was notable for its cultural distinctiveness – most prominently shown in the different inscriptions of their languages – but they all shared similar economic and political foundations. Basically, these traditional civilizations were large societies where people's sustenance was organised through commercial cities and their security attended to by military empires. However, they produced much more than these two basic needs: they operated as large-scale social laboratories generating new ways of living. In essence civilizations, in their various different ways, invented both means of economic growth and created institutions of political order. Where they were especially successful the outcomes were extraordinary: cities commonly grew to populations over a 100,000, with a few reaching one million; empires extended over hundreds of miles, with a few encompassing thousands of miles. The rise of regional civilizations was palpably a major step change in the ecological impact of humans across the Earth.

Civilizations developed in different regions at different times, the earliest being in Mesopotamia in western Asia over 5,000 years ago. The first thing to note about this civilization is that it was river-based, developing along the twin-rivers of Tigris and Euphrates as they flow down to the Persian Gulf. This association of rivers with civilization was soon to become the norm: roughly the same time as the rise of Mesopotamia the ancient Egyptian civilization developed along the Nile. Other civilizations bestriding great rivers developed in regions around the world: for instance, the Yangtze and Yellow rivers in China, the Mekong in Cambodia, the

Ganges and Indus in India, and the Senegal, Niger, and Congo in West Africa. This common feature of civilizations growing in major river valleys was not a coincidence. Large river basins – the main river and all its tributaries – have been the crucibles of civilization. They provide their societies with two practical advantages: means for enhanced food production and ways for commerce to prosper. In the case of the former, irrigation in valley bottoms and terracing on valley sides totally transformed the river basin ecologies into simpler, often one crop, ecologies. This increased production was necessary for feeding large populations. And of equal importance, rivers also provided crucial trading routes. Movement by water was far easier – quicker and cheaper - than by land and thus rivers provided a ready-made transport infrastructure enabling physical movements between cities and beyond. For instance, metal ores from mountainous hinterlands could be traded down river to cities for making the tools used in local farming.

In Sumer, the most southerly region of Mesopotamia, these very circumstances underpinned the making of Uruk 5000 years ago: the world's first great city, its population has been estimated to be 80,000. A city of this size is a very complex entity – all these people needing to be fed and watered daily as they interact with each other in countless ways, socially, economically, and culturally. And all these contacts were not just a huge random collection of activities; they existed within an overall configuration that ensured the city functioned day-by-day, year-by-year in a secure milieu. One key effect of this large agglomeration of people was to generate numerous innovations created through the process of learning how to carry out all the many tasks that made the city work. In the case of Uruk this included the inventions of accountancy and writing, using clay tablets to record, for instance, goods coming in and out from agents working in other cities in Sumer and further upstream along the Tigris and Euphrates.

For several centuries cities in Sumer both traded and made war with each other, while at the same becoming increasingly rich. Looking on enviously from the outside, neighbouring peoples intermittently raided the cities. These minor interventions became deadly serious with the arrival of Sargon the Great, ruler of Akkad, a city just north of Sumer. Commonly identified as the first real person known to history, Sargon conquered Sumer, the rest of Mesopotamia, and more, in creating the Akkadian Empire. This subjugation of multiple cities required the invention of new political mechanisms of governance. Conquered cities had their walls destroyed but they still required administration. Thus were the prior city-states converted

into 'provinces', ruled by outside governors from their new 'capital city' Akkad. The resulting mix of this invented imperial control mechanism with continuing urban commercial innovations was to be replicated in all later successful regional civilizations. Sargon was the first of many conquerors to be designated as 'the Great' – which always begs the question 'great for whom?' But note that, in contrast, we do not know the names of commercial innovators. For example, who invented writing in Sumer is an historical unknown: we must wait until modern times before commercial innovators become regular historical subjects.

The long sequence of Chinese civilizations represents the apex of this regional form of advanced social organization. This was clearly indicated in two related ways. First, in the number and sizes of cities: several cities grew to over a million people. And second, as a consequence, it was a civilization that generated an amazing quantity and variety of important innovations. Here are some famous examples: ball bearings, blast furnace, cast iron, chess, crossbow, gear wheels, gunpowder, magnetic compass, porcelain, and printing. The immense success of this great civilization was built upon a doubling of its environmental base by combining developments along two separate major rivers: the Yellow and Yangtze rivers. Through creating the 'Grand Canal' between the two river systems, consisting of multiple waterways covering thousands of miles, the combined civilizational potential of two river basins was harnessed to great effect. But, like all human ventures, this prodigious civilization was not an incessant success story; its long history consisted of cycles of centralization (empire) and decentralization (multiple warring states). Nevertheless, the Chinese civilization was extraordinary for both its size and longevity.

Although civilizations developed separately in their different regions there were contacts between them, most notably along sea routes. Thus, the Mesopotamian cities located in Sumer had contacts with the Indus civilization further along the Arabian Sea coast. Moving forward, by the fourteenth century there were established trade routes along the eastern and southern coasts of Asia from China and Japan through the Indonesian archipelago to India and onto Arabia with an extension down the East African coast. This linking of Pacific and Indian Oceans created a huge Sino-Indian Maritime World connecting many cities and empires. It was anchored at each end by two dominant civilizations, China in the east and Islam in the west. There are two key things to note about this impressive maritime realm. First it enabled the diffusion of innovations – economic, political, social, cultural - between civilizations. Thus, the Chinese

inventions mentioned above moved west along these sea routes, while Islamic teachings diffused eastwards from Arabia. Second, physical items were traded between civilizations but because of the distances involved and resulting costs, these consisted of transfers of luxury goods, silks from China being the classic example. Luxury trade is for a small elite and does not materially change the general workings within a civilization; each remained a distinctive separate society, not dependent on other distant civilizations. Thus the Sino-Indian Maritime World evolved as a connected world but was not an integrated one.

It is this lack of integration that explains why traditional civilizations did not create a catastrophic human world like the one we know was to come. Certainly, these civilizations grew but never at an exponential rate so as to utterly change the Earth's ecology and thereby endanger all life. Hence it was not China, the largest and richest traditional civilization, which created a global environmental threat. Rather it came from outside the Sino-Indian Maritime World, ironically from a civilization searching for a new route to China: the path to global ecological destruction starts in the Atlantic Ocean.

Initially a minor backwater, it is the crossing of the Atlantic Ocean in 1392 that began the creation of a second major maritime world, one very different from the Sino-Indian version. Spatially, the latter operated as many strands of activities, but essentially it was a long trading route with multiple offshoots. It never formed a cohesive spatial network. In contrast the new Atlantic Maritime World was created through the integration of three different regions to make a single economic growth-machine. In simple terms this was a 3-into-1 scam, one lead region encompassing two other regions to create a larger integrated, but very unequal, whole. That one privileged region was the Great Bend of Africa - from Senegambia, through Guinea to the Congo. This was the network creator. The other two regions provided the labour (slaves from the lands of the northeast Atlantic coasts) to produce the commodities (in the new lands 'discovered' across the Atlantic) for consumption in the organising centre (West Africa). This was a fundamental civilizational shift: the economic integration of three separate regions enabled the Great Bend of Africa to become a distinctively new type of region, an economic core region. This is what made the Atlantic Maritime World so very different from the traditional Sino-Indian Maritime World. Subsequently labelled as 'modern', it was a civilization whose ultimate priority was incessant economic growth. In the following centuries an ever-expanding modernity subsumed the traditional Sino-Indian Maritime World. China was the last great regional civilization to succumb to the