World Government!

Why the rise and fall of great powers must come to an end

Gero Jenner

Jenner's discussions of fundamental political, ecological, socio-economic, and cultural questions, prompted by current events but never limited to them, are among the most stimulating contributions to clear and well-formulated historical sociology currently available in the German-speaking world. *Karl Acham, professor of sociology Graz*

At last I've had a chance to read your sweeping, trenchant, and extraordinarily erudite manuscript. It's rife with integrative insight about science and the human condition and coins a wonderful term – holodoxy - that gives a name and legitimacy to the vital discipline of whole-system studies now emerging. The appreciation of indeterminate bifurcation in social evolution - "different solutions to the same problem" - is an important contribution that invites thinking about different solutions, or scenarios, for the global future. Also, the compelling case for "universal consciousness," the basis for a common human project going forward, could not be more timely in our divided world. Without doubt, the book will launch readers into a panoramic view of where we've been and where we are, and a richer understanding of what we face and what we can do. *Paul Raskin, author of Earthland*

In his large-scale socio-historical overview, Jenner shows that the transition to the post-fossil Era will force a break with past national antagonism. Together we will end the destruction of life's foundations or together we will destroy the globe and ourselves. An analysis full of surprising insights and outlooks. *Ernst von Weizsäcker, environmental scientist*

I have read with the greatest interest and also admiration your book Homo Faber /title was changed/. I fully agree with your conclusion. Mankind will survive only if it understands itself as a unity. Your excellent book will help to change collective consciousness. *Jean Ziegler, sociologist and author*

I enjoyed reading the chapters from page 1 to page 39. Based on your in-depth knowledge of ethnology, philosophy and psychology, you have convincingly explained how human development very probably proceeded and how Faber conceptualized his world. In addition, there are your important remarks on 'universal conscience', which is actually found in all world views and religions in some way ... From the chapter 'The Fossil Revolution' onwards, I do not agree with your explanation of the causes of the modern development of human societies. I am firmly convinced - and I have come to this conclusion over many years - that it is not the 'fossil revolution' that is the 'cause' of modern industrial and social development, but the 'empirical-analytical and mathematical-formalized **method** of science, which was discovered on the threshold between the 16th and 17th centuries by personalities such as Gilbert, Galileo, Kepler, Newton and Francis Bacon. *Rolf Kreibich, former president of Freie Universität Berlin*

I respond to this critical objection in the chapter 'The transition from a moral to a scientific world view' (p. 90)*. Prof Kreibich is, of course, right: the suddenly wide-open cornucopia of fossil energy should not, of course, be seen as the* ***cause*** *of industrial revolution*.

This work has undergone several transformations. Initially, I wanted to publish it under the title *Sapiens Whereto? – What Holodoxy Tells Us About the Future of Man and Society*. This version I had submitted to the commentators mentioned above. My acquaintance with Ray Dalio's important work *The Changing World Order – Why Nations Succeed and Fail* then inspired me to choose the title *Crisis and Global Realignment – The End of the Rise and Fall of Great Powers).* But in the end, I decided on the current title because it succinctly expresses the book's intention.

Introduction

What We Know and What We Cannot Know

> *Looking back on history is like grounding your view of the future.*
>
> *— Herfried Münkler*

A thousand years ago, the future of humanity was genuinely unreadable. Even a century ago, the paths forward were so numerous that prediction would have been a fool's errand. That has changed. Today, the options have narrowed sharply — and some of them lead toward catastrophe.

This book begins with a personal admission. In a work that engages with history and social science, convention demands that the author hide behind the facts, suppressing every trace of a private perspective. I want to break with that convention immediately — and explain why.

The facts of the past are fixed. We can distort them or deny them, but we cannot alter them. The future, however, is not yet a fact. It exists only as intention, will, and choice. Any writer who pretends otherwise — who claims to derive the future from the past as a physicist derives tomorrow's solar eclipse from the laws of gravity — is, whether consciously or not, deceiving the reader. No one has certain knowledge of what is coming. What every author offers, when writing about humanity's future, is ultimately their own vision: what they believe is possible, what they fear, and what they hope for. Honesty requires saying so plainly.

That said, subjective vision is not the same as arbitrary speculation. The natural sciences offer a useful contrast. Since the Babylonians, astronomers have predicted lunar eclipses with precision extending millennia into the future. The stars do not negotiate with human desires; physical laws hold whether we approve of them or not. It would be absurd for an astrophysicist to introduce their personal values into a paper on stellar mechanics.

Human affairs are different — but not entirely different. Physics can tell us that the sun will exhaust its fuel in roughly five billion years. It cannot tell us which country will hold the most power in two hundred years, or whether the nations that exist today will still exist at all. Human behaviour escapes the determinism of celestial mechanics. A head of state can choose

to sign a peace treaty or order a war; the moon has no such freedom. Collective desires and collective memories shape what comes next, and those are not reducible to equations.

Yet this does not mean that all futures are equally open. We know enough about the forces shaping the present — demographic, technological, ecological, geopolitical — to identify a small number of realistic scenarios. Some lead to stability; others to destruction. The narrowing of possibilities is itself a form of knowledge, one that makes the work of forecasting less hopeless than it might seem.

The best illustration of this argument is a book that reached me only after I had finished the first version of this work: Ray Dalio's *The Changing World Order — Why Nations Succeed and Fail.* Dalio, one of the world's most successful investors, has spent his career studying the patterns that recur across five centuries of imperial rise and decline. The topic addressed by the author is by no means new. In England, Adam Smith and, after him, David Ricardo had already asked why their country — Great Britain, which was then rapidly emerging as a major power — had managed to successfully outpace all its rivals. In Germany, none other than Max Weber also took up this question, bringing ideological factors into play alongside economic ones. Finally, the American historian Paul Kennedy addressed the same question in a work with an almost identical title, and Daron Acemoglu, like Adam Smith before him, asked about the economic prerequisites. But these are just a few of a whole host of names, each of whom has made some contribution to this topic.

What makes Dalio's analysis remarkable is its blend of quantitative rigour and historical sweep — and its willingness, for a committed capitalist, to acknowledge uncomfortable truths about his own country.

Dalio identifies a recognisable cycle. Great powers rise, reach a peak, then decline — usually through a combination of debt accumulation, widening inequality, political polarisation, and eventual military overreach. The pattern, he argues, is both timeless and universal: it has governed the arc of the Netherlands, the British Empire, and now the United States.

This conclusion, arrived at with admirable honesty, struck me as both correct and incomplete. Correct, because the cycle Dalio describes is real and well-documented. Incomplete, because it assumes the cycle will simply continue — that after the United States, another power will rise to dominance, and the old game will restart. I believe this assumption is wrong. The race between nations, as I call it, has been running for roughly five hundred years. It cannot run for another five hundred. The weapons and the ecological pressures that humanity has now

created mean that the old pattern, if it continues unchanged, will not produce another cycle. It will produce an ending.

Tidal Shift: The End of the Rise and Fall of Great Powers

> *When things start to go truly wrong, empires regularly unravel with unholy speed: just a year for Portugal, two years for the Soviet Union, eight years for France, eleven years for the Ottomans, seventeen years for Great Britain, and, in all likelihood, just twenty-seven years for the United States, counting from the crucial year 2003 … The American Century, proclaimed so triumphantly at the start of World War II, may already be tattered and fading by 2025 and … could be over by 2030.*
>
> — *Alfred W. McCoy*

Dalio insists that the rise and fall of great powers follows laws that are 'timeless' and 'universal.' But this claim does not survive historical scrutiny. For the vast majority of human existence — the hundreds of thousands of years during which our ancestors lived as hunters and gatherers — there were no empires at all. You cannot have the rise and fall of something that does not exist. Large territorial empires first appeared after the transition to settled agriculture, roughly five thousand years ago. Yet even then, for most of that period, geography did the work of keeping civilisations apart. The pharaohs of Egypt, the dynasties of China, the Incas of the Andes: each flourished in relative isolation, shielded by oceans, mountains, and deserts. The *idea* of competing against distant powers for global supremacy would have been incomprehensible to them.

The race between nations as Dalio describes it — systematic, mechanical, quasi-legal in its patterns — began only about five hundred years ago, with the emergence of capitalism in Europe and the oceanic voyages that brought every part of the world within reach of every other. The cycle he traces is real. But it is historically recent, and it is not eternal.

Dalio himself, in an unguarded aside, lets slip the flaw in his own argument. Discussing the prospects for future technological progress, he writes: 'So my view is that inventiveness and increases in living standards will probably get a lot better a lot faster — *if humanity doesn't kill itself first.*'

I find this sentence — dropped so casually, as though the annihilation of our species were a minor caveat — deeply troubling. If it is genuinely true that, for the first time in history, humanity could destroy itself, then that fact is not a footnote. It is the whole argument. It changes everything that follows. The apocalyptic option that Dalio waves away with a shrug should be, for any serious thinker about the future, the starting point.

That is what this book tries to do: take the possibility of self-destruction seriously, and ask what it implies about the arc of history. The rise and fall of great powers, broadly following Dalio's pattern, is real. But if the cycle continues without interruption, the next transition will not simply replace the United States with China as the leading power. It will, for the first time, threaten to end the game altogether.

This is not mere speculation. Two analyses written at roughly the same time as Dalio's — Ulrich Menzel's work on hegemonic transition and Herfried Münkler's *Welt in Aufruhr* (World in Turmoil) — reach similar empirical conclusions about the present moment, though not the same normative conclusions. Menzel: the US is entering a phase of irreversible relative decline, yet China is not yet ready to assume the stabilising role of a global hegemon. The result is an interregnum of heightened anarchy. Münkler: multipolar systems that lack a dominant power are structurally prone to conflict. Without a hegemon willing and able to bear the costs of order, the world defaults toward instability.

We are living in that interregnum now. What was once managed by a single dominant power — international trade rules, security guarantees, the norms of diplomacy — is increasingly contested. The transition from one leading power to the next has, historically, often passed through war. The question this book asks is whether that transition must follow the old script — or whether humanity is, at last, capable of writing a different one.

How Does a Shift Unfold?

Aristotle called the human being a *zoon politikon* — a creature that can only live and thrive in the company of others. Everything fine in a human life, and almost everything terrible, comes from other people. We experience this truth in its most concentrated form from the very beginning: in the family.

The family is the first circle of dependency. Its hold over us is absolute at birth and loosens, usually through conflict, as we grow. By early adulthood, the healthy individual must break

free — must become capable of surviving without the unconditional support of parents. This first emancipation is built into our biology.

But the individual who has escaped the family's orbit immediately enters a second circle: society. Now the rules are not biological but cultural — laws, customs, norms, professional expectations. The state makes its demands. Citizenship requires obligations. What the family held together through love, the state holds together through shared rules and, if necessary, force.

These two circles have existed in recognisable form since the beginning of human history. The family structure, however universal, produces individuals who are broadly similar across cultures. The second circle, by contrast, reveals a stunning diversity — each society shapes its members in its own way. Sparta and Athens, both small Greek city-states, drew on the same geography and roughly the same gene pool, yet built radically different worlds. In Sparta, ninety percent of the population served as slaves to feed a warrior elite. Athens imported food and paid for it with craft goods, keeping slaves but in smaller numbers and treating them less harshly. The differences were not incidental — they were structural, the product of deliberate choices about what kind of community to be.

Plato noticed this diversity and was disturbed by it. In *The Republic*, he asked whether reason alone could design a community immune to the cycles of political decay — monarchy giving way to aristocracy, aristocracy to democracy, democracy to mob rule (*ochlocracy*). His answer was a blueprint, the first systematic attempt in Western thought to ground political order in something more durable than tradition or force.

The Strangers from Across the Border

The family and the state never formed a closed world. Beyond the borders of every community lay a third circle of dependency — the most dangerous of all.

Imagine a band of hunter-gatherers moving through unfamiliar territory and encountering another band. Neither group knows what to expect. The strangers speak a different language, follow different rules, worship different powers. Their behaviour is, by definition, unpredictable — and in a world where survival depends on reading others correctly, unpredictability is terrifying. The encounter could end in alliance, absorption, or massacre.

Cannibalism was once widespread across the world; it is a reminder that other humans have often been classified as prey rather than kin.

This radical unpredictability — this anarchy — has never been permanently resolved. It persists today in the relations between sovereign states. There is no world government. There are only treaties, which hold so long as all parties find them advantageous, and institutions, which depend on the compliance of states that retain the ultimate right to defect. The anarchy of the third circle is, at best, temporarily managed. It is never abolished.

History's most dangerous moments occur when the power that has been managing that anarchy begins to fail. Ray Dalio describes the United States as currently entering stage five of his six-stage decline cycle: high deficits, mounting debt, political polarisation, declining industrial competitiveness, and the early tremors of domestic instability. The political scientist Ulrich Menzel reaches the same conclusion from a different analytical tradition: the US is losing both the capacity and the will to play the role of global order-maker, while China — the obvious successor — lacks the structural prerequisites to assume that role today.

The result is a power vacuum. And into that vacuum, historically, has flowed war.

That is the pattern. The US will not peacefully surrender its supremacy to China; China will not stop pushing. The standard resolution — a war that determines which power is strong enough to impose a new order — would, in the twenty-first century, be fought with nuclear weapons. Albert Einstein, asked what weapons World War III would be fought with, famously replied that he didn't know, but World War IV would be fought with sticks and stones. The anarchy of the third circle has reached a point where its traditional resolution — war — has become existentially indefensible.

This is the crisis. Not just another hegemonic transition, but the first transition in human history that must be accomplished without war — because this time, war could mean the end.

The Force That Generates the Most Dangerous Shift

> *Innovation and inventiveness are clearly the most powerful determinants of a country's conditions.*
>
> *— Ray Dalio*

The picture so far is of a human being embedded in three concentric circles of dependency — family, state, the anarchic interstate order — each capable of delivering both security and catastrophe. But this synchronic picture, a kind of still photograph, leaves out the most important dimension: change over time.

The agent of that change is the individual inventor. Knowledge and technical skill do not emerge from committees or from the collective will of nations. They arise, always, in the mind of a single person — an engineer, a tinkerer, a dreamer. And the inventions that follow from those individual minds have, again and again, shattered existing structures and forced humanity to adapt.

The first and greatest tidal shift in human history was not, strictly speaking, an invention at all: it was the development of language. No individual chose to give the species speech; it emerged through evolutionary processes over hundreds of thousands of years. What it produced was a being of an entirely new kind — not just an intelligent animal, but a creature capable of transmitting accumulated knowledge across generations, building culture on culture until the total exceeded anything biological evolution could have achieved alone.

The three subsequent tidal shifts were genuine inventions. Agriculture ended the nomadic life that had prevailed for most of human existence — but the benefit came at a price. In every mass society that agriculture made possible, a small ruling class found ways to extract the labour of the majority. The proportion of the population forced into near-slavery to sustain a privileged elite consistently ran to eighty or ninety percent. The exception was the small 'garden cultures' — communities too limited in scale to sustain hierarchical exploitation — but they remained marginal to the main stream of history.

It took the third tidal shift, the Industrial Revolution, to break that ten-thousand-year pattern. When machines could do the work of many hands, and when those machines required factory workers who could strike and organise and paralyse production, the old formula — tiny elite, vast subjugated majority — became unworkable. Power was, for the first time in history, genuinely redistributed. Democracy followed.

But every invention brings unintended consequences. Agriculture enabled civilisation and created serfdom. Gunpowder made modern warfare possible. The printing press spread knowledge and propaganda alike. The Industrial Revolution raised living standards and poisoned the atmosphere. The pattern is consistent: individual genius unleashes forces that no one fully controls, and history bends around the results.

Two examples illustrate the principle with particular clarity. The composite reflex bow — capable of firing twenty arrows a minute from the back of a galloping horse — gave the Mongols in the thirteenth century a military advantage so overwhelming that Genghis Khan's armies briefly controlled an arc of territory stretching from Korea to Poland. No cavalry in the world could match them. Their empire collapsed within a century, but in its aftermath, the *Pax Mongolica* briefly imposed peace on half the known world — an unintended civilisational dividend of mass slaughter.

More consequential for the modern world: around five hundred years ago, a cluster of European inventions — reliable firearms, ocean-going galleons, and a sophisticated credit system — gave a small peninsula on the western edge of Eurasia dominion over the entire globe. If European civilisation still carries disproportionate intellectual and material weight today, it is in large part because of those cannons and those banking houses. The race between nations that now threatens humanity was not an accident of human nature. It was set in motion by specific inventions, at a specific moment, in a specific place. Material development and intellectual influence are inseparable.

The Value and Danger of Human Inventions

> *If we lost our neophilia, we would stagnate. If we lost our neophobia, we would rush headlong into disaster.*
>
> *— Desmond Morris*

Every society must decide which inventions to welcome and which to suppress. This is not obscurantism — it is prudent governance. States that cannot regulate the consequences of new technologies tend to be destroyed by them.

China offers the most instructive case. For two thousand years, Chinese civilisation was arguably the most technologically capable on earth. It produced paper money, gunpowder, mass-produced steel (seven centuries before the English Industrial Revolution), and — in the

early fifteenth century — the largest fleet the world had ever seen. Under the admiral Zheng He, the Ming dynasty dispatched armadas across the Indian Ocean and along the East African coast, three quarters of a century before Vasco da Gama's much smaller Portuguese ships made the same journey. Had the two fleets met, da Gama would not have survived the encounter.

And yet the Chinese scrapped that fleet in 1433, by imperial decree. The expeditions had been enormously expensive and had served mainly to demand ritual submission to the Emperor. More importantly, they had enriched one class of merchants and manufacturers — precisely the groups that Confucian doctrine ranked below peasants in the social hierarchy. The literate governors who ran the Empire saw the disruption to the established order as a greater threat than any advantage the fleet might provide. China looked inward, reinforced the Great Wall, and waited for danger from the steppes — the only direction from which it had historically come.

The danger came from the sea instead. Within decades, European powers armed with inferior but battle-tested ships appeared on China's coasts. The greatest fleet the world had ever built was gone. The greatest land empire in the world was helpless against a new kind of threat it had never imagined. What followed — two centuries of humiliation, occupation, and forced transformation — was the direct consequence of one decision made by people who thought they were protecting their civilisation.

The lesson is not that China was foolish. The lesson is that the effects of inventions are radically unpredictable, especially when they cross the border into the third circle of dependency. What protects you in one direction may leave you naked in another. And in a world where states are constantly competing, where new capabilities spread and are weaponised faster than any government can track, the only safe outcome is one in which the 8 itself is brought under rules — binding, universal rules that no single state can defect from.

Interstate Anarchy Brings Forth the Most Ruinous Inventions

The decision to scrap Zheng He's fleet was, on its own terms, entirely logical. From the perspective of domestic order — the second circle of dependency — it made sense to protect the social hierarchy, conserve resources, and avoid enriching destabilising groups. No one

could reasonably have predicted a maritime threat that had never existed in two thousand years of history.

And yet the logic of the third circle — the anarchic interstate order — operates by different rules. In that sphere, the question is not what strengthens your society internally, but what prevents other societies from destroying it externally. These two imperatives are frequently in tension. Resources spent on internal welfare cannot be spent on defence; innovations suppressed to preserve social order may be the very innovations a rival weaponises. The state that optimises for internal harmony may be perfectly arranged for destruction from outside.

This is the self-accelerating trap at the heart of human history. Every invention that brings peoples into closer contact generates new threats, which generate new inventions in response, which bring peoples into closer contact still. The Mongol bow created a military revolution; the European cannon created a geopolitical one; the nuclear bomb created a potential civilisational extinction event. There is no natural ceiling to this process. Left to itself, it runs to the limit.

Island nations — Britain before the Channel became manageable, Japan before Commodore Perry's arrival — could for a time insulate themselves from the worst pressures of the interstate race. Even China, surrounded by steppes and deserts and seas, managed near-total isolation for two millennia. But the oceanic revolution of five hundred years ago eliminated all permanent geographical refuges. Today, no state is truly protected by its borders. The logic of mutual threat and mutual arming now governs every government on earth.

This is what I mean by the need for a holodox analysis — one that keeps the whole in view, not just the parts. Any analysis of politics, economics, or technology that ignores the third circle of dependency, the anarchic interstate order, will misdiagnose the most urgent threats facing humanity. The crisis we face is not primarily a crisis of climate policy, or of inequality, or of democratic backsliding, though it expresses itself in all those forms. It is a crisis of the third circle — of anarchy among armed states in a world where the weapons at their disposal can, for the first time in history, end the story.

The Holodox Analysis of Material Inventions

> *The new revolution transcends the reductive and mechanistic models of old to place holism and emergence at the frontiers of contemporary theory.*
>
> — *Paul Raskin*

What I call holodoxy is simply the systematic attempt to keep the whole in view. Its starting point is the recognition that no state, no society, no individual can be understood in isolation from the larger systems they inhabit — and that, of those systems, the most powerful and the most neglected is the anarchic order among states.

China's story shows the principle in action. For most of its history, Chinese thinking about technology was shaped entirely by domestic considerations: will this invention disturb the social hierarchy? Will it reduce the supply of labour? Will it enrich the wrong groups? These were sensible questions. But they were questions asked from inside the second circle, with the third circle invisible. When Europe arrived — armed with inventions China had not developed because it had not needed to — the entire framework collapsed.

Today, no state thinks exclusively about domestic consequences. Every government must scan the globe for threats, for rivals, for the innovations its enemies are developing that could tilt the balance of power. The result is a world in permanent mutual surveillance, in which the race to develop military advantage generates a relentless upward pressure on the lethality of available weapons, the sophistication of surveillance systems, and the speed of delivery. This is not a choice any individual state has made; it is the logic of the system, the iron law of the third circle.

Russia and China attempt to break their dependence on the dollar and insulate their populations from external information flows, while simultaneously importing every Western innovation that might enhance their military or economic competitiveness. They accuse others of stealing intellectual property — often correctly — while doing the same themselves. They impose ideological narratives that define the outside world as enemy, not because their leaders necessarily believe this, but because a population convinced of external threat is easier to govern and more willing to make sacrifices. The race between nations is not just military; it is cognitive.

And none of them can stop it unilaterally. No single state can prevent its rivals from heating the atmosphere, exhausting the fish stocks, or developing a new class of autonomous

weapons. The tragedy of the commons operates at civilisational scale: each state has strong incentives to defect from any agreement that constrains it, and no authority exists to enforce compliance. The race runs on.

The holodox perspective demands that we take this systemic reality as our starting point rather than treating it as background noise. The climate crisis, the nuclear arms race, the erosion of democratic norms, the rise of authoritarian nationalism — these are not separate problems to be addressed with separate policies. They are expressions of a single underlying structure: a world of sovereign states in permanent competition, with no common authority capable of binding them.

The Role of Science

The physicist Ludwig Boltzmann once offered a striking justification for the scientific worldview: not logic, not philosophy, not metaphysics decides whether something is true, but *action*. Practical achievement is the proof of correct reasoning. If a scientific theory generates working technology, the theory is confirmed.

Boltzmann was right, as far as he went. But the argument cuts both ways. The Brahmin scholars of ancient India, the Confucian literati of China, the theologians of the medieval Catholic Church — all of them presided over systems that lasted more than two thousand years. By Boltzmann's standard, their worldviews were extraordinarily well confirmed. Modern science, after barely three centuries, is now threatening to destroy the conditions for its own continuation. The dual catastrophe of environmental devastation and the nuclear arms race is not a failure of science; it is science operating exactly as designed — generating instrumental power without generating moral guidance about how to use it.

This is not a flaw that can be engineered away. Science deals with nature, and nature is trans-moral: its laws hold whether we approve of them or not, whether they serve life or annihilate it. The knowledge that physics gives us about chain reactions is the same knowledge that powers a reactor and detonates a warhead. The chemistry that enables nitrogen fertilisers — which feed billions — also enables nerve agents. Science provides the means; it cannot provide the ends.

What determines the ends is human will — which belongs to the domain of morality, not physics. And morality, in turn, is shaped by culture, history, ideology, and the structures of

power that prevail at any given moment. In a world governed by the logic of the third circle — by interstate anarchy — that will is systematically directed toward competition, armament, and the pursuit of national advantage. Universal conscience exists; but the race between nations corrupts and suppresses it.

This is why the scientific revolution, for all its magnificent achievements, has not made humanity safer. It has made individual nations more powerful, and in doing so has intensified the very competition that now threatens to consume us.

Inner-Directed and Outward-Directed Morality

Why is the final step — toward a genuinely unified world order — so extraordinarily difficult? Why do most people, confronted with the argument, prefer not to think about it at all?

Part of the answer lies in one of the deepest structures of human morality: the contrast between how we treat those who belong to our community and how we treat everyone else.

Internal morality governs our relations within the group: loyalty, solidarity, mutual aid — even, in extremis, the willingness to die for one's people. External morality governs our relations with outsiders. At best, it permits indifference. At worst — and history supplies abundant examples — it sanctions extermination of those who look different, believe differently, or speak a different language.

This contrast is not a product of human wickedness. It is a structural consequence of the way communities form. Every community coheres through shared rules, shared language, and shared symbols — an 'intersubjective reality,' as Harari calls it. Those shared meanings are, by definition, not shared with outsiders. The very mechanism that creates trust and predictability within the group simultaneously creates unpredictability and potential hostility toward everyone outside it.

The history of the past five centuries is largely a history of this mechanism operating at scale. Nations mobilise their populations through narratives of shared identity; those narratives define outsiders as threats; and the race between nations accelerates. Putin invades Ukraine while insisting that all Ukrainians are fascists. The logic is ancient, even if the weapons are new.

What makes One World necessary is precisely this: so long as the third circle remains anarchic, external morality will always be available as a resource for those who wish to mobilise populations for war. The only way to neutralise it is to eliminate the category of 'the outside' entirely — to create a political structure in which there are no outsiders, only members.

Is There a Universal Conscience?

If internal and external morality were the only moral forces in human experience, the argument of this book would be hopeless. A species irrevocably divided between brotherly solidarity toward insiders and lethal hostility toward outsiders would have no basis for the global community that the present crisis demands.

But internal and external morality do not exhaust the moral repertoire of Homo sapiens. Alongside them — sometimes suppressed, sometimes blazing — there has always been a third dimension: the awareness that others are also human, even when they are different, even when they are strangers.

Every major civilisation has produced thinkers and mystics who insisted on this awareness. Aldous Huxley identified mysticism — the conviction that all conscious beings participate in a single, ultimately inexpressible truth — as the only genuinely universal religion in human history. It appears in Christian Rhineland mysticism, in Sufi Islam, in Buddhist thought, in the philosophical traditions of China and India, and in the spiritual practices of indigenous peoples on every continent. The specific doctrines differ enormously; the underlying recognition — that the boundary between self and other is ultimately less absolute than it appears — is everywhere.

I call this recognition 'universal conscience.' It is not a hypothesis or a moral ideal. It is an empirical observation: throughout human history, across every culture and period, there have been people who refused to treat outsiders as mere enemies, who extended the logic of internal morality beyond the boundaries their community drew. They were usually in the minority, often persecuted, rarely in power. But they were always there.

Universal conscience does not automatically prevent war — Parts II and III of this book will show in some detail why it has so often failed to do so. But it means that the goal of One World is not a fantasy imposed on a species incapable of it. It answers to something real in

human nature — something that has persisted across the full span of our existence, from the totemism of the earliest hunter-gatherers to the present day.

Why Universal Conscience Could Not Prevent War

The argument requires honesty about its own limits. Universal conscience has been present throughout human history; wars have also been present throughout human history. The first fact does not explain away the second.

The reason lies in the structure of cultural knowledge. Every community maintains its coherence through shared meanings — a common language, shared rules, shared symbols and stories. These are the mechanisms of mutual predictability that make communal life possible. But 'shared' is the operative word: cultural knowledge that unifies one group is precisely not shared by another. The diversity of human languages, religions, and customs is not an accident or a deficiency; it is the natural outcome of communities developing their own coherence.

The problem arises when these coherent communities encounter each other. The very machinery that makes a community internally stable — shared rules, shared identity, shared enemies — makes it externally unpredictable and potentially threatening. Internal morality and external morality are not two separate systems; they are the two faces of a single mechanism. The solidarity that makes a soldier willing to die for his comrades is inseparable from the hostility that makes him willing to kill the enemy.

Universal conscience has never been strong enough to override this mechanism at the civilisational level. It has inspired individuals and influenced cultures, but it has not created institutions capable of binding sovereign states. That is the task that remains undone. It is, this book argues, the decisive task of the century we are living through.

Material Conditions Expand or Restrict Human Freedom

Running alongside the moral history of humanity is a material one. The degrees of freedom available to human beings at any moment — the range of social arrangements they can

choose, the cultures they can build, the lives they can live — are shaped and constrained by the technical conditions of their existence.

The hunter-gatherer life was, for most of its duration, one of remarkable equality. In mobile bands of thirty to fifty people, no one could accumulate property that could not be carried. There were no granaries to guard, no land to defend, no surplus to exploit. Hierarchy existed, but it was personal — based on skill, age, and reputation — not structural. By any reasonable measure of equality of condition, these small bands were more egalitarian than almost any society that followed them.

Agriculture changed everything. A settled community could produce a surplus, and a surplus could be seized. Across every continent and every civilisation, the same pattern repeated: a military class discovered that it was cheaper to extract the labour of farmers than to grow food themselves. The agrarian dependency formula installed itself with the force of a law of nature. Not because anyone designed it, but because the technical conditions of settled agriculture — fixed land, storable food, concentrated population — made it structurally available.

The Industrial Revolution broke the formula for the first time in ten thousand years. Factory work required concentrated, mobile, literate workers who could organise and withhold their labour. A state could not function without them. This meant the old monopoly on power — held by tiny elites through the threat of force — became untenable. Power had to be shared; democracy became possible.

But this redistribution of power was itself temporary. The automation of labour — first the routine physical work, then increasingly the routine cognitive work — is dismantling the structural basis of democratic inclusion. A growing share of the population is becoming economically superfluous: not needed for production, not in a position to threaten the system by withholding their labour. Democracy is in danger not primarily because of bad ideas, but because the material conditions that made it structurally necessary are being eroded.

The End of a Millennium-Long Trend: United Humanity

One thread runs through all four epochs — hunter-gatherer, agrarian, fossil, and what comes next. Since the first small bands of Homo sapiens began to spread out of Africa sixty thousand years ago, the units of human organisation have been growing: bands into tribes,

tribes into chiefdoms, chiefdoms into kingdoms, kingdoms into empires, empires into the current system of nearly two hundred nation-states interconnected by instantaneous communication, global supply chains, and weapons capable of reaching any point on earth in minutes.

This is a striking empirical fact. Despite all the fragmentation — the thousands of languages, the dozens of major religions, the centuries of warfare — the long-run trend has been toward larger and more integrated units of human community. The process has been violent, exploitative, and unequal; but it has been real.

We have now reached a paradoxical threshold. Humanity is, in the material sense, already a single system: the same technology, the same financial networks, the same climate (crisis), the same oceans. A virus in Wuhan reaches New York in weeks. A financial shock in Wall Street reaches Lagos in days. A nuclear exchange anywhere poisons the atmosphere everywhere. The technical integration that the Industrial Revolution began has now run so far that it has effectively abolished the kind of isolation that once allowed great civilisations to develop independently.

What has not caught up is the political dimension. We are materially one world and politically a collection of sovereign states in competition. The gap between those two realities is the defining danger of the twenty-first century. Closing it — creating political institutions adequate to the scale of the material interdependence that already exists — is the task that universal conscience now demands.

Reflecting on the Past Reveals the Future

A wide-angle view of history is not indulgence in antiquarianism. It is the only foundation on which honest forecasting can be built. The argument of this book rests on a way of looking at the past that I call holodox — a term I introduce to name something that has always existed but lacked a name: the systematic study of wholes, of systems, of the interactions between parts and the structures they generate.

The holodox approach follows the tradition of thinkers like Montesquieu, who tried to explain human behaviour through environmental conditions, but goes further. Montesquieu noticed that people in tropical climates behaved differently from people in the frozen north. True enough — but the explanation runs in the wrong direction. The environment does not

determine the human; the human transforms the environment. Our ancestors spread from Africa to the Arctic not because they evolved fur, but because they invented fur clothing. The tool precedes the adaptation; Homo faber — the maker — precedes Homo sapiens in the order of explanation.

This is why the four epochs of human history are best understood through the tools that defined them, and through the social structures those tools made possible (or necessary). Hunter-gatherers could not build cathedrals; their technology forbade it. Agrarian civilisations could not sustain mass democracy; their technology forbade it. Industrial societies could not maintain traditional hierarchies; their technology forbade it. The post-fossil civilisation that we are now beginning to build will have its own structural constraints and possibilities — though, crucially, it is the first epoch in which we are aware of those constraints before they have fully taken hold, and in which we retain genuine freedom to choose.

The four epochs — Homo loquens, Homo domesticus, Homo technologicus, and what I call Homo Deus sive Diabolus (the human who, for the first time, holds the power of both creation and destruction at planetary scale) — are the structure around which this book is organised. Parts I through III look backward, tracing the origins of the forces that now converge in a single crisis. Part IV looks forward, asking what the crisis demands and whether universal conscience is capable of rising to it.

Throughout, one constant will recur. Across all four epochs, universal conscience has been present as an empirical force — not always decisive, not always visible, but never absent. It is this constant that gives the argument of the book its cautious hope. Humanity has, against all odds and through immeasurable suffering, managed to build progressively larger and more inclusive communities. The question is whether it can now make the final step.

A note on reading modes. This book is designed to be read in two ways. The main text presents the core argument without interruption. References adds an extensive section at the end of the book, where each major theme is explored in greater depth.

Part I — First Tidal Shift: Homo loquens (From Ape to Sapiens)

> *By the age of two the average child can speak nearly 300 words. By three it has tripled this figure. By four it manages nearly 1,600, and by five it has achieved 2,100.*
>
> *— Desmond Morris*

The transition from 'naked ape' to Homo sapiens was probably the greatest leap evolution has ever made in the history of biological life. Language gave humans primacy over every other creature on earth. That primacy is worth examining closely — not as a given, but as a puzzle whose solution illuminates everything that followed.

All higher animals possess something like a mental map of their environment. The matriarch of an elephant herd, to take a striking example, must carry in her memory the locations of waterholes across a territory that may span hundreds of miles. During droughts, she leads the herd to places she visited decades earlier. She clearly holds this spatial knowledge; she navigates by it. But she cannot tell it to anyone. She cannot say: there is a waterhole four days' march to the northeast, near the hill that catches the morning light. The knowledge dies with her, or must be relearned from scratch by her successors.

Language changed that entirely. What one individual knows, others can now share. What one generation learns, the next inherits. Knowledge becomes cumulative, growing across time rather than resetting with each death. This is the peculiar explosive power of speech — not merely communication, but the multiplication and preservation of understanding across generations and communities.

But language does something more than transmit information. It creates a second layer of reality inside the human mind. Consider what happens when a word is learned. The brain does not merely store a sound; it builds a link between that sound and the thing, action, or concept it represents. Every word is a bridge between a symbol and a meaning, between the arbitrary noise we make and the structured world we perceive. Construct enough of these bridges, and something remarkable happens: the inner world begins to have a life of its own. Humans can think about things that are not present, things that do not yet exist, things that never will exist. They can invent stories, formulate plans, imagine alternatives.

This inner dimension — the capacity to construct and inhabit a symbolic world — is what separates Homo sapiens from every other species. A crow can use a tool. A chimpanzee can

recognise itself in a mirror. But neither can sit around a fire and discuss what the world was like before they were born, or what it might look like after they are gone. Neither can coordinate a hunting strategy with twenty others who are scattered across a hillside. Neither can convince a stranger — through words alone — to risk their life for a shared cause.

The emergence of language was therefore not a single adaptation but the foundation of an entirely new kind of existence. Homo faber — the tool-maker — had existed for at least a hundred thousand years before language became complex enough to transform social life. With language, Homo faber became Homo sapiens: not just a maker of tools, but a maker of worlds.

We will never know precisely how this happened. The fossil record preserves bones, not speech. Linguistics can describe in abstract terms the structural conditions that language requires — the organisation of meaning and sign within the brain — but it cannot reconstruct the moment of origin. What we can say is that, once language became sufficiently complex, it was self-reinforcing: groups that communicated more effectively outcompeted those that communicated less well, and the capacity spread and deepened across the species.

Homo vagans et sapiens — Hunter-Gatherers

About this earliest and longest chapter of human history, contemporary research has both alarming and remarkable things to report. The alarming comes first.

The expansion of Homo sapiens across the globe, which began in Africa around sixty thousand years ago and concluded with the colonisation of the Americas roughly twelve thousand years ago, had the character of a slow extinction event. Wherever our ancestors arrived, other species disappeared. The list of earlier human variants alone is sobering: Homo neanderthalensis in western Eurasia; Homo erectus, which had persisted in East Asia for over two million years; Homo soloensis on Java; Homo floresiensis on the Indonesian island of Flores — a dwarf species no taller than a metre, weighing barely twenty-five kilograms; Homo denisova, known from a Siberian cave; and at least two further African variants, Homo rudolfensis and Homo ergaster. Sapiens encountered all of them. None survived. Occasional interbreeding occurred — traces of Neanderthal and Denisovan DNA persist in modern human genomes — but the outcome was not coexistence. It was replacement.

An Early Extinction of Species

The same pattern extended to the animal kingdom. When Homo sapiens arrived in Australia and New Guinea more than thirty thousand years ago, the continents were home to a megafauna of extraordinary richness: giant marsupials, pouched leopards, flightless birds weighing over a hundred and fifty kilograms, and a variety of other large mammals that had evolved over millions of years in the absence of human hunters. Within a geologically short period of their arrival, almost all of these species were gone. Climate change had not caused comparable extinctions during previous warm periods; the arrival of human hunters is the only variable that correlates with the timing.

The same story repeated in the Americas. When Sapiens crossed the Bering land bridge into North America around seventeen thousand years ago, the continent was rich with mammals that rivalled the African savannah: mammoths, mastodons, giant ground sloths, native horses, camels, lions, and cheetahs. Within a few thousand years, the great majority had vanished. The historian Yuval Noah Harari summarises the research results in stark terms: before Sapiens planted a single field or smelted a single tool, he had erased all other human species, ninety percent of Australia's large animals, seventy-five percent of the large mammals in both Americas, and roughly fifty percent of all large land mammals worldwide.

The comparison with the near-extermination of the North American bison is instructive. European settlers reduced a population of roughly sixty million animals to five hundred and forty-one individuals by 1889 — a collapse achieved in mere decades with modern firearms. The prehistoric collapses took longer. The difference was not human intention or human nature; it was weaponry and speed.

A Propensity for Violence

The violence was not confined to other species. Recent research on surviving hunter-gatherer societies has complicated the older image of a peaceful primitive life. The Kung people of the Kalahari Desert have a homicide rate that, proportionally, exceeds that of inner-city America. Of all hunter-gatherer groups studied to date, ninety percent had been involved in warfare at some point, and sixty percent fought wars at least once every two years. In societies without

fixed hierarchical structures, disputes tend to be resolved personally — which means violently.

There is no reason to suppose prehistory was different. As the sociologist Max Weber observed, every human community operates with two moralities: an inward-facing one governing relations with fellow members — loyalty, mutual aid, the restraint of violence — and an outward-facing one governing relations with strangers, where those constraints dissolve. From the very beginning, the group's morality did not extend beyond the group's borders. Outsiders were competitors; in times of scarcity, they were enemies. That human history has witnessed relentless cycles of conflict is, from this perspective, unsurprising. The real question — which this book returns to repeatedly — is why it has also witnessed the opposite: the persistent extension of moral concern beyond the immediate group.

Totemism — The Earliest Testimony of Universal Conscience

Here we encounter one of the most remarkable features of early human culture: the fact that even the hunters who eradicated entire megafaunas felt the need to justify, ritualise, and ask forgiveness for their killing.

Every reader will have encountered, somewhere, myths and stories from early cultures in which a bear, a kangaroo, or a salmon is addressed before being killed — thanked, apologised to, its spirit propitiated. This is not mere superstition. It is evidence that the people performing these rituals understood themselves to be doing something morally significant: taking a life that had value independent of its usefulness to them.

The Australian Aboriginal practice of totemism, studied extensively by anthropologists from Baldwin Spencer and Francis Gillen to Émile Durkheim and Claude Lévi-Strauss, gives this intuition its most elaborate early form. Aboriginal communities divided themselves into clans, each of which identified with a specific species or natural element in the surrounding environment. A wallaby-man was spiritually connected to wallabies; a koala-woman to koalas; an acacia-man to acacias. This identification carried practical consequences. A koala-man was forbidden from killing a koala except in emergencies; that was the privilege — and responsibility — of those without the koala totem. Marriage between members of the same totem was also prohibited, functioning as an incest rule extended to the natural world.

But the system went further than a simple division of responsibilities. Totemic peoples believed that through their spiritual connection with their totem species, they were responsible for that species' flourishing. The wallaby-man did not merely refrain from killing wallabies; he performed ceremonies to ensure that wallabies reproduced and thrived, so that other clans could hunt them. Giving and taking were thus placed within a cosmological framework that extended beyond the human community to encompass all of nature. The hunter who killed was simultaneously the guardian who enabled life.

I want to suggest that we should read totemism as the first philosophical attempt to reconcile the moral wrong of killing with the biological necessity of survival. Hunter-gatherers had no choice but to kill in order to live. But they refused to accept that killing was morally neutral. They invented a cosmological narrative in which taking life was balanced by a responsibility for giving it — a narrative in which the human community was embedded in, rather than set against, the natural order.

The expansion of human moral concern across species lines is not, then, a modern innovation. It is among the oldest attested features of human culture. And it points toward something that will recur throughout this book: the universal conscience that all human beings seem to carry, however differently it is expressed, however often it is suppressed. Totemism is its earliest known testimony.

The same impulse appears at a higher cultural stage in the Hindu doctrine of reincarnation, which placed every living being — from earthworm to tiger to god — on a single continuum of spiritual development. To harm any of them was to harm a soul on the path toward liberation. The cultural expression differs entirely from Australian totemism; the underlying moral intuition — that life has value beyond its utility to us — is the same.

Hospitality and Its Shadow

Another institution attests to the early reach of universal conscience beyond the immediate group: hospitality. It exists in virtually every known human culture, and it applies specifically to strangers — those who, by definition, do not share one's language, customs, or gods. In some traditions, the stranger is not merely to be tolerated but to be honoured: the gods themselves may appear in disguise, and how one treats an unknown traveller reveals the

quality of one's moral character. The Homeric epics, the Old Testament, the Norse sagas — all feature hospitality as a cardinal virtue, its violation as a grave sin.

This is not a trivial observation. In a world defined by the violence of inter-group relations, hospitality is a crack in the wall — an acknowledgment that humanity does not stop at the tribal boundary. Every culture that institutionalised hospitality was implicitly asserting what its warfare simultaneously denied: that the stranger is also a human being, deserving of protection and care.

Crime and Conscience

Yet hospitality has its dark mirror, and understanding that mirror is essential to understanding how universal conscience actually operates in history.

Consider the phenomenon of xenophobia. It is, arguably, as universal as hospitality — equally ancient, equally persistent. In virtually every culture, outsiders have been described in terms that deny or diminish their humanity: barbarians, savages, infidels, aliens, subhumans. The list of labels changes; the function is constant. And that function reveals something crucial.

Why must outsiders be labelled as less than human before they can be attacked? If human beings were simply amoral calculators of group advantage, no such labelling would be necessary. You would simply kill the competitor and be done with it. The fact that cultures invest enormous effort in constructing ideologies of dehumanisation — the Nazis' propaganda apparatus being only the most extreme modern example — is itself evidence of universal conscience. It shows that people know, at some level, that what they are about to do requires justification. The dehumanising label is the justification. It says: these beings are not among those to whom our moral obligations extend; therefore, what we do to them is not a crime.

Heinrich Himmler, addressing SS officers in Poznan in 1943, famously described mass murder as an act that had left them 'decent.' The very fact that he felt it necessary to make this argument — to insist that honour and conscience could coexist with industrialised killing — is the proof that conscience was present. It had to be overridden. Ideology was the instrument of that overriding.

The judges at Nuremberg were not informing Germans of something they had not known. They were reinstating, in institutional form, a conscience that had been suppressed. That the trials happened at all — that the victorious powers chose a court rather than simply a firing squad — was itself an expression of universal conscience. And it remains, as Hannah Arendt observed, a moral achievement of the Americans that they were the first to establish a court for crimes against humanity.

The lesson is not comfortable, but it is important. Universal conscience has never been strong enough, by itself, to prevent atrocity. It can be overridden, corrupted, and weaponised by ideology. But its presence is attested precisely by the effort that must be made to suppress it. No culture simply kills outsiders without ceremony, without justification, without at least the pretence of a moral framework. The need to justify is the fingerprint of conscience.

The Social Structure of Hunting Hordes

> *To judge by the archaeological and anthropological evidence, democracy was the most typical political system among archaic hunter-gatherers.*
>
> — *Yuval Noah Harari*

Having recorded the dark side of early human history — the extinctions, the violence, the capacity for dehumanisation — it is time to turn to the other side, which is equally real and considerably more surprising.

For at least fifty thousand years, Homo sapiens lived in mobile bands of ten to a hundred and fifty individuals. The most salient feature of these groups, by the standards of all that followed, was their equality. Not equality in the sense of identical capacities — some individuals were stronger, wiser, more experienced than others, and leadership accrued accordingly. But structural equality: no one was born into a position of permanent privilege, no family owned the labour of another, and no hereditary caste system divided the population into rulers and ruled.

The material basis of this equality was straightforward: you cannot accumulate property you cannot carry. In a world of constant movement, following prey across landscapes, the only possessions that mattered were those portable enough to take on the march. No granaries, no herds, no land. Without the ability to accumulate surplus, the mechanism that generates permanent inequality simply did not operate.

The consequence was a social structure built on cooperation and daily sharing. In a band of thirty where hunting and gathering produced unpredictable results — some days a kill, some days nothing — the only rational strategy was to pool resources. The hunter who brought in a large animal today might return empty-handed tomorrow; sharing ensured that the entire band ate consistently rather than cycling between feast and starvation. This was not altruism in the moral sense so much as rational mutual insurance: the same logic that leads modern societies to create healthcare systems and unemployment benefits, scaled down to the intimate bonds of a small kin group.

The health evidence supports a picture of relative wellbeing. Human skeletal remains from the hunter-gatherer period suggest bodies that were, on average, larger and more robust than those of the early farmers who came after them. Men in the late Palaeolithic averaged around 1.77 metres; by the early Neolithic, that average had dropped to 1.65. Women shrank proportionally. The likely explanation involves a combination of factors: less dietary variety after the adoption of grain monocultures, greater exposure to infectious diseases in denser settled populations, and the physical wear of agricultural labour. By some measures, the transition to farming made the average person worse off, at least in the short run.

Hunter-gatherers also worked less. Studies of contemporary foraging societies — the Bushmen of the Kalahari, Aboriginal Australians, and others — consistently show that subsistence requires roughly four to five hours of active work per day. The economist Ian Morris has calculated that in the richest foraging environments, gathering produced fifty calories of food energy for every calorie of physical effort expended. The contrast with modern industrial agriculture, which consumes approximately eighty calories of fossil-fuel energy to produce a single calorie of food, is stark.

Equality in Hunting Hordes

The equality of hunter-gatherer life was not chosen; it was imposed by the conditions of production. This is a point worth dwelling on, because it complicates both the idealisers and the cynics.

The idealisers — those who romanticise the 'primitive paradise' — are right that a remarkable degree of equality existed, and that it contrasts sharply with almost everything that followed. But they are wrong if they attribute it to moral superiority. Hunter-gatherers shared because

sharing was adaptive; the social structures they built reflected the logic of their circumstances.

The cynics — those who argue that human nature is fundamentally selfish and hierarchical — face a different problem. The evidence shows that for the majority of our species' existence, non-hierarchical social organisation was the norm. Hierarchy, inherited privilege, and structural inequality are not expressions of some deep biological imperative. They are adaptations to specific material conditions — conditions that, as we shall see, emerged with agriculture and could, in principle, be altered again.

One qualification is necessary. The equality of hunting bands was not total. Women's lives differed markedly from men's. The demands of reproduction — in an era without contraception, with high infant mortality, and with the physical constraints of nursing — meant that women spent a large portion of their lives pregnant or caring for very young children. Historian Ian Morris' blunt assessment that women were 'mainly breeding machines' may be ungenerous, but the underlying demographic reality was brutal: to maintain population stability with infant mortality rates above fifty percent in the first year of life, women needed to bear an average of five children. This biological constraint shaped every other aspect of their lives, and it was not chosen.

A final, remarkable exception to the rule of hunter-gatherer equality deserves mention. Among the Kwakiutl of the Pacific Northwest — a group with unusually rich food resources, particularly salmon — genuine aristocratic hierarchies emerged within a hunting-gathering framework. Some individuals accumulated surplus wealth and hosted the famous potlatch ceremonies, in which prestige was measured by the extravagance of what one gave away. This shows that material conditions shape but do not determine social organisation. Where surplus existed, hierarchy followed — even without agriculture.

The lesson is not that inequality is inevitable, but that it follows, reliably, from certain material conditions. Understanding those conditions is the prerequisite for understanding what can be changed.

Part I has traced the first tidal shift in human history — the emergence of language — and the world it created: mobile, egalitarian in structure, violent toward outsiders, yet capable of extending moral consideration across species lines and investing the act of killing with the weight of conscience. It was a world without cities, without writing, without states. But it was not without culture, not without ethics, and not without the seeds of the universal conscience that this book argues will ultimately determine humanity's future.

The second tidal shift — the invention of agriculture — built on these foundations while destroying much of what had made them possible. That is the subject of Part II.

Part II — Second Tidal Shift: Homo domesticus (Agrarian Society)

> *How many Romans or Jews in the days of Tiberius could have anticipated that a splinter Jewish sect would eventually take over the Roman Empire, and that the emperors would abandon Rome's old gods to worship an executed Jewish rabbi?*
>
> — *Yuval Noah Harari*

Imagine a philosopher of the late Stone Age — a thoughtful hunter who has spent his life tracking prey across open savannah — watching the first experiments in crop cultivation. What would he predict about the future?

Almost certainly, something paradisiacal. In his world, violence was inseparable from survival: you killed to eat, and you fought to defend your band's territory. But these farmers he is watching do not need weapons to tend their fields. They sow and harvest without bloodshed. Settled in one place, they have no obvious reason to collide with their neighbours. The very act of growing food rather than hunting it seems to promise a more peaceful existence. Our philosopher, being a hunter himself, might find this sedentary life somewhat decadent — all that digging, so little courage required — but he would surely conclude that future generations would be more equal, more peaceful, and more prosperous than his own.

He would be almost entirely wrong.

The American ethnologist Marvin Harris, placing himself in exactly this position, articulated the prediction with precision: ″An observer viewing human life shortly after cultural takeoff would easily have concluded that our species was destined to be irredeemably egalitarian except for distinctions of sex and age. That someday the world would be divided into aristocrats and commoners, masters and slaves, billionaires and homeless beggars would have seemed wholly contrary to human nature as evidenced in the affairs of every human society then on earth."

The failure of this prediction is one of the great ironies of human history. Agriculture did not produce equality and peace. It produced, with remarkable consistency across every continent where it took hold, extreme inequality and endemic war. Understanding why it did so — and why the lesson was forgotten or ignored by every subsequent generation until the Industrial Revolution finally broke the pattern — is the central task of this chapter.

Agrarian Civilisation: Endemic Inequality

> *Civilisation is* [was!] *a parasite on the man with the hoe.*
>
> — *Will Durant*

The invention of agriculture was, in material terms, spectacularly successful. Before it, the human population was constrained by the bounty of what nature happened to provide in any given territory. In the most favourable environments — the 'Lucky Latitudes' where game was plentiful and plants abundant — bands of a hundred or more could subsist. In harsher regions, far fewer. After the Neolithic Revolution, which began in earnest around twelve thousand years ago, the arithmetic of human settlement was transformed: where at most four people could previously live on ten square kilometres, a thousand or more now could. The food surplus generated by farming and animal husbandry was the foundation of everything we call civilisation — cities, writing, specialised crafts, philosophy, organised religion, monumental architecture.

But that surplus immediately created a problem that hunter-gatherer life had not faced: it could be seized.

In a nomadic band, there was nothing worth seizing. Possessions were limited to what a person could carry. Accumulated food spoiled. Social status derived from personal qualities — strength, skill, experience — that could not be transferred to one's children. But once people settled and began to produce reliable surpluses, the game changed entirely. A stored harvest could be taxed. Irrigated land had a fixed location and could be claimed. Granaries could be raided or controlled. And a small group of well-armed men, mounted on horses or organised into a disciplined infantry, could extract the labour of a far larger group of farmers who were, by the nature of their work, scattered across the landscape and tied to the soil.

This is what happened, with a consistency that amounts almost to a law of nature, wherever agriculture took hold in large populations. A minority seized control of the surplus and lived off it. The majority produced and paid. The formula is so universal — across Mesopotamia, Egypt, China, India, the Aztec and Inca empires, medieval Europe — that the historian Will Durant captured it in a single sardonic sentence: civilisation is a parasite on the man with the hoe.

I call this pattern the agrarian dependency formula: depending on the quality of the land and the available technology, between eighty and ninety-five percent of the population worked to

sustain themselves and a privileged minority of five to twenty percent. This was not an accident or a temporary aberration. It persisted, with local variation, for over ten thousand years — from the first Mesopotamian city-states to the eve of the Industrial Revolution.

Why did it persist so long? Three interlocking reasons.

First, hydraulic agriculture — the management of rivers, irrigation channels, and drainage systems — required centralised coordination on a scale that no band of equals could provide. The civilisations of Mesopotamia, Egypt, the Indus Valley, and the Yellow River all depended on engineering works that mobilised thousands of labourers in precisely specified tasks, year after year. This created an immediate demand for command structures, technical expertise, and record-keeping. Someone had to be in charge. And once in charge, those people were difficult to displace.

Second, settled populations were militarily vulnerable in ways that mobile hunter-gatherers were not. A farmer cannot abandon his fields when raiders approach; his whole life is rooted in that specific patch of earth. A small force of mobile warriors — the prototype of every aristocracy in history — could therefore extract tribute from a far larger population of settled farmers at relatively low cost. The Dutch historian Johan Huizinga noted that the real history of aristocracies everywhere presents a picture in which pride and 'impudent selfishness' walk hand in hand. Alexis de Tocqueville was blunter still: wherever aristocracy conquered power by arms, it maintained that power by arms, and its rule was based on military valor displayed 'often at the expense of reason and humanity.'

Third, ownership. Property in land, stored grain, and domesticated animals was inheritable in a way that personal skills and reputation were not. A warrior who seized fertile land passed it to his sons; his sons passed it to their sons. Within a few generations, structural inequality hardened into hereditary caste. The accident of birth determined, in most large agrarian societies, whether one lived in a palace or a hovel, whether one commanded or obeyed, whether one ate well or went hungry.

Different Solutions to the Same Problem

The agrarian dependency formula was not, however, entirely inescapable. History offers significant variations — some of them instructive for what they reveal about the degrees of freedom that always existed within apparently fixed structures.

The most striking exception among large civilisations was classical China. The 'Son of Heaven' at the apex of the imperial system did inherit his position. But the vast bureaucratic apparatus that administered an empire of hundreds of millions was recruited, in principle, on the basis of merit rather than birth. The Hanlin Academy's examination system — covering philosophy, history, law, and the classical texts — opened the imperial administration to men of humble origin who could demonstrate the required knowledge. This did not abolish inequality; the examination system itself was accessible mainly to those wealthy enough to afford years of study. But it introduced a principle of personal achievement into a world otherwise dominated by inherited privilege, and it gave China a degree of social mobility — and administrative competence — that most agrarian civilisations entirely lacked.

India offered a different solution: the caste system. Hereditary inequality was made not merely legal but cosmic. Your position in the social order reflected your karma, the accumulated moral weight of previous lives; accepting your station was a religious duty, not a political submission. This may seem the most oppressive of all arrangements, and in some respects it was. But Hinduism's cosmological framework also offered something else: a guarantee that the social order was not arbitrary, and a path — through righteous conduct within one's caste — toward a better rebirth. The system provided psychological stability at the cost of social rigidity. For over two thousand years, it held.

Europe's path was different again. Unlike China or India, medieval Europe was defined by the fragmentation of power among competing kingdoms, principalities, and city-states. This fragmentation was, in one sense, a source of endemic warfare. But it was also, paradoxically, a source of eventual freedom: no single authority was strong enough to foreclose all alternatives. Urban centres — above all the trading cities of northern Italy and the Low Countries — developed their own forms of law, commerce, and self-governance that existed in tension with the feudal order surrounding them. It was from this tension, amplified by the discoveries of the fifteenth and sixteenth centuries and finally ignited by fossil energy, that the modern world eventually emerged.

A revealing small-scale contrast exists right within Austria. Travelling between Upper Austria and the Waldviertel, one notices a persistent difference in the landscape and human architecture even today. Upper Austria was, historically, a land of relatively independent farmers; its countryside is marked by prosperous farms but few castles or monasteries. The Waldviertel shows the opposite pattern: grand fortifications and rich religious houses loom over a population that for centuries lived in meagre circumstances, its surplus extracted by secular and ecclesiastical lords. Both provinces practised agriculture. Both lay within the

same political culture. The difference in outcomes illustrates the point that material conditions shape but do not determine social organisation: where the balance of power allowed farmers to retain their independence, they did; where it did not, they were subjugated.

Weapons and the Agrarian Dependency Formula

The mechanism by which a small armed minority extracted the labour of a large farming majority has a brutal simplicity. Farmers are immobile. Their work ties them to specific fields for most of the year. They are dispersed across the landscape in small settlements, making coordinated resistance difficult. And they are, by the nature of their occupation, unarmed — ploughs and hoes are poor substitutes for swords and spears.

A mounted warrior, or a small disciplined force of infantry, faced no great challenge in establishing dominance over a farming village. The threat of violence was usually sufficient; actual violence, though it certainly occurred, was the less efficient option. A living farmer continued to produce; a dead one did not. The logic of the rentier economy was therefore the logic of sustainable predation: extract enough to live well, but not so much that the productive base collapses.

The ancient class struggle between those who held political control and those who produced the food took forms ranging from outright slavery (as in Rome, where slave plantations replaced free farmers with the inevitable consequence, noted by Toynbee, of depopulating the countryside and creating a parasitic urban proletariat) to serfdom, sharecropping, and taxation in kind. But whatever its legal form, the underlying structure was the same: those with weapons lived off those with hoes.

There were exceptions. In early Rome, free farmers formed the backbone of the army; their military service granted them political rights. In medieval Switzerland, a community of armed peasants successfully defended itself against the surrounding nobility. In the pioneer communities of the American frontier, the combination of armed settlers and scarce alternative labour created conditions of relative equality. But these were exceptions that proved the rule. In every case where a large settled population existed without the means of collective defence, the agrarian dependency formula reasserted itself.

The pattern held with particular force in what the political scientist Karl Wittfogel called 'hydraulic civilisations' — those where survival depended on large-scale water management. In Mesopotamia, Egypt, the Indus Valley, and China, the irrigation works that made dense settlement possible also required a central authority capable of organising and directing mass labour. Once established, that central authority had both the technical competence and the military force to extract tribute from the populations it administered. The hydraulic state was, in a sense, the original protection racket: it provided order and water; in exchange, it took whatever it wanted.

Yet even here, the agrarian dependency formula was not simply imposed from above. It was also reproduced from within. Writing — invented around 3000 BCE in Sumer and Egypt, later in China and Mesoamerica — was initially an instrument of administration and taxation. Detailed records of landholdings, harvests, and tribute payments allowed rulers to extend their reach across vast territories. The archive was the instrument of exploitation: once you could record who owed what, and enforce payment across distance and time, the rentier economy could scale almost without limit.

Could There Be an Escape from the Agrarian Formula?

The answer, for most of human history: not really. Not because the formula was immutable — we have just seen that different societies found different ways of organising it — but because no available technology could overcome the fundamental constraint. Producing enough food for a large population required enormous quantities of human labour. That labour had to come from somewhere. As long as muscle power — human and animal — was the only energy source available, the formula held.

This did not stop people from trying. The history of the agrarian world is punctuated by revolts, rebellions, and millenarian movements that sought to overturn the existing order. China had hundreds of peasant uprisings across its imperial history, several of which succeeded in toppling dynasties — only for the new rulers to reproduce the same structure they had overthrown. Europe's peasant rebellions, from the Jacquerie in fourteenth-century France to the German Peasants' War of 1524–25, were suppressed with ferocious violence. The lesson was not that revolt was impossible, but that it could not produce lasting change. The new peasant-king, if he survived long enough, became an aristocrat; his sons became nobles; his successors extracted tribute just as their predecessors had done.

Why? Because the conditions of production had not changed. Ten thousand peasants tied to the land could still be governed by a small mercenary army. Until those conditions changed — until new technologies made it both possible and necessary to distribute power more broadly — the formula reasserted itself regardless of who nominally held power.

What universal conscience could do, under these conditions, was limited but not nothing. It could articulate the injustice of the existing order with increasing clarity, creating a moral pressure that accumulated across centuries. It could identify, in specific local contexts, arrangements that were somewhat less oppressive. And it could, in moments of particular intensity, produce movements of spiritual rebellion that reordered the inner lives of millions even when they could not change the outer structure of society. The most powerful of these movements, in the Western world, was Christianity.

Universal Moral Conscience in Christian Religion

In the Egypt of the pharaohs, the afterlife was arranged on the same hierarchical principles as this world. The kings would continue to reign; their subjects would continue to serve. Religious texts from the earliest dynasties make this explicit: the social order on earth was the divine order, and it was eternal. With writing confined to a caste of priestly specialists in the service of power, there was no institutional space for any other view to be expressed or preserved.

The theological revolution that began with Buddhism, five centuries before the Common Era, and reached its fullest expression in early Christianity, was therefore a genuine rupture. Both movements insisted, against the entire social logic of the hydraulic empires surrounding them, that before the ultimate reality — whether the Buddha-nature, or God — all human beings were equal. The distinctions that organised earthly life: king and slave, free and bound, man and woman, Jew and Gentile, were temporary, accidental, and spiritually meaningless.

Christianity pressed this claim more radically than any previous religion. The New Testament passages are unambiguous: 'There is neither Jew nor Greek, there is neither bond nor free, there is neither male nor female: for ye are all one in Christ Jesus' (Galatians 3:28). 'Blessed be ye poor: for yours is the kingdom of God' (Luke 6:20). 'Woe unto you that are rich! for ye have received your consolation' (Luke 6:24). The inversion of earthly values could hardly be

stated more plainly: wealth and power, the markers of success in this world, were liabilities in the next. The poor, the hungry, the persecuted — these were the favoured of God.

From the perspective of universal conscience, Christianity was its loudest and most uncompromising expression to that point in history. The agrarian dependency formula had been running for three thousand years before the Sermon on the Mount. And the Sermon named it, implicitly, as a moral failure — not a natural order, not a divine dispensation, but a human injustice that the highest authority in the universe had already overturned in principle, even if earthly conditions had not yet caught up.

Why, then, did Christianity not transform the social order? The answer is practical rather than theological. The conditions of production had not changed. Eighty or ninety percent of the population still had to work the land. A small armed minority still controlled the surplus. No amount of spiritual conviction could alter these material realities. The Church accommodated itself to them — it had to, to survive — and the accommodation produced the famous contradictions: 'Render unto Caesar the things which are Caesar's'; 'Let every soul be subject unto the higher powers, for there is no power but of God.' The same tradition that proclaimed the equality of all souls before God also counselled obedience to earthly masters.

But the accommodation was always unstable. The egalitarian core of the Christian message could not be permanently suppressed; it kept erupting in new forms — in monastic communities that practised common ownership, in heretical movements that took the Sermon on the Mount literally, in the Peasants' War whose leaders quoted scripture in justification of their rebellion. Each eruption was suppressed. The underlying moral pressure accumulated.

This is the pattern that universal conscience follows throughout the agrarian epoch: it articulates what the conditions of production cannot yet realise. It keeps the ideal alive, maintains the moral pressure, ensures that no form of oppression can ever be fully naturalised — can ever convince the majority that their subjugation is simply the way things are. The history of agrarian civilisation is, among other things, a history of failed attempts to extinguish this pressure. None succeeded.

The European Enlightenment

The great thinkers of the seventeenth and eighteenth centuries — Bacon, Descartes, Leibniz, Voltaire, Rousseau, Kant — gave universal conscience its most systematic and self-conscious

expression in the Western tradition. They did not invent the idea of human equality; Buddhism and Christianity had insisted on it for centuries. But they reformulated it in terms that made no reference to the afterlife, to karma, or to God's will. The equality of human beings was, they argued, a fact of reason — provable from first principles, requiring no theological warrant.

The central argument of the Enlightenment on social justice can be stated simply, though its implications are complex. On one hand: people are fundamentally similar. A surgeon who has mastered human anatomy can operate on any patient regardless of nationality, race, or social standing. A psychologist who understands the principal disorders of the human mind can treat patients from any culture. Seen from a sufficient distance, the human species is one.

On the other hand: people differ enormously in specific capacities. Some have musical gifts; others are gifted in mathematics or engineering. Some are more energetic, more disciplined, more creative than others. These differences are real and consequential. A society that ignores them — that treats a gifted surgeon identically to a mediocre one — both wastes talent and creates injustice of a different kind.

The Enlightenment's proposed resolution was elegant: design a social order in which the differences that matter are those of knowledge, skill, and effort — not the accidents of birth. Strip away hereditary privilege entirely. Give every person equal access to education, and then let individual merit determine social position. This is not a vision of identical outcomes; it is a vision of equal opportunities and legitimately unequal results. And crucially, the inequality it produces is non-hereditary: a great physician cannot pass her professional standing to her children. Each generation starts again.

This is, it bears emphasising, the only model of social organisation that has ever been proposed that can consistently satisfy both the claims of equality (we are all fundamentally the same) and the claims of difference (we are not all equally gifted). Every other system either enforces a false uniformity — suppressing real differences in talent and inclination — or entrenches a false hierarchy — treating the accidents of birth as marks of genuine merit.

Karl Marx understood the injustice of agrarian civilisation as clearly as any Enlightenment philosopher. But his proposed remedy was misconceived, in a way that had catastrophic consequences. Marx drew the battle line between workers and entrepreneurs — between those who did not own the means of production and those who did — and called for the violent expropriation of the latter by the former. In doing so, he systematically misidentified the enemy. The real destroyers of a classless society are not entrepreneurs, who typically earn

their position through genuine skill and effort, but those who extract unearned income from the labour of others without contributing anything of comparable value in return: the rentier class, the holders of scarce assets, the owners of land and capital whose wealth compounds automatically regardless of personal merit.

By directing working-class anger against the productive class rather than the parasitic one, Marx made the genuine goal — a society without hereditary privilege — harder, not easier, to achieve. And by insisting that equality required collective ownership of all productive assets, he proposed something that is achievable only through terror, since it requires overriding the deepest human attachments to family, property, and personal autonomy. The Enlightenment vision was more modest and more feasible: not common ownership, but equal access to education, and the substitution of merit for birth as the criterion of social position.

The Powerlessness of Enlightenment

But the Enlightenment philosophers, for all their intellectual brilliance, faced the same obstacle that had defeated every previous reformer. They could describe the just society in meticulous detail. They could demonstrate, with impeccable logic, that hereditary privilege was irrational and unjust. What they could not do was explain how to get from here to there — how, under conditions in which eighty percent of the population was needed to produce food, the formula of agrarian dependency could be broken.

Thomas Robert Malthus, perhaps the most influential social thinker of the late eighteenth century, argued that it could not. Population, he believed, would always grow faster than food production. Any improvement in living conditions would simply produce more mouths to feed, driving the majority back toward subsistence. The formula would hold forever.

What Malthus could not foresee — what no one foresaw — was that a solution was already emerging, not from any philosopher's study or political programme, but from the workshops and coalfields of northern England. The Industrial Revolution did not begin as a project of social justice. Its driving forces were commercial: cheaper textiles, more efficient transport, greater industrial output. But its social consequences were revolutionary in a way that no previous political movement had managed to achieve.

When machines began to replace the muscle power of human labourers, the agrarian dependency formula lost its material basis. It was no longer necessary for eighty or ninety

percent of the population to work the land. People could leave the fields. They could move to factories. And in factories, concentrated in cities, they could organise, strike, and exert political pressure in ways that scattered rural labourers never could. The privatisation of power that followed — the distribution of political rights to an ever-wider portion of the population — was not the product of moral progress alone. It was the product of a change in the conditions of production that made the old formula structurally untenable.

This is the deepest lesson of the agrarian epoch. Universal conscience had been articulating the case for human equality for thousands of years — through totemism, Buddhism, Christianity, the Enlightenment. The case was always logically sound. It was never, under agrarian conditions, materially achievable. The thinkers of the Enlightenment gave the ideal its clearest formulation. The engineers of the Industrial Revolution, almost accidentally, gave it its first real chance.

That chance, and what humanity made of it — and what it failed to make of it — is the subject of Part III.

Part III — Third Tidal Shift: Homo technologicus (The Fossil Revolution)

In 1775, India and China together produced roughly two-thirds of the world's economic output. Europe was a modest peninsula on the western edge of Eurasia — culturally vibrant, politically fractious, and economically marginal by comparison. A hundred and seventy-five years later, Great Britain and the United States between them generated more than half of global GDP, while China's share had collapsed to around five percent. In the space of a few generations, the balance of the world had been overturned.

The force responsible was not superior intelligence, not racial fitness, not divine favour — though Europeans offered all three as explanations at various points. It was energy. Specifically, the energy stored over three hundred million years in the coal seams and oil fields beneath the earth's surface, which Europeans were the first to exploit on an industrial scale. Everything else followed from that.

The Release of Dormant Energy

The scale of the energy transformation defies easy intuition. Before the Industrial Revolution, France's total energy output — from animal labour, watermills, and wood combustion — amounted to roughly thirteen gigawatts. That figure has since multiplied more than a hundredfold, with eighty-five percent of the increase coming from fossil sources. The historian Ian Morris calculated that England's steam engines around 1870 generated the equivalent of forty million human workers. Had British industry still relied on muscle power, the entire country would have needed to be twice as large — and those additional forty million labourers would have consumed three times the annual British wheat harvest just to feed themselves. No other figures make the revolution so concrete.

The numbers compound further when traced across time. Global energy consumption stood at roughly four hundred million tons of oil equivalent in 1800. By 1900 it had nearly quintupled. By 1990 it had multiplied by a factor of sixteen. And the growth was self-reinforcing: more energy enabled more production, which funded more research, which produced more efficient engines, which released more energy. Half of all fossil fuels ever burned were burned in the last thirty-five years.

The economic consequences were equally dramatic. Global GDP, measured in constant 1990 dollars, stood at around 650 billion in 1800. By 1900 it had tripled. By 1990 it had multiplied fourteen-fold. Growth — that word that had barely existed as an economic concept before the Industrial Revolution — became the new organising principle of civilisation. And growth changed everything, because it was the first time in twelve thousand years of settled human life that the material condition of the majority could improve without requiring the minority at the top to give anything up. Under agrarian conditions, the pie was fixed; your gain was my loss. Fossil energy enlarged the pie. That single fact — modest as it sounds — was the material prerequisite for everything the Enlightenment had dreamed of but could not deliver.

The social consequences were equally spectacular. Around the mid-nineteenth century, twenty-five men needed a full day to harvest and thresh a ton of grain. Today, one person does it with a combine harvester in six minutes. The productivity gains extended across every sector. Between 1920 and 2020, productivity in manufacturing increased by around four thousand percent; in services, by four thousand five hundred percent; in agriculture, by three thousand five hundred percent. The eightfold increase in world population since 1800 would have been impossible without this revolution. So would the free choice of occupation — the ability to be something other than a food producer — which had been denied to eighty or ninety percent of humanity for ten thousand years.

One Hand: A World-Historical Success for Individuals

> *Standing in 1750, it would have been reasonable to believe that monarchies and landowning nobles overseeing peasants would be the governance system in the future, that agricultural land would continue to be the most important money-earning asset, that per capita incomes would grow at only around half a percent per year, and that life expectancy would remain steady at about thirty years. That was how it had always been. You would not have imagined capitalism and democracy as we now know it.*
>
> — *Ray Dalio*

Equality Through Competition

The first and most counterintuitive achievement of the Fossil Revolution was to make competition a vehicle of equality rather than inequality. In every agrarian civilisation, competition among the lower orders had been pointless and often dangerous. If a peasant improved his yield, the surplus went to his lord in the form of higher taxes. Personal initiative brought nothing but disadvantages. The rational strategy was conservatism — cling to what you know, resist all change, submit to the powerful and hope for solidarity from your neighbours. This explains the profound social conservatism that characterised the lower ninety percent of the population in every agrarian society: not stupidity or timidity, but a perfectly rational response to a system in which innovation was punished and conformity rewarded.

The Industrial Revolution broke that logic. When factories required trained workers who could strike and organise and withhold their labour, the threat of simple violence that had kept agrarian labourers in line became insufficient. The state could not function without the cooperation of its working population. And a state that wanted to compete economically and militarily with its rivals needed to develop all the talent available to it, not merely the talent that happened to be born into the right families.

The result was what I call the *privatisation of power*: the redistribution of influence, prestige, and material reward away from hereditary elites and toward individuals on the basis of knowledge, skill, and effort. Everyone should have equal access to education; everyone should compete for social positions on the same terms; the outcome should reflect individual

merit rather than the accident of birth. Competition, once suppressed as a threat to privilege, became the mechanism of equality.

This was not a smooth or painless process. Early industrial capitalism was brutal — the working conditions in the first factories were worse in many respects than the peasant life they replaced. But the structural dynamic was irreversible. Mobile workers could organise in ways that scattered rural labourers never could. The race between nations created pressure to develop every available talent. And the moral logic of the Enlightenment, which had been demanding this transformation for a century, finally had the material conditions to take hold.

The Privatisation of Knowledge and Power

The most visible expression of this transformation was economic. Entrepreneurs displaced aristocrats; merit displaced birth. But the privatisation of power ran deeper than capitalism. It reshaped education, politics, culture, and the very idea of what it meant to be a competent person.

In all previous large civilisations, the people who enjoyed the greatest prestige were those who could explain the meaning of the world: priests, philosophers, and sages. They derived their authority from access to a higher truth — divine, cosmological, or moral — that was unavailable to ordinary people. Writing, which preserved and transmitted this truth, remained in their hands. The mass of the population was deliberately kept in ignorance; knowledge was a privilege, not a right.

The Industrial Revolution overturned this hierarchy with remarkable speed. Within a few generations, the most prestigious people in society were no longer those who explained the meaning of the world but those who changed it: engineers, inventors, scientists, industrialists. Francis Bacon had anticipated this two centuries earlier in his unfinished utopia Nova Atlantis, conjuring a civilisation whose heroes were the inventors of machines — 'engines and instruments for all sorts of motions,' ships that could travel underwater, devices for flying. What had seemed a fantastic vision became, within two centuries, a literal description of the world. The Nobel Committee, established at the end of the nineteenth century, enshrined the new hierarchy in official ritual: it honoured those who deciphered the laws of nature, not those who explained its meaning.

The economist John Kenneth Galbraith captured the inversion with characteristic wit: "If a man seeks to design a better mousetrap, he is the soul of enterprise; if he seeks to design a better society, he is a crackpot." The explainers of meaning — priests, philosophers, humanists — had been progressively marginalised, and were finally regarded not merely as superfluous but as obstacles.

Why did the new doctrine of practical science succeed where all previous worldviews had failed? Three reasons, each significant. First, it required no faith: technology demonstrated its correctness through practical results that anyone could observe. The physicist Ludwig Boltzmann put it directly: "I do not consider the achievements of technology as incidental by-products of natural science; I consider them as logical proofs." Second, the domain of science was potentially infinite — it could be extended indefinitely, into any corner of nature, even into outer space. Third, and most importantly for global adoption, science was morally and aesthetically neutral. It made no demands about what to believe, how to worship, or how to organise one's inner life. A Mongolian shaman, an Indian guru, and a follower of ISIS could all use mobile phones and missiles without the slightest ideological contradiction. This trans-moral, trans-aesthetic character was science's most powerful feature — and, as we shall see, its most dangerous one.

Did the Privatisation of Power Succeed?

The short answer: only partially, and temporarily.

The material gains were extraordinary and real. In 1800, average income worldwide was equivalent to what we now define as extreme poverty — about five hundred dollars per year. Nearly ninety-five percent of humanity lived on less than $1.90 a day. In the richest country in the world at the time, the Netherlands, life expectancy was forty years; nowhere did it exceed forty-five. By the early twenty-first century, even the poorest country on earth had a life expectancy of fifty-four. The average income of the world's entire population — all seven billion of them — had risen to the equivalent of Western Europe in 1964.

These are not small achievements. They represent the largest reduction in absolute suffering in the history of our species. For ten thousand years, the majority of human beings had lived in conditions of material deprivation, political powerlessness, and legal subjugation. The Fossil Revolution changed that, at least in the industrialised world and, to a significant extent, globally. The three 'golden decades' after the Second World War — when democratic welfare

states in Europe and North America achieved unprecedented levels of equality, security, and participation — represented perhaps the closest the human experiment had yet come to the ideal of the Enlightenment.

But the privatisation of power also contained, from the outset, the seeds of its own subversion. Two of those seeds are worth examining closely, because they are still growing.

The Mousetrap Fallacy: When Means Become Ends

The first problem concerns the relationship between knowledge and purpose. Science and technology are, as we have noted, trans-moral and trans-aesthetic. They are instruments — means to ends, not ends in themselves. Their value depends entirely on the purposes to which they are put. A knife can peel a fruit or slit a throat; the chemistry that enables nitrogen fertilisers also enables nerve agents; the physics of nuclear fission powers both reactors and warheads.

For most of the Industrial Revolution, this dual character was acknowledged but regarded as manageable. Progress was overwhelmingly beneficial; the dark side was a price worth paying. But as the twentieth century advanced, the calculus shifted. The weapons developed by two world wars killed tens of millions. The industrial processes that produced unprecedented prosperity also produced industrial-scale pollution. The same scientific knowledge that eradicated smallpox and revolutionised agriculture also created the conditions for ecological catastrophe and nuclear annihilation.

The deepest problem is not that science and technology have been misused. The deeper problem is that in the competitive race between nations, there is no structural mechanism to separate beneficial from harmful applications. Every state has powerful incentives to develop the most lethal weapons available — not because its leaders are evil, but because the state that falls behind in the arms race faces existential risk. Every company has powerful incentives to externalise environmental costs — not because its managers are malicious, but because the company that absorbs those costs is undercut by competitors who do not. The race between nations, as described in the Introduction, systematically overrides the moral dimension that alone could distinguish constructive from destructive innovation. The means — weapons, polluting processes, tools of surveillance and manipulation — become ends in themselves, because each state and each company derives advantage from developing them, regardless of the consequences for the whole.

This is what Galbraith's quip really captures. The inventor of a better mousetrap is rewarded; the person who asks what all these mousetraps are for is dismissed as a crackpot. The question of purpose — the moral question — has been structurally excluded from the dominant framework of civilisation. And the consequences are now becoming visible.

But why Democracy, after all?

> *Between 2007 and 2014, China crisscrossed its own countryside with 9,000 miles of new high-speed rail, more than the rest of the world combined.*
>
> *— Alfred McCoy*

> *Their /the Chinese/ system of governance is more like what is typical in big companies…, so they wonder why it is hard for Americans and other Westerners to understand the rationale for the Chinese system*
>
> *— Ray Dalio*

The Enlightenment insisted on expertise and competence, and this program was faithfully adopted by business. So why do we need political democracy at all, *if the core organizational structure, even of democratic states, is and will certainly persist in being anti-democratic given that its extraordinary efficiency is owed to this very fact?*

Max Weber had already raised this question. He believed that modern states would increasingly resemble authoritarian bureaucracies. Had he been able to witness the rise of China, he would have seen this as a most convincing confirmation.

As a matter of fact, the two central Western institutions – the political order on one, the economic enterprise on the other side – are in stark opposition, each attempting to extend its governing principle across society. Labor unions have to a limited extent achieved democratic participation in areas such as working conditions and wage negotiations. However, the likelihood of the democratic principle spreading to the economy is nearly zero, especially in our time where expertise is essential. But the reverse process, *the spread of hierarchical and undemocratic corporate structures to the political order, remains a real possibility and danger*. This is not just a theoretical conclusion – this tendency has been proven time and again throughout history, most recently by a certain Donald Trump. If the majority of a population consists of poorly educated, perhaps even largely uninformed people who do not understand the complex problems of a modern technological society, then the uninformed will elect an uninformed person as their president or their parliamentary

representative. In comparison, a political dictatorship can — *under certain conditions!* — be far more successful, indeed just as successful as a modern industrial enterprise.

In any case, it seems difficult to deny China's one-party system and its leadership a sensational historical success. Within a few decades, China catapulted from a bitterly poor agrarian nation to a superpower that threatens to dethrone the previous alpha state, the United States. The secret of this success is as clear as in any well-run enterprise. First, a goal is set; for a company, this is maximum profit. In the case of a country like China, the goal is determined in such a way that the government can count on maxi-mum consent from most of its citizens. This was and is the eradication of poverty and eventually the achievement of Western levels of prosperity and beyond.

Second, the goal must be reached in the shortest possible time and at the lowest cost according to rational criteria. For a company, this approach usually involves the reduction of costs or improved production methods. In China, it is taken for granted to engage scientific experts in overcoming poverty. Development - 发展 (Fa zhan) and science - 科学 (Ke xue) - based on knowledge and skills are the prevailing mantras – fully in line with the Enlightenment. The government's promise may be summarized in the following way: "*We'll make all of you a bit wealthier every day, but we can only achieve our ambitious task if you follow our instructions to the letter. If you don't, you are the enemies of progress, and we will eliminate you*."

So far, the Chinese leadership has fulfilled both parts of its promise: a meteoric rise – meticulously planned like that of any successful corporation – and, on the other hand, the ruthless prosecution of all dissenters and dissidents opposing its directives. So long as the first part of the promise is consistently realized, most citizens support the regime, and it can feel sufficiently secure.

Did China endorse and fulfil the Enlightenment's ideals by not only applying knowledge and skills to corporate management but also to the governance of the state? And if so, why don't we transfer even in Western states the undemocratic but well-functioning corporate model to the political sphere as it works so well in China – and is, indeed, increasingly emulated by developing countries worldwide? Why not an elite of knowledgeable people, when in democracies there is a risk that the ignorant and demagogues will rise to the top of the state?

We know that many people in the West are asking themselves precisely this question — especially leading business figures such as Peter Thiel, Elon Musk, and lots of Silicon Valley executives. The same attitude is likely to prevail among CEOs doing business in Russia or

China. And there can be little doubt that the freedom to express one's opinion on any subject in public is an intellectual luxury that means little or nothing to people living in poverty. They willingly give up this freedom if they can hope for material progress in return.

The United States may just go through such a process. There the outsourcing of the past thirty years has caused a significant portion of the working class to drift into precarity. For these people, Donald Trump is a messiah who, like Hitler, Mussolini, and other great seducers, promises them salvation. Furthermore, the contrast between the super-rich power elite and the broader masses is evident not only in income and wealth but also in education and the opportunities it provides. A handful of American universities still rank among the world's best, but "*a third of high school graduates never read another book for the rest of their lives, and neither do 42 percent of college graduates*" (Chris Hedges). Donald Trump is a representative of this stratum. Therein lies an acute danger as a minimum level of education is essential for democracy to function.

Democracy's Vulnerability

Democracy is not self-sustaining. It requires material conditions that not every society has achieved, and it can be eroded from within when those conditions deteriorate.

The German case is instructive. Between 1924 and 1928, the Nazi vote fell from 6.6 percent to 2.6 percent as the economy recovered and ordinary Germans could afford the luxury of political freedom. Then the Great Depression arrived. Unemployment rose from 270,000 in 1928 to 5.5 million in 1933. The Nazi vote surged from 18 to 44 percent in the same period. The men queuing at soup kitchens were not attracted to fascism by its ideology; they were attracted by the promise of salvation. Democracy, which had given them freedom of speech and not much else, had nothing comparable to offer.

The pattern is repeating in the United States. Thirty years of outsourcing have left a significant portion of the working class in economic precarity. For these people — the inhabitants of the rust belt, the workers whose industries relocated to cheaper countries — the democratic system has delivered global economic integration and not much of the benefit. Donald Trump is not the cause of their anger; he is the symptom. And like all populists, he has shown that the easiest way to mobilise the economically dispossessed is to give them an enemy: the immigrant, the cosmopolitan elite, the foreign competitor. The 'deplorables' — Hillary Clinton's contemptuous label for Trump's base — were people to whom the liberal

consensus had offered globalisation and called it progress. They were not wrong to reject the label.

The State as Moral Purpose with Technical Means

> *Elections are not a method for discovering truth. Rather, they are a method for maintaining order by adjudicating between people's conflicting desires.*
>
> — *Yuval Noah Harari*

One of the great tensions of the Fossil Era has been the collision between two radically different models of collective organisation: the democratic state and the industrial corporation.

The corporation is, in its essential structure, a meritocratic hierarchy. Authority is allocated on the basis of competence; decisions flow from the top; those who fail to perform are replaced. This structure is not a moral choice but a functional necessity. A factory that makes decisions by popular vote will quickly be outcompeted by one that delegates those decisions to engineers. The anti-democratic nature of the modern enterprise is not a flaw; it is the source of its extraordinary efficiency.

The democratic state operates on entirely different principles. Its citizens cannot be replaced. They have a right to belong, regardless of their economic utility. The questions it must answer — how to distribute wealth and power, what counts as justice, whose suffering deserves attention — are not technical questions with objectively correct answers. They are moral questions, and moral questions are ones that all members of the community have an equal right to address.

This is the deepest justification for democracy, and it is one that the European Enlightenment, focused as it was on reason and expertise, often missed. The Enlightenment was right that governance requires knowledge. A head of state who understands nothing about economics, international relations, or public health will make worse decisions than one who does. But the Enlightenment was wrong — or at least incomplete — in assuming that governance is primarily a technical problem. Before any technical question can be addressed, a moral one must be answered: whose interests count, and how much? That question belongs to everyone.

Experts have a legitimate and necessary role wherever specific moral decisions subsequently require technical means to realise. But they have no special claim over the moral decisions

themselves. Whether a society should prioritise equality or growth, security or freedom, present welfare or future sustainability — these are not questions that economists or engineers can resolve by calculation. They require democratic deliberation precisely because they involve competing values that no technical framework can adjudicate.

In this perspective, the state is a moral purpose achieved through technical means. It differs from a company in kind, not just in scale. And any political movement that treats the state as if it were a company — measuring success purely by economic growth, dismissing questions of justice as inefficiencies, and replacing democratic deliberation with technocratic management — has fundamentally misunderstood what a state is for.

Two contemporary figures illustrate the contrast sharply. Franklin Roosevelt governed during a crisis of democracy, and his response was to reaffirm the moral purpose of the state — to make the institutions of government serve the majority rather than a wealthy minority, and to present this reorientation as a matter of justice, not merely efficiency. Vladimir Putin uses technical competence to serve a moral vision so archaic it has to be enforced by terror: the chosen-people nationalism of the nineteenth century, dressed in twenty-first-century surveillance technology. The first is a democracy struggling with its own contradictions; the second is a diabolocracy — a system in which the instruments of modernity serve the purposes of barbarism.

The Other Hand: An Existential Failure for the Whole

> *We are so smart that we can produce nuclear missiles and superintelligent algorithms. And we are so stupid that we go ahead producing these things even though we're not sure we can control them, and failing to do so could destroy us.*
>
> — *Yuval Noah Harari*

The Fossil Revolution's achievement in raising living standards for the majority of humanity is real and should not be minimised. But it has a shadow side that is equally real and potentially far more consequential. The same forces that distributed power more broadly within societies also disrupted, and continue to disrupt, two forms of equilibrium that are essential to human survival: the equilibrium between human activity and the natural world, and the equilibrium within and between human societies.

The Disruption of Natural Homeostasis

The natural world is not a passive backdrop to human history. It is a system of extraordinary complexity, characterised by what biologists call homeostasis: self-regulating processes that maintain stability within ranges compatible with life. If atmospheric carbon dioxide rises, vegetation flourishes to absorb the excess. If a predator species is depleted, its prey proliferates until new constraints emerge. The interlocking cycles of carbon, nitrogen, water, and energy that sustain life on earth have been operating, with local perturbations, for billions of years. They established a relatively stable climate roughly twelve thousand years ago — the conditions under which all of human civilisation developed.

The Industrial Revolution set in motion a process of disruption that no previous epoch of human activity had approached. Before 1800, the transformations that human beings had imposed on the natural world — the extinction of megafauna, the conversion of forests to farmland, the diversion of rivers — were significant but locally bounded. Fossil fuels changed the scale. The systematic combustion of carbon that had been sequestered over three hundred million years, compressed into a period of two centuries, overwhelmed the feedback mechanisms that had previously maintained atmospheric stability. The planet's temperature is rising; the ice caps are melting; the oceans are acidifying; the species extinction rate has reached levels not seen since the asteroid impact that ended the Cretaceous period.

But climate change, for all its urgency, is only the most discussed symptom. The deeper problem is the production of artificial substances that natural metabolism cannot process. Evolution, over millions of years, has created organisms capable of decomposing virtually every organic compound that biological life produces. It has had no time to adapt to the hundreds of thousands of synthetic compounds — plastics, pesticides, industrial solvents, pharmaceutical residues — that the Fossil Era has introduced into the environment. These substances accumulate in ecosystems, in food chains, in bodies. The EU alone currently produces around three hundred million tons of artificial substances each year. The cumulative burden is approaching the limits of what natural systems can absorb.

The privatisation of power that made this possible also makes it structurally difficult to address. When economic power is dispersed among millions of private actors — companies, investors, consumers — no single authority has both the will and the capacity to regulate the aggregate consequences of their individual decisions. The state's regulatory apparatus cannot keep pace with the rate of innovation; the costs of environmental damage are largely externalised onto the public and onto the future; and the race between nations creates systematic pressure against any government that tries to impose standards its competitors do not share. The fox, as the saying goes, has been appointed gardener.

Disturbed Equilibrium in the Human World

> *The world, awash in specialised reports, was starved of systemic examinations and panoptic foresight.*
>
> — *Paul Raskin*

The privatisation of power has disrupted not only the relationship between humanity and nature but also the relationships among human beings themselves.

The mechanism is specialisation. In every agrarian civilisation, the vast majority of the population shared a common reservoir of knowledge and experience. A farmer in Egypt, a farmer in China, a farmer in medieval England — the basic techniques of tillage, irrigation, and animal husbandry were recognisably similar. The knowledge that sustained life was communal, passed from generation to generation through shared practice. It was the foundation of social cohesion: people understood each other's worlds because they largely inhabited the same one.

Industrial society has steadily eroded this common ground. The deepening of knowledge requires its fragmentation. A quantum physicist has nothing intellectually to discuss with a software engineer, who has nothing to discuss with a lepidopterist, who has nothing to discuss with a heart surgeon. Each inhabits an intellectual world that is largely inaccessible to the others. This is not merely a personal inconvenience; it is a structural feature of advanced technological society that produces what Marx, in a broader sense than he intended, called alienation: the disconnection of the individual from the larger human community, the reduction of the person to a function in a system they cannot comprehend.

In earlier societies, the gap left by the dissolution of shared practical knowledge was filled by religion and tradition. These provided what Harari calls a 'shared intersubjective reality' — a common narrative framework within which people could locate themselves, understand their obligations, and make sense of suffering. Industrial society has largely dismantled these frameworks without replacing them. Science has discredited much of their metaphysical content; the mechanisation of everyday life has hollowed out the practices that sustained them. In their place, there is silence: the silence of people who live in physical proximity but have nothing to say to one another.

This silence is not neutral. It is experienced as painful, and it drives a continuous search for identity — for some framework of shared meaning that can overcome the isolation of specialisation. That search is the deep source of the populist and nationalist movements that are reshaping the politics of the developed world. When the educated and economically secure can afford cosmopolitan identities — 'I am a citizen of the world' — those who lack that security turn to identities that are immediately available: national, ethnic, religious. The 'deplorables' are not deplorable; they are people in genuine distress, reaching for the only identities that have not been taken from them.

The Mechanics of Debt: A New Aristocracy

The second form of internal disruption is more structural and less visible than alienation, but no less corrosive. It concerns the mechanism by which wealth accumulates in the absence of merit — the counter-principle to the Enlightenment's vision of a society organised around knowledge and skill.

The Industrial Revolution did not abolish the institution that had undermined equality in every previous civilisation: the automatic multiplication of existing wealth through the

mechanism of interest and dividends. In a society of heirs, this mechanism operates independently of talent or effort. Surplus wealth lent at interest generates more wealth; that wealth is inherited; the inheritors lend it at interest again. Over generations, the compounding is relentless, and it is entirely indifferent to individual merit.

There is an additional, less visible channel through which this redistribution occurs. When companies borrow money, they must somehow cover the cost of the interest they pay. If they cannot reduce wages or acquire cheaper inputs, they pass the cost into the prices of their products. Consumers pay those higher prices. But the burden falls disproportionately on those for whom consumption represents the largest share of income — the poor. The wealthy, who spend only a small fraction of their income on consumption, are barely affected. The result is a continuous, legally sanctioned flow of wealth from the many to the few — not through theft, not through coercion, but through the normal operation of the credit system.

During the initial phases of industrialisation, when wealth differentials were modest and savings were needed to finance investment, this mechanism had positive effects: it encouraged saving, channelled capital into productive use, and helped fuel growth. But once significant wealth inequalities have emerged, the mechanism operates in reverse. The rich get richer automatically; the poor get poorer, in real terms, even when they nominally earn interest on their savings. The transition from the feudal aristocracy of birth to what we might call the fossil aristocracy of accumulated wealth is complete when, as in the United States today, the top one percent owns more than the bottom fifty percent combined.

Karl Marx saw the tendency toward wealth concentration clearly. But he drew the wrong conclusion. By framing the conflict as one between workers and entrepreneurs — between those who did not own the means of production and those who did — he directed the moral energy of the left against the productive class rather than the parasitic one. Entrepreneurs, who typically earn their position through genuine skill and risk-taking, were conflated with rentiers, who earn theirs through the passive ownership of scarce assets. The result was a century of political misdirection, in which the most vocal opponents of inequality attacked the mechanism of profit (which is generally compatible with a classless society) while leaving the mechanism of unearned income largely intact.

The Enlightenment's vision remains the only logically coherent alternative: strip away hereditary privilege, ensure equal access to education, and let individual merit determine social position. The problem is that this vision has never been fully implemented, because the race between nations systematically prevents it. No state can afford to make life difficult for

investors while its competitors court them. No government can abolish the mechanism of unearned income while others exploit it to attract capital. The social Achilles' heel of the Fossil Era — the new aristocracy of accumulated wealth — cannot be addressed within a single state. It requires the same thing that every other crisis of the third circle of dependency requires: a global solution.

Hobbes' State of Nature: No Equilibrium Between States

> *There are now more types of warfare than one can imagine and, within each, more weapons systems than anyone knows. Nuclear warfare is a scary prospect, but I have heard equally scary prospects of biological, cyber, chemical, space, and other types of warfare.*
>
> — *Ray Dalio*

Every human society has had to solve the problem of internal order. The solutions have varied enormously — from the egalitarian cooperation of hunter-gatherer bands to the brutal hierarchies of hydraulic empires — but every functioning society has solved it, in the sense that it has established some mechanism for constraining the pursuit of individual interest at the expense of the common good. Laws, courts, police, social norms: these are the instruments through which the state of nature that Hobbes described — the war of all against all — is prevented from operating within communities.

What no human society has yet solved is the problem of external order. Between states, the Hobbesian state of nature has never been abolished. It has been managed, temporarily and partially, by the dominant power of the moment: the Pax Romana, the Pax Mongolica, the Pax Britannica, the Pax Americana. Each imposed a form of order, but each was the order of a particular power pursuing its particular interests, not the order of a community governing itself for the common good. And each eventually collapsed as the dominant power declined and no replacement emerged to fill the vacuum.

For most of human history, the absence of global order was tolerable because most human communities were, in effect, isolated from one another. The oceans, mountains, and deserts that separated the great civilisations of Asia, Europe, Africa, and the Americas meant that the anarchic relationships between them had limited practical consequences. The Fossil Revolution ended that isolation. Modern technology has reduced the world to a single

interconnected system. Communication is instantaneous; military reach is global; the economic and ecological consequences of any state's decisions are felt everywhere.

The result is a paradox that defines the current moment. Humanity is already, in the material sense, a single community: interconnected by supply chains, financial markets, the internet, and a shared atmosphere. But it remains, in the political sense, a collection of sovereign states in permanent competition, with no common authority capable of binding them. The gap between material integration and political fragmentation is the fundamental source of the crises — climate, nuclear, democratic, economic — that are converging in the twenty-first century.

The statistics make the competitive pressure concrete. Between 2001 and 2022, global military spending nearly doubled, from $1.1 trillion to $2.2 trillion per year. Per capita military spending in China increased fivefold during that period; in Russia, threefold. The BRICS countries, which accounted for seventeen percent of global GDP in 1990, now account for thirty-one percent — roughly equal to the G7. China is expected to overtake the United States in total economic output by the late 2020s. The transition from a unipolar world order, in which American dominance provided a rough substitute for global governance, to a multipolar one — in which no single power is strong enough to impose order, and every power has incentives to undermine the others — is already underway.

This transition is the most dangerous moment in the history of the Fossil Era. Hegemonic transitions have historically been resolved by war: the declining power fights to maintain its position; the rising power fights to seize it; and the outcome determines the shape of the next world order. The next such war, between nuclear-armed superpowers, would not simply determine the shape of the next world order. It would, in all probability, end the capacity to have one.

Individual reasoning and collective catastrophe are not the same thing. Each nuclear state has excellent reasons, from its own perspective, to maintain and modernise its arsenal: deterrence works, and the state that disarms unilaterally exposes itself to coercion. Each state that chooses to externalise environmental costs has excellent reasons for doing so: the state that absorbs those costs is undercut by competitors who do not. Each state that refuses to bind itself by international law has excellent reasons: sovereignty is a real and valuable achievement. But the sum of all these individually rational decisions is a world racing toward collective catastrophe. The logic of the third circle of dependency — the anarchic interstate

order — produces outcomes that no individual state desires and all individual states contribute to.

This is the crisis that Part IV addresses. Not the ordinary crises of politics and economics, which human societies have always navigated, but the first crisis in human history where the race between nations, if not interrupted, leads not to a new cycle of rise and fall but to the end of the cycle altogether.

Part IV — Fourth Tidal Shift: Homo Deus sive Diabolus (The End of the Rise and Fall of Great Nations)

> *Nuclear weapons would only disappear once there were no more superpowers, and a politically united humanity had taken their place.*
>
> — *Herfried Münkler*

> *The big risk is that when existential, irreconcilable differences exist and there is no mutually agreed-upon party or process to adjudicate the conflict, there is a good chance that there will be a fight.*
>
> — *Ray Dalio*

Every previous tidal shift in human history has surprised the people living through it. The hunter-gatherers who first experimented with cultivating crops could not have predicted that agriculture would produce ten thousand years of servitude for the majority of humankind. The Enlightenment philosophers who celebrated the emancipation of reason could not have foreseen that the Industrial Revolution would simultaneously liberate billions from poverty and set in motion the processes that now threaten to make the planet uninhabitable. Each shift created conditions so radically new that the people who initiated it had no framework for grasping the consequences.

The fourth shift is different in one crucial respect: we can see it coming. We know that the race between nations, conducted with twenty-first-century weapons in a world of ecological limits, leads to outcomes that no individual state desires and all individual states are jointly creating. We know what a nuclear exchange would mean; we understand the dynamics of climate breakdown; we can calculate the trajectory of wealth concentration and democratic erosion. The knowledge is not the problem. The problem is the structure of the world — a structure in which individually rational behaviour produces collectively catastrophic results.

This is the fourth tidal shift: not the invention of a new technology, but the arrival of a moment when humanity must decide whether to govern itself as a whole, or be destroyed by the consequences of failing to do so. The name I give to this phase — Homo Deus sive Homo Diabolus — captures the choice. We have acquired the power of gods: to transform the living world, to reach beyond the atmosphere, to reshape the genetic code of life. Whether we use that power for creation or for destruction is the only question that now matters.

The Dilemma That Cannot Be Solved From Below

> *The human race's prospects of survival were considerably better when we were defenceless against tigers than they are today when we have become defenceless against ourselves.*
>
> — *Arnold Toynbee*

The paradox at the heart of the current crisis is almost unbearably simple. We have the knowledge and the technical capacity to solve every major problem threatening our species. The population question can be addressed through voluntary contraception without a single casualty. The climate crisis can be addressed through existing technologies — renewable energy, efficient transport, circular production — without reducing the quality of life in the industrialised world. The nuclear threat can in principle be eliminated: the arsenals that now contain fourteen thousand warheads were once more than seventy thousand, and the reductions achieved between 1986 and the early 2000s proved that the logic of deterrence does not require unlimited escalation.

What prevents these solutions from being implemented is not ignorance, not technology, not even popular will. What prevents them is the structure of the interstate system. Any state that unilaterally adopts environmental standards its competitors do not share makes its goods more expensive and loses market share. Any state that disarms while others maintain their arsenals invites coercion. Ukraine's experience — which surrendered its nuclear weapons in exchange for security guarantees that Russia subsequently violated — has not been lost on any government contemplating disarmament. The logic is iron: the first mover loses. And because every state knows this, no one moves.

This is what I mean by a problem that cannot be solved from below. Individual states, acting rationally within the current system, will consistently choose the course of action that is collectively destructive. Not because their leaders are malicious — though some are — but because the incentive structure leaves them no other viable option. The race between nations has its own momentum, and it runs toward catastrophe.

There is also an ideological dimension that makes the dilemma harder to break. Since the Industrial Revolution, the advancement of scientific and technical knowledge has become the universal religion of human civilisation — a doctrine that crosses all cultural, political, and religious boundaries. Buddhist, Muslim, Christian, and atheist governments all invest in science education. Authoritarian and democratic regimes alike sponsor research. The

scientific method is, as noted earlier, trans-moral and trans-aesthetic: it makes no demands about how people should live or what they should value. This universality is its greatest strength. It is also what makes it impossible, within the current framework, to distinguish beneficial from destructive innovation. The same institutional machinery that produces vaccines produces bioweapons. The same research culture that developed solar panels developed thermobaric bombs. Asking states to exercise restraint in scientific and technical development while competing for economic and military survival is asking them to fight with one hand tied behind their back.

The Nuclear Ratchet

> *Today's independent regional states are unable to maintain peace, to protect the biosphere from human pollution or to preserve the irreplaceable sources of raw materials. In an age in which mankind has acquired control of nuclear power, political agreement can only take place voluntarily. It will probably be delayed until catastrophes of such magnitude occur that mankind will eventually consent to a global political unity as a lesser evil.*
>
> — *Arnold Toynbee*

Nothing makes the vulnerability of the current world order more concrete than the global nuclear arsenal. Nine states — the United States, Russia, France, China, Britain, India, Pakistan, Israel, and North Korea — collectively maintain around twelve thousand nuclear warheads. American experts have estimated that three hundred warheads would be more than sufficient to deter any adversary: a retaliatory strike of that size would render the attacking country uninhabitable for centuries. The remaining eleven thousand seven hundred exist not for deterrence, but as the accumulated momentum of a race that neither side has been able to stop.

The partial successes of arms control deserve acknowledgement. Between 1986 and the early 2000s, the United States reduced its arsenal by eighty-five percent from its Cold War peak; Russia reduced by eighty-nine percent. The New START treaty, which limited deployed strategic warheads on each side to fifteen hundred, represented a genuine achievement of diplomacy. These reductions show that the race can, in principle, be slowed.

But it has not been stopped. Article VI of the 1968 Non-Proliferation Treaty committed the nuclear powers to pursue disarmament in good faith. That commitment has never been

honoured. The treaty is now being openly undermined: Russia suspended its participation in New START in 2023; the United States has abandoned several arms control agreements; China is expanding its arsenal; North Korea continues its programme; Iran approaches the threshold. Global military spending, which stood at $1.1 trillion in 2001, had nearly doubled to $2.2 trillion by 2022. The world is not moving toward disarmament. It is accelerating in the opposite direction.

The technical dimension of the problem is becoming more acute with each passing year. Supersonic missiles have reduced the warning time for an incoming strike from thirty minutes, which at least allowed for minimal human deliberation, to somewhere between five and fifteen minutes, depending on launch position. Within that window, the president of the attacked country must decide whether the warning is genuine or a false alarm, and whether to authorise a retaliatory strike that will kill tens of millions of people. There is no longer time for consultation with advisors, let alone a cabinet meeting. The decision will be made — if it is made at a human level at all — on the basis of a single person's gut instinct, or by automated systems operating without human intervention.

In 1983, the world came close to nuclear war not because of deliberate aggression but because of a malfunction in the Soviet early-warning system that indicated an incoming American strike. Lieutenant Colonel Stanislav Petrov, the duty officer that night, decided — correctly, as it turned out — that the warning was a false alarm. His decision saved civilisation. It was not policy, not deterrence theory, not diplomacy that prevented the exchange. It was one man's judgment in a moment of acute pressure. Noam Chomsky has noted that the continued avoidance of nuclear war is, by this point, 'nothing short of a miracle.' The miracle has held for eighty years. The mathematics of probability suggest it will not hold indefinitely.

What Causes Our Conscience to Fail?

> *The concentrated destructive power of weapons of mass destruction leaves us with a choice between peace with the help of a world government and the self-destruction of industrial societies.*
>
> — *Raymond Aron*

Universal conscience has not disappeared. Opinion polls consistently show that majorities in every country want to live in peace, want a clean environment, and want their children to inherit a functioning world. The values are there. What is absent is the institutional structure that would allow those values to override the competitive logic of the interstate system.

The European precedent is the most instructive we have. For centuries, the nation-states of Europe fought each other with increasing ferocity — the Thirty Years' War, the Napoleonic Wars, two world wars that together killed over a hundred million people. In 1945, the idea that France and Germany would within a generation be partners in a common political structure was regarded by serious people as fantasy. The 'realists' — the statesmen and strategists who prided themselves on their freedom from illusion — said that national interest was permanent, sovereignty was non-negotiable, and any supranational authority was utopian.

They were wrong. What changed was not human nature. What changed was the exhaustion of the alternatives. Two world wars had demonstrated, with devastating clarity, that the logic of sovereign competition led to catastrophe. The European project was not built on idealism; it was built on the recognition, shared by people who had lived through the catastrophe, that the old system had failed. The coal and steel community of 1951, the Treaty of Rome of 1957, the steady expansion of shared institutions over the following decades — these were acts of pragmatic self-preservation by states that had learned, at enormous cost, what sovereign competition produced.

The global situation today is analogous, with two crucial differences. The first is scale: the catastrophe we are trying to prevent is not a European civil war but the potential extinction of complex life on earth. The second is timing: the European states had the luxury of learning from two catastrophes before building the institutions to prevent a third. We may not have that luxury. A nuclear exchange between great powers, an engineered pandemic, or a runaway climate transition might not leave a world capable of drawing lessons and building institutions. The learning must happen before the catastrophe, not after.

This is the deepest challenge of the fourth tidal shift. Not the technical problems — we know how to solve those — but the political and psychological problem of building the will to create, before the catastrophe that would otherwise be necessary to motivate it, the institutions of common governance that survival now requires.

The Holodox Principle in the Post-Fossil Era

> *The world has become one interconnected place, but not yet one integral nation.*
> *Years of denial and drift have allowed the preconditions for cataclysm to strengthen.*
>
> — *Paul Raskin*

The core insight of holodoxy — the systematic study of the relationship between the whole and its parts — is that the health of the whole and the health of the parts are not separable. A cell that grows without constraint, without reference to the needs of the organism it inhabits, is not exercising freedom. It is cancer.

The current global system has the structure of a body in which all the cells are pursuing their individual interests without any coordinating principle that refers to the health of the whole. Each state maximises its own power, its own economic output, its own military capability. Each corporation maximises its own profit. Each individual maximises their own utility. These are all rational, even admirable, pursuits within their appropriate domain. But when they operate without reference to the systems that make them possible — the ecological systems, the social systems, the political systems — they destroy the conditions of their own existence.

The holodox principle in the post-fossil era states this with clarity: changes in the parts are only effective if, simultaneously, the whole changes. A country that eliminates its carbon emissions while others expand theirs has made a sacrifice without achieving an outcome. A state that disarms while its rivals modernise has weakened itself without reducing the global threat. The old slogan 'think globally, act locally' has lost its validity — not because local action is worthless, but because it is insufficient. The crises we face are structural, and structural crises require structural solutions.

The European Commission is the best existing model of what such a structural solution looks like. It is not a world government; its powers are limited and contested. But it is an institution that exercises genuine authority over sovereign states in matters of common interest — trade,

competition, environmental standards, human rights — and that does so through democratic procedures rather than military coercion. Its imperfections are real and well-documented. But its existence proves something important: states that were recently killing each other in the millions can build institutions of common governance when the alternative is sufficiently clear.

The United Nations: Universal Conscience Without Authority

> *War is a horrible thing ... unless it is ended it will certainly end human society. An effective will for world peace is an effective will for world law under a world government; for in no other fashion is a secure world peace conceivable.*
>
> *— H. G. Wells*

The United Nations is the first institutional expression of universal conscience at global scale. It embodies the recognition — shared, in principle, by all its member states — that the anarchy of the interstate system must eventually be overcome, and that the human community has interests that transcend the interests of any individual state.

It has also been almost entirely powerless in practice, for reasons that are structurally inevitable given its design. The UN has no independent military force; it can only draw on troops lent by member states, which means it has no capacity for enforcement that those states do not choose to provide. The Security Council veto means that any of the five permanent members can block any binding resolution — which means the institution can only act when the interests of the great powers happen to align, which is precisely the circumstance in which it is least needed. The General Assembly can pass resolutions by democratic majority, but those resolutions have no legal force and are routinely ignored by the states they target.

The pattern of behaviour this produces is cynical and predictable. States invoke the UN's authority when it serves their interests and ignore or undermine it when it does not. China and Russia disregard rulings by the International Court of Justice when those rulings constrain their actions, while loudly praising multilateralism when it can be used to embarrass the United States. The United States withdraws from agencies and treaties it finds inconvenient, while insisting on the legitimacy of a rules-based international order that it effectively defines

unilaterally. The institution that was meant to transcend the logic of national interest has been colonised by it.

This does not mean the UN is worthless. Its specialised agencies — the World Health Organization, the World Food Programme, the United Nations High Commissioner for Refugees — do genuine and important work. The Security Council occasionally achieves consensus on matters of genuine global concern. The institution maintains the idea, at least, of a community of nations with shared responsibilities. But it cannot, as currently constituted, perform the functions that the current moment demands: binding states to environmental commitments they would otherwise defect from, enforcing arms control agreements, preventing the privatisation of global commons, or adjudicating conflicts between great powers.

The gap between what the UN is and what the world needs it to be is one of the defining features of the current crisis. Filling that gap — transforming the UN, or building alongside it institutions with real authority — is the central political challenge of the twenty-first century.

Cruel Leviathan, Mild Hegemon — and the Vacuum Between

> *The long-term momentum in the US is toward increasing division. The fact that the US is simultaneously deeply indebted, internationally weakened, and experiencing serious internal conflict should concern both Americans and non-Americans who depend on them.*
>
> — *Ray Dalio*

The absence of global governance has, for most of recent history, been partially compensated by American hegemony. At the end of the Second World War, the United States accounted for more than half of all global military spending. It was the undisputed leading power — and, crucially, it used that power in a way that was, by historical standards, unusually benign. It did not convert its dominance into direct territorial conquest. It established international institutions — the UN, the World Bank, the International Monetary Fund, the GATT — that served American interests but also provided genuine public goods. Arnold Toynbee noted, with evident surprise, that America was making its imperial position felt by giving economic aid rather than exploiting the peoples under its sway. The Pax Americana created the conditions for the most rapid and widespread improvement in human welfare in recorded history.

It also created the conditions for its own erosion. By opening its markets and sharing its technology, the United States enabled the rise of the very competitors that would challenge its dominance. Japan, South Korea, Taiwan, and eventually China grew rich under the American order, and their growth redistributed the global balance of power. By 2022, the BRICS countries collectively matched the G7 in purchasing power. China is expected to surpass the United States in total economic output within the decade. The US share of global military spending has fallen from over fifty percent in 1945 to thirty-eight percent today, while China's has risen to fourteen percent and continues to climb. The hegemony that kept the peace is declining; no replacement has emerged; and the transition period — which history suggests is the most dangerous phase — is already underway.

The alternatives to American hegemony are not attractive. The Leviathan model — enforced order through the dominance of the strongest — has two contemporary exemplars: Putin's Russia, which asserts its 'sphere of influence' through military invasion, assassinations abroad, and systematic repression at home; and Xi's China, which has built the most comprehensive surveillance state in history while pursuing territorial expansion across the South China Sea and along the Himalayan border. Neither offers a model of global order compatible with human dignity. The choice between an imperfect American hegemony and a world governed by the logic of Beijing or Moscow is not a difficult one.

But the American hegemon is no longer reliable. Its domestic politics have become an arena of factional warfare that makes consistent foreign policy difficult. Its infrastructure is decaying; its educational system is deteriorating; its social fabric is fraying. Donald Trump's presidency — and the possibility of its continuation — represents not just a policy disagreement but a challenge to the institutional norms that allowed American power to function as a relatively benign world order. A hegemon that withdraws from climate agreements, attacks international institutions, and treats alliances as protection rackets is not a substitute for global governance; it is an obstacle to it.

The hard truth is that neither American hegemony nor any conceivable replacement hegemon is adequate to the demands of the twenty-first century. The crises we face — climate, nuclear, democratic erosion, ecological collapse — are structural problems that require structural solutions. No single state, however powerful, can solve them unilaterally. And the declining power of the existing hegemon, combined with the absence of a legitimate successor, creates exactly the kind of dangerous vacuum that hegemonic transitions have historically filled with war.

There Will Be No Lasting Multipolar World Order

> *The only salvation for civilisation and the human race lies in the formation of a world government. So long as sovereign states have weapons and military secrets, wars will be inevitable.*
>
> *— Albert Einstein*

When Russia and China call for a 'multipolar world order', they are not advocating for democracy at the international level. They are advocating for a system in which their power is not constrained by American dominance — which is a reasonable grievance — but without any alternative constraint. The multipolarity they envision is a world in which each great power does as it pleases within its sphere of influence, without interference from outside. This is not a new world order. It is the old Hobbesian state of nature, dressed up in the language of sovereignty and equality.

The only genuine meaning of a multipolar order — the only version that is not simply a euphemism for great-power competition — is democracy at the international level: a system in which all states, large and small, participate in making binding decisions about matters of common concern, and in which those decisions are enforced by institutions that no single state can unilaterally override. This is, of course, what the United Nations was supposed to be, and what it has failed to become.

Max Weber's insight about the state applies equally to the international order: peace requires a monopoly on legitimate violence. A world in which every state retains the sovereign right to go to war, to develop weapons of mass destruction, and to pollute the global commons without external accountability is not a multipolar order. It is organised anarchy. And organised anarchy, in a world of nuclear weapons and ecological limits, is a death sentence.

The sovereignty of the parts must end precisely where it threatens the survival of the whole. No state should have sovereign authority over the production of weapons capable of planetary destruction. No state should have the sovereign right to emit greenhouse gases above a level compatible with a stable climate. No state should be able to claim exclusive ownership of resources — ocean fisheries, atmospheric capacity, fresh water systems — that belong to humanity as a whole. These are not utopian demands. They are the minimum conditions for the continuation of organised human life. And they are incompatible with the system of unlimited state sovereignty that currently prevails.

Doom and Gloom — Or Something Else?

> *The solidarity of a state is due primarily to its need to defend itself against other states; one loves one's fellow countrymen because one hates foreigners. That is primitive instinct, still there beneath a superficial covering of civilisation. We reach love of our neighbours directly; love of Humanity is a cultivated taste, reached only at second hand.*
>
> — *Arnold Toynbee*

Fifty years ago, the German scientist Hoimar von Ditfurth wrote a book whose title translates roughly as 'Let us plant an apple tree — the apocalypse is near.' His argument was not a warning but a verdict: the destruction of the natural world was already inevitable, and the most honest response was to continue living as meaningfully as possible while the end approached. His book caused a brief sensation and was then, characteristically, forgotten. The audience preferred not to receive the message.

I cannot follow Ditfurth in his radical pessimism — but I can follow his logic up to a point. He is right, as I have argued throughout this book, as long as the race between nations continues unabated. If the current system persists — if states continue to compete without binding rules, if weapons continue to proliferate, if the atmosphere continues to be treated as a free dump — then the outcome is, over the medium term, catastrophic. The mathematics are not kind.

But the current system is not a law of nature. It is a set of human arrangements that humans created and that humans can change. The European Union did not exist in 1945; it was built, painstakingly and imperfectly, by people who decided that the alternative was unacceptable. The partial successes of nuclear arms control — reducing the global arsenal from seventy thousand to fourteen thousand — show that states can cooperate even in domains where their security interests seem to conflict irreconcilably. The Montreal Protocol, which reversed the depletion of the ozone layer, shows that global collective action on environmental threats is possible.

These precedents are modest. The ozone layer is not the climate system; the Montreal Protocol did not require restructuring the global economy. The European Union encompasses twenty-seven states; a world government would encompass nearly two hundred, in vastly different conditions of development, culture, and political tradition. The gap between what

has been achieved and what is needed is enormous. But the direction is correct, and the need is clear.

The question is whether humanity will find the will to close that gap before a catastrophe forces it to — or whether, like the European states before 1914 and again before 1939, it will wait until the disaster has occurred before drawing the lessons. Europe had two world wars to learn from. We may not be afforded that repetition.

One World: A Global Community

> *The Planetary Phase calls for a global movement: an encompassing cultural and political awakening united under the banner of our shared humanity.*
>
> — *Paul Raskin*

Against the will of every state that has contributed to it, against the intentions of every inventor and entrepreneur and general who has shaped it, humanity has already become, in the material sense, a single community. The supply chains that feed, clothe, and equip eight billion people cross every border. The atmosphere that every person breathes is shared. The financial systems that determine employment and poverty in Lagos and Lima are linked to decisions made in New York and Frankfurt. The internet — despite the walls that authoritarian governments have built around portions of it — connects virtually every human being to virtually every other. A pandemic that began in a wet market in Wuhan reached the hospitals of New York and London in weeks.

This material integration is the greatest achievement of the Fossil Era and its most dangerous legacy. Greatest, because it has enabled the reduction of poverty, the spread of education and medicine, and the enrichment of human culture on a scale unimaginable to previous centuries. Dangerous, because it has created interdependencies that can transmit catastrophe as efficiently as they transmit prosperity — and because it has not been matched by any equivalent political integration.

The gap between material and political integration is the defining fault line of the twenty-first century. Humanity is already one world in every functional sense. It is not yet one world in the only sense that would allow it to manage the consequences of that unity: a world with institutions capable of making and enforcing binding decisions about matters of common concern.

Both China and Europe invoke, in their different ways, the idea of a shared global destiny. China's Belt and Road Initiative, whatever its strategic purposes, embodies a vision of global economic integration with Beijing at its hub. The European Union, in its best moments, represents a model of sovereign states pooling authority in the service of common goals. Neither vision is adequate: China's model reproduces the logic of imperial hegemony with Chinese characteristics; Europe's model remains too parochial, too dependent on American security, too internally divided to serve as a template for global governance. But both reflect an awareness — however instrumentalised — that the nation-state is no longer sufficient as the ultimate unit of political organisation.

The US has been the world's leading power for a century, not by design but by the logic of technological development that brought all nations into permanent contact. That role is now declining. The question is not whether American hegemony will end — it will — but what replaces it. The alternatives are three: a new hegemony (Chinese or otherwise), renewed anarchic competition among great powers, or the construction of genuine global institutions. The first leads eventually to the same dynamic as the present; the second accelerates it; only the third offers a way out of the cycle.

Why We May Hope

> *For states, there can be no other way out of the state of lawlessness, which is nothing but war, than for them, like individuals, to give up their wild (lawless) freedom.*
>
> — *Immanuel Kant*

Hope, in this context, is not optimism. Optimism is the belief that things will turn out well regardless of what we do. Hope is the recognition that things might turn out well if we choose wisely, and that the choice is still ours to make.

The argument for hope is not that human beings are fundamentally good — the evidence for that is, at best, mixed. The argument for hope is that human beings are fundamentally rational, and that the case for cooperation, clearly understood, is stronger than the case for competition. The tragedy of the commons — in which individually rational actors collectively destroy a shared resource — is not resolved by changing human nature. It is resolved by changing the rules: by creating institutions that align individual incentives with collective welfare.

This has been done before, on smaller scales. Within states, it was done by the establishment of law, courts, police, and taxation — institutions that constrain individual freedom in the service of collective survival. Between states, it has been partially done by the European Union, by international trade law, by arms control agreements, by the norms and institutions of international law however imperfect. The trajectory of human history, examined at sufficient scale, is one of progressive expansion of the circle within which binding rules apply. The question is whether that expansion can reach its logical conclusion — a global order with genuine authority — before the consequences of failing to do so become irreversible.

Universal conscience gives reason for a cautious affirmative. It has been present, as this book has tried to show, throughout the entire span of human history — in the totemism of Australian hunter-gatherers, in the Christianity of the Roman Empire, in the Enlightenment philosophy of the eighteenth century, in the Universal Declaration of Human Rights of 1948. It has been suppressed, corrupted, and weaponised. It has never been extinguished. And it is, today, more widely diffused and more clearly articulated than at any previous point in human history. The global communications infrastructure that authoritarian regimes use to spread propaganda and manipulation also transmits, unstoppably, the evidence of shared humanity: the suffering of others, the beauty of the world, the possibility of a different future.

Just a few years before Germany and France committed themselves to the project of European integration, they were what they had been for three centuries: mortal enemies. The statesmen who negotiated the Treaty of Paris in 1951, which placed their coal and steel industries under common authority, were people who had personally lived through two wars. They chose integration not because they had transcended nationalism, but because they had understood what nationalism, taken to its logical conclusion, produced. That understanding was sufficient.

Today, the whole world stands where Europe stood in the late 1940s — facing a choice between the continuation of competitive nationalism and the construction of institutions adequate to common survival. The difference is that the catastrophes that would educate the world as two world wars educated Europe might be the last catastrophes humanity is capable of surviving. Herfried Münkler is right that a politically united humanity 'lies in the distant future.' But he is wrong — or at least he must be wrong — if he means that we can afford to wait for it.

Towards a New Consciousness

The institutional challenge of the fourth tidal shift cannot be met without a corresponding shift in consciousness. Not a transformation of human nature — that is beyond anyone's power to engineer — but a shift in how we understand the relationship between individual freedom and collective responsibility, between national interest and human survival.

The Enlightenment gave humanity its most powerful intellectual tools. Science, democracy, human rights, the principle that social position should reflect merit rather than birth — these are not merely European values. They are the most reliable instruments humanity has yet developed for organising collective life in a way that is compatible with human dignity. They should not be abandoned.

But the Enlightenment had a flaw, and that flaw has become increasingly dangerous over time. In its enthusiasm for reason, it systematically marginalised the moral dimension of human existence — the domain of values, conscience, and meaning that cannot be derived from scientific calculation. It treated the trans-moral character of science not as a limitation but as a virtue. And in doing so, it created a civilisation extraordinarily powerful in its means and dangerously impoverished in its purposes.

Science can tell us how to release the energy in a uranium atom. It cannot tell us whether we should use that knowledge to build a power plant or a warhead. Technology can produce a communication network that connects every human being on earth. It cannot tell us whether to use it to spread truth or lies, solidarity or hatred. These are moral questions. They cannot be answered by calculation. They require what the Romans called religio — not in the narrow sense of institutional religion, but in the original sense of the word: a bond, a connection, an acknowledgment of obligation to something larger than oneself.

Universal conscience is that bond. It is not a vague sentiment. It is an empirical reality, attested across the full span of human history — in every culture, in every epoch, under every form of social organisation. It manifests differently in different contexts: as totemism among hunter-gatherers, as prophetic religion in agrarian civilisations, as the Enlightenment concept of human rights in the modern era. But in each manifestation, its core content is the same: the recognition that other human beings matter, that their suffering is not indifferent to us, that the community of those to whom we owe obligation extends beyond the borders of our immediate group.

The task of the post-fossil era is to give that recognition institutional form. To build, on the foundations of the Enlightenment — science, democracy, the rule of law — a political structure adequate to the scale of human interdependence that the Fossil Era has created. A structure in which the moral question — what kind of world do we want to leave to those who come after us? — has a forum in which it can be asked and answered, and institutions through which the answer can be enforced.

This is not a utopia. Utopia means 'no place' — a perfect order that exists nowhere and can be approached only asymptotically. What is being proposed here is not perfection but adequacy: institutions that are adequate to the problems they are asked to solve, as the European Union has been adequate — imperfect, contested, but real — to the problem of preventing war among European states.

The human community — whether at the level of the individual state or of humanity as a whole — is, in the deepest sense, a moral purpose achieved through technical means. The means, including the trans-moral sciences, must never become ends in themselves. The purpose of human life, in its moral and aesthetic dimensions, may use rational means, but it cannot be reduced to them. Reason must be in the service of life, and thus of universal conscience.

That service is what the fourth tidal shift demands. It is also what it makes possible — for the first time in human history, in a world that is already materially one, the construction of a political order that is adequate to that unity. We have never been closer to disaster. We have never been closer to the possibility of transcending it.

Part V: The Twelve Main Theses

1. ***Universal conscience*** runs like a thread from the earliest hunter-gatherers to the present day (pp. 14, 15, 22, 23, 24, 35, 81). Every known human society has regarded peace among its members as the highest good. This is not sentiment — it is a demonstrable pattern across millennia (p. 89, 65).

2. Yet ***the very source of social peace is also the source of war***. Rules bind a community together by making its members predictable to one another. But each community generates its own rules — and those rules make neighbouring communities unpredictable, and therefore threatening. The result is an enduring tension between two opposing forces: the drive toward unity and the pull of separation (pp. 5, 13, 24, 77). Over the full sweep of history, unity has gained the upper hand — enough to speak of a *quasi-law* (pp. 16, 77). Only the completion of that trend — the formation of a single global community — can permanently dissolve the opposition between the morality we extend to *our own* and the hostility we reserve for *the other* (p. 13).

3. History is driven by two forces: ***universal conscience*** and the ***serendipity of invention.*** Language, agriculture, the industrial revolution, and the coming post-fossil civilisation — the four great turning points — were each triggered by unpredictable inventions. The first was evolution's gift; the other three were humanity's own doing (pp. 8, 9, 11, 12).

4. About twelve thousand years ago, the invention of agriculture set the ***agrarian dependency formula*** in motion: a small ruling class extracted the labour of a food-producing majority — at least eighty percent of the population — across virtually every mass society on earth (pp. 30, 33, 34, 85). Only tiny 'garden cultures' escaped this pattern. Breaking it required the fossil-energy revolution.

5. Capitalism is usually treated as the defining feature of the industrial era. From a holodox perspective, it is better understood as one expression of a broader ***privatisation of power*** — a transformation that reached into every domain of life, and for the first time in history made genuine democracy possible for whole populations, including women (pp. 44, 45, 54, 120, 121, 123, 144).

6. ***Competition*** — so often maligned — is an indispensable condition of equal opportunity. Hierarchies and dictatorships suppress it; free societies depend on it. But

controlled competition is one thing; the *anarchic race among nations for military and economic supremacy* is another. The latter knows no rules, and could end in self-destruction (pp. 8, 12, 16, 43, 56, 63, 68).

7. Long before Marx, the Enlightenment dreamed of a ***classless society*** in which *personal ability* — knowledge and skill — would determine a person's standing (pp. 36, 54, 56). Yet from its first day, democracies harbour a contradiction: the manufacturing economy, the very foundation of the new order, operates on principles that are anything but democratic (pp. 47, 49, 98).

8. Even in well-functioning democracies, wealth tends to compound independently of merit. The ***mechanism of interest*** channels money upward regardless of individual merit, producing a steady flow from the many to the few (pp. 54, 116, 120, 121, 123). Redistribution can slow this drift — but cannot reverse it so long as the race between nations continues.

9. Universal conscience demands a ***just state***: one in which differences in reward and prestige reflect generally accepted standards of knowledge and skill, not the accident of birth or the power of capital (29, 31, 36, 43, 44, 45, 54, 73, 83).

10. Science and technology are now humanity's most powerful instruments — and its most dangerous. The mounting ***complexity of modern civilisation*** is building a new Tower of Babel, with ever more specialised sublanguages that no single person can master (53, 144). More ominous still: our command of nature may end in ecological and nuclear catastrophe.

11. Science and technology are *trans-moral* and *trans-aesthetic*: they operate beyond questions of good, bad, beautiful, or ugly (12, 44, 46, 60, 73, 94). It is ***shared moral values*** that make people predictable to one another — the indispensable precondition of community (4, 13, 15, 53,). A worldview that loses sight of this fact invites fragmentation and conflict.

12. ***The state is a moral purpose achieved by technical means***. Before the scientific revolution, this was taken for granted everywhere (50). But the race between nations has inverted the logic: the means have become ends in themselves, because each state gains advantage from them (46). Only a world government can close this fatal loop and allow universal conscience to prevail.

References

The sections that follow expand on themes introduced in the main text. They are intended for readers who wish to pursue individual arguments in greater depth. The sections can be read in any order; each is self-contained.

1 Unity versus Separation (Separatism)

People become predictable to one another when they share a common language, common customs, and common moral imperatives. These shared frameworks are the precondition for social trust. Yet the same commonality that builds cohesion within a community simultaneously generates opposition to those outside it — the 'strangers' who speak differently, observe different rules, and follow different beliefs. Max Weber was, to this author's knowledge, the first to systematically describe the contrast between internal and external morality (Binnen- versus Außenmoral) in sociological terms. Desmond Morris puts the matter this way: "The strong urge towards mutual assistance … has become susceptible to powerful arousal in intra-specific aggressive contexts. Loyalty on the hunt has become loyalty in fighting, and war is born. Ironically, it is the evolution of a deep-seated urge to help our fellows that has been the main cause of all the major horrors of war." Every soccer match proves just how much maximum cooperation within a team boosts its success against rivals. The winning team is admired for its superior competitive efficiency — in a feigned struggle for existence, it has prevailed. But it owes its victory to perfect internal cooperation, and that cooperation generates its own specific form of satisfaction that is irreducible to the competitive dimension. Cooperation precedes the fight and is its indispensable precondition. Competition between polities was first established in Europe in the history of the Greek city-states, which lived together — or rather against each other — in a geographically very small area.

Ingroup loyalty and cohesion could produce outward divergences so marked that members of different groups appeared to belong to different species. Konrad Lorenz summed up this diversity of lifestyles: 'Let us assume that a zoologist had come from Mars who was well informed about the sociology of various animal species but knew nothing of the specific achievements of the human mind. If such a researcher compared, for example, the clothing and dwellings of New Yorkers with those of the Papuans in central New Guinea, he would certainly

believe that these cultural groups belong to different species, perhaps even different genera" (Lorenz 1977; p. 223).

Within groups, the tolerance of divergence is not fixed; it shifts over time and across societies. Tolerance can develop naturally, as it did toward Jews in Germany during the 19th century, but it can also turn into radical intolerance for the sake of political agitation, as it did under Hitler. Carl Schmitt, the Nazi head of German legal theorists in the first half of the 1930s, offers an extreme example of what happens when the scientific concept of objective truth is rejected on ideological grounds: "An alien to the species /he thinks of Jews/ may act however critically and strive however perceptively, may read books and write books; he thinks and understands differently because he is of a different kind, and remains in the existential conditions of his own species in every decisive train of thought" (Acham 2016). The rejection of universal scientific truth in favour of racially determined knowledge is the reductio ad absurdum of the anti-Enlightenment position. Less bloody in its consequences but still bound by the same logic of racial segregation is the idea that Shakespeare's Othello should be played only by Black actors, as if the poet himself had possessed a Black mind. Other separating characteristics, which would have triggered reflexive rejection a generation ago, are nowadays widely accepted. Yet it remains true, that every society draws a line somewhere. The reason is consistent: people are uncomfortable with those who refuse the common rules, because unpredictability in small matters raises doubts about reliability in larger ones.

Against this pressure toward conformity, every society also depends on the diversity of its members' talents and perspectives. A community that suppresses all individual idiosyncrasy will ossify; just as genetic diversity within a species enhances adaptive capacity in changing environments, so individual diversity within a society enhances its resilience and creative potential. The tension between unifying rules and separating idiosyncrasies is therefore not a pathology but a structural feature of all human communities — one that is never finally resolved, only continuously managed. Fukuyama (2018) identifies the outer limit of this argument: "The extreme example of what can happen absent national identity is state breakdown and civil war.' Cohesion and conflict are two sides of the same coin." And: "If we do not agree on a minimal common culture, we cannot cooperate on shared tasks and will not regard the same institutions as legitimate; indeed, we will not even be able to communicate with one another." The problem of the global community is, in this sense, the problem of the nation-state writ large.

However, the two opposing tendencies of separatism and unity are not equally pronounced. Historically, the tendency toward standardisation has prevailed. The most powerful driver is

the fear of the unknown: when peoples with different languages and customs encounter one another, the outcome is usually war unless one absorbs the other, with the stronger typically imposing its rules on the weaker, or — more rarely — genuine mutual assimilation taking place. Over the twelve thousand years of agrarian civilisation, a further motive reinforced this tendency: rulers sought to expand the taxable population and enhance their power at the expense of rival neighbours, thereby consolidating peace within enlarged political entities. The Roman Empire, the Habsburg Monarchy, the Russian Empire, and many other unions formed under a single government followed this pattern. Such entities rarely attempted to standardise language, custom, or belief — the prince wanted taxes, not cultural uniformity — and were therefore always vulnerable to separatist disintegration as soon as central authority weakened.

The long-term direction of this process is nonetheless unmistakable. Families became clans; clans became tribes; tribes became city-states and kingdoms; kingdoms became empires. Today, only three genuine superpowers remain — China, the United States, and a rapidly declining Russia — alongside a number of significant regional powers. The reason for this long-run convergence toward ever larger political units is not difficult to identify: it is the escalating threat of mutual annihilation through increasingly comprehensive, powerful, and unpredictable instruments of destruction. "Any state that hopes to maintain its political autonomy is forced to adopt the technology of its enemies and rivals" (Fukuyama 1992). This apocalyptic pressure makes the final convergence toward a united humanity not merely desirable but, over time, likely to be experienced as necessary. Only such a step can permanently eliminate the mutual unpredictability that generates the race between superpowers. Only this step can guarantee peace.

1a Unity versus Separatism within Groups

Unity is the result of natural bonds – mostly in families – and outward pressure. In prehistoric times, the latter predominantly resulted from competing tribes and dangerous beasts. When pressure relaxed there could be much strife within groups. "Modern hunter-gatherer life is famously violent; with no real hierarchy to keep their passions in check, young hunters often treat homicide as a reasonable way to settle disagreements. In many bands, it is the leading cause of death" (Ian Morris 2010). Even primitive garden cultures were not immune to violence. Jared Diamond notes that New Guineans "have been living in societies where human numbers were too low for epidemic diseases of dense populations to evolve. Instead, traditional New Guineans suffered high mortality from murder, chronic tribal warfare, accidents, and problems in procuring food." When the imperatives of survival dictated human behavior, minimizing social antagonisms could be much more

appealing. Joseph Henrich (2019) describes the sharing ethic among the Hadza: "Social norms dictate that the hunter-gatherer must share, so his store of goods won't last for more than a couple of weeks. In short, among the Hadza, one just can't get too attached to one's stuff, because soon it will be someone else's stuff." A hunter-gatherer from the Inuit tribe expressed the underlying ethic succinctly when thanked for a lavish gift of prey: "Up in our country we are human. And since we are human, we help each other. We don't like to hear anybody say thanks for that. What I get today you may get tomorrow. Up here we say that by gifts one makes slaves and by whips one makes dogs" (Graeber 2012). Under different circumstances, however, these lofty ethical prescriptions could easily be corrupted. The Kwakiutl of the Pacific Northwest illustrate an exceptional case: sedentary hunter-gatherers whose abundant fish supply permitted a hereditary aristocracy. The original tradition of sharing persisted in the form of the potlatch festival, at which aristocrats distributed accumulated wealth — blankets, furs, canoes, slaves, and food — to peers of equivalent rank. The moral obligation was to reciprocate within one or two years with gifts of at least equal value. This system preserved the form of redistribution while transforming its social function: sharing was now restricted to the privileged few at the apex of the pyramid, reinforcing hierarchy rather than levelling it. "The purpose of all Kwakiutl enterprises was to outdo rivals ... Measured against the standards of other cultures, the speeches of the chiefs at the Potlatch festivals were an expression of megalomania" (Ruth Benedict). Erich Fromm categorized the Kwakiutl as "destructive societies" (see also Huizinga 2006). Marvin Harris tracing potlatch back to its ancient root of mutual sharing provided a more balanced interpretation.

1b Technology as a uniting factor

Jared Diamond (1997) estimates that "if the Americas had been settled at average modern hunter-gatherer population density of somewhat under one person per square mile (a high value for modern hunter-gatherers), then the whole area of the Americas would eventually have held about 10 million hunter-gatherers /instead of actually 1 billion/. Being scattered over large stretches of land, our distant ancestors were almost untouched by epidemics. The situation is quite different in our time. Ulrich Menzel (2023) illustrates the compression of time through technology: "In the mid-14th century, it took about twenty to thirty years for the plague to spread from the central Chinese province of Wuhan to the coastal cities and the end points of the ancient Silk Road … In 2020, it took only a few hours by plane for coronavirus to reach Heinsberg in the Lower Rhine region of Germany, from where it spread literally in no time at all."

2 Language and Writing

In emphasising language as the decisive distinguishing feature between apes and Homo sapiens, I differ from Desmond Morris, who treats language as only one of several distinguishing features.

Morris is nonetheless acutely aware of its uniqueness: "The astonishing rate of learning in the field of vocal imitation is unique to our species and must be considered as one of our greatest achievements. There is nothing like it, nothing even remotely approaching it, in other closely related living primates."

Whether the storage of linguistic meaning requires a spatially separate brain region, or whether meaning and signs are stored alongside each other, is a question that only neurological research can resolve. What is logically unavoidable is that a new functional capacity must have been added — that is, the brain's capabilities must have been expanded. See Gero Jenner: The Principles of Language – towards trans-Chomskyan Linguistics (revised edition Amazon 2019) and as an introduction: Noam Chomsky as a Linguist: A Great Vision defeated by Faulty Logic (Amazon 2020).

Jared Diamond (1977) on the independent invention of writing: “The two indisputably independent inventions of writing were achieved by the Sumerians of Mesopotamia somewhat before 3000 B.C. and by Mexican Indians before 600 B.C. (Figure 12.1); Egyptian writing of 3000 B.C. and Chinese writing (by 1300 B.C.) may also have arisen independently. Probably all other peoples who have developed writing since then have borrowed, adapted, or at least been inspired by existing systems.”

3 India's Reverence for Life

No epoch in the history of agrarian civilisation produced greater inequality or more endemic warfare than the ten millennia between the Neolithic Revolution and the Industrial Revolution. Yet this general pattern admitted of striking exceptions — the most sustained and intellectually rich of which was classical India.

When the concept of reincarnation established itself in Hindu thought, perhaps two or three centuries before the Common Era, it transformed the moral status of all living beings. From blades of grass to elephants, from the lowest-caste labourer to the gods themselves, every creature was understood as a wandering soul on the path toward liberation — a soul whose present station reflected the accumulated moral weight of previous lives, and whose future station would reflect the choices of this one. Moral conduct within one's caste held the promise of a higher rebirth; misconduct risked a descent in the hierarchy of beings, as far as the 'Pretas' — the terrifying hungry spirits of Hindu cosmology. This profoundly moral worldview transformed the entire web of living beings into a single moral community.

The practical consequences were distinctive. Classical India — at least its high-caste culture — became a civilisation of vegetarians. While China never had fundamental reservations about consuming meat (though the majority could rarely afford it), and while European civilisation industrialised animal slaughter from the nineteenth century onward, high-caste Hindus regarded the killing of any living being as a moral violation. It is worth noting that the moral inhibition against killing and eating animals that characterises Hindu India had close parallels in totemistic systems worldwide. When people become vegetarians, it is because they recognise — as science has long confirmed — that humans and animals are branches on the same evolutionary tree. The specific content of the prohibition varies across cultures, but the underlying logic is the same: the living world constitutes a moral community. A. L. Basham notes, however, that war was not, even in India, categorically renounced: "War was generally accepted as a normal activity of the state, even by Buddhist kings. The doctrine of non-violence, which in medieval India had become very influential and had made most of the respectable classes vegetarian, was never at this time taken to forbid war or capital punishment. It was only in modern times that Mahatma Gandhi reinterpreted it in this sense." The warrior caste's licence to kill humans coexisted for millennia with a general taboo among Brahmins on killing animals.

The claim in one of India's holiest texts, the Bhagavad Gita, that killing in warfare was a duty and right of the Kshatriya caste — the warrior order — appeared quite normal against this background. In practice, it resolved the same tension that every agrarian civilisation faced: the subjugation of the lower ninety percent required the threat or use of force, and someone had to exercise it. The Brahmins — the intellectual and spiritual leadership — delegated that function to the warrior caste, much as the medieval Church in the Christian West left the execution of heretics and witches to the secular arm.

The cultural achievement of Hinduism lay in a different domain. Where the great empires of Mesopotamia and China sought maximum uniformity within their territories — through linguistic standardisation, common economic systems, and administrative homogeneity — Hinduism made pluralism of worldviews and traditions its very foundation. Truth was not denied; it was hierarchised. The highest truth could be grasped, in principle, only by those who had attained the highest level of spiritual development — the Brahmins. All others were at various removes from it. But this hierarchical epistemology generated, paradoxically, a culture of extraordinary intellectual tolerance: so long as the spiritual authority of the Brahmins and the secular authority of the warriors remained unchallenged, each caste was free to find its path to salvation in its own way. Hinduism's tolerance had no difficulty

absorbing Christ or Mohammed as avatars of Indian deities — but the reverse was not true: Islam refused this appropriation and fought Hinduism with extreme brutality. Will Durant's assessment is stark: "The Muslim conquest of India is probably the bloodiest event in world history. It is a disheartening story because it conveys the obvious insight that civilization is always at risk." Sultan Ahmad Shah reportedly celebrated for three days every time the number of Hindus slaughtered in a single engagement reached a certain threshold (20 000). Hinduism's pluralism, in short, required tolerance in return — and when it did not receive it, the consequences were catastrophic.

The tolerance for diversity under the umbrella of a leading caste made India what the poet Jorge Luis Borges described as '*a country greater than the world*' — and what the Indologist A. L. Basham explored under the title The Wonder That Was India: a civilisation of inexhaustible material and intellectual diversity, whose internal variety exceeded anything produced by the more homogenising impulses of China, Rome, or the Islamic caliphates. Within the constraints of the agrarian social order, human freedom unfolded in India into an astonishing intellectual cosmos.

The comparison with Plato is instructive and will be developed in the following section. Both the Greek philosopher and the Brahmin tradition arrived, through entirely independent paths, at the same insight: that the equation of power with wealth — the near-universal tendency of ruling classes throughout history — was the fundamental corruption of just governance. Plato argued that the philosopher-guardians of his ideal state should renounce material wealth; the Brahmin caste, for over two thousand years, largely practised this renunciation in fact. Wealth concentrated in the hands of the Kshatriyas — the warrior-kings — not the Brahmins, whose spiritual authority rested precisely on their distance from material power. That this arrangement gave the Indian caste system a stability lasting two millennia — however unjust in other respects — is evidence that universal moral conscience, following the logic of justice, can arrive at similar conclusions across very different cultural traditions.

4 Plato and the Totalitarian State

Plato's testimony is significant on two related grounds. First, he was acutely conscious that a society is unjust when it condemns some people, by accident of birth, to lifelong labour while granting others a life of leisure and privilege. His refusal to accept this injustice drove him to propose a radical remedy. Second, that remedy — however well-intentioned — illuminates

the recurring danger of philosophical idealism in politics: the willingness to sacrifice human nature on the altar of logical consistency.

Plato was a realist about the material constraints of his time. Under the agrarian production conditions of fifth-century Athens, a society could provide space for intellectual and cultural activity only if a majority produced the food that freed a minority for other pursuits. He accepted this constraint. What he refused to accept was the hereditary principle by which access to the privileged minority was determined: the arbitrary fact that a king's son became a king and a slave's child a slave, regardless of their individual capacities. His starting point was thus the tension between two things he regarded as equally true: that the hereditary assignment of social roles was unjust, and that any civilised society required a minority to be free from agricultural labour.

His proposed resolution had two elements. The first was the abolition of hereditary succession in social function: positions should be assigned according to ability, not birth. The second — deriving logically from the first — was the removal of children from their families immediately after birth, to be raised by the state and allocated to appropriate classes according to demonstrated aptitude. Philosophers and sages would form the governing class; warriors would provide defence; artisans, farmers, and traders would constitute the productive base. As Karl Popper explains in The Open Society and its Enemies, the closed society of Sparta became Plato's model — the original blueprint for a militarised totalitarian state in which the claims of collective efficiency permanently override those of individual freedom.

This solution resembles the classical Chinese examination system in one respect: both sought to regulate access to social positions on the basis of demonstrated knowledge and ability rather than inherited status. But there is a crucial difference. The Chinese system did not sever the child from its family; it created a pathway through education. Plato's system required the destruction of the family bond — a bond so deeply embedded in human biology and psychology that overcoming it would require coercion of the most intrusive kind. Karl Popper was right to identify Plato's Republic as a blueprint for a totalitarian state: no arrangement that requires the forced separation of mothers from their newborns can be sustained without the permanent exercise of state violence. Sparta, which Plato admired, provided the historical model — and its legacy is not an advertisement for the approach.

Yet the greatest thinker of ancient Greece was not simply a proto-totalitarian. His fundamental concern was justice, and one of his proposals deserves serious attention even today: his insistence that the governing class — the philosophers — should largely forgo

material wealth. Plato saw clearly that the fusion of political power and economic wealth was the characteristic corruption of all known governments. Power is pursued for the sake of wealth; wealth is pursued for the sake of power. Each reinforces the other, producing a ruling class that serves its own interests while claiming to serve the common good. His proposed remedy was to break this bond by making wisdom incompatible with the pursuit of riches.

In Greece and Europe, this recommendation was honoured more often in theory than in practice. But history offers at least one major civilisation in which something close to Plato's ideal was actually realised. The Brahmins of classical India occupied a position analogous to his philosopher-governors. For over two thousand years, concentrated wealth did not accumulate in their hands; it belonged instead to the Kshatriyas — the warrior-kings and their vassals. The Brahmins owed their spiritual dominance to their renunciation of material wealth, which broke the otherwise universal link between power and money. The sacred texts they produced expressly advocated renouncing property, in terms that closely parallel Plato's prescriptions. That Plato and the Brahmin tradition arrived at similar conclusions by independent routes is itself evidence of what I have called universal moral conscience: the shared human recognition, transcending particular cultures, that wisdom and justice require a certain distance from the corrupting attractions of material power.

The contrast with China is instructive. The literati-governors of the imperial administration — China's closest approximation to Plato's philosopher-rulers — accepted the fundamental equality of human beings (in principle, access to the civil service was open to any man who could pass the examinations), but they simultaneously accumulated considerable personal wealth. They never tolerated significant wealth in the hands of merchants or manufacturers, whom Confucian doctrine ranked below peasants in the social hierarchy. This ensured that economic power remained subordinate to intellectual and political authority — but it did not eliminate the corruption that Plato feared.

4a The Origins of Totalitarianism

Karl August Wittfogel traced the origins of totalitarianism to the irrigation-based civilizations of the Neolithic era: Babylonia, Egypt, China, and India. Jared Diamond rejects this hypothesis. "Detailed archaeological studies have shown that complex irrigation systems did not accompany the rise of centralized bureaucracies but followed after a considerable lag." Centralised power did not simply arise to manage irrigation; it found irrigation a useful instrument once established. The thesis of this book—that the agrarian dependency formula allowed a small number of well-armed individuals to effortlessly dominate and exploit a large

number of people tied to the land—offers an alternative hypothesis for the emergence of totalitarian states. Irrigation and flood control can also function in this way, but they are not a prerequisite.

Even among communities that escaped the agrarian dependency formula, significant inequality could emerge. As Jared Diamond (1977) shows, "In social organization, Polynesian societies ran the gamut from fairly egalitarian village societies to some of the most stratified societies in the world, with many hierarchically ranked lineages and with chief and commoner classes whose members married within their own class." The availability of a food surplus, wherever it arose, consistently generated hierarchy.

But in mass societies—the kind that only became possible with the transition to agriculture—domination and exploitation typically arise through the agrarian dependency formula. This should not be interpreted to mean that mass societies are necessarily ruled by a military apparatus. That was not the case in either India or China. But in both places, the intellectual elite (the Brahmins in India, the literati governors in China) made use of the secular arm—that is, the military—as an instrument of rule. Hallpike (1988) succinctly describes the Confucian social hierarchy: "With the final establishment of the Confucians as the orthodox philosophers of the Empire, the Four Classes became an ideal hierarchy of social merit — scholar-officials at the top, followed by farmers, artisans, and merchants in the lowest category. Four groups of major significance in other civilizations are notably absent: priests, nobles, soldiers, and slaves." That's not entirely true. The military did indeed hold a low rank, as Mencius had philosophically argued. "Some labour with their brains and some labour with their brawn. Those who labour with their brains govern others; those who labour with their brawn are governed by others" (Mencius IIIa, 4). But the intellectual elite turned to the military whenever it was necessary to take action against internal or external enemies who threatened their position.

Just compare the large number of the exploited and the extremely small one of their exploiters in Sparta which represents the most extreme expression of the agrarian formula. The number of Helots at the beginning of the 4th century B.C. is estimated at around 200,000; the free Spartan citizen population at about 9,000 — a ratio of roughly 95 to 5 percent. Helots could be killed by the Spartan secret police (the krypteia) at any time without cause or trial (Cartledge; Durant). The entire apparatus of the Spartan state — its famous military culture, its prohibition of commerce — existed primarily to maintain this system of subjugation.

The case of Athens' is different to a certain degree. Economic dependence on distant food supplies shaped its entire social structure. Grain came from Thrace and Egypt, paid for with the produce of the silver mines at Laurion (60 km from Athens) and with the luxury goods of a thriving artisan industry. The mines employed slaves in their tens of thousands — estimates range from 10,000 to 20,000 (David Graeber). The luxury goods — wine, olives, fine ceramics, jewellery — were intended for the ruling classes of the exporting countries, not for the peasants who delivered the grain. Athens' democracy, celebrated as a model for the ages, was built on this foundation.

The demographic estimates for classical Attica vary considerably. Brockmeyer and Will Durant estimate a total population of around 315,000 circa 431 B.C., with only 43,000 citizens having voting rights. Keith Roberts (2011), drawing on Sallares (1991), arrives at a lower total of around 150,000, with 20,000 slaves and 10,000–30,000 unfree persons. The uncertainty reflects the difficulty of ancient demographic reconstruction, but all estimates agree that the franchise was enjoyed by a small minority of the total population.

Compared to Sparta, Athens was considerably less militarised, but the basic agrarian law was equally in force. The difference was geographical: while the Helots who supplied Sparta were immediate neighbours, the food producers who supplied Athens were mostly in Egypt and Thrace, invisible and far away. This distance made it easier to celebrate Athenian freedom without confronting its material foundation.

Wherever the military set the tone, the voice of critical intelligence was silenced because any protest was considered dangerous to the state. When speaking of the Axial Age and its great wealth of thought, it is easy to forget that the world does not owe a single significant thought to the military dictatorship of Sparta, one of the leading Greek states at the time. As Jacob Burckhardt observed in his "Greek Cultural History", not even reading and writing were taught in Sparta. Likewise, Will Durant: "The Spartan code of conduct produced good soldiers and nothing more ... mere physical strength it transformed into repulsive brutality, because it killed off almost all receptivity to things of the spirit."

It does not make this dictatorship any more sympathetic that among free Spartiates the principle of equality was more strictly maintained than anywhere else. The reason for such equality is all too obvious: any difference in terms of class and property would have torn the tiny minority of exploiters apart internally and endangered their position vis-à-vis their subjugated slaves. Therefore, “Every Spartiate held from the state an allotment of land of equal size, or equal productivity, and each of these allotments, cultivated by Messenian serfs (Helots), was sufficient to provide maintenance for the Spartiate and his family and thus

enable him to devote the whole of his own energies to the art of war…. The Spartiate served fifty-three years with the colours" (Toynbee)." What a contrast with Athens, which was a commercial empire, where free citizens were under arms only in times of war, but during peace were occupied with the production of those special goods of weaponry and handicraft, which enjoyed such a great demand that the Athenians could not only exchange for it the food they needed, but, moreover, possessed leisure enough to develop that "Attic spirit" which has ever since belonged to the heritage of mankind.

The Athenian pattern recurred more than two thousand years later. As Will Durant observes of the Netherlands in the 17th century: "The products of their soil could support only an eighth of their population; the life of the country depended upon foreign trade and colonial exploitation; and these depended upon a navy capable of protecting Dutch vessels and settlements." The city-state dependent on long-distance trade and a distant food supply is a recurring type.

Immanuel Wallerstein (2004) describes the social structure of the lower 90% in the 16th-century European world-economy: "There were slaves who worked on sugar plantations and with simpler mining methods. Then there were the serfs, who worked on large manors in cereal cultivation and the timber industry. There were tenants who produced cash-crop agricultural products in different ways, and in some branches of agricultural production wage labourers. These groups accounted for 90–95% of the European world economy." The agrarian dependency formula led to similar social strata in all mass societies. Will Durant records that "France was 24,670,000 men, women, and children; so Necker reckoned the population in 1784. The number had grown from 17,000,000 in 1715 through greater food production, better sanitation, and the absence of foreign invasion and civil war. *All but two millions of the French /that is one tenth of France's population/ were rural*." The proportions held across the continent.

Oswald Spengler was well aware of the peasant's predicament, yet his treatment is characteristically self-contradictory. On one hand: "All real history begins with … nobility and priesthood, forming themselves as such and rising above the peasantry … The peasant is without history … good enough for comedy and to create this world's bread." But then he celebrates the peasant as "the great symbol of sedentariness … itself a plant, sinking its roots deep into its own soil." He simultaneously belittled and idealised him.

In his biography of Georg Büchner, Hermann Kurzke observes: "would rural poverty have been eliminated by a redistribution of state finances? The entire Hesse-Darmstadt state budget of 1831, distributed equally among the population, would have amounted to nine

guilders per head — enough to buy three sheep." The arithmetic of scarcity made radical redistribution structurally ineffective until fossil energy changed the terms.

4b Rebellions – the Power of Universal Conscience

The persistence of peasant resistance throughout the agrarian era is documented in a virtually unbroken sequence of uprisings. Between the late 14th century and the French Revolution, revolts flared at least once every decade, and later almost annually: the Jacquerie (France, 1358), the Peasants' Revolt (England, 1381), the Maillotins Uprising (France, 1382), the Engelbrekt Uprising (Sweden, 1434–36), the Peasants' Revolt in Transylvania (1437–38), Hans Böhm's 'Drummer of Niklashausen' (Tauberfranken, 1476), the Carinthian Uprising (1478), the Bundschuh Movement (Southwest Germany, 1493–1517), György Dózsa's uprising (Hungary, 1514), Poor Konrad (Württemberg, 1514), the Windisch Peasant War (Carinthia, 1515), the German Peasant War (1524–26), Palatine Peasant War (Palatinate, 1525), Peasant Uprising of Kaymen (East Prussia, 1525), Schladming Peasant and Squire Uprising (1525), Dacke Uprising (Sweden, 1542-1543), Württemberg Peasant Uprising (Southern Germany, 1547), Croatian-Slovenian Peasant Uprising (1572-1573), Second Upper Austrian Peasant Uprising (1595-1597), Lower Austrian Peasant Uprising 1596/1597, Rebellion of the Croquants (France, 1593/94, 1624 and 1636/37), Upper Austrian Peasant War (1626), Lower Austrian Peasant Uprisings (1632), Swiss Peasant War (1653), Tolmein Peasant Uprising (1713), Horea Uprising in Transylvania (1784), Grande Peur in France (1789), Saxon peasant uprising (1790), peasant unrest in Lusatia (1790-1794), “clapper war” in the Eifel (1798). On this subject Walter Scheidel (2017) remarks: “The largest of all rural uprisings in western Europe, the German Peasants’ War of 1524 and 1525, which engulfed much of southern Germany, sought to preserve income gains achieved in the wake of the plague and resist seigneurial rights and encroachment on common lands, goals that were reinforced by the spread of antiauthoritarian ideas. As so often occurred, elite reaction proved vastly more violent than peasant action itself.” Friedrich Heer (1953) also describes the frequent peasant uprisings in his „Europäische Geistesgeschichte“ (European History of Ideas). Universal conscience never fell silent, even when it was always defeated.

4c Wounds left by the breakdown of the agrarian system

The typical outcome of industrialization was the replacement, at a more or less rapid pace, of the old elite by a new one. Priests and the nobility were replaced by engineers and scientists, and political power came to be based on elections rather than heredity. In Germany – and even more so in Russia and other industrial laggards - the displacement of the priest and philosopher by the engineer and scientist had a particular cultural consequence. The vacuum left by the decline of the moral worldview as upheld in those societies was filled by a cult of genius that culminated in

Nietzsche's contempt for modern masses and the modern mass man, and in the Zarathustran celebration of the violent individual who places himself at their head. This cult, unparalleled in French or British intellectual culture, contributed to German society's susceptibility to charismatic authoritarian leadership.

But a return to undemocratic conditions need not be based on a nostalgic longing for a supposedly better past, as Fukuyama explicitly notes: "A modernizing dictatorship can in principle be far more effective than a democracy in creating the social conditions that would permit both capitalist economic growth and, over time, the emergence of a stable democracy." The Chinese case is his clearest illustration — but also his clearest cautionary example of what happens when the conditions of stable democracy fail to emerge.

5 The Transition from a Moral to a Scientific Worldview

Running through this book like a leitmotif is a fundamental distinction between two complementary and perpetually competing worldviews. The first — the moral worldview — is rooted in our dealings with other people: it seeks to understand human behaviour in order to navigate it effectively, and it operates by distinguishing good from evil, beautiful from ugly. The second — the scientific worldview — aims at the mastery of nature: it seeks to identify regularities that can be exploited technically, and it operates by distinguishing true from false. Both have been present throughout human history; both are necessary; the problems arise when either is extended beyond its appropriate domain.

The moral worldview was dominant in all three of the great Eurasian civilisations — India, China, and Christian Europe — until approximately the seventeenth century. In each case, the intellectually leading class derived its authority from its command of a higher moral or cosmological truth: the Brahmins from their mastery of Vedic scripture and ritual; the Chinese literati-governors from their mastery of Confucian ethics and classical texts; the European clergy from their authority over revealed Christian doctrine. The natural world was interpreted through this moral lens — as the creation or expression of divine will, or as a moral order accessible to spiritual understanding. Yuval N. Harari point to the main task fulfilled by religions: "In our personal lives, religion can fulfil many different functions, like providing solace or explaining the mysteries of life. But historically, the most important function of religion has been to provide superhuman legitimacy for the social order." Radcliffe-Brown, the British social anthropologist, summarised the inevitable coexistence of both conceptions: "In every human society there inevitably exist two different and in a certain sense conflicting conceptions of nature. One of them, the naturalistic, is implicit everywhere in technology ... The

other, which might be called the mythological or spiritualistic conception, is implicit in myth and religion and often becomes explicit in philosophy" (Radcliffe-Brown, 1979; p. 130).

Both conceptions are valid within their respective domains; both generate error when extended beyond them. The natural world is not governed by moral principles; there is no empirical warrant for the belief that it is ruled by spirits, gods, or divine providence. The Enlightenment was entirely justified in dismantling this anthropomorphic projection. But the natural sciences, in their triumphant advance, made a mistake of their own: they assumed that the elimination of moral and aesthetic categories from the study of nature implied that those categories had no genuine independent domain — that they were merely primitive approximations to scientific truth, eventually to be replaced by it.

The denial of human freedom by its replacement with mere automatism is as old as mankind. Lévi-Strauss noted that magical thinking differs from science not in its absence of causal reasoning, but in the character of its determinism: "Magical thinking ... differs from science only in the assumption of an even more imperious and unyielding determinism ... The rites and beliefs of magic appear as expressions of the belief in a science that has yet to be born" (Lévi-Strauss 1962, p. 18).

Arnold Gehlen reached a similar conclusion from a different angle: "In our view, rational technology is as old as magic, and both are as old as man ... However, if you consider what appears to be the most fascinating thing about both phenomena, it may well be automatism. Because even in the minds of 'primitives', magical powers are neither arbitrary nor spontaneous, but ... an automatism that permeates the whole world and can be set in motion with the right formula" (Arnold Gehlen, 1980; p. 96).

The point is important: both magic and science presuppose that natural events as well as human actions follow regular patterns — that the world is, at least in principle, predictable and controllable. Magic fails not because it postulates law-like regularities in nature, but because its specific claims about those regularities are empirically wrong. The scientific worldview supersedes magic not by abandoning the search for natural law but by subjecting that search to rigorous empirical discipline. The classic formulation of this discipline comes from Alfred North Whitehead: "Search for measurable elements in phenomena and then for relationships between the measured physical quantities."

This basic rule is elegantly simple and universally applicable across all branches of natural science. It is what allows physicists and biologists and chemists — specialists who work in entirely separate domains — to share a common methodological framework and to speak

meaningfully to one another's results. It is also why scientific knowledge is, in principle, universally accessible: the book of nature is open to any human intelligence willing to apply the method, regardless of language, culture, or tradition.

But the question of why the moral worldview was displaced by the scientific one — specifically in seventeenth-century Europe, rather than in Song-dynasty China or classical India, which in many respects possessed superior scientific capabilities — is not answered by Whitehead's formula. Greater European inventiveness cannot be the explanation: Paul Kennedy has documented China's technological precocity at length: "To readers brought up to respect 'western' science, the most striking feature of Chinese civilization must be its technological precocity ... By the later decades of the eleventh century there existed an enormous iron industry in North China, producing about 125,000 tons per annum ... It is worth remarking that this production figure was far larger than the British iron output in the early stages of the Industrial Revolution, seven centuries later! The Chinese were also probably the first to invent true gunpowder; and cannon were used by the Ming to overthrow their Mongol rulers in the late fourteenth century. [And] Cheng Ho's navy ... might well have been able to sail around Africa and 'discover' Portugal several decades before Henry the Navigator's expeditions began earnestly to push south of Ceuta. [But] a key element in China's retreat was the sheer conservatism of the Confucian bureaucracy ... According to Confucian code, warfare itself was a deplorable activity, and armed forces were made necessary only by the fear of barbarian attacks or internal revolts" (Paul Kennedy 2017, p. 6ff).

The endemic warfare among Europe's many competing kingdoms and principalities — which stimulated constant pressure for military innovation — is a more plausible explanation, though not a complete one. Max Weber's hypothesis connecting Protestant ethics to the spirit of capitalism captures a real correlation, though the *causation* is contested: Catholic Italy, before the Galileo affair, was scientifically leading. Only after Galileo's condemnation did scientific progress shift northward. Then Protestant northern Europe and eventually Protestant North America became the leading centres of scientific and industrial development.

At the beginning of the second millennium AD, the Song dynasty offered conditions that appeared ripe for an industrial revolution on Chinese soil. But it did not happen: the abundant labour supply in ancient China explains why labour-saving machines appeared economically unnecessary. The industrial revolution, however, when it eventually came to Europe, created far more employment than it destroyed. The purely economic explanation, therefore, seems insufficient. Let us look back to the year 1700. A rough estimate of global social product

assigns about 22.3 percent to India and 24.4 percent to China, or 61.7 percent to Asia as a whole, with only 2.9 percent for England and 22.5 percent for Western Europe as a whole; on a per-capita basis, incomes in Western Europe were only about twice those of China and India at that date, with only the Netherlands and England reaching three times the Asian figure (Menzel 2023).

The proximate cause of Europe's eventual dominance was not superior intellect, superior culture, or superior economics, but the availability of concentrated fossil energy at a moment when other conditions — political fragmentation, commercial development, scientific curiosity, and Protestant suspicion of inherited authority — made its exploitation possible. Pure knowledge does not require material resources: Euclid developed geometry on a slate, and the Babylonians, Indians, and Incas acquired accurate astronomical knowledge through observation alone, over millennia. But the transformation of scientific knowledge into technical mastery — the systematic reshaping of matter according to human purposes — requires energy on a scale that wood, water, wind, and animal muscle cannot supply. The coal seams of northern England, and the cultural conditions that allowed their exploitation, are where the scientific worldview finally acquired the material foundations to displace the moral one.

5a The Material Conditions enabling the Rise of Modern Science

Ian Morris documents the English transition: "By 1650 more than half of Britain's fuel energy came from coal." This pre-industrial coal economy, unique in Europe, created the material precondition for the steam engine and thus for the Industrial Revolution proper.

Ulrike Herrmann (2022) summarises the current research consensus on why industrialisation began in England rather than elsewhere: "The most convincing answer is that industrialization began in England because it was there that the highest wages in the world were paid. In the 18th century, English workers earned at least three times as much as their counterparts on the European continent. As early as 1600, England experienced a coal revolution that replaced wood. Well before industrialisation proper, coal was used in energy-intensive trades. So, England had the most expensive labour and the cheapest energy. This combination was unique in the world. Machines were developed and used only because labour was so expensive." Capitalism arose in Britain, as Herrmann notes, unintentionally — as the rational response to a specific factor-price configuration.

The relationship between energy input and agricultural output reveals an important asymmetry. Between 1900 and 2000, energy input per hectare increased approximately eightyfold, yet the harvest increased only fourfold. The 'green revolution' was, from an energy-efficiency perspective, a massive negative return — compensated by the fact that the energy was fossil and therefore, for most of the twentieth century, cheap.

The exponential growth of scientific publication is itself a measure of the new worldview's expansion. Rolf Kreibich (1986) documents that since 1750, when there were about ten scientific journals in the whole world, the number of scientific publications has increased tenfold every fifty years with remarkable precision.

6 Nature versus Culture

This book is concerned with two fundamentally different kinds of knowledge: the knowledge of nature's laws on the one hand, and human will and conscience on the other. The tendency of modern science has been to treat these as a single domain — to reduce the second to the first, explaining desire, intention, and moral choice as merely the output of physical processes that are, in principle, fully calculable. Francis Fukuyama has described this tendency with precision: The entire tendency of modern natural science and philosophy ... consisted in denying the possibility of autonomous moral decision and understanding human behaviour solely in terms of subhuman and subrational impulses. What once appeared to Kant as free and rational choice was seen by Marx as the product of economic forces or by Freud as deeply hidden sexual drives. According to Darwin, humans literally evolved from the subhuman; more and more of what he was became understandable through biology and biochemistry ..."

This reductionist impulse — however much it has clarified particular mechanisms of human behaviour — leads to logical difficulties when pushed to its conclusion. The present section examines why the two kinds of knowledge are genuinely distinct, and what follows from that distinction.

I designate the first kind *'knowledge of nature'*: it concerns processes that are fundamentally beyond human will and desire. We cannot alter the regularities of natural events — the laws of thermodynamics, the behaviour of subatomic particles, the gravitational constant. These laws exist objectively, independently of what we wish them to be. Harari (Nexus) frames the distinction between natural and cultural knowledge in terms of 'truth' and 'order': truth (knowledge of nature) represents objectively existing facts, while order (cultural knowledge) is an intersubjective reality created by people. Order therefore has only intersubjective validity; it serves to regulate interpersonal relationships. This framing captures the distinction well, though it risks understating the degree to which established cultural knowledge — past choices that have become institutional facts — is also genuinely constraining, not merely conventional. At another place he says: "If you build a bomb and ignore the facts of physics, the bomb will not explode. But if you build an ideology and ignore the facts, the ideology may still prove explosive. While power depends on both truth and order, it is usually the people who know how to build ideologies and maintain order who give

instructions to the people who merely know how to build bombs or hunt mammoths.″ Only truth is universal: "While different people, nations or cultures may have competing beliefs and feelings, they cannot possess contradictory truths, because they all share a universal reality. Anyone who rejects universalism rejects truth." Rudolf Carnap's formulation is among the clearest: "Our everyday observations as well as the more systematic observations of scientists lead us to certain repetitions and regularities in the world. Night always follows day; the seasons repeat themselves in the same order; fire always feels hot. The laws of nature make nothing but statements that express these regularities as precisely as possible" (Carnap, 1974; p. 11). This observation does not change the fact that all knowledge has arisen historically, and thus from subjective sources, as science historians Thomas Kuhn and Jürgen Renn note: "Even the most fundamental aspects of the classical scientific paradigm — evidence, experiments, data, objectivity, rationality — have turned out to be profoundly historical in nature" (Renn 2020). But this qualification does not undermine objectivity: the independently existing facts of nature can be described using different conventions, but those conventions must fit nature if they are to yield the desired practical results.

The second kind I call '*cultural knowledge*': knowledge that we generate through our own will and desire. The laws that regulate a community's behaviour — its constitution, its social norms, the language it speaks, the institutions it has built — are all human artefacts. Insofar as they were created by earlier generations, they exist objectively, as facts that constrain the present. Insofar as they are currently being created or revised, they appear subjective — coming into being through contemporary acts of human will. The clear distinction of cultural knowledge from that of nature does not reach further back than to the Enlightenment. It was unknown to primitive societies. A. R. Radcliffe-Brown made this point in terms that every anthropologist working with pre-modern societies would recognise: "For the primitive, the universe as a whole is a moral or social order, governed not by what we would call natural laws, but by laws which we must call moral ... The recognition of this view … is, I believe, one of the most important steps towards the right understanding not only of what is sometimes called primitive mentality, but also of all those phenomena which are vaguely grouped around the concept of religion" (Radcliffe-Brown, 1979; p. 130). Desmond Morris (2017) gives a functionalist account of religious behaviour: "In a behavioural sense, religious activities consist of the coming together of large groups of people to perform repeated and prolonged submissive displays to appease a dominant individual … The dominant individual is usually, but not always, referred to as a god ... Religion has proved immensely valuable as a device for aiding social cohesion."

Both cultural knowledge and knowledge about nature are valid when applied to their proper sphere; both become distorted when extended beyond it. The laws of inanimate nature are neither good nor bad, neither beautiful nor ugly — they hold regardless of human values. There is no empirical evidence that surrounding nature is governed by human-like spirits, as

virtually all pre-modern cultures believed. The Enlightenment was right to subject that belief to rigorous criticism.

The natural sciences are therefore correctly understood as trans-moral and trans-aesthetic: they deal with what is, not with what should be. The laws of nature are the same whether we regard their effects as beneficial or catastrophic. This is precisely what makes scientific knowledge universally applicable and universally transferable across cultural boundaries — but also what makes it insufficient, by itself, as a guide for human action.

A fundamental asymmetry separates the two forms of knowledge in terms of explanation. Collecting cultural facts requires no greater effort than collecting natural ones. But explaining cultural facts requires a different kind of inquiry. When we ask why a particular practice exists — why, in one country, the consumption of pork is forbidden; in another, beef; why a particular day of the week is held sacred — we are asking about motives: the intentions, values, and circumstances of the people who created and perpetuated these practices. These motives are not always recoverable. But the impossibility of recovering them in particular cases does not undermine our confidence that motives existed; we recognise ourselves in other people, and therefore find cultural knowledge in principle explicable in a way that natural phenomena are not.

No scientist, calculating the trajectory of a comet, asks about the comet's motives. Nature has none – at least none we are able to discover. Its complexity is mathematical, not intentional. The natural sciences achieve their extraordinary power precisely by eliminating the question of purpose. Alfred North Whitehead reduced the scientific method to its simplest formulation: "Seek measurable elements in phenomena, then seek relationships between measured physical quantities." This basic rule is the same across all branches of natural science, which is why specialists in one narrow domain can engage with the conclusions of specialists in entirely different domains — both are operating by the same fundamental method.

The bon mot that the specialist knows everything about nothing while the philosophising generalist knows nothing about everything captures a genuine tension. This book — an attempt at what I call holodoxy, the systematic study of wholes — is a deliberate effort to demonstrate that the conclusions reached by attending to the whole are neither trivial nor unscientific, but rather indispensable to any adequate understanding of the human condition.

6a Technological change and the ideal society

There is no single definition of a just society that applies once and for all. Is it fair that the most capable enjoy the greatest material rewards and the highest prestige? Or ought the disabled and the sick to be compensated for the fact that nature has treated them so cruelly? Every society is oriented toward its own benefit. It promotes those whose activities promise the greatest gain. In the past, this was the religious explainers of the world; today, it is primarily the world-changers — scientists and technicians.

The artificial environment created by early humans was not limited to tools. As Jared Diamond (1977) notes: "That's why Darwin, in his great book On the Origin of Species, didn't start with an account of natural selection. His first chapter is instead a lengthy account of how our domesticated plants and animals arose through artificial selection by humans." The domestication of plants was itself among the earliest acts of deliberate environmental transformation.

The figures for energy consumption across epochs are instructive. Maja Göpel (drawing on Vaclav Smil) calculates that during the hunter-gatherer period, each person needed about 5 gigajoules of energy per year to survive. Today, average global energy consumption is almost 80 gigajoules per person per year. Germany consumes roughly twice the global average; the United States, twice the German level. The step from hunter-gatherer to industrial society thus represents a roughly 30-fold increase in individual energy throughput.

6b The two Dimensions of Inequality: material and cultural

Material inequality arises from technological conditions at a given time. It was least pronounced among hunter-gatherers and most in agrarian mass societies due to the agrarian dependency formula. But the Industrial Revolution did not automatically produce egalitarian societies. Cultural conditions, alongside material ones, could in turn advance or inhibit that tendency. Education and political organization proved to be of decisive importance.

Francis Fukuyama (1992) makes the necessary link explicit: "Middle-class societies arise as a result of universal education. The link between education and liberal democracy has been frequently noted and would seem to be an all-important one." One may go further: it is not merely important but structurally necessary. A democracy without a broadly educated citizenry cannot sustain the informed deliberation that democratic self-governance requires.

Inequality in power is not the same thing as inequality in material rewards, and it is important to keep the two distinct. It is both inevitable and desirable that people with greater competence have more say than others in matters requiring their expertise. A gap in influence and authority is a feature of every functioning society, down to the family. What is corrosive is not power differential as such, but power differential that has become hereditary — that is, when the position of power can be transferred from one generation to the next independently of the individual's merit. It seems to me – but this is a

mere assertion – that a society is more stable when it mainly relies on differences in power keeping those of material reward as low as possible (in international competition, where head hunting is usual practice, this has become more and more difficult, though). In this sense, I wrote a paper years ago that explains how greater material equality would be substantially enhanced through the taxation of consumption - as already proposed by John Stuart Mill. "Ecological Consumption Tax" (https://www.amazon.de/Ecological-Consumption-Tax-Verbrauchssteuer-Steuersystem/dp/1686752474). In view of all that has been said, it goes without saying that, unlike Marx, I do not intend any attack on private property.

The statistical evidence from the twentieth century is unambiguous. In 1988, shortly before German reunification, West Germany's per capita GDP was DM 36,200; the GDR's was less than half that amount. The difference cannot be attributed to natural resources, geography, or the cultural capacities of a population that was effectively identical. It can only be attributed to the presence or absence of institutionalised competition as the mechanism for allocating social positions. The difference between the north and south of the still divided Korean peninsula is even greater. There, the ratio in average per capita income is about one for the North and ten for the South. For reasons of communist ideology, the North forbids private property as well as a free market (only now things slowly begin to change). Both prohibitions deter private citizens from investing their money because they justly fear that the state may confiscate it at any time. To this day, famine is a regular occurrence in the communist country; the standard of living does not exceed that of countries south of the Sahara. In contrast, South Korea has experienced a rocket-like rise since 1961, catapulting it to the same level as much older industrialized nations such as Italy and Spain. It has since enjoyed a free market economy, secure private property, regulated competition, and surprised the whole world because of the great success of its leading corporations (See Acemoglu 2012).

6c Scientific Society - Inherent Contradictions

The economy is not a monolithic entity. While the manufacture of products generally requires a high degree of knowledge and skill, successful trade relies rather on persuasion and psychological influence — on what might be called theatrical talent. In extreme cases, factual competence can be entirely dispensed with. Production and trade are therefore two fundamentally different parts of the economy — and so are the people employed in the respective fields. Accept from rare cases when great inventors and man of ideas become the head of corporations (Like Bill Gates or Elon Musk), the man of trade relying on persuasion and seduction normally obtain most power. The president of the United States proves this for the political sphere.

7 Subjective Will, Objective Laws

There is no doubt that human beings are part of nature. But we must maintain a strict distinction between knowledge of nature and cultural knowledge, because these are not merely different domains of the same inquiry — they are governed by fundamentally different criteria of validity.

Scientific findings are either correct or false: the relationships between measurable physical quantities that the scientist identifies are either given or they are not. According to Whitehead's methodological guideline, this is the whole of what natural-scientific knowledge claims to establish.

Cultural knowledge operates differently. We judge political arrangements, inherited norms, and social institutions according to the criteria of good or bad — that is, according to moral standards. We judge our living space and the architecture that surrounds us, the design of landscapes and the monuments of past cultures, according to the standard of beautiful or ugly — that is, according to aesthetic standards. Both dimensions, the moral and the aesthetic, express human desires and values, and as such have no place in 'objective natural knowledge'. The laws of physics hold regardless of whether we approve of them; the fact that ice melts when the freezing point is exceeded is neither good nor bad, neither beautiful nor ugly.

Wilhelm Dilthey and Erwin Schrödinger converge on the same insight from different directions. Dilthey (1905): 'This context /human activities/ differs from the causal context of nature in that it generates values and realises purposes. Historical life creates. It is constantly active in the creation of goods and values." Schrödinger: "As a species, we are in the process of development, and those currently living form the vanguard of generations; every day in a person's life therefore represents a small part in the evolution of our species, an evolution that is still in full development. Only those changes enter consciousness that are still in the stage of practice before they are transformed, much later, into a hereditarily fixed, well-acquired and unconscious possession of the species. In short, consciousness is an occurrence within the zone of evolution. This world illuminates itself only where and insofar as it develops and creates new forms" (Schrödinger, 1967; p. 106). Henri Bergson speaks of "Évolution créatrice".

Schrödinger makes the distinction between cultural and natural knowledge still more explicit by insisting that the latter is not affected by any subjective colouring: For Schrödinger, it is clear that there is no other definition of the physical than through the medium of laws, and cannot be. That electrons really exist and that they follow certain paths can only mean that the laws we derive from experiments with cathode rays and other observations apply. There is no other

physical reality for us than that which is conveyed through physical measurements and the laws based on them, and which are therefore objective" (Ernst Cassirer 1957). This does, however, not mean that the scientist may not add his personal preferences to objective facts. Even among physicists, the subjective dimension of scientific knowledge cannot be entirely suppressed. Albert Einstein explicitly recognised the beauty and elegance of certain formulas, and attributed the simplicity of fundamental physical laws to a form of divine intelligence. My thesis — that subjective cultural knowledge always stands in the background of all objective natural knowledge — is reinforced rather than undermined by such personal idiosyncrasies.

There is, however, a less obvious dimension to the distinction between these two types of knowledge. When the results of natural science are embodied in products of daily use — vehicles, aircraft, computers, medical instruments — they immediately acquire moral and aesthetic significance. Whether a product is well-designed, whether it serves human needs, whether its side effects are acceptable: these are cultural judgments, not scientific ones. Advertising correctly assumes that people purchase products because they find them beautiful or useful, because they believe those products will enrich their lives. The objective knowledge embedded in a device acquires its value entirely from the subjective desires it satisfies. As a general principle: natural knowledge derives its meaning from cultural knowledge, and not the reverse. That we consider it useful to uncover the laws of nature at all arises from our subjective will — this is confirmed by the fact that for most of human history it was considered far more important to attend to personal salvation and one's God-given duties toward fellow human beings. Measuring natural processes seemed, in that context, superfluous if not sacrilegious. This explains why Roger Bacon's experimental work in the 13th century was punished by his superiors.

This observation may appear obvious, but its implications are far-reaching. When the methods appropriate to inanimate nature are applied to human beings and human societies — when psychology and sociology attempt to operate as if human behaviour were as fully law-governed as the behaviour of atoms — a fundamental category error occurs. The possibility of autonomous moral decision is denied; human behaviour is explained entirely in terms of, as Fukuyama puts it, 'subhuman and subrational impulses.' Cultural knowledge loses its autonomy and is treated as a special case of natural knowledge. This is what Max Horkheimer means when saying: "According to the philosophy of the average modern intellectual, there is only one authority, namely science, conceived as the classification of facts and the calculation of probabilities. The realisation that justice and freedom are intrinsically better than injustice and oppression is scientifically unverifiable and useless. In itself, it now sounds just as senseless as the realisation that red is more beautiful than blue or that an egg is

better than milk." And George Orwell equates this tendency even with totalitarianism: "The really frightening thing about totalitarianism is not that it commits atrocities but that it attacks the concept of objective truth: it claims to control the past as well as the future."

The holodox critique of this position concerns the relationship between the whole and its parts. When the natural-scientific understanding of the world is extended to encompass the totality of human experience — when there is, in Horkheimer's words, only one authority — the moral and aesthetic dimensions of human existence are treated as epiphenomena, as illusions generated by physical processes that are ultimately reducible to calculation. This position is not merely philosophically mistaken; it is, as Ludwig Boltzmann's own criterion requires, empirically refuted. If we accept Boltzmann's argument that the practical successes of natural science prove the correctness of its methods, then the global destruction of nature over the past two centuries — the consequence of applying those methods without moral restraint — must be evaluated as practical proof of their limitations and dangers when generalised beyond their appropriate domain. The ultimate meaning of all objective knowledge lies in satisfying subjective desires. And it is conscience — the moral dimension that natural science cannot capture — that must adjudicate which desires deserve to be satisfied.

8 A Global Glut of Man-Made Materials

The privatisation of power — the redistribution of knowledge, influence, and productive capacity from hereditary elites to individuals on the basis of merit — was the great social achievement of the Fossil Revolution. It opened careers to talent, created the material conditions for democracy, and raised the living standards of the majority for the first time in ten thousand years. But this distribution of power was not only an opportunity; from the outset it was also a danger. Power distributed to individuals enables them to serve the common good — but also to harm it for private benefit.

The most visible expression of this danger is, first, the huge increase in the scale of resource extraction and, second, the proliferation of artificial substances at a scale that natural processes cannot metabolise. As to resource extraction: "Global raw material extraction alone has increased by more than fifty percent since the turn of the millennium and is twice as high as it should be for the sustainable use of our planet's resources. Metals, non-metals, fossil fuels, and biomass — everywhere the curves are going up. The same is true for global consumption of water and energy" (Maja Göpel).

Friedrich Schmidt-Bleek's argument in Grüne Lügen (Green Lies) goes beyond the familiar focus on CO_2. He rightly insists that the exponential pollution of water and soil is less immediate in its effects but equally consequential in the long term. The narrow public and political focus on greenhouse gases risks creating a false sense that the ecological problem is essentially a climate problem, when it is in fact a systemic disruption of the entire relationship between industrial civilisation and the biosphere. The European Chemicals Agency estimates that there are more than 144,000 man-made chemicals currently in use. The US Department of Health and Human Services assumes that 2,000 new chemicals are introduced every year. Schmidt-Bleek opens a disheartening perspective: "It is suspected that at least 300,000 substances and entire cocktails of various, constantly changing compositions enter the air, soil, and water. Some of the best-known problematic substances are now subject to legal requirements. But what about the vast majority? These numbers illustrate the stark disproportion between the damage induced by technology and the possibilities to control and contain it. There cannot be a checklist that claims completeness and ensures safety regarding the chemicals we produce and use."

Rolf Kreibich's demand — "In principle, all new product and technology developments must be put to the test of impact assessment and evaluation" — is as reasonable in principle as it is unrealisable in practice under the current conditions of global economic competition. Schmidt-Bleek documents the structural impossibility of the task: given the testing capacities available in (West) Germany at the time, he estimated that it would take approximately 400 years to test the chemicals already on the market — without taking into account that many new chemicals would enter the market during those 400 years.

This checklist cannot exist for a structural reason: the state's regulatory apparatus would need to be approximately as large as the entire private sector to perform such monitoring effectively. It would further require access to confidential product data that competition law typically protects. The result is a systematic gap between the rate at which private actors introduce novel substances into the environment and the rate at which public authorities can assess their consequences.

This clearly indicates that the public has lost control over its private actors — it can only exercise it in exceptional cases. Only when products from the chemical, pharmaceutical, or biocide industries have demonstrably harmful effects is there any meaningful oversight. In all other cases, the sheer number of produced substances makes effective monitoring impossible. This explains why the state long ago delegated the task of assessment to the companies themselves — who are legally required to evaluate impacts on health, environment, and climate, but whose short-term commercial interests systematically incline them to minimise

long-term consequences. The old observation that making the fox a gardener has always been questionable applies with full force here.

Herman Daly's observation captures the ultimate accounting problem: "If the cost of toxic waste dumps were subtracted from the value product of the chemical industry, we might discover that we have already attained zero growth in value from that sector of the economy.' (Daly 1996) The apparent growth of the chemical sector is, in part, the internalised benefit minus the externalised cost — and the externalised cost is borne by the biosphere and future generations.

It would be short-sighted, however, to attribute this problem primarily to capitalism. The issue is more fundamental: it arises from the indirect consequences of greatly increased human technical capability. As the privatisation of power channelled science and technology into private hands, public oversight became progressively more difficult — not because of malice, but because the pace of innovation outstripped the capacity of any regulatory system to track it.

In the media and in political discourse, the abundance of material production is routinely presented as an unambiguous indicator of progress. Gross domestic product growth is the universal measure of a country's advancement. Where people produce only what is necessary for subsistence, disturbing the natural balance as little as possible, the prevailing standard dismisses them as living in extreme poverty. The greatest challenge of the post-fossil era will be to reconcile the genuine benefits of material production with the necessity of state control over its environmental consequences — recognising that increased individual freedom in production requires, paradoxically, substantially greater public authority over its externalities.

9 Waste: Disrupting Natural Metabolism

Until the eighteenth century, human activity operated broadly within the metabolic cycles of the natural world. The materials of daily life — food, clothing, construction — were derived from organic sources or from natural minerals transformed without producing substances that natural processes could not decompose. Even iron and bronze, which involved the transformation of natural elements, did not significantly disrupt the self-regulating homeostasis of the biosphere.

The Fossil Revolution changed this relationship fundamentally. Since its onset, hundreds of thousands of new inorganic and organic substances have been manufactured and introduced into the environment. The EU alone currently produces approximately 300 million tons of

man-made substances per year. The problem is not merely one of quantity but of kind: evolution, over millions of years, created organisms capable of decomposing virtually all naturally occurring compounds. It had no time to adapt to synthetic plastics, biocides, pharmaceutical residues, and the thousands of other novel substances that industrial civilisation generates. Most of these substances cannot be broken down and reintegrated into natural cycles. They persist as foreign bodies in ecosystems, accumulating rather than cycling, and progressively disrupting the equilibrium on which all life depends.

This disruption is most publicly debated in the context of CO_2 — which, while naturally occurring, is being released from geological storage (as fossil fuels) in quantities that overwhelm the atmospheric carbon cycle. The carbon budget arithmetic is indeed stark. Tim Jackson (2017) calculates that "the maximum available carbon budget between now and the end of the century is only 350 billion tons. At the current rate of emissions, this budget would be exhausted within a decade." Ernst Ulrich von Weizsäcker adds a further irony: "What is particularly bizarre for climate protection is the fact that most countries even subsidize the burning of fossil fuels. In the annually published World Energy Outlook, one can read that annual subsidies amount to several hundred billion US dollars."

But CO_2 is only the most prominent example. Synthetic plastics are now present in the deepest ocean trenches and in the bloodstreams of Arctic wildlife. Pesticide residues have contributed to documented collapses of insect populations across Europe and North America. Pharmaceutical compounds — antibiotics, hormones, antidepressants — are detectable in groundwater and river systems worldwide, with consequences for aquatic ecosystems that are not yet fully understood.

The satellite orbit provides a striking illustration of the general principle. At altitudes between 160 and 40,000 kilometres, the debris from thousands of satellites, rocket stages, and mission fragments accumulates in concentrations now dense enough that the risk of cascading collisions — in which debris from one collision creates further debris — threatens to make certain orbital bands permanently impassable. The problem is structural: once debris is in orbit, the energy cost of removing it is comparable to the energy cost of placing it there initially. The Swiss company ClearSpace has proposed collecting satellite debris and returning it to Earth or burning it up on re-entry. The energy arithmetic makes this unattractive: 120 million Swiss francs would currently be required to remove even a single piece of debris. Given that the cost of space launches is itself enormous, and that the fossil fuels burned in such operations would contribute further to the climate crisis, the 'solution' is circular. In other words, we have created a commons in near-Earth space and are filling it with waste without any authority capable of imposing a remedy.

There could be a radical remedy – boundless energy. The prospect of virtually costless nuclear fusion energy is sometimes presented as the solution to all ecological problems. It may not be unrealistic to assume that such energy will one day be available. But there is a strong case that this would represent the greatest of all conceivable disasters. Free energy would unlock the last corners of the earth and the remotest depths of the seas for exploitation at near-zero marginal cost. The final attack on nature would begin precisely when we had Pandora's box of nuclear fusion at our disposal.

The problem of waste does not allow for an easy solution. On Earth, the alternatives to waste — recycling, incineration, disposal — each carry their own costs and limitations. Recycling requires substantial energy inputs, often exceeding the energy value of the materials recovered; it is not a closed loop but a slowing of loss. Incineration, as the chemist Ugo Bardi has noted, frequently produces end products more dangerous than the original waste (for instance dioxine). Disposal — burial on land or dispersal in the ocean — merely relocates the problem spatially and temporally, at mounting cost to ecosystems and groundwater systems.

Among affluent industrialised nations, a convenient pseudo-solution has been to export waste to poorer countries in exchange for payment. Germany alone sent approximately 70,000 tons of waste to India in 2018. But this practice is increasingly meeting resistance as recipient countries recognise that they are trading long-term environmental damage for short-term revenue. The Blacksmith Institute's designation of the e-waste landfill in Accra, Ghana, as one of the ten most toxic places on earth illustrates the consequences. Meanwhile, developing countries pursuing industrialisation are themselves generating mounting waste streams: India's landfills now occupy over 10,000 hectares of urban land, with waste mountains in Delhi reaching heights that far exceed legal limits. In Sri Lanka, elephant herds have been observed scavenging on waste tips in landscapes of otherwise extraordinary natural beauty — an image that captures the fundamental dynamic with uncomfortable precision.

The scale of this problem is captured in a figure from the American National Academy of Engineering: in the United States, ninety-three percent (?) of extracted natural resources are never converted into sellable products; eighty (?) percent of all products are discarded after a single use; and ninety-nine (?) percent of the substances in products become waste within six weeks of sale. These figures represent a comprehensive failure of the metabolic relationship between human civilisation and its natural substrate — a failure that, unlike most failures of industrial civilisation, cannot be addressed through further technological innovation alone. It requires a fundamental reconception of the relationship between production, consumption, and the natural systems that make both possible.

10 Population

Throughout human history until the recent past, nature's primary instrument for rectifying population imbalances was catastrophic mortality: famine, epidemic, and war. Marvin Harris attributed endemic warfare in 'primitive' societies primarily to competition for scarce food. Harari documents the regularity with which famine struck pre-industrial populations. "Between 1692 and 1694, while Louis XIV indulged with his mistresses, 2.8 million French people starved to death — 15 percent of the population. In the following year, famine struck Estonia, where it killed one-fifth of the population. In 1696, it was Finland's turn, where between one-quarter and one-third of the population perished. Scotland suffered a severe famine between 1695 and 1698, with some districts losing up to twenty percent of their population." Will Durant records that in London around the middle of the eighteenth century, only one child in three survived to the age of ten: "Fifty-nine per cent of all children born in London died before reaching the age of five, sixty-four per cent before reaching ten." The life expectancy figures that mark the Fossil Era's achievement only become fully legible against this background. These are randomly chosen examples from a scourge that regularly afflicted all of humanity. In India and China, it was not uncommon for between five and ten percent of the population to die of hunger in a single year. Between 1958 and 1961, during the "Great Leap Forward," between 20 to 50 million people died from starvation. Of the total 70 million people that hunger killed in the 20th century, 80 percent were victims of forced collectivization and totalitarian planning in communist regimes. In North Korea's Stone Age communism, as late as 1996 to 1997, two million people died due to the lack of food. Thomas Malthus, writing at the dawn of the Industrial Revolution, argued that population growth would always tend to outrun food supply, constraining human numbers through what he called 'preventive' and 'positive' checks. Gunnar Heinsohn, in his 2006 study Sons and World Power, applied similar reasoning to the instabilities of North Africa and the Middle East. Bertrand Russell, as early as 1949, warned of the catastrophic consequences of continuous population growth if rational planning failed to contain it.

The pattern of the past is clear: when population exceeds the available food supply, nature corrects the imbalance through suffering. The climate crisis will substantially increase this threat by reducing agricultural yields in many regions already at or near subsistence. Jean Ziegler's warnings about global hunger are not invalidated by the statistical progress of the past half-century — they remain an urgent indictment of the distribution of available resources. The relevant qualification is that today the diseases of affluence — above all obesity, caused by excess calories — now affect far more people in developed countries than hunger does. In 2014, 850 million people suffered from malnutrition worldwide, while around 2.1 billion suffered from overweight. The problem of fossil civilisations is that hunger was fought with means that will be exhausted in the foreseeable future and that the temporary

a affluence they produced remained the privilege of the rich North. This will not last. William Rees (2019) — together with Mathis Wackernagel the inventor of the ecological footprint concept — has calculated that humanity should not exceed approximately two billion people at current resource consumption levels if it wants to operate sustainably. At the present level, five or more planets' worth of resources would be needed to support the global population indefinitely. In more abstract terms: "Gross over-crowding will produce social stresses and tensions that will shatter our community organisations long before it starves us to death. It will work directly against improvements in intellectual control and will savagely heighten the likelihood of emotional explosion" (Desmond Morris).

10a The remedy: possible but unlikely

Against this bleak historical record, the present moment offers something genuinely unprecedented: for the first time in human history, the knowledge and technical capacity exist to reduce population voluntarily, painlessly, and without harm to any individual. If all women in all countries had access to and chose to use effective contraception, the global population could be reduced from eight billion to something like two billion within two generations — not through deaths, but through the absence of births that would otherwise be condemned to lives of poverty, malnutrition, or conflict. The pressure on natural systems would be dramatically reduced; the remaining population would, per capita, be considerably wealthier. The COVID-19 pandemic provided a brief and inadvertent demonstration: when economic activity paused in the most affected regions, atmospheric pollution decreased measurably within weeks.

The example of China is instructive. The People's Republic implemented its one-child policy beginning in the late 1970s, recognising that any improvement in per-capita prosperity was being offset by uncontrolled population growth. The policy was implemented by coercive means — which violated fundamental rights and produced serious demographic distortions — but it achieved its demographic objective and is arguably the single most important factor behind China's subsequent economic rise. Meanwhile the policy has changed. The Chinese Communist Party's reversal of the one-child policy is instructive: having successfully reduced fertility for decades, the party would now like to encourage more births to compensate for a rapidly ageing population. The women of China are, however, no longer playing along — a demonstration that reproductive autonomy, once established, is extremely difficult to override.

A bloodless, voluntary version of the same demographic transition, achieved through universal access to family planning rather than state compulsion, would represent a transformation of comparable magnitude without the coercive costs.

The obstacle is not technical but political. Population reduction through voluntary means would be a straightforward benefit for the planet and its inhabitants. It need not alter the existing balance of power between states if all participated proportionally. Yet any informed observer of the current world situation will recognise it as, for the present, politically unrealisable. The freedom to reproduce at will is understood as a fundamental right in virtually every political tradition, even when its exercise produces demonstrable harm to both the individual and the collective. We remain, as a species, unable to apply our available knowledge and capabilities for the benefit of the whole.

11 Transportation

Germany, with approximately eighty million inhabitants, currently has about sixty million cars in use. In China, approximately twenty-four million new passenger vehicles entered the market in a single year (2016) — roughly equivalent to half the entire German fleet. The trajectory is clear: as the living standards of developing economies approach those of the industrialised world, global car ownership will multiply several-fold, approaching five to ten billion vehicles rather than the current 1.3 billion. Transportation already accounts for approximately fifteen percent of global fossil energy consumption. A tenfold increase in the vehicle fleet would make ecological collapse a mathematical certainty.

The obvious partial responses — fuel taxation, electric vehicle incentives — are insufficient and socially regressive. So long as renewable energy remains expensive and electric vehicles remain more costly than their fossil-fuel equivalents, these measures impose disproportionate burdens on lower-income households. Eliminating personal transport altogether is not viable in societies where workplaces and residences are geographically dispersed. Expansion of public transit is necessary but cannot serve all journeys economically. Unfortunately, public transport systems have been intentionally destroyed in some countries. In the United States, an excellently functioning public transport system of railroads and streetcars was deliberately dismantled after 1929 to clear the way for the automobile industry (Kemfert 2020). This strategic destruction of public infrastructure in the interests of a single industry has shaped American urban geography — and American carbon emissions — ever since.

11a The remedy: possible but unlikely

An ecologically adequate solution is, however, already technically available. It requires five elements working in combination: electric vehicles with a minimum range of four hundred kilometres; autonomous (driverless) control enabling vehicles to reposition themselves without a driver; artificial intelligence to coordinate routing and vehicle allocation across an

entire urban area; a widespread fifth-generation communications network enabling real-time coordination with onboard computers; and mobile devices allowing any citizen to summon a vehicle and specify a destination at any time. The fleet of shared autonomous vehicles need not be publicly owned. Private companies could compete to offer this service, charging customers a usage and maintenance fee plus automatically calculated travel costs — as they do now with shared scooters or bicycles. Individual car ownership would be eliminated; the vehicles would be owned by competing private firms, with government ensuring that their total number is appropriately limited and that prices are kept low through competition.

The arithmetic of a reduced car fleet requires careful qualification. Traffic is not evenly distributed over 24 hours — peak demand at the start and end of the working day creates a floor on the number of vehicles required. Germany has approximately 45 million employed people. If we conservatively assume that one-tenth use bicycles or public transport to commute, some 35 million vehicles would be needed during peak hours. However, if each vehicle carries on average three people per journey (easily achievable with intelligent routing), the required fleet falls to roughly 12 million — about one-fifth of the current 60 million. The figure of one-tenth is therefore a reasonable target over time, as patterns of work and settlement adapt.

The logic is straightforward: private cars are idle for approximately ninety percent of their operational life. A shared fleet of vehicles in continuous use could therefore serve the same mobility needs with one-tenth the number of vehicles — and one-tenth the associated energy consumption, raw material use, and infrastructure demand. The principle has already been demonstrated at small scale through electric scooter and bicycle-sharing schemes. The extension to autonomous passenger vehicles is technically feasible with existing capabilities. The result would be equivalent personal mobility with a fraction of the material and energy cost.

The secondary benefits of a substantially reduced car fleet are considerable. Only one-tenth of current parking spaces would be required. Urban land now occupied by parking lots and multi-storey car parks could be reclaimed for greenery, playgrounds, and community facilities. The resource burden from vehicle manufacturing would be reduced by 80–90 percent. Daily energy consumption in transportation would fall proportionally, making the transition to electric vehicles far more tractable. Under these conditions, the cost of electric vehicles would be distributed across the entire population as a usage fee rather than concentrated on individual purchasers.

The picture looks entirely different if electric cars merely take the place of their fossil counterparts. The IEA projects that the global electric vehicle fleet will grow from approximately 2 million today to 280 million by 2040. Kohei Saito (drawing on IEA data) calculates that the resulting reduction in CO_2 emissions would amount to approximately 1 percent of the total. The contrast with the potential impact of reducing the global fleet to one-tenth is therefore substantial — the latter would cut transport emissions not by one but by 90 percent.

One structural obstacle deserves acknowledgement. The German automotive industry built its world-leading position on the excellence of internal combustion engines. Electric vehicles are technologically less demanding and can be produced by a wider range of manufacturers. The transition to electric autonomous shared vehicles therefore risks accelerating the deindustrialisation of a central sector of the German economy — a concern that is legitimate even if it cannot be allowed to delay the necessary transformation indefinitely.

The conclusion is the same as in the population example: a straightforward technical solution exists; its implementation would benefit both the planet and its inhabitants; it would not disturb the existing balance of power between states if adopted proportionally; yet any informed observer must conclude that it is, for the present, politically unrealisable. The car industry, employment in associated sectors, and the cultural attachment to private vehicle ownership form an obstacle that no individual state is positioned to overcome unilaterally while competing in the international race.

12 Farewell to Disposable Society

Throwaway society — the systematic production of goods designed for rapid obsolescence and single use — is both a cause and an expression of the ecological crisis. The required alternative is conceptually simple: equivalent performance with substantially lower material throughput, achieved by increasing the lifespan of products. If the average lifespan of all manufactured goods were extended by a factor of ten, the consumption of energy and raw materials for their production would fall by ninety percent — an effect equivalent, for the purposes of environmental impact, to reducing the population by the same factor. The potential of extended product lifespans was recognised early. Kenneth E. Boulding stated in 1966: "I suspect that we in our wasteful society have underestimated the benefits of a longer lifespan, and that this could well be one of the areas where the price system needs correction through government-sponsored research and development." The Centennial Light — a carbon-filament bulb in Livermore, California, that has burned almost continuously since

1901 — demonstrates that extremely long product lifespans are technically feasible when durability is designed in rather than designed out.

This is not technically demanding. The oldest Egyptian pyramids are approaching five thousand years of age. Until the Industrial Revolution, the wealthy throughout the world placed a premium on the durability of their possessions — castles, furniture, weapons, instruments — and the poor maintained and repaired their fewer possessions as a matter of survival. Erich Fromm (2000) captured the cultural transformation with characteristic precision: "In the past, people cherished and took care of everything they possessed, using it for as long as possible. They bought things to keep them. The motto was: Old is beautiful! Today, people buy things to discard them. The motto is: Consume, don't preserve." Modern buildings and consumer goods could, of course, achieve comparable longevity, particularly if designed on modular principles allowing faulty components to be replaced rather than requiring disposal of entire products.

The obstacle is not technical but economic. Industry and commerce have a direct financial interest in short product lifespans: the faster a product becomes waste, the sooner the customer purchases a replacement. Tim Jackson (2017) makes the point sharply: "The throwaway society is not so much a consequence of consumer greed as a structural prerequisite for its survival. Novelty has become a conscript to and an agent for economic expansion." Planned obsolescence is not a moral failing of individual consumers or companies; it is the logical consequence of an economic system in which growth is both the goal and the condition of stability. "When demand stalls, unemployment typically rises, tax revenues typically fall and debts rise. These impacts tend to create a growth imperative." This interest is not merely a characteristic of unscrupulous actors; it is structurally embedded in the competitive dynamics of any market where innovation and growth are the primary measures of success. "Radically altering production and consumption practices within a conventional framework would be akin to trying to climb up a down escalator" (Paul Raskin).

Consider the arithmetic: if German industry were to increase the durability of all products by a factor of ten, economic output in those sectors would fall by a corresponding proportion. If durability were halved by general agreement among competitors, output would double — growth through greater waste production.

There is, however, an important asymmetry that this analysis tends to obscure. A tenfold increase in product lifespan would mean that each product is purchased once per decade rather than once per year — but the individual citizen's real purchasing power would be unchanged. They would need one-tenth the income to maintain their current standard of

living. Negative growth — or 'degrowth', as Herman Daly called it — does not necessarily imply a lower material standard of living; it implies a different organisation of economic activity, one in which services for the maintenance of health, social cohesion, and cultural life largely replace the production and disposal of physical goods.

It implies a different social attitude as well. Thorstein Veblen's concept of conspicuous consumption, first articulated over a century ago, remains analytically indispensable. Many products are expected to deliver more than their advertised functions — they serve as status symbols, as visible markers of social position. This expectation is actively cultivated by advertising and product design. The result is that durability and repairability conflict not only with producers' economic interests but with consumers' social ones.

But more ominous still: negative growth is incompatible with modern economies – under present conditions it amounts to social breakdown. Naomi Klein and the economist Nicholas Stern both note that historically, significant reductions in carbon emissions have occurred only during major economic downturns. As Nicholas Stern's 2006 report for the British government documented, reductions of more than 1 percent per year have historically only been associated with economic recession or upheaval — and the Great Depression years were the only period in American history when emissions fell at 10 percent per year for multiple consecutive years. This historical pattern supports the argument that degrowth is compatible with lower emissions — but also underlines the challenge of achieving it voluntarily. Even the transition from a manufacturing economy to an service-based one does not avert danger. Tim Jackson (2017) documents the structural tendency of service-based economies to depart from the growth trajectory: "The returns on service-based investments are lower than those in manufacturing, for a very specific reason: they resist increases in labour productivity. Ultimately, an economy insisting on preserving its service sector is heading towards zero growth." Baumol's cost disease — the tendency of labour-intensive services to absorb an ever-larger share of GDP without producing equivalent output growth — turns out be an obstacle on the path to ecological progress.

12a The remedy: possible but unlikely

The citizen as consumer would welcome durable goods and reduced waste; the same citizen as employee depends on income generated by the industries producing those goods. This structural contradiction between consumption interests and production interests is one of the defining features of the ecological problem, and it cannot be resolved within any single state while competing states continue to treat growth as the primary goal. Once again: a technically available solution, individually and collectively beneficial, remains beyond reach so long as the race between nations shapes all economic decision-making.

13 British Wartime Economy

Population reduction through voluntary means, autonomous vehicle-sharing, and extended product lifespans are all examples of technically available solutions that cannot be implemented within the current competitive interstate framework. A fourth example — perhaps the most striking, because it is historical rather than hypothetical — is provided by the British wartime economy of 1939–45.

Ulrike Herrmann, in her book The End of Capitalism, draws attention to this precedent: "Rationing was carried out, but there was no shortage. The British invented a private and democratic planned economy that had nothing to do with the dysfunctional socialism in the Soviet Union ... The British wartime economy from 1939 onward provides a suitable model as to how a climate-neutral world could be striven for in an orderly fashion ... unfortunately, it will not work without constraints. Our way of life can only be ecological if we do not consume permanently and without limits. The analogy to World War II is therefore apt ... Quantity and price controls were immensely popular in Britain ... The state-imposed egalitarianism proved to be a blessing: during the war, the lower classes were even better off than ever before. The British did not starve during World War II, because there were 2,800 calories per capita per day ... in the middle of the war, the population was healthier than ever ... Consumption fell by a third — and in a very short time. The enormous cutback and rebuilding make the British wartime economy a fascinating model for today: German consumption must fall similarly dramatically if the climate is to be saved."

The historical record is clear. When a sufficiently compelling collective emergency was perceived, a democratic society accepted a substantial reduction in individual consumption — not reluctantly, but with broad popular support, because the rationing system distributed the burden equitably. This is not a trivial precedent. It demonstrates that the political and social obstacles to radical consumption reduction are not insurmountable in principle; they are contingent on the absence of a sufficiently shared perception of emergency. 'Climate Maoism' and 'Degrowth Communism' as advocated by Kohei Saito (2023) are by no means the only alternatives. Saito confronts the two basic alternatives facing a civilisation that must simultaneously reduce its material throughput and maintain social stability. The first 'Climate Maoism' entails the abandonment of free markets and liberal democracy in favour of a centralised dictatorship pursuing rapid decarbonisation. 'Degrowth Communism', draws on late notes by Karl Marx in which he expressed disappointment with industrialism's treatment of nature. The attempt to portray Marx as a founding theorist of degrowth seems to be as fantastic as past attempts to read Christianity as a call to violence against non-believers. Saito himself knows this: his proposals remain at the level of aspiration.

Not only British consumption, but that of all countries operating at ecologically unsustainable levels, would need to be curtailed in the manner of a wartime emergency. The analysis above suggests that this curtailment could be achieved without popular uprising, provided it were implemented proportionally and equitably. The obstacle is not technological, not economic in the fundamental sense that it would produce unbearable suffering, nor is it a matter of human incapacity. Sustainability does, however, comes at a price: a sharp reduction in industrial production necessarily reduces the research budget — which depends on corporate revenues and tax income — and simultaneously weakens the state's capacity to finance defence. This is not an argument against degrowth; it is an argument for coordinated global implementation. A state that degrows unilaterally while its rivals maintain their industrial base is strategically vulnerable. So again, the real obstacle to sustainability is the current global system, which makes any individual state that imposes such constraints on itself unilaterally less competitive than its rivals. The conclusion is the same: we are capable of applying our knowledge and skills for the benefit of the whole; we lack only the institutions that would allow us to do so simultaneously.

14 Alienation

Adam Smith identified the division of labour as the primary engine of economic wealth: by distributing the tasks of production among many workers, each performing a single specialised operation, output could be multiplied almost indefinitely. This principle now governs all industrial production and was – before the introduction of robotics - the indispensable foundation of the mass-production economy. Without progressive specialisation, the modern material world would be inconceivable.

The psychological cost of this arrangement is what Hegel and Marx called alienation — the disconnection of the worker from the meaning of their labour. A painter who produces an entire canvas, a craftsman who builds a cabinet from raw timber to finished object, a writer who completes a novel: each experiences their work as a process of creation in which they can recognise themselves. The factory worker performing one of a thousand sequential operations on a product they will never see assembled, let alone use, has no comparable relationship to their labour. A Harvard Business Review study found that fifty percent of American professionals feel disconnected from the meaning of their work; thirty-seven percent of British workers consider their jobs completely pointless. A cross-national survey of 142 countries found that no more than thirteen percent of wage earners report genuine satisfaction with their work.

This alienation is not entirely new. As a historical matter, the agrarian dependency formula condemned ninety percent of the population to labour that served others' purposes rather than their own. But the industrial form of alienation is distinctive in that it affects technically advanced societies, and in that it operates alongside a formal ideology of individual freedom and self-realisation — making the gap between promise and experience particularly acute.

Two further dimensions of alienation in Fossil society deserve attention. The first is the erosion of responsibility. When work processes are fragmented into thousands of sequential operations, moral responsibility fragments alongside them. The novelist bears responsibility for their novel; the scientist bears responsibility for their published claims. When no individual makes a whole product or pursues a complete inquiry, no individual can be held accountable for the consequences of the whole. The diffusion of responsibility is not an accident of modern economic organisation; it is structurally built into it. The resulting sense of meaninglessness — the inability to answer the question 'what is all this production and consumption ultimately for?' — is one of the defining pathologies of late Fossil civilisation.

The fragmentation of work processes entails that of communities no longer bound together by common tasks. David Engels (2012) draws a parallel with the decline of Rome: "Western man has created a society in which the seemingly free, independent, and unprejudiced individual actually feels increasingly isolated and abandoned. The tendency toward individualization has led to a systematic devaluation of the concept of community, confirming research findings that observe a decline in social solidarity in Western civilization, and in Europe in particular. Today, as in Rome during the first century B.C., the systematic self-destruction of traditional groupings in favour of the material self-interest of individuals has a shadow side: the end of emotional attachment to the community leads to the loneliness of individuals and to an increasing but unreal idealization of the concept of individual friendship."

The second dimension concerns the progressive replacement of manual and cognitive tasks by automation. The Industrial Revolution automated physical labour; the digital revolution is automating routine cognitive labour. Each successive wave of automation eliminates jobs at the lower end of the skill distribution while creating new ones at the upper end — producing what economists call a polarisation of the labour market, with growing demand for highly skilled and highly paid work at one extreme, and for low-wage service work at the other, and declining demand in the middle. This structural transformation is one of the principal drivers of the social divisions that have generated populist movements across the industrialised world. The marginalisation of those deemed economically superfluous is not, it must be acknowledged, entirely new. When the survival of the community was at stake, earlier

societies dealt ruthlessly with individuals seen as burdens. In the poorest regions of Japan, the elderly — especially old women — were sent to the mountains to die when food was insufficient for both the newborn and the aged. In Europe until the Industrial Revolution, beggars were locked out of cities to starve. People did this with a guilty conscience, because religion had proclaimed all people equal before God — but they did it nonetheless. What is new in secular industrial society is the systematic intellectual framework that justifies the devaluation of those whose knowledge and skills no longer meet current requirements, reducing them to their utilitarian value for the production apparatus.

15 Marx

Marx profoundly misunderstood the nature of industrial society's central problem, and this misunderstanding has had lasting consequences. He correctly identified the tendency toward wealth concentration as a structural feature of capitalism; he correctly recognised that this concentration undermined the Enlightenment ideal of a classless society based on knowledge and skill. But he drew the wrong conclusion about where the line of conflict should be drawn. The communal ownership of property as advocated by communism works within families and will likely always do so, since the sharing of goods within a love-based small community appears as a natural ideal. But it has never been successfully extended to mass societies for more than a brief period. The reason is simple: love that binds a handful of people together cannot be transferred to millions of fellow citizens. Strict material equality among strangers can only be established and maintained through terror and violence — as the historical record of every society that has attempted it demonstrates.

For Marx, the fundamental opposition was between workers (who did not own the means of production) and entrepreneurs (who did). This led him to set the numerically large but politically weaker working class against the entrepreneurial class — both of which, viewed from a holodox perspective, contribute indispensably to the common good. In doing so, he obscured the real destroyers of a classless society of knowledge and skills: those who derive unearned income from the ownership of scarce assets, who accumulate wealth and power through the mechanism of interest and dividend without contributing knowledge, skill, or effort in return. Ulrich Menzel (2023) draws the essential distinction: "The difference between the logic of profit and the logic of rent, in a nutshell, is that in the first case, income arises from entrepreneurial activity and in the second case, from political control of income-generating resources. In the first case, you have to invest to remain competitive; in the second case, you have to invest in the organs of power — the army, police, presidential guard, secret services — in order to maintain control." This distinction between productive and parasitic income is the key to understanding how inequality reproduces itself independently of merit.

This parasitic layer — the rentier class — remained largely invisible to Marx, and he gave his followers no analytical tools to identify or oppose it. Ulrike Herrmann (2022) puts the fundamental dynamic concisely: "As long as a society is poor, the rulers can only get rich by exploiting their subjects — it amounts to a brutal zero-sum game: the powerful appropriate the scarce goods, leaving the vast remainder almost completely empty-handed. However, when economies grow, this struggle is no longer compelling. The gains are large enough for everyone to share." Karl Marx's theory of pauperisation wrongly assumed that this zero-sum logic would also apply to capitalism.

The consequences have been lasting. By directing the moral energy of the left against entrepreneurs and the mechanism of profit — which is broadly compatible with a meritocratic society — Marx misdirected the protest against hereditary privilege. Social democrats spent over a century attempting to defuse the class conflict Marx had ignited, with modest success in the post-war decades and declining success since. He would be surprised to learn that unions, representing present-day workers, are indeed the 'saviours of capitalism' as Ulrike Herrmann (2022) rightly observes. By ensuring that workers can purchase the goods they produce, unions prevent the demand collapse that would otherwise destroy the system. The conflict between labour and capital is real, but both parties have a structural interest in the system's continuation. But financial parasitism, having grown to avalanche proportions - the top one percent of wealth-holders in the United States now own more than the bottom fifty percent combined - could well destroy the system. Oxfam (2016) documents the cumulative effect: the poorest half of the world's population earn less than 7 percent of total global income, while the top 1 percent earn about 20 percent and own almost half of all global wealth (Tim Jackson 2017). The eight individuals whose combined wealth equals that of 3.6 billion people represent the extreme tip of a redistribution that has been proceeding steadily through legal mechanisms for two centuries. Financial parasitism may achieve particular gains in many illegal ways – this is not my theme. Insofar as speculation is a pure game of chance, the profit of one speculator is always paid for by the loss of another. Where losses mainly affect poorer players, illegal insider knowledge is typically involved. Here I consider only the legal transfer of wealth from the bottom to the top through the normal operation of the credit system. This mechanism alone is quite sufficient to produce the social disintegration that we observe — without any recourse to illegal behaviour.

The logic of compound interest is most easily grasped through its long-run extrapolation. The standard thought experiment posits a saver who, in the era of the Emperor Augustus, invested a modest sum at two percent annual interest and whose heirs withdraw the deposit two thousand years later. The accumulated value, after compound interest over that period, would not merely exceed the entire current wealth of the globe — the heir could claim a dozen gold

planets in addition. The example is, of course, impossible in practice; what it demonstrates is that the compound interest mechanism, if uninterrupted, produces not gradual enrichment of a few but the absorption of all wealth by a single person. The interruptions — wars, inflations, defaults, jubilee years, revolutions — are not market failures but necessary corrections of a runaway system.

Nevertheless, interest as well as their counterpart dividends have become perfectly legal. The same mechanism of automatic wealth accumulation operates when companies sell part of their ownership in the form of shares to investors, who then receive dividends. The dividend is structurally identical to interest: it represents a claim on the enterprise's output that accrues to the owner of capital without requiring any additional effort or contribution. Both must always be mentioned together, because one may fall toward zero or even below zero — as occurred in Europe in the 2010s — at which point the wealthy simply redirect their surplus into dividend-paying equities. The two mechanisms are functionally equivalent as instruments of passive wealth accumulation; the choice between them is tactical. The parasitic nature of unearned income was most clearly identified by Silvio Gesell in Germany and Henry George in the United States. Helmut Creutz added considerable theoretical depth to their insights, and Michael Hudson has extended the analysis to contemporary finance. All three are outside the academic mainstream, which is itself part of the phenomenon they describe. Even Maynard Keynes' remark — quoted a thousand times — that "we have more to learn from Silvio Gesell than from Marx" has produced no change in the dominant framework. But Keynes was well aware of the destructive consequences of social parasitism. He identified the unearned income of rentiers as one of the main structural evils of the capitalist economy. His proposal for the 'euthanasia of the rentier' — the gradual elimination of rentier income through sustained low interest rates — has remained unrealised.

Let me add an important qualification: debt as such is not an evil; it becomes an evil only when the interest paid on it exceeds the real return on the investment it finances, thereby transferring wealth from the productive to the parasitic class. Thomas Piketty's Capital in the Twenty-First Century reached a much wider audience than Gesell, Creutz and Hudson but falls short of the earlier authors' analysis: Piketty advocates progressive taxation, which is necessary but insufficient, because it treats all wealth equally without distinguishing between wealth earned through productive contribution and wealth accumulated through passive ownership of scarce assets. Münkler (2003) identifies the structural consequence for a contemporary economy like Russia. "Russia has transformed itself economically into a rentier state. The economy of a rentier state is based to a large extent on the capitalisation of natural resources and is at the same time dependent on the import of technologically sophisticated finished products." The rentier state model is the energy-economy equivalent of

the financial rentier: income flows from ownership of a scarce asset rather than from productive contribution.

On the international scene, financial parasitism profits from the mechanism of debt. As David Graeber documents, loans were virtually forced upon Third World states — or rather upon the dictators who ruled them — through the mediation of the IMF. Often inflated by compound interest to several times the original amount, the debt was then 'repaid' by selling off natural resources and imposing severe austerity on populations who had no say in the original borrowing. The mechanism transferred wealth from poor countries to rich creditors while structurally preventing the development of independent industrial capacity. If we define crony capitalism, for the purposes of this analysis, as a system that tends to substitute parasitic income for earned income, we may agree with David Graeber (2012), who, discussing classical China, distinguishes between a market economy and capitalism so defined: "The Confucian state may have been the world's greatest bureaucracy, but it actively promoted markets, and as a result commercial life in China soon became far more sophisticated than anywhere else in the world. This even though Confucian orthodoxy was overtly hostile to the profit motive itself. Commercial profit was seen as legitimate only as compensation for the labour of transporting goods from one place to another, but never as the fruits of speculation or rent. What this meant in practice was that China developed a sophisticated market economy without the class of absentee owners and parasitic rentiers that characterised European capitalism."

Marx's vision of a classless society was also flawed in a different way. His famous formulation in The German Ideology — a society in which one could 'hunt in the morning, fish in the afternoon, rear cattle in the evening, criticise after dinner, just as I have a mind, without ever becoming hunter, fisherman, herdsman or critic' — describes, as I have noted in the main text, conditions that had existed among hunter-gatherers but are entirely incompatible with the complex division of labour in any industrial economy. He was describing freedom as it could exist with a technology of ten thousand years earlier, not as it could exist in the society he was actually analysing. His fundamental self-contradiction deserves to be stated explicitly. As an idealist, he strove to abolish all power of man over his fellows — his classless society amounts, strictly speaking, to anarchy: the abolition of domination. But as a realist, he was perfectly clear that no ruling class would voluntarily renounce its prerogatives. He therefore insisted on bringing about the end of domination by means of domination: through the dictatorship of the proletariat. This radical self-contradiction persists in the real-existing communist systems that claimed his authority: the Soviet Union and present-day China sanctify Marx as an idealist who wanted a society

without rulers and classes, while in practice implementing the most comprehensive systems of political control in human history.

The Enlightenment tradition offers a more coherent account of what a classless society would require: equal access to education, the substitution of demonstrated merit for inherited privilege as the criterion of social position, and — crucially — the elimination of unearned income as a mechanism of class formation. Classes arise when privileges can be transferred from one generation to the next. Knowledge cannot be inherited; it must be reacquired by each individual through effort. Wealth can be inherited; and as long as the mechanism of compound interest allows wealth to multiply automatically regardless of the owner's contribution to society, a new hereditary elite will continually reform itself even in societies formally committed to equality of opportunity.

16 Money

Ulrike Herrmann argues in The End of Capitalism that growth can only occur when loans are taken out, and that loans can only be repaid when there is further growth — an argument that implies a structural dependency between capitalism and continuous expansion. This formulation captures a genuine insight but overstates it: growth can also arise from the deployment of existing private capital or from corporate profits, without recourse to new debt. What is correct in Herrmann's claim is that the pressure for growth is intensified by debt, since debt service creates a floor on the rate of return that investments must achieve. The question of whether interest is 'the problem' at the macroeconomic level is, however, more complex than Herrmann's formulation suggests.

Herrmann draws on the argument of the economist Mathias Binswanger, who contends that growth cannot result from savings because savers, by definition, withdraw purchasing power from the economy rather than injecting new money into it. This is true at the level of individual financial intermediation, but Binswanger's conclusion — that only new money creation can drive growth — misses the crucial distinction, central to Keynes's economic theory, between consumption and investment. Citizens who save make their resources available to businesses through the banking system for productive investment; this does not increase the money supply but does redirect existing resources toward activities that expand productive capacity. The growth that results repays the loans and generates the interest that rewards the savers. Keynes's account of this mechanism in the General Theory remains the most robust available.

The question of where new money comes from — necessary to prevent a deflationary spiral as an economy grows — has been debated for nearly a century. Keynes himself held different views in his Treatise on Money (1930), where he attributed money creation to private banks, and in the General Theory (1936), where central banks assume that role. Ray Dalio takes a clear position: the central bank is the ultimate source of new money, with private banks acting as transmission belts. A private bank cannot create money from nothing; a central bank can. Central banks inject money into the economy by purchasing securities (typically government bonds) in exchange for newly created central bank reserves, and charge interest on those injections. When the economy contracts and money becomes surplus relative to economic activity — producing inflation — the central bank withdraws it by selling securities back to the market. This elegant mechanism allows the money supply to expand with the economy without either chronic inflation or deflationary contraction.

What this mechanism does not address, however, is the distributional consequence of the interest system — the systematic transfer of wealth from those who must borrow to those who can lend. This is not a macroeconomic argument about aggregate money creation; it is a microeconomic argument about the distribution of the gains from growth. Even in an economy where interest payments cancel out at the aggregate level (every debt is someone else's asset), the distribution of those assets is highly unequal: wealthy lenders systematically capture a larger share of the returns to investment than small savers, because their scale allows them to negotiate better rates, insure against losses, and access opportunities unavailable to smaller creditors. The mechanism of compound interest, operating on this unequal distribution, produces the upward redistribution of wealth that has characterised all phases of industrial capitalism after the initial equalising phase of rapid growth.

17 World Reserve Currency

The leading position of a world power in the race between nations inevitably confers on its currency the role of the world's reserve medium of exchange. This is both a privilege and, over time, a structural disadvantage — a dynamic that even Ray Dalio, despite his generally acute analysis of hegemonic cycles, fails to fully articulate. He repeatedly expresses the creditor-debtor relationship in a way I find misleading. He writes of "rich countries borrowing money from poor countries" — as if it were the poor countries that were extending credit out of generosity. The reality is the reverse: countries with large dollar surpluses are seeking a safe haven for their savings, and the United States is the only borrower capable of absorbing those savings at the required scale and security. The asymmetry of power runs in the opposite direction from Dalio's formulation. But Dalio rightly points out that the Chinese currency has the best chance of becoming the next global reserve currency. "The renminbi is

the only fiat currency chosen as a reserve currency because of its fundamentals. China's shares of world trade, world capital flows, and world GDP are roughly equal to the United States. China has managed its currency to be relatively stable against other currencies and against goods and services prices, has large foreign exchange reserves, does not have a zero or negative real interest rate, and is not printing and monetising a large quantity of debt."

Both the opportunities and risks a country faces when its currency becomes the world's reserve currency are clear to see. As the latter serves as an international means of payment, it is demanded by all countries for its own sake. Foreign exporters accept it in exchange for their goods *without requiring an equivalent flow of goods in return* — they hold the currency as a store of value and a medium for international transactions. The result is an inflow of foreign goods into the reserve currency country that is not balanced by an equivalent outflow of goods – leading to a structural trade deficit. As I have argued elsewhere: "The success of the dollar as the world's reserve currency inevitably led to a negative trade balance for the United States — just as the success of any other national currency would if it assumed the role of world reserve currency." Donald Trump's complaint — "They sell us their goods but buy much less from us. This cannot continue!" — is empirically accurate as a description of the outcome, but it misidentifies the cause. The trade deficit is not the result of unfair practices by trading partners; it is the automatic consequence for any country holding the world's reserve currency. Constraining trade will not solve the structural problem; it will only solve it by sacrificing the reserve currency status that generates the problem.

The deeper mechanism thus lead to industrial decline in the long run. To obtain dollars, trading partners produce industrial goods for the US market at a scale exceeding what the US produces for theirs. Japan, in the 1980s, flooded American markets with industrial products while importing primarily agricultural goods from the US. China has followed the same pattern on a larger scale: as of April 2025, Chinese suppliers accounted for up to ninety percent of goods on the shelves of major American retailers. Since the 1990s, large American industrial companies even accelerated this process by relocating production to low-wage countries — China above all — to reduce costs. The resulting dollar surpluses accumulated by successful foreign exporters had then to be invested safely: typically in US government bonds and equity markets, making those exporters the largest creditors of the United States and the United States the largest debtor of its competitors. The erstwhile hegemon, at the height of its power, has laid the material foundations for its own industrial decline.

The wars in Iraq and Afghanistan between 2003 and 2006 cost approximately $400 billion. During the same period, the Chinese foreign exchange administration acquired US government bonds and mortgage-backed securities worth approximately $464 billion. China,

inadvertently and indirectly, financed those wars. This is an illustration of what reserve currency status means in practice: the hegemon can fund its military commitments from foreign savings – apparent advantage - but only at the cost of deepening the structural indebtedness that will eventually undermine its position.

The dollar's reserve currency role also strengthens its exchange rate against all other currencies, making American manufactured exports progressively less competitive on world markets — another factor contributing to the deindustrialisation that has hollowed out the productive base of the US economy. Trump's tariff experiments, whatever their other merits or demerits, address a symptom (trade imbalances) rather than the structural cause (reserve currency status and its consequences). More dangerously, aggressive tariff policy risks triggering a flight from the dollar that, if it gathered momentum, could end reserve currency status abruptly rather than gradually — a financial shock without precedent in the post-war era.

18 Free Trade

The relationship between free trade and economic development has followed a consistent historical pattern: states at an early stage of industrial development protect their infant industries through tariffs and import controls; once those industries become internationally competitive, they advocate for free trade to gain access to foreign markets. States that have already reached the technological frontier prefer free trade because it allows them to exploit their advantages; states that are catching up prefer protection because it allows them to develop without being undersold by more advanced competitors.

Japan's industrialisation in the Meiji period exemplifies the pattern. The Japanese government correctly identified that allowing the free import of superior Western manufactured goods would prevent the development of domestic industries. By protecting its own manufacturers while selectively adopting foreign technology, Japan built within a few decades the industrial base that would make it the world's second-largest economy within a century. China followed the same strategy from the late 1970s onward, protecting domestic industries while acquiring Western technology by every available means — licensing, joint ventures, and, critics argue, outright industrial espionage. Only once these industries had become competitive did China embrace the language of free trade.

The United States itself has been a protectionist country for most of its history. It owes its founding as a nation partly to its rebellion against the economic dependency imposed by Britain; after independence, it built its industrial base behind tariff walls that the dominant

industrial power of the day — Britain — condemned as backward and unfair. Only after the Second World War, when American industry was globally dominant and its competitors' industrial capacity had been largely destroyed, did the United States become the world's leading advocate of free trade. Ulrich Menzel (2023) identifies the structural parallel: "The United States initially tolerated the free-rider China just as Great Britain tolerated the free-rider USA in its day, by alone ensuring a liberal world economic system. China used liberalism for its export offensive while restricting access to its own market. Chinese tankers and container ships benefited from the freedom of the seas guaranteed by the United States, as well as from the US development of the Global Positioning System (GPS), the lighthouse of the 21st century, while China made no contribution to global security." The ideological position has consistently followed the material interest: freedom is a luxury that leading states can afford; protection is a necessity for those trying to catch up. As long as a state is unable to compete internationally, it pursues protectionism — quite rightly, and without apology. As soon as it has become competitive, it immediately changes its ideological position and becomes a champion of free trade. The hypocrisy is systematic, not individual; it is produced by the logic of interstate competition. As Donald Trump's administration has demonstrated, the same country reverts to protectionism the moment it perceives its leading position to be at risk. In my 1997 book Die Arbeitslose Gesellschaft (Jobless Society, S. Fischer), I predicted almost thirty years ago that the United States would be the first to defend itself against predatory trade and the resulting deindustrialisation of its own country with protectionism, with the Europeans following suit later. The first part of this prediction has been fulfilled. In his foreword to my book Das Pyramidenspiel (The Ponzi Scheme, Signum, 2008), the former member of the German Council of Economic Experts Gerhard Scherhorn wrote: "We owe to Gero Jenner's book Die Arbeitslose Gesellschaft the concept and analysis of predatory trade."

The dialectic between free trade and protection is, however, increasingly losing its theoretical clarity as global supply chains and mutual dependencies make genuine national economic autonomy less and less achievable. The largest economies require access to raw materials found only abroad, access to educated workforces that cannot be produced domestically at sufficient scale for all purposes, and access to markets far exceeding any single nation's capacity to absorb their output. Populist politicians who promise economic self-sufficiency are selling a nostalgic fiction. But the opposite extreme — the belief that free trade automatically serves all parties proportionally — has been equally refuted by experience: unregulated free trade strengthens the competitive and weakens the uncompetitive, producing eventually the same tendency toward wealth concentration that unregulated domestic capitalism produces. A beneficial global trading system would require, at the international level, the same regulatory framework that a well-functioning domestic economy requires: one that promotes competition while preventing the exploitation of dominant positions. That

framework requires the same thing that every other global problem requires — institutions of common governance that do not yet exist.

19 War Psychosis

The conditions preceding the First World War offer an instructive parallel to the present. Germany had undergone a brilliant industrial ascent in the three preceding decades, transforming itself from a largely agrarian economy into the continent's leading industrial power. The states of Europe had achieved greater material prosperity than ever before. Yet each of the leading powers felt threatened, envied, and strategically cornered by its rivals. Britain feared Germany's challenge to its naval supremacy; Germany feared encirclement by the Franco-Russian alliance; Austria-Hungary feared the dissolution of its multi-ethnic empire. In this environment of mutual suspicion and paranoia, preventive war came to seem not merely possible but rational — a cleansing thunderstorm that would resolve the accumulating tensions before they became unmanageable. The enthusiasm with which millions greeted the outbreak of war in August 1914 remains, a century later, deeply difficult to comprehend from the outside.

Seen from an economic perspective, the structural parallel with the present is evident. After the collapse of the Soviet Union and the end of the Cold War, people anticipated a period of peace, but it soon became clear that Russia would take a different path. Münkler (2023) notes that Russia's trajectory diverges fundamentally from the path that economic interdependence theory predicted: "Ideally, the order of economic interdependence is based on the complete substitution of military with economic power. However, Russia under Putin has taken the opposite path. It was not the establishment of a prosperous order that played the decisive role, but rather the historical cultivation of memories of former imperial glory and power — the breeding and nurturing of resentment. Russia feels that it is not recognised as a great power, and Putin's belligerent actions can also be interpreted as a desperate struggle for recognition." In the form of the BRICS countries, this led to renewed political and economic antagonism. Thomas Gomart summarises the current data: "The BRICS format ... has managed to overtake the G7: at the end of 2022, the BRICS accounted for 31.5% of global GDP in purchasing power parity, compared to 31% for the G7. As a reminder: in 1990, the BRICS accounted for only 17% of global GDP, while the G7 reached 47%.' The economic catch-up has been reflected in military spending: 'Between 2001 and 2022, military spending rose from 1,139 billion US dollars to 2,240 billion US dollars within one generation. During this period, military spending per capita increased fivefold in China and threefold in Russia" (Thomas Gomart, Les guerres des autres, 2024).

The United States, meanwhile, has maintained its share of global GDP with remarkable consistency: "In 1980, the US accounted for 25% of global GDP, 15 years later at the height of its unipolar moment it still accounted for 25%, and in 2023 it still achieved 25%." But this aggregate stability conceals an important structural weakness, as Gomart observes: 'Its supremacy is based less on its military strength, which has been undermined several times since September 11, 2001, than on its technological and global control over the hubs through which the most important financial and information flows pass." As to military strength, Ray Dalio expresses caution: "Some people imagine that China could achieve broad military superiority in five to ten years. I don't know if that is true". Gomart is more definite: "the Chinese Navy already surpasses the US Navy in the number of ships and is expected to field 450 units by 2030, while the US will have 360 units", and "China is the only permanent member of the Security Council that continues to produce fissile material for military purposes."

And China is simultaneously extending its territorial claims. At the end of August 2023, the Chinese Ministry of Natural Resources published a 'National Map of China' that encroached on the territories of India, Malaysia, the Philippines, Vietnam, Taiwan, and even Russia, provoking fierce protests. On this map, Taiwan is represented as an integral part of the PRC.

The pattern recapitulates much of what the world experienced before the First World War: a leading power that perceives itself as declining; challengers who feel humiliated by their subordinate position; mutual suspicion accelerating toward strategic pre-emption. China’s territorial ambitions are in themselves a cause for war; the U.S. ban on transferring leading technologies to China is a second one, as Dalio notes: "if the United States shuts off Chinese access to essential technologies, that would signal a major step up in the risk of a shooting war." But the decisive trigger for war has always been widespread arms buildup. As Carl Sagan (quoted in Schlosser 2013) notes: "Nuclear weapons may well have made deliberate war less likely, but the complex and tightly coupled nuclear arsenal we have constructed has simultaneously made accidental war more likely." In 1983 the world narrowly escaped a nuclear retaliatory strike by the Soviet Union.

As we have seen, technological progress is the primary driver of historical upheavals – and nowhere more so than in the field of armaments. This is particularly true of advances in the field of armaments. At the beginning of 2013, eight states possessed around 4,400 operational nuclear weapons, with nearly 2,000 kept on high alert. Counting all warheads — deployed, spare, stored, and scheduled for dismantlement — the total was approximately 17,270 across the US, Russia, UK, France, China, India, Pakistan, and Israel. According to SIPRI 2025, the total stockpile has decreased to 12,241, but the number of operational warheads has

simultaneously increased to 2,100. Far more alarming than the figures mentioned is the fact that the warning time before a fatal blow has now been reduced to virtually zero. Nuclear-equipped submarines can take up positions in the immediate vicinity of the enemy's national territory — for example, off the US East Coast — reducing warning time for a first strike to near zero. This is why Vladimir Putin warned the West not to position its missiles in Ukraine: such positioning would reduce Moscow's warning time for a first strike to less than one to five minutes. This means that machines and artificial intelligence will automatically respond to potential attacks. Thanks to technological advances, the warning time has been reduced so drastically that it will no longer be a president who decides matters of war and peace, but machines. The prospect that the collective fate of mankind will soon have to be placed entirely in the hands of machines instead of humans is probably the most depressing of all future perspectives, because machines are indifferent to our fate. The Boeing 737 Max crashes of 2018 and 2019, in which a faulty automated control system overrode pilot inputs and killed 346 people, are a revealing symptom. Overwhelmed and insufficiently informed by their own technical creation, two airlines and a regulatory system placed their passengers' fate in a machine that they did not fully understand. This should be a serious warning: overwhelmed and stunned by our own technical 'progress', we have placed our fate in the hands of subhuman machines and artificial intelligence. In 1983, machines had in effect already decided in favour of World War III; it was Lieutenant Colonel Stanislav Petrov who, at the last moment, averted the disaster.

20 World Government

From Kant to Bertrand Russell no thinker argued for a politically united humanity on the grounds that size is intrinsically advantageous over smaller units of self-governance. The thesis 'small is beautiful', as E. F. Schumacher formulated it in 1973, encountered no serious intellectual opposition. The case for world government has always rested on a single, specific argument: the elimination of war. Kant was explicit about this in his essay on Perpetual Peace: "Man has a tendency to socialize because in such a state he feels himself more as a man, capable of developing his natural dispositions. But he also has a great tendency to isolate himself ... because at the same time he finds in himself the unsociable quality of wanting to direct everything solely according to his own sense ... He therefore needs a master who will break his own will and compel him to obey a universal will in which everyone can be free … But for states ... there can be no other way out of the lawless state, which is full of war, than for them, like individual people, to give up their wild (lawless) freedom ... Thus, international law should be based on a federalism of free states." Apart from federalism Hobbes would have endorsed this position: beyond the sovereign — and for Hobbes, sovereigns always exist in the plural with regard to Europe — there is no master, so the 'state

of nature' (anarchy) and wars continue to exist between states. The inescapable conclusion is that the abolition of this anarchy requires either hegemony or supranational governance — but hegemony is always temporary.

Münkler's typology of interstate order is analytically valuable. He distinguishes between horizontal competition (the Vegetius model), where states compete for economic and military power and the outcome is at best a temporary balance that regularly ends in an arms race; vertical hierarchy (the Dante model), where a credible hegemon temporarily replaces inter-state anarchy with an order recognised by all; and interdependence (the Comte-Spencer model), which attempts to replace war with economic integration — as if economic competition did not itself generate imbalances and tensions. From a historical perspective, the first model — horizontal competition — has prevailed in the long run, but for a reason that Münkler himself identifies it was never stable: unpredictable inventions can always upset the existing balance, giving latecomers the means to challenge leaders. This is the structural reason why the race between nations is self-perpetuating.

A world government can come into being in various ways. First, when one state is much stronger than all the others and can therefore impose its will on them. Second, when states voluntarily submit to an authority they have chosen. Great Britain served as the world’s leading power until the end of World War I. After that, the United States assumed that role. Arnold Toynbee largely acknowledged the United States as a benevolent hegemon, but also recognised the structural temptation: the strongest nation is always tempted to exploit its superiority by dictating rules that humiliate others or exploit them materially. The US was a benevolent hegemon toward Europe but acted with considerable ruthlessness toward the states of South America and other 'backyards'. Whether Toynbee would still have given this favourable verdict after Vietnam and Iraq under Bush Junior remains an open question. Münkler argues that the US position as hegemon and peacekeeper is threatened as much by its own foreign policy failures as by the erosion of economic and military supremacy: "In no war waged by the US worldwide has the image of Western supremacy been so severely and consequentially damaged as in the Vietnam War, also and especially in Europe. For some, these were regrettable but unavoidable violations of Western values that occurred repeatedly but did not invalidate Western values; for others, geostrategically guided power politics was the real purpose of the Western alliance, and the narrative of values was merely the ideological veil."

Kant explicitly advocated federalism — the voluntary association of sovereign states under a framework of common rules — rather than a single world-state that would absorb existing sovereignties. He believed that a true world-state would produce only a 'soulless despotism'.

The higher authority he envisioned would function as a mediator and arbitrator in inter-state conflicts, not as a replacement for national self-governance.

The League of Nations — conceived by Woodrow Wilson after the First World War — was the first institutional attempt to realise this vision. The United Nations, reconstituted after the Second World War, has come closer but still falls far short. The structural problem is the same in both cases: a genuinely democratic forum of sovereign states capable of making binding decisions would require the great powers to submit to the democratic will of the majority — which would, among other things, require them to forgo their nuclear arsenals, since no democratic majority of the world's nations would grant any subset of states a permanent monopoly on weapons of mass destruction.

This creates a double bind. If the UN could democratically prevail over the nuclear powers, the General Assembly would be confronted with only two realistic options: demand the abolition of all weapons of mass destruction, so that no state enjoys nuclear privilege; or accept the democratic right of all states to acquire such weapons. The first option is currently unacceptable to the nuclear powers; the second would be catastrophic for the world. The Security Council veto system preserves this double bind by ensuring that the nuclear powers retain an absolute veto over any binding decision that threatens their interests.

Nevertheless, the UN Security Council does, in its rare moments of consensus, function as the embryo of a world government — the first such institution in human history. When it makes a binding decision and the major powers comply, it acts with genuine authority that transcends national sovereignty. This is a precedent of extraordinary importance, however rarely it is actualised in practice.

The conclusion that Kant's federalist vision has failed — that the voluntary association of sovereign states cannot address the twin threats of nuclear proliferation and ecological collapse — does not mean that the alternative is a world dictatorship. Every functioning state imposes laws — constraints on individual freedom in the service of collective survival. The question is not whether such constraints exist but by whose authority and in whose interest they are imposed. The contrast between democratic and authoritarian states in their treatment of political opponents is not merely a moral distinction but a structural one. In democratically constituted societies, it is their elected representatives who determine what powers the community may exercise over its members when they violate common rules. In the fascism of Mussolini, the National Socialism of Hitler, and the arbitrary regime of Vladimir Putin, it is a single individual who presumes to act on behalf of everyone — who destroys those who

stand in his way and rewards those who grovel before him. This applies to all dictators from Lenin and Stalin to Mao Zedong.

A world government based on democratic deliberation — imposing constraints on sovereign states in precisely those domains where unconstrained sovereignty produces outcomes that all states individually deplore — would be neither more nor less 'dictatorial' than a democratic national government. The sovereignty of the parts must end precisely where it threatens the survival of the whole.

21 Distorted Worldview — The 'Religion of Science'

Holodoxy, as its name suggests, is the study of wholes. It therefore transcends the disciplinary boundaries that normally separate enquiry into nature from enquiry into human society, and both from enquiry into the philosophical foundations of knowledge itself. The social constraints to which human beings have been subjected during the three past epochs of civilisation — hunter-gatherer, agrarian, fossil — had to be addressed in the preceding parts of this book, as did their relationship to the natural environment. But equally important is the spiritual or intellectual foundation that characterises each epoch, because civilisations base their social organisation and their relationship to nature on the worldview that prevails among them.

The fossil epoch owes its intellectual foundation to the European Enlightenment, which I have called 'science-religion': a worldview that treats the natural sciences not merely as a method for understanding specific aspects of reality but as the unique and all-sufficient path to truth — the modern successor to the omniscient God of theological tradition, differing only in that the omniscience is attributed to a progressive collective enterprise rather than a supernatural being.

21a Nature and Man Viewed as Machines

The holodox perspective is as old as humanity itself, even if it has lacked this name. It manifests most clearly in religion, which has always claimed to offer access to the whole — to the ultimate ground of reality — rather than to a particular region of it. Undogmatic science, by contrast, practised a certain modesty: it made claims about specific, measurable phenomena and refrained from claims about the totality.

This modesty was, however, abandoned early. As early as the seventeenth century, a dogmatic science was born — more accurately described as a science-religion — that

continued the tradition of dogmatic theology but pushed its claims further. Science was understood not merely as a method for understanding natural phenomena but as a process leading ultimately to omniscience and omnipotence over both nature and humanity. Francis Fukuyama has characterised this tendency: "The entire tendency of modern natural science and philosophy ... consisted in denying the possibility of autonomous moral decision and understanding human behavior solely in terms of subhuman and subrational impulses."

Fukuyama is a social scientist not a physicist. A physicist might rightly object that the extraordinary successes of scientific medicine would be impossible if human beings could not be understood and treated 'like machines' — that is, as organisms exhibiting law-governed processes that respond predictably to interventions. This objection has real force. Laws that apply at the level of biological organisms are genuine laws, even if they are not as universally valid as the laws of physics and chemistry that govern inorganic matter. And why should organisms not be governed by natural laws like outward nature? Human freedom, its complexity and multidimensionality, remains intact even when its limits are sometimes determined by very simple factors. Throughout history, humans formulated complex multicausal theories to explain natural disasters, plagues, and diseases — attributing them to witchcraft, the wrath of gods, or the malice of enemies. It was not until the 19th century that bacteria were discovered, and later viruses. At that point, these correct monocausal explanations immediately swept away the elaborate but incorrect theories. The lesson is not that human behaviour is similarly reducible to simple causes, but that freedom does not require that all causes be complex. Karl Popper (1980) even maintained that general determinism can never be definitively disproved: "One can sometimes hear that the movements of the stars obey invariable laws, while the fall of a dice is random. In my view, the difference lies only in the fact that we have been able so far to successfully predict the motions of the planets, but not the single result of a throw of the dice. There are cases in which predictions prove to be unsuccessful. In such cases it can happen that we consider it hopeless to ever find a satisfying law. But it is not probable that we will ever give up the attempt to do so, unless the problem does not interest us very much. In no case, however, can we assert with absolute certainty that a given event is uncaused." The logical counter-argument — that strict determinism, if consistently applied, would eliminate the possibility of scientific truth — does not appear in Popper's account. The philosopher finds himself - for once - in contradiction to himself, because The Open Society and Ist Enemies he resolutely opposed historicism, i.e. the transfer of determinism to man and history.

There remains a critical distinction: 'humans also behave like machines' — a relative truth that underlies all successful medicine and psychology — is not the same as 'humans are nothing but machines' — an absolute claim that generates irresolvable self-contradiction. For

if all human thought and action is fully determined by physical laws, this applies equally to the scientist making the claim. The distinction between scientifically true and scientifically false statements presupposes that the scientist has the freedom to reason correctly or incorrectly, to follow evidence or to ignore it. An omniscient science that could predict all human intellectual activity would thereby have abolished science itself, since science requires the genuinely open possibility of discovery — the possibility that the evidence might lead somewhere not already determined.

The point may be restated as a principle of holodoxy: the search for natural laws that describe calculable regularities makes sense only in relation to a realm of freedom that allows those laws to be applied in unpredictable, non-calculable ways. The moon has no choice about whether to eclipse the sun; a physicist has a choice about whether to apply gravitational mechanics to the design of a rocket or a weapon. The laws are the same; the freedom to apply them is not determined by the laws themselves.

21b Two Perspectives

The debate between determinism and freedom has a long philosophical history. The Babylonians believed human destiny was written in the stars. The theological version of the determinism-freedom problem tormented the Church Fathers for centuries. Augustine followed a circuitous path: his De libero arbitrio (On Free Will) defended freedom against the Manichaeans, but later — in De diversis quaestionibus ad Simplicianum (397 AD) and De dono perseverantiae — he came down firmly against autonomous human agency: "We will, but God works the willing in us." In his book on freedom, *De servo arbitrio*, Luther took a position that was quite similar to that defended later on by Calvin. "De servo arbitrio argued that if God is omnipotent He must be the sole cause of all actions, including man's; that if God is omniscient He foresees everything, and everything must happen as He has foreseen it; that therefore all events, through all time, have been predetermined in His mind, and are forever fated to be. Luther concluded, like Spinoza, that man is as 'unfree as a block of wood, a rock, a lump of clay, or a pillar of salt'. More strangely still, the same divine foresight deprives the angels, nay, God Himself, of freedom"… But Luther and Calvin argue in a different way: Luther says that "the future is determined because God has foreseen it and His foresight cannot be falsified; Calvin reverses the matter, and considers that God foresees the future because He has willed and determined it … We shall always find it hard", concludes Will Durant in his report on John Calvin, "to love the man who darkened the human soul with the most absurd and blasphemous conception of God in all the long and honoured history of nonsense."

Augustine, Luther, and Calvin denied human freedom on theological grounds: an omniscient God knows the entire future from the beginning of creation, so human choices cannot be genuinely open. Democritus, Spinoza, Voltaire, Schopenhauer, and Bertrand Russell belong among the philosophers who denied freedom. Fichte and Heidegger proclaimed it. William James, Karl Jaspers, and Karl Popper argued — more carefully and, I believe, more convincingly — for a position that acknowledges both the reality of constraint and the reality of genuine choice.

The opposition between these views is not merely philosophical; it is embedded in the structure of everyday experience and scientific practice. When we observe other people — especially people whose behaviour matters to us — we naturally adopt what I call the object perspective: we ask about the motives, habits, and constraints that govern their actions, seeking the regularities that will allow us to anticipate and respond to them appropriately. This is the perspective of the novelist, who makes protagonists intelligible by revealing the forces acting on them, and of the psychologist and sociologist, who seek law-like regularities in human behaviour.

When we reflect on our own actions, we naturally adopt the subject perspective: we experience ourselves as making choices among genuine alternatives, as capable — within limits — of doing otherwise than we do. Yesterday I spontaneously decided to walk to a nearby hill, the autumn morning being fresh and beautiful. This was a free decision: nobody compelled me to make it, and I could have revised it at any moment. The awareness of one's own freedom can go so far that some people deliberately do the opposite of what others expect of them, purely to demonstrate to themselves and others that they are not determined by external prediction.

These two perspectives are not merely different ways of describing the same situation; they are grounded in different fundamental needs. The need for security in our dealings with nature and with other people is served by understanding the rules and regularities that govern them. In the physical sciences, this need has been extraordinarily well satisfied: we can retrodict the history of the cosmos to the Big Bang and project the future of the solar system millions of years forward with confidence.

But security has never been humanity's only need. For anyone who has preserved their natural curiosity, the unexpected — the surprise, the mystery, the genuinely new — is a constant challenge without which life would lose its colour. Complete predictability would encase us in a straitjacket that suffocates all spontaneity. A world in which everything was already known would be a world in which nothing could be discovered, nothing created,

nothing genuinely experienced for the first time. The Polish philosopher Leszek Kolakowski (1973) expresses the human need for unpredictability with rare honesty: "The unknown world can be a source of fear, but the source of that fear can also be the excessively familiar world with a well-known course that we ourselves have planned. In the things we have subjugated over centuries of dramatic effort, we can no longer find a mythical organization, nor can we seriously believe in it. Precisely because they are tamed, harnessed to the cart that we know how to steer, physical energies appear to our eyes a hundred times more dehumanised, indifferent, in the abundance of meaninglessness, even though we have just integrated them meaningfully into our plans. We yearn once again for the abandoned unpredictability of things. We have longed for it since the 18th century, from the moment mechanized industry began to alter the Earth's surface."

And elsewhere: "Complete predictability is a quality fundamentally different from what we know from our relationships with other people. In encounters with other people, where we manage to loosen the rules of objective exchange and let the pulsating spontaneity on both sides come to the fore, the inability to predict and its superfluity represent a distinctly human value for us; predictability in other people is a characteristic of reified relationships between us: every spontaneity is creative..."

The paradox of the human condition is that we alternately — and with something like inner necessity — seek security and seek freedom. This paradox becomes most acute when the person becomes a researcher: the neurologist who studies the brain is seeking law-like regularities in the very organ that enables the search. If the brain were fully determined by physical laws, the neurologist's own cognitive processes — including the reasoning that produces their scientific conclusions — would be equally determined. A scientific statement would then be as 'necessary' as its negation, and the distinction between truth and error would dissolve. The neurologist who regards human beings as objects revealing law-like regularities is simultaneously a subject — the active observer who makes free choices about what to study, how to interpret evidence, and whether to follow the argument wherever it leads.

The fact that chance, understood probabilistically, can range from zero to one — from total unpredictability to the certain occurrence of an event — means only that the transition from recognisable order to unrecognisable chaos is gradual rather than absolute. It does not imply that chance is ultimately reducible to hidden order; it means only that our ability to perceive order extends further in some domains than in others. And note: Every algorithm — however complex — that purports to generate randomness necessarily produces repeatable orders: the exact opposite of genuine randomness. Anyone who knows the algorithm can predict its output. We can approximate genuine chance only by coupling an algorithm to a real random

event — for example, by triggering it whenever a sensor detects some genuinely unpredictable occurrence, such as a passing pedestrian wearing a yellow shirt. The dependence on real-world randomness as input demonstrates that chance cannot be manufactured from within a purely formal system.

The insight is unambiguous: even if science discovers ever more regularities and quasi-laws governing human thought and action, these regularities never determine human beings completely. Freedom and constraint are not alternative explanations of human behaviour; they are complementary dimensions of a single reality. Two hundred years ago a great poet had already expressed this truth "Man alone ... has the privilege ... to reach into the ring of necessity ... through his will and to start a completely fresh series of phenomena in himself. The act by which he does this is preferably called an action (Friedrich Schiller, On Grace and Dignity).

21c Prescribed Meaninglessness

Every human worldview has been, in the sense I am using the term, holodox: it has attempted to provide access to the whole — to an ultimate ground of meaning that situates individual human lives within a larger order. Until the European Enlightenment, that whole was understood as a manifestation of divine power, or, in the mystical traditions, as an ultimate unity in which the individual self is dissolved into the absolute. From this whole, the parts derived their sense of purpose and their ultimate goals. This mythological unity is still upheld in Arthur Schopenhauer's philosophy: "Everyone finds himself as this will, in which the inner essence of the world exists, just as he also finds himself as the cognizing subject, whose representation the whole world is. In this twofold view, everyone is therefore the whole world itself, the microcosm, and finds both sides of it completely within himself" (Schopenhauer, The World as Will and Representation, 1818). This is the mirror image of scientific reductionism: instead of reducing the moral world to mechanism, Schopenhauer expanded human will to encompass the cosmos of natural laws. Since the French Enlightenment, human beings have been placed at the centre; the parts — individuals and states — derive their sense of life from this new human-centred framework.

The initial promise seemed as generous as the religious one it replaced. Where God had promised paradise after death, the Enlightenment — amplified by the material achievements of the Fossil Revolution — promised paradise on earth, accessible within living memory through the application of knowledge. This promise was, as the preceding parts of this book have documented, substantially fulfilled: the agrarian majority that had toiled for millennia in subjugation achieved, for the first time, a dignified material existence.

But science as a worldview contained, from the beginning, a flaw that gradually became apparent: it offers no account of meaning. William James (1897) gave early and eloquent expression to the psychological consequences of scientific naturalism: "For a hundred and fifty years past the progress of science has seemed to mean the enlargement of the material universe and the diminution of man's importance. The result is what one may call the growth of naturalistic or positivistic feeling. Man is no law-giver to nature, he is an absorber. She it is who stands firm; he it is who must accommodate himself. Let him record truth, inhuman though it be, and submit to it! The romantic spontaneity and courage are gone, the vision is materialistic and depressing. Ideals appear as inert by-products of physiology; what is higher is explained by what is lower and treated forever as a case of nothing but — nothing but something else of a quite inferior sort."

The protest against such reductionism filled volumes in the German-speaking philosophical tradition: the Schichtenlehre (strata theory) developed by Wilhelm Dilthey, Nicolai Hartmann, Konrad Lorenz, and Rupert Riedl, and Henri Bergson's parallel tradition in France. The great difference from Jacques Monod lies in evaluation: for Monod, chance is blind; for these thinkers, it is a creative force. Riedl and Bergson would have said that Monod's 'blindness' is simply the name we give to our own explanatory limitations. Similar critiques of the reductionist ambitions of modern science as expressed by William James can be found in the writings of Will Durant, and Lewis Mumford — both combined deep respect for scientific method with resistance to the claim that it exhausts the dimensions of human reality.

In 1970, the French biochemist Jacques Monod published Le Hasard et la Nécessité — Chance and Necessity — in which he summed up the scientific worldview in a formula that has since become canonical: "Chance alone is at the source of every innovation, of all creation in the biosphere. Pure chance, absolutely free but blind, at the very root of the stupendous edifice of evolution: this central concept of modern biology is no longer one among other possible or even conceivable hypotheses. It is today the sole conceivable hypothesis, the only one that squares with observed and tested fact." For objective science, the world is nothing but chance and necessity. On one side, necessity: the order that the natural sciences explore in the form of laws. On the other, chance: the void within that order — a meaningless nothing with which science does not know what to do.

And Bertrand Russell, writing from a philosophical rather than biological perspective, produced one of the most eloquent expressions of the resulting despair: "That man is the result of causes which had no prevision of the end they were achieving; that his origin, his growth, his hopes and fears, his loves and his beliefs, are but the outcome of accidental

collocations of atoms — all these things, if not quite beyond dispute, are yet so nearly certain, that no philosophy which rejects them can hope to stand. Only within the scaffolding of these truths, only on the firm foundation of unyielding despair, can the soul's habitation henceforth be safely built."

This hopeless pessimism is inseparably linked to the emergence of the natural sciences as the dominant intellectual authority. The religious tradition had located the cosmos within a meaningful order — a divine plan of salvation in which every soul had a place and a destiny. When science dismantled this narrative, it did not replace it with another meaningful account; it replaced it with no account at all. Where God had embodied wisdom and creative intelligence, the scientific worldview substituted what one might call the monkey at the typewriter: over limitless aeons, pure chance mechanically generated the cosmos without purpose or direction. Even Albert Schweitzer — among the most honest of the great religious thinkers — adopted this conclusion: "The sophisticated and deceitful attempts to understand the world in an optimistic-ethical sense have no better success than the naive ones. What our mind wants to pass off as knowledge is always only an unjustified interpretation of the world. What moral sense to give to the human existence, if we must renounce to recognise the moral sense of the world? But there is nothing left for our mind but to submit to the facts." And yet he did not revert to nihilism; he rebuilt his ethics on the foundation of 'reverence for life' — a moral stance that preceded all scientific calculation and refused to be derived from it

I regard both metaphors as equally illegitimate, for opposite reasons. The divine plan of salvation, however consoling, cannot be proved; it asserts more than the available evidence warrants. But the assertion that chance is 'blind' and 'meaningless' equally asserts more than the evidence warrants — indeed, it asserts something that is, by its own terms, unknowable. We can form a mental image of chance only as the negation of what we know: it is what lies beyond the reach of human knowledge and natural laws. To call this negation 'meaningless' is to make a judgment about something that lies, by definition, beyond our capacity to judge. As Rupert Riedl observed: "How presumptuous it would be if a tick wanted to imagine the blood vessels of a mammal, a dog the international drug scene, or we the laws beyond the cosmos."

British philosopher A. C. Grayling (2021) acknowledges the dilemma with admirable candour: "Scientific enquiry generates a paradox: increasing knowledge increases our ignorance." But he also notes, inconsistently, that the question about the limits of knowledge is not, in his view, a meaningful or answerable one. This self-contradiction is instructive: even a committed advocate of the Enlightenment programme is forced to recognise that the expansion of knowledge simultaneously expands the domain of the unknown.

Science can explain, with increasing precision, why a bee stings, how a volcano erupts, what happens in a cell phone. It cannot tell us why this world and its order exist, or what meaning we should assign to human existence. The Enlightenment abolished the answers that religion had given to this question - and rightly so where those answers rested on empirically unsupported claims. But it drew an illegitimate further conclusion: that because the religious answer was wrong, the question itself has no answer — that life is meaningless. Meaning, if it exists, is simply too large to be grasped by our present understanding. The appropriate response to the limits of our explanatory knowledge is not the declaration of meaninglessness but what I would call wonder: the recognition that the universe has produced, through processes we cannot fully explain, entities capable of experiencing it and asking about it. This is not blindness and mechanism but — to borrow a phrase — an incomprehensible miracle, the subject of never-ending amazement. The very improbability of our existence on Earth reinforces this point. Our planet's conditions — the precise atmospheric composition, the distance from the sun, the geological stability — are highly specific and, by any naive probability estimate, extraordinarily unlikely. We are riding through the cosmos on a ball glowing with interior fire, whose crust must be neither too cold nor too hot, whose gossamer mantle of gases must have exactly the right mixture to protect us from a particle bombardment from outer space. The fact that evolution, operating through chance, produced organisms capable of reflecting on this improbability does not make the improbability less striking. Chance is neither blind nor meaningless; it is, more accurately, an incomprehensible miracle — the proper object of never-ending wonder.

21d Power-Science and Power-Religion

The Enlightenment both spread truth and propagated delusion. Its deepest intellectual achievement — the rigorous application of empirical method to the study of nature — was genuine and irreversible. But it did not take seriously its own concept of truth. This failure transformed it into a double-edged sword. Initially, it denied the existence of chance on the grounds that chance was incompatible with the vision of God-like scientific omniscience; chance, imposing insurmountable limits on human knowledge and predictive power, had to be eliminated. When science was finally forced to acknowledge the existence of chance — by the findings of quantum mechanics — the resistance persisted in a different form: chance was admitted but declared 'blind' and 'meaningless', preserving the nihilistic implications of determinism by other means.

Both power religion and power science claim to know more than they can know. Power religion believed it possessed certain knowledge of God's plan of salvation. But then it never satisfactorily explained why God's creation was so fundamentally imperfect. The problem of evil always posed the deepest challenge to any form of theism. As Schopenhauer observed

with characteristic bleakness, in this world there is eating and being eaten, love and hate, childbearing and murder, wonder and horror. Traditional religions never fully reconciled with this contradiction. The move to a 'loving God' requires closing one's eyes to so much cruelty that undeniably belongs to the world that it can only be sustained by determined inattention. The alternative — a God who is not omnipotent, or whose purposes are beyond human comprehension — is more honest but harder to live with. That's one reason why the 18th century adopted 'deism': the view that God created the laws of nature and then withdrew, leaving the machine to run itself. This resolved the problem of miracles — no supernatural intervention required — while preserving a minimal divine role. Pascal's reproach to Descartes captures the dissatisfaction: "I cannot forgive Descartes; in his whole philosophy he would have preferred to do without God at all; instead, he has agreed to the concession that God gives the world a nudge at the beginning to set it in motion; after that he doesn't know what to do with God."

Power science commits the same mistake. It believes either that future science will eventually predict all possible events (the Laplacian vision, restated by Russell in the twentieth century), or that chance, while real, is necessarily meaningless. Both positions exceed what the evidence can support; both are driven by the desire for total explanation, which is to say, for a kind of omniscience.

The resemblance between power religion and power science extends to their treatment of dissent. The Church of the all-forgiving Jesus Christ burned heretics for centuries; power science uses subtler but equally effective means. The label 'unscientific' serves the function that 'heretical' served in an earlier era: it excludes the person so designated from the community of legitimate inquirers and renders their arguments, however well-reasoned, inadmissible. For those who hold that truth can only be found in measurement and experiment, philosophers are particularly susceptible to this dismissal, since their primary tool is argument rather than data.

There were always scientists who resisted this tendency. Kurt Gödel, from purely logical considerations, demonstrated that no formal system can achieve a complete and consistent account of all mathematical truths — a result that generalises, in spirit if not in formal detail, to the impossibility of total scientific explanation. Gödel's incompleteness theorem is the formal demonstration of what holodoxy asserts as a matter of principle: no system can fully account for itself from within its own resources. If a system attempts to do so — as power science attempts when it claims that all of reality, including the scientist's own thinking, is fully explicable in terms of physical laws — it generates contradictions.

Critical religion — represented by mystics such as Meister Eckhart, who insisted that the ultimate reality exceeds all conceptual formulation — has always understood this. Critical science — represented by James, Popper, Jaspers, and Riedl, among others — has understood it as well. What they share is the recognition that honesty about the limits of one's knowledge is not a defeat but a virtue — and that the acknowledgment of mystery is not a failure of science but its completion.

In music, this principle can be experienced directly. The power of a great piece of music — a Bach partita, a Beethoven quartet — rests on the interplay of order and surprise: the listener recognises familiar patterns while being constantly surprised by how they unfold. Music that is entirely predictable is boring; music that is entirely random is noise. The greatness of great music lies in the creative freedom with which it plays on and departs from structural regularities. In this context, unpredictable freedom — chance, as experienced from within a creative act — is not the absence of meaning but its highest expression. This is not merely an analogy; it is an argument. The ability of chance, operating within constraints, to generate experiences that human beings recognise as profoundly meaningful is evidence — not conclusive, but real — that chance and meaninglessness are not synonymous.

22 Benjamin Libet – an apparent disproval of freedom

Within the context of freedom versus necessity, this famous physiologist cannot be left aside. The psychoanalyst Joachim Bauer has raised methodological objections to Libet's famous experiment and its interpretation. But even setting those objections aside — even granting that Libet's measurements are correct and his question is well-posed — human freedom is not thereby disproved. The argument developed in my book Creative Reason runs as follows.

In his experiment, Libet measured the temporal sequence of a conscious act of will and the corresponding release of muscular activity. The result, confirmed in multiple replications, is that muscular activity *precedes* the conscious experience of willing by between 350 and 550 milliseconds. As Gerhard Roth summarised the finding: "The act of will occurs after the brain already decided on the movement to be produced." The implication drawn by Libet and many subsequent commentators is that conscious volition is not the cause of action but a post-hoc experience of a process already set in motion at a pre-conscious level — and therefore that free will, in the traditional sense, is an illusion. Lüder Deecke (2012) comments sharply on the implications drawn by some of his colleagues: "Gerhard Roth, who worked predominantly on salamanders, is trying to persuade us to give up responsibility. Another neuroscientist, Wolf Singer, an expert on the visual system, is of the opinion that the principle of responsibility of man is untenable, for in the brain there is no leadership. Wolf Singer

draws extensive conclusions for our legal system from his dubious premises — he pleads for the abolition of responsibility." I fully agree with Deecke's protest, but I looked in vain for a convincing refutation of Libet's experiments.

My objection is straightforward. Both the inner act of volition — the conscious, linguistically framed decision 'I will now raise my hand' — and its objective manifestation — the actual movement — are two different expressions of a single underlying cause situated at a pre-linguistic, pre-conscious level. If this is so, Libet's experiment tells us nothing about the existence or non-existence of freedom; it tells us only that conscious, linguistically formulated intentions are not the deepest level of volitional activity.

Leibniz, two hundred years before Freud, had already identified this pre-conscious realm. Our conscious thoughts, he observed, are 'small islands in a sea' — they rest on a pre-linguistic and pre-conscious basis. I call this pre-conscious basis 'non-manifest volition': it *precedes* both the linguistically marked conscious intention and the visible act of its execution.

Libet himself, in his book Mind Time, describes an instructive example: the unconscious braking action of a driver who suddenly sees a child in front of the car. The driver applies the brake 150 milliseconds after the visual impression reaches the visual cortex; the driver's conscious awareness of the danger appears only 500 milliseconds later — that is, 350 milliseconds after the braking action has already begun. This is not evidence against freedom; it is evidence that when immediate survival-relevant action is required, the brain — wisely — does not wait for conscious deliberation. The temporal sequence precisely confirms the interpretation: non-manifest volition precedes both manifest volition and overt action.

The broader point is that the opposition between freedom and determinism cannot be settled by physiological experiment alone, because the question is at root logical rather than empirical. An experiment can establish regularities and correlations; it cannot establish, by itself, that no form of freedom is compatible with those regularities. The logical argument — that strict determinism leads to irresolvable self-contradiction, since a science that could predict all human thoughts and actions would have to include predictions of its own future findings, eliminating the possibility of genuine discovery — precedes any experimental consideration and cannot be overridden by it.

23 All Against All: The Cyberwar Against Truth and Reason

Hardly anyone today argues that the development of weapons technology makes the world a better or safer place. But this was precisely the prediction made about the internet and social media: that global connectivity would diffuse truth, empower citizens, and create conditions for a new global democracy. The prediction has been comprehensively falsified.

The failure follows a pattern familiar from previous technological transitions. Our hypothetical Stone Age philosopher, observing the first experiments in crop cultivation, predicted peace and equality; he got ten thousand years of exploitation and war. The optimists of the early internet era predicted democratic empowerment; they have received a global infrastructure for state propaganda, corporate manipulation, and the industrialised production of misinformation.

The first major demonstration of the internet as a weapon came with the Stuxnet virus, deployed — almost certainly by the United States and Israel — to destroy approximately fifty Iranian uranium enrichment centrifuges in 2009-10. As David Colon describes in his 2023 study La Guerre de L'Information: "Described in the press as the most sophisticated cyber weapon in history, Stuxnet is the first major offensive in global cyber warfare." What the deployment failed to anticipate was the asymmetric character of the new weapon: a cyberattack costs a fraction of the resources required to develop conventional weapons systems, making it immediately accessible to any adversary capable of assembling skilled technical personnel.

The response was swift. In May 2017, North Korea deployed the WannaCry ransomware virus — built from an NSA tool previously leaked by Russian hackers — against 230,000 computers in 150 countries. The attack paralysed the British National Health Service, halted production at multiple Renault manufacturing plants, and caused billions in economic damage. As Colon notes: "Because it affects civilian infrastructures massively and indiscriminately, the North Korean WannaCry virus has emerged as a new form of international terrorism."

Espionage has proceeded in parallel. James Comey, then FBI Director, observed in 2014: "There are two types of large companies in the United States: those that have been hacked by the Chinese and those that don't know they've been hacked by the Chinese." Chinese cyberattacks have penetrated some of the US government's most sensitive data repositories.

The more corrosive long-term damage, however, comes not from direct sabotage or espionage but from the manipulation of public discourse. The same mechanism that causes all

nations in a Hobbesian state of nature to invest in the most destructive available weapons also drives each of them to project the most favourable possible self-image. Since this self-portrait rarely corresponds to reality, states systematically 'correct' the facts through propaganda — embellishing their own record and falsifying that of rivals.

Western democracies engage in this practice, though more constrained by independent press and legal requirements than authoritarian states. The staged dismantling of Saddam Hussein's statue in Baghdad's Firdos Square on 9 April 2003 — presented worldwide as spontaneous popular celebration — was, as Colon documents, "organised by the American army with the help of a few dozen militants of Ahmed Chalabi in front of journalists gathered for the occasion." Meanwhile, the ratio of public relations professionals to journalists in the United States has inverted dramatically: by 1990, the number of PR employees (162,000) already exceeded journalists (50,900) by a factor of three.

Social media has dramatically accelerated these dynamics. Research by the MIT Media Lab, tracking 126,000 rumours spread by three million Twitter users between 2006 and 2017, found that false news spreads six times faster than true news and reaches far more people. The platforms' algorithmic incentive structures systematically amplify content that generates strong emotional reactions — above all anger — because engagement drives revenue. The right to freedom of expression, which is a precondition for democracy, is systematically exploited to spread the incitement and distortion that undermine democracy. The broader context of information warfare is comprehensively analysed by the French sociologist Gérald Bronner in À l'assaut du réel (2024). Bronner documents both the structural vulnerability of democratic societies to coordinated misinformation campaigns and the specific mechanisms by which social media platforms amplify the most inflammatory content.

Russian information warfare has exploited these vulnerabilities with particular sophistication and strategic purpose. Russian propaganda has consistently sought to amplify centrifugal forces within Western democracies — supporting Scottish independence, Catalan secession, far-right parties across Europe from Hungary's Jobbik to France's Front National to Germany's AfD. In 2020, the same disinformation infrastructure that was directing Russians to vaccinate against COVID-19 was simultaneously promoting vaccine scepticism in Western democracies. Dmitri Kisselev, one of Russia's leading state propagandists, stated the strategic objective directly in 2013: "Objectivity is a myth that is proposed to us and imposed on us." Ben Nimmo, a leading analyst of Kremlin disinformation, identified its operational formula as the 'four Ds': dismiss the critic, distort the facts, distract from the main issue, and dismay the audience. The goal, as Vladimir Zhirinovsky triumphantly proclaimed, is nothing less

than a transformation of Western cognitive space: "Today we're succeeding in what we've been trying unsuccessfully to do for five hundred years!"

China has developed its own instruments. TikTok's domestic version, made available only to Chinese users under 14, shows 'scientific experiments to reproduce at home, museum visits, patriotic or educational videos', with usage limited to 40 minutes per day. The version exported to the rest of the world is algorithmically optimised for maximal engagement — which means maximal addictiveness. As one observer has noted, the hypnotic effect on young users evokes descriptions of opium addiction among the Chinese in the nineteenth century, now reversed in direction. The CCP's 'Document 972' lists seven categories of online discussion forbidden within China itself: universal values, freedom of expression, civil society, civil rights, the CCP's historical errors, crony capitalism, and the independence of the judiciary. The party denies its own citizens access to the discourse it exports to others.

The convergence of these developments — weaponised misinformation, algorithmic amplification of division, systematic attacks on shared factual ground — represents a new form of the same race between nations that has always characterised the third circle of human dependency. In this domain as in the others, the logic of mutual competition generates outcomes that every individual state has reasons to deplore and no individual state has incentives to arrest unilaterally.

24 Overcomplexity — and the Surveillance State

The digitisation of information and its rapid transmission is universally regarded by governments as one of the most important technical priorities of the present age. Nuclear power plants, ballistic missiles, drones, driverless cars, and surgical procedures can all be controlled remotely. State surveillance of entire populations has become technically feasible, as has the targeted manipulation of individual voting behaviour on the basis of detailed behavioural profiles. This process requires the unleashing of private ingenuity, thereby accelerating and multiplying the privatization of power that was set in motion by the Industrial Revolution.

The concentration of private power at the apex of the digital economy is, indeed, unprecedented in kind, not merely in degree. Google, Facebook (Meta), Amazon, Twitter (now X), and Starlink are privately owned, but their proprietors have wielded power equivalent to that of medium-sized nations for over a decade. Elon Musk's personal fortune exceeds $200 billion; in 2021, the total tax revenues of Germany amounted to approximately $354 billion. The comparison has limitations, but it illustrates the scale. Perhaps the most

concrete demonstration of Musk's political significance is the fact that Ukraine's survival as an independent state in the early months of the Russian invasion depended in part on his decision to maintain Starlink service — a decision made by a private individual whose commercial interests are only partially aligned with any state's national security.

It has been a truism for millennia that the same knife can peel fruit or cut a throat. It should cause no surprise that Google can provide encyclopaedic access to knowledge while simultaneously making the user subject to constant observation. What merits examination here is not the familiar dual-use problem of digital technology but a less-discussed consequence: the growing complexity of the artificial world that human beings have created.

The first consequence of this complexity is that an overwhelming majority of people no longer understand the artefacts they depend on daily. A car — still an analogue device in many of its core functions — can be understood in its basic principles by most users. The internal workings of a contemporary smartphone are inaccessible to all but a tiny technical elite. This in itself need not be alarming: the natural world has always been orders of magnitude more complex than any human technology, and Stone Age people survived perfectly well without understanding the physics of fire. The natural world's complexity has never prevented human beings from exploiting it.

But the artificial world presents a different kind of problem. It was designed and built by human beings, and it requires human beings to maintain it, update it, and defend it against adversarial manipulation. The pool of people capable of performing these functions — the technical elite who can develop, maintain, and monitor the hardware and software of the artificial world — is determined by the Gaussian normal distribution of technical intelligence within any population, a distribution that is approximately fixed. As the complexity of the technical world increases exponentially, the fraction of the population capable of operating at its frontier shrinks correspondingly. The demands on technical intelligence are rising faster than technical intelligence can be cultivated.

There is a second driver of complexity that operates independently of baseline capability. The artificial world is permanently under attack from adversarial actors — criminal hackers, state-sponsored cyber-espionage, information warriors — whose capabilities are also improving continuously. Every institution that depends on digital infrastructure — banks, hospitals, power grids, communications systems — must maintain defensive capabilities against these attacks, which requires not only technical personnel but organisational scale. The costs of adequate cyber-defence favour large institutions over small ones; this is one reason why the

compulsion toward institutional size in modern economies reflects not only economies of production scale but the costs of managing complexity.

A third consequence follows: the progressive displacement of the humanities by technical education in school and university curricula. As the share of resources devoted to science, technology, engineering, and mathematics increases to meet competitive and defensive needs, the resources available for the study of history, literature, philosophy, and the arts decline. This process — already documented by Steven Pinker for the United States and observable across the developed world — has consequences that are difficult to quantify but important: the systematic diminution of the cultural knowledge, critical thinking, and historical awareness on which the health of democratic societies depends.

The paradox is stark. Technology was supposed to relieve human beings of tedious practical concerns, freeing their minds for higher purposes. In its initial phase, it did so, to a remarkable extent. But as complexity has grown, technology increasingly consumes the intellectual and institutional resources that it was supposed to liberate. Not only do revolutions devour their children; so does complexity.

The fourth and most disturbing consequence is the expansion of state surveillance. The risk of catastrophic sabotage — of nuclear plants, power grids, financial systems, communications infrastructure — grows with the complexity and interconnection of these systems. Governments, facing existential risks from both criminal actors and state adversaries, find themselves under increasing pressure to monitor the public sphere comprehensively. There are now approximately one billion CCTV cameras in operation worldwide — roughly one per eight people. Smartphone malware ('Trojans') is deployed by state security services as a routine tool of domestic intelligence. The quantum computer, when it becomes commercially available, will threaten to crack all existing encryption systems overnight, making every financial transaction and secure communication temporarily accessible to any actor with the technology. An even greater danger seems to emanate from Anthropics' Mythos AI's capacity to find and exploit software vulnerabilities.

It is tempting to interpret the expansion of surveillance primarily as a political phenomenon — as the expression of authoritarian instincts that could be checked by appropriate legal and institutional constraints. This interpretation is not wrong, but it is incomplete. An increasingly large fraction of surveillance is driven not by political desire for control but by the structural imperatives of managing a world of escalating technical complexity and adversarial threat. *The surveillance state is not only the product of bad intentions; it is the product of technical*

progress itself. This is not an argument for acquiescing to surveillance; it is an argument for understanding its deep structural causes, without which no remedy is adequate.

25 Nordstream 2

In the months before Russia's full-scale invasion of Ukraine, the question of whether Germany would continue to receive natural gas through the Nord Stream 2 pipeline was a significant point of transatlantic tension. Donald Trump, during his first term, had pressured Angela Merkel to abandon Russian gas imports. Joe Biden maintained the same position. At their joint press conference in Washington shortly before the invasion, Biden addressed Chancellor Olaf Scholz directly: 'If Russia invades Ukraine, then there will be no longer a Nord Stream 2. We will bring an end to it.' When a reporter noted that the pipeline was under German sovereign control and asked how this could be achieved, Biden added: 'I promise you, we'll be able to do it.'

This remark — apparently inadvertent in its candour — was not subsequently acted on through diplomatic channels. On 26 September 2022, both the Nord Stream 1 and Nord Stream 2 pipelines were destroyed by underwater explosions in the Baltic Sea. The question of responsibility has been the subject of extensive investigative reporting. Several considerations bear on the assessment.

Russia had no strategic motive to destroy the pipelines: it could have stopped gas flows simply by closing the valves. Ukraine had a partial motive (the loss of transit fees) but lacked the technical logistics for an underwater sabotage operation of this scale. The positioning signals of vessels in the area were, according to reports, temporarily disabled at the time of the attack — a capability associated with state actors rather than private ones.

Biden's pre-invasion public commitment, combined with the subsequent implausibility of Russian or Ukrainian responsibility, points toward American authorship. My own assessment is that the decision, in its strategic logic, was justified: the situation was untenable, with the US providing full political and military support to Ukraine while its principal European ally continued to finance Putin's war machine. But the decision was not acknowledged, and the denial has persisted. This dishonesty was unnecessary: the US could have acknowledged the action — and provided a compelling account of its justification — without seriously damaging its strategic position. The continuing denial simply reinforces the popular cynicism, particularly acute in the current political climate, that 'those in power are all liars'. The state of nature between nations allows for actions of this kind; what it should not allow, in a country that claims to defend a rules-based international order, is the concealment of

them when concealment serves no strategic purpose that candour would not equally serve. For a more detailed account of the Nordstream sabotage and the quality of Western media coverage of the event, see my article of 29 September 2022: https://www.gerojenner.com/wp/falter-spiegel-and-nord-stream-2-what-about-the-quality-of-western-quality-media/

26 Donald Trump

Any assessment of Donald Trump must begin with two genuine achievements. His administration played a significant role in preventing a nuclear exchange between India and Pakistan at the last minute — a crisis that came dangerously close to escalation in 2025. And his administration provided meaningful support to Israel in the targeted destruction of Iran's nuclear facilities, before immediately seeking to transform the confrontation into a diplomatic opening — offering Iran the most favourable conditions for reconstruction and sanctions relief in exchange for renouncing its nuclear programme. This sequence — swift decisive action followed by immediate diplomatic overture — was politically courageous, particularly given that the same president had unilaterally destroyed the carefully negotiated JCPOA agreement during his first term in office.

Against these achievements, however, must be set objections without precedent in the history of the American presidency.

Donald Trump despises truth as an operating principle, not merely as an occasional tactical convenience. His contempt is expressed in gestures that would be unthinkable for any previous holder of the office — including his public statement "They will kiss my ass to make a deal with me" — and in a systematic disregard for factual accuracy that has degraded public discourse in ways that will outlast his administration. His opposition to education — reflected in budget cuts to universities, hostility to expert institutions, and contempt for scientific consensus — directly threatens the intellectual foundations on which American global primacy rests. His political instincts are structurally closer to those of Vladimir Putin and Kim Jong-un than to any predecessor within the American democratic tradition. His incitement of the mob that attacked the Capitol on 6 January 2021, and his stated indifference to constitutional electoral processes, represent challenges to the institutional order that go beyond ordinary political controversy.

The incompetence of his administration is now recognised even by many of his former supporters: decisions are made and reversed within days, advisors are chosen for personal loyalty rather than competence, and the resulting incoherence has damaged American

credibility with allies and adversaries alike. The acronym MAGA — Make America Great Again — is increasingly, in practice, being replaced by its functional inverse.

How did such a man reach the highest office of a great nation? The answer lies in a genuine failure of American politics, not merely of one party or faction. The United States has built an economy that rewards winners spectacularly and abandons losers without adequate social protection. The outsourcing of industrial production over the past three decades has created failed communities — the 'rust belts' — where well-paid manufacturing employment has been replaced by nothing comparable. The professional class that navigates the globalised economy has typically regarded these communities with indifference or, as Hillary Clinton demonstrated with her description of Trump's base as 'deplorables', with open contempt. Leftists tend to be cosmopolitans with little sympathy for their less favoured countrymen. "Parties of the left have been losing out to nationalists for well over a hundred years, precisely among those poor or working-class constituencies that should have been their most solid base of support" (Fukuyama 2018). The failure is not recent — it is structural, arising from the gap between the cosmopolitan values of the educated left and the material and cultural anxieties of the working class.

The structural roots of Trump's support are clearly identified by Neumann (2022): "In America, the number of industrial workers fell from seventeen million to eleven million during the 2000s — a loss of more than one-third. Thomas Piketty argues that, except for the years leading up to the French Revolution, there has been no historical period in which inequality has been greater. When Obama pushed to phase out coal in the early 2010s, it was a kind of declaration of war on traditional coal states like West Virginia, where mines closed by the dozen and once-thriving towns became deserted. Many of the former coal communities found their saviour in Donald Trump." Fukuyama's analysis (2018) supports these findings: "Between 2000 and 2016, half of Americans saw no gains to their real incomes; the proportion of national output going to the top 1 percent went from 9 percent of GDP in 1974 to 24 percent in 2008."

For people in these communities, abstract questions about democratic norms or constitutional processes are distant from daily experience. What is immediate is the perception that the elite — regardless of party — has served itself at their expense, and that the political system has no credible mechanism for addressing this failure. Trump offered them something that the establishment had failed to provide: recognition, anger, and - an enemy. That his proposed solutions are largely fraudulent and that his economic policies have in practice served the wealthy rather than the dispossessed is, from the perspective of his supporters, less important

than the fact that someone in power appeared to acknowledge their existence and their grievance.

This is a lesson that Europe would do well to take seriously. American capitalism has made extraordinary achievements possible; it has also, over recent decades, created a substantial class of people who feel economically superfluous and politically invisible. When a significant portion of the population reaches this condition, the democratic system becomes vulnerable to the kind of authoritarian populism that promises simple answers to complex problems and identifies convenient enemies. The remedy is not better messaging or more cosmopolitan rhetoric; it is the genuine political will to ensure that the material gains of economic development are broadly shared — which is, precisely, the Enlightenment ideal that the race between nations has so consistently prevented from being realised.

27 Hot Societies, Cold Societies

The race between nations has, as I have argued throughout this book, been under way for approximately five hundred years — but the changes that set it in motion have deeper roots. Claude Lévi-Strauss, in La Pensée Sauvage (The Savage Mind), introduced a distinction that clarifies the historical context: his contrast between 'cold' and 'hot' societies. "The goal of 'cold' societies is to ensure that temporal circumstances alter as little as possible the essence of each of them ... they try ... almost automatically to neutralize the effects that history might have on their equilibrium and continuity ... In contrast, 'hot' societies resolutely internalize historical development in order to make it the engine of their development."

Lévi-Strauss directed this conceptual distinction implicitly against Hegel and his student Marx, both of whom excluded 'static' Asian civilisations from their accounts of meaningful historical development. Hegel's formulation was particularly reductive: "History must begin with the Chinese Empire, for it is the oldest, as far as history records ... Early on, we see China growing into the state it is in today; for since the contrast between objective being and subjective movement is still lacking, any changeability is ruled out, and the static, which reappears eternally, replaces what we would call the historical. China and India still lie, as it were, outside world history" (Lectures on the Philosophy of World History).

Marx's version was slightly more specific: "The simplicity of the productive organism of these self-sufficient communities ... explains the mystery of the immutability of Asian societies" (Karl Marx, Grundrisse der Kritik der politischen Ökonomie, MEW 42, p. 379).

Lévi-Strauss, approaching the question as an anthropologist rather than a philosopher of history, offers a different account. Cold societies do not wish to be static because they lack the capacity for change; *they actively suppress change because their worldview locates the golden age in the past rather than the future*. Any innovation is therefore suspect — a potential deviation from the model established by the ancestors. The ruling classes of agrarian civilisations had obvious material interests in maintaining this orientation: stability protected their privileges, while change threatened them.

Even cold societies achieved change, however imperfectly. Individual hunters and gatherers developed the technologies of agriculture and animal husbandry — thereby setting in motion the revolutionary second tidal shift — from within a culture that, in principle, resisted innovation. China, for over two thousand years the world's most powerful and technologically sophisticated state, produced an extraordinary wealth of inventions, as Paul Kennedy has documented. That these inventions were not deployed for systematic economic transformation was the result of a deliberate policy choice — the Confucian bureaucracy's assessment that labour-saving machines would destabilise the social order — not of any incapacity for innovation. Max Weber's monumental work The Protestant Ethic and the Spirit of Capitalism argues that China would never have developed capitalism on its own precisely because, under the moral guidance of the literati, there could be no legal security for traders and producers. Confucian orthodoxy classified merchants below farmers in the social hierarchy; the accumulation of commercial profit was regarded as a form of exploitation. Legal security for commercial actors — the precondition for the emergence of the new economic order in Europe — was therefore structurally unlikely. Ulrich Menzel (2023) provides a modernized version of the same argument: "Rent-based systems are perfectly capable of setting technical and artistic development in motion and forming advanced civilisations. However, they do not lead to freedom and capitalism, but to increasingly elaborate forms of violence-based rent economies." This explains why neither classical India nor imperial China, for all their cultural and technical achievements, generated the specific combination of private property rights, legal security for commercial actors, and competitive labour markets that produced industrial capitalism. It was the extreme humiliation China suffered in the 19th century that jolted the country out of its slumber and transformed it from a cold society into a hot one.

Hot societies — those that embrace historical development as the engine of their progress — are a product of the Fossil Revolution. Before it, even the most dynamic of agrarian civilisations located salvation in the past (classical antiquity, the divine creation) or in a transcendent beyond (paradise, enlightenment). Only after the Fossil Revolution did a new orientation emerge: the systematic projection of salvation into the earthly future, to be

achieved through the application of scientific knowledge. This is the sense in which the Industrial Revolution was not merely an economic or technological event but a transformation of the temporal horizon of human aspiration — from retrospect to prospect, from restoration to technological progress. The fever of innovation spread from England to Europe, from there to the United States for America, to Japan, to the Asian tigers, to China. Ray Dalio provides a detailed account of Deng Xiaoping's transformation: "Deng died on February 19, 1997, having transformed China almost beyond recognition. When he came to power, 90 percent of the population lived in extreme poverty; at the time of his death that number had fallen by more than half, and as of the most recent data is below 1 percent. From the start of his reforms in 1978 until his death in 1997, the Chinese economy grew at an average rate of 10 percent a year, sextupling in size while experiencing an average inflation rate of just 8 percent. Output per person has increased 25 times, the percentage of people living below the poverty line has fallen from 96 percent to less than 1 percent, life expectancy has increased by an average of about 10 years, and the average number of years of education has increased by 80 percent… the number of science, technology, engineering, and math (STEM) graduates that are coming out of college and pursuing tech careers in China is about eight times that in the US."

But the fervour for change endangers not only the natural world – humanity's biological habitat – it may also place an excessive burden on human adaptability to constantly changing social conditions. Münkler (2023) notes the structural instability within China's success: "It cannot be ruled out that China's income inequality, which is the highest in the world, and the sub-proletariat of rural migrant workers living in miserable conditions will develop such political explosive power that it will shake Xi Jinping's regime, which appears so unshakeable to the outside world."

In other words, the cold-society impulse — the desire to preserve what is against the disruptions of innovation — will therefore always remain. Indeed, it has never been entirely extinguished. Every society contains both tendencies; what differs is the balance between them, and the material conditions that determine which prevails.

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