

Homo Faber, Homo in-sapiens

What holodoxy - the science of the whole - tells
us about the future of man

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*

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*

In his large-scale socio-historical overview, Jenner shows that the transition to the Postfossil 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*

I have read with the greatest interest and also admiration your book *Homo Faber*. 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*

I enjoyed reading the chapters from page 1 to page 118. Based on your in-depth knowledge of ethnology, philosophy and psychology, you have con-

vincingly explained how human development very probably proceeded and how Faber conceptualised 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-formalised **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*

*I respond to this critical objection in the chapter ‘Knowledge of nature versus mastery of nature’. Prof Kreibich is absolutely right: the suddenly wide-open cornucopia of fossil energy should not, of course, be seen as the **cause** of industrial revolution.*

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Warning to the reader

Critics are quite right when they describe this book as radical - radical in its analysis of the causes of the crises besetting us, radical in its proposals for remedying them. The author must face up to this assessment, although he resists it, as he has always seen himself as a man of the center, averse and even hostile to political extremism from both the right and the left. Reason, so the study of history has taught him, is usually to be found among the level-headed; it rarely appears on the side of the extremists. But our time is unique because, both for good and for evil, it has achieved unprecedented power over man and nature. With the help of its immense knowledge and the resulting technical possibilities, mankind has the power for the first time in history to transform the globe into a paradise or into its very opposite, namely into a hell permanently destroying the natural basis of its own existence.

There has never been a situation like this before. Despite all the horrific wars that mankind has suffered in the past, a life-affirming, vital optimism has nevertheless returned after every misfortune. The nineteenth century was still animated by an exuberant hope in unending progress. In the prosperous North at least, this is now a thing of the past - although minor miracles continue to take place on a small scale. Destroyed natural areas are being reclaimed, renewable energies promoted, and under Reagan and Gorbachev a significant proportion of the nuclear weapons that threatened human existence have been scrapped. But the general trend is quite different. The exploitation of remaining resources (including fossil fuels) continues unabated, as do greenhouse gas emissions. Global waste production is exploding and polluting the air, soil and oceans in ever-increasing quantities, because the

so-called global South is now also laying claim to the nature-destroying luxury of the rich North. More than half a century ago, far-sighted observers already proclaimed that the Western model of prosperity could not be generalized. But it is only now when this model is actually being generalized across the whole globe that we are witnessing its devastating effects.

I have already pointed out that important steps are being taken on a small scale in many countries to give people the optimistic hope they are so much longing for. If these steps were really sufficient, then the present warning would of course be superfluous. But these steps are certainly not sufficient - all in all, humanity is rapidly approaching the abyss. On the one hand, the rapidly increasing and now global exploitation of natural resources, which subsequently end up polluting the global environment in the shape of waste, is endangering the natural foundations of life. On the other hand, a recently accelerated pace of rearmament is endangering human coexistence on an ever-narrower globe. This dual threat has become the hallmark of humanity in the 21st century.

In the face of such an existential threat, only radical solutions will do - in other words, instead of the many small ones, only a big miracle can save us. A divided humanity will not withstand the double threat, it will lurch madly into the abyss, only a united humanity can save us. This salvation - although propagated years ago by artists, researchers and philosophers such as Immanuel Kant, H. G. Wells, Arnold Toynbee, Raymond Aron, Ernst Jünger, Bertrand Russell and Albert Einstein - still seems quite improbable today, if not utopian - in other words, radical. But let's not forget that it was the same before the European Union came into being. France and Germany had been at war with each other for a millennium. At the last moment, these "hereditary enemies"

finally realized that they had to unite for otherwise they would destroy each other.

Is philosophy still admissible?

The present book falls under the category of "Philosophy". Unfortunately, this is not a recommendation given the lamtably low status of philosophy today, as described by Steven Pinker (2003) for the United States. "*Philosophy today gets no respect. Many scientists use the term as a synonym for effete speculation.*" And elsewhere: "*Universities have disinvested in the humanities: since 1960, the proportion of faculty in liberal arts has fallen by half, salaries and working conditions have stagnated...*"

According to the prevailing view, reliable, advancing knowledge manifests itself on the battlefields of experimental research as conducted in the natural sciences or in the field research of the human disciplines. In contrast, philosophy evokes mistrust because it seems to hover somewhere up there in trans-empirical clouds.

And it is undoubtedly true: since the times of the European Enlightenment, experiments and field research have infinitely expanded the human horizon. And they have made suspicious of all kinds of prescriptive, dogmatic thinking. At its best, science turned into a continuous battle against dogma. Every opinion, first of all that of the scientist himself, needed empirical verification. Self-critical modesty thus seems to characterize the very DNA of scientists.

But unfortunately, this is not always true. Criticism and idolatry of knowledge are very close to each other. Nor is this a new phenomenon. Human equality, still the prevailing norm during the epoch of hunter-gatherers, was, since the transition to the agricultural way of life, threatened in two distinct ways: by material and by intellectual property. Those who knew to write and were able to read the holy texts could acquire as much power - in some cultures even more power - than people who owed their

precedence to owning land, palaces, and concubines. The Brahmins of India elevated knowledge to such a unique fetish that they threatened to blind members of lower castes or to rip out their tongues if they dared to glance at or to read the Vedas. The same attitude, albeit somewhat toned down, led the Catholic Church for centuries to strictly forbid lay people from reading the Bible. Only knowledgeable persons were and should be allowed to enjoy such a privilege. It was no different in China. There, the literati governors owed their position to the knowledge of writing (ideograms) and canonical texts.

In other words, knowledge has always been used – and often misused – to derive a claim to power.

It would probably have remained that way to this day if it could be asserted that the effect of human knowledge is consistently positive. But this is by no means the case. The immense knowledge, humanity has been able to accumulate over the past three hundred years, has turned out to be a double-edged sword. It has brought unprecedented wealth to a part of society while at the same time threatening to drive the globe into ruin. Few will argue that this should be considered a positive impact, let alone a success.

In this context, a statement by the outstanding physicist Ludwig Boltzmann (1990) deserves special attention. He justified the truth of the scientific world view with its practical success. *“It is not logic, not philosophy, not metaphysics that decides in the last instance whether something is true or false, but deeds. That is why I do not consider the achievements of technology as incidental byproducts of natural science; I consider them as logical proofs. If we had not achieved these practical achievements, we would not know how to conclude. Only such conclusions, which have practical success, are correct.”*

If Boltzmann is right, then the world faces a huge problem. The worldviews of the Indian Brahmins and the Chinese literati-governors, not to mention that of the Catholic Church, would have an unsurpassable success to their credit, for all three have endured for more than two thousand years. In contrast, after barely three hundred years, modern science is in danger of failing because of itself and its child, modern technology. In the warning preceding the book, we already mentioned the twofold threat posed by the destruction of the natural foundations of human existence on the one hand and on the other by an insane armament, i.e. by apocalyptic weapons, which likewise we owe to scientific and technological "progress". It is not very likely that we will avert this danger with further experiments and still more field research. *Therefore, it seems appropriate, even necessary, to reflect on knowledge itself.* That precisely was and is the task of philosophy. It poses the fundamental question of how far experimentation and field research can take us, and where we encounter the limits of human knowledge.

The author of this book may not claim any originality in terms of experiments or field research. All knowledge he cites is taken out of existing sources.¹ His ambition is to show the limits of knowledge and to warn against its idolatry. In doing so, he draws on a tradition that has never quite been severed, as it stretches from Plato's eminent teacher to David Hume and the Kant of antinomies, and from there to Kurt Gödel and Karl Popper. We should also know *what we cannot know* (that is no contradiction).

The borders of the unknown are drawn in several ways – most visible by unknowable chance and by human freedom. But not merely in the pre-Enlightenment past, in science too, the idolatry of knowledge played and still plays such a blinding role that freedom and chance came to be denied dogmatically again and again. The consequences are devastating, denying those limits and its

consequences threatens to turn the successes of scientific knowledge into the greatest failure in human history.

Because we do not want to see the limits of knowledge, the success invoked by Boltzmann and the threat of failure are so close to each other. The science of nature and man has never been able to provide us with more than *the instrumental means to moral ends*. But whether we use these means correctly or not depends on human will and desires. *As these belong to human freedom, they are beyond any scientific predictability, we always had and still have the choice to turn the world into paradise or into hell.*

What use has man made of his freedom in the past? The question is important because it may provide us with a guide for the future. I believe that throughout history there is evidence of a force that I call "universal moral conscience," a force that I hope will continue to work in the future. This confidence may give this attempt at a philosophy of history its direction and perhaps some justification as well.

It is precisely at this point, however, that Steven Pinker's observation, quoted at the beginning, comes into mind - philosophical reflection being rejected as a sort of "effete speculation". Some German philosophers are known - and notorious - for having furthered this accusation by their deliberate obscurity of expression. What the layman does not or only superficially understand appears to him as if wrapped in an aura of higher knowledge. Hopefully, the author of the present book cannot be accused of such evasion. To present even complex issues as simply as possible (or to relegate them to the annotations in the first place) is his declared goal, but he knows that this exposes him to the opposite danger of being considered trivial.

Be that as it may, whether he has something to say or not must ultimately be proven by the method he chooses, which he presents to the reader as “holodoxy”.

What is holodoxy?

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

It is the relationship of the parts to each other, their interaction, that drives a certain dynamic and a development /leading to balances or their opposite/... *Maja Göpel*

The genesis of this book owes itself to a phrase that caught my eye on a display board within a zoo: "*You are a part of the whole.*"

The phrase requires no elucidation: as individuals, we bear responsibility not only for ourselves but also for the whole within which and from which we live. This insight becomes most apparent within the realm that, for over two centuries, has granted an escalating standard of living to growing segments of mankind - the realm of science and technology. Through thousands of life-easing machines, they have provided each of us with an increasingly convenient life, yet their impact upon the entire globe is calamitous. The unintended, unpredictable consequences of this mass invasion of man-made products range from the rapidly advancing extinction of our fellow creatures to the pollution of the oceans and climate change. Evidently, the admonition on the zoo's display board is no longer taken seriously. *We, the parts, live at the expense of the whole.*

Our extraordinary knowledge and skills have ushered in an era characterized by the radical reshaping of our habitat. The epoch has even been given a distinct scientific label, known as the "Anthropocene". If we pinpoint its inception with the transition into the fossil era, it commenced with the Industrial Revolution in the latter half of the 18th century. Should we include the previous

upsurge in science, we might even trace it back as far as Francis Bacon at the onset of the 17th century.

The radical interventions into the environment facilitated by the Anthropocene have become the paramount challenge of our time and those to come. *The whole and its parts are no longer attuned to each other.* In this precarious juncture, what we require is an understanding of interconnections. What constitutes the mutual relationship and dependence of the whole upon its parts, and the parts upon the whole? I would like to give a special name to the understanding of this connection. *Holodoxy is the doctrine or science of the whole (holon) and its parts; more precisely, it is the science that describes that relation between the parts and the whole, without which the latter cannot exist - at least in the shape known to us.*

Holodoxy unveils a rather comprehensive perspective, as the relationship between the whole and its parts manifests in both the inanimate and organic realms. The atom constitutes a whole in relation to protons, neutrons, and electrons. A bacterium comprises a whole concerning the cells that compose it; a human being embodies a whole relative to its organs; a state corresponds to a whole in relation to the individuals constituting it. Earth embodies a whole with respect to the life it brings forth. *In each of these holodox domains, it holds true that the constituent parts must maintain a specific relationship with the whole for a sustainable equilibrium to be achieved.*

Of course, Physics long since embraced the holodox principle, albeit without using the nomenclature here proposed. Electromagnetic forces, as well as the gravitational constant, describing the universe's current state, must remain within certain bounds; surpassing these values too greatly, either upward or downward, implies the universe can no longer retain its familiar shape. This statement is especially true for the emergence of life, which is

possible only within very specific boundary conditions. The relationship of the parts to the whole thus leads to concrete statements about the conditions for science to search for life in other regions of the universe.

When we apply this knowledge to specific phenomena, its ubiquity renders it commonplace, as we are enumerating the familiar conditions required for specific plants or creatures to exist - or not. Life on Mars, for example, as imagined by visionaries like Elon Musk, would only be possible if every person there wore a mask on their face and an oxygen tank on their back, or spent their lives in hermetically sealed chambers. The holodox principle of harmony between the whole and its parts, observed on our planet, becomes inoperative there, at least for humans and most other species.

Yet, there is no need to look to uninhabitable celestial bodies to realize our relationship with the whole. Merely a gaze upon our terrestrial abode suffices. By now, most people have recognized the danger that we are destroying it in several ways simultaneously: the looming apocalypse of nuclear contamination, the saturation of the atmosphere with carbon dioxide, and not least through thousands of other anthropogenic toxins - biocides and other chemicals - that have already claimed the life of numerous fellow creatures. In the Anthropocene, we - billions of humans - jeopardize the enduring equilibrium, the homeostasis, between ourselves and the environment.

However, the holodox principle extends beyond the physical metabolism with the surrounding world; it is equally relevant to the human sphere itself: the relationship between state and citizens and, on a broader level, that between individual nations and the global community. It is here that boundary conditions apply, that must not be violated if we do not want to put both in danger - the parts as well as the whole. On a globe that is becoming

increasingly crowded due to mobility and a huge population density, this is the paramount challenge of our time. *Hence this will be the chief focus of the present book.*

In summary, the holodox spans from the electromagnetic forces of the universe to the butterfly that, according to Edward Lorenz's chaos theory, initiates a storm in Alaska with a single wing flap; and it extends to humans when their irresponsible actions jeopardize the equilibrium between themselves and nature. From the vast whole of the universe to the minutiae of the subatomic realm, we observe everywhere the intricate interplay of individual events with the encompassing whole. *Holodox harmony is conceivable only when the whole and its parts coexist in enduring equilibrium.* Yet, this declaration brings us to an equally crucial point.

Harmony is not the only principle governing this world. The disruption, breaking, annihilation of harmony is likewise ubiquitous. At some juncture in an individual's life, the constituent elements of their organism wear down, falter in their function, and the whole disintegrates. This decay, this disharmony, is what we term death: it affects individuals as well as states or entire cultures. And death or demise does not solely afflict organic entities. Stars, too, die - and so do entire galaxies. The so-called black holes, these gigantic vacuum cleaners of the universe, seem to be designed just with the purpose to dissolve existing order. Thus, Holodoxy would be an incomplete science if it failed to describe the processes leading to growing disharmony between the whole and its parts, culminating in dissolution.²

As already mentioned, the holodox perspective, even if it has not been named as such, has never been alien to the natural sciences, but also the science of man, anthropology, has adopted it. American evolutionary biologist Jared Diamond (2005) expresses it in the very title of one of his works when he describes

the collapse of certain early societies. There, humans, as part of the whole of nature, had destroyed their own ecological basis to such an extent that the societies were in the end doomed to collapse. Today, modern techno-society is interfering so deeply with nature that the problem is posed for the world community as a whole.

In his book "Who rules the world?", British historian Ian Morris (2010) addresses the question of which factors favor or inhibit the development of sovereign power leading to shifts in the balance between nations. This problem is of existential relevance today, as the current race of nations must be overcome if humanity is to survive on an increasingly crowded globe. Can there be a balance between the whole of the world community and its parts, those sovereign states which are still mercilessly fighting each other?

What purpose does holodoxy serve?

After this brief clarification of the term, I would like to explain the practical purpose of the holodox approach. How can the doctrine of the whole and its parts contribute to a better understanding of the future and inspire actions that correspond to our deeper insight? Quite acutely we are becoming aware of the disrupted relationship between the whole and its parts in the context of human interaction with the natural environment. However, not everyone perceives the origins of this disruption as keenly as the German philosopher Max Scheler did over a century ago:

*"There is... a new will to dominate nature... sharply contrasting with the loving devotion to it..., which now gains primacy in all cognitive behavior. The will to dominate... The goal and fundamental value guiding the new technology is not to invent economically or otherwise useful machines whose benefits could be foreseen and measured beforehand. It aspires to something much higher. It aspires to the goal, if I may put it this way, of constructing all possible machines, initially merely as ideas and plans, through which nature could be directed and guided toward any, be it useful or useless, purposes if desired."*³

If this assertion is true, then we understand that the real task of holodoxy must be to analyze this "will to dominate" because it constitutes the essential drive of the Anthropocene. Does it stem from accurate insight, or is it a mere delusion, the pernicious consequences of which humanity is now grappling with? In other words, are we right to assume that an unlimited dominion over nature will yield a stable balance between the whole and its parts, or are we inadvertently achieving the opposite, as our misguided will to dominate does not subject nature but progressively destroys it, thereby depriving us of the very foundation of our life on the planet?

What we may say with certainty today is that science and technology have shaped the Anthropocene into what it is today - a deity with a double face. This new god, whom we obsessively venerate, bestows upon us the supreme triumphs of human knowledge and the greatest achievements of technology. However, it is the parts that benefit: the individual scientist who is honored with the Nobel Prize for his contributions, the privileged individual from the Global North who boasts of unparalleled luxury, and the wealthy individual nation that seizes all available resources. The whole, however, is in danger of being increasingly lost from view in this process. Yet, *only now, as whole ecosystems teeter on the brink of collapse, do we realize that the holodox equilibrium no longer endures*. Only now do we awaken. The imperiled whole suddenly enters the purview of global attention. It took this imminent peril to turn our focus toward the insights of Holodoxy.

When inquiring about the boundary conditions of life or the natural constants to which the universe, as we know it, must adhere, Holodoxy deals with facts beyond our control. The laws of nature elude our dominion. However, when it comes to the accumulation of carbon dioxide in the atmosphere or the melting of glaciers, a new element comes into play: our *desires and intentions*, which do not constitute external "objective" facts. We ourselves have disrupted the relationship between the whole and its parts. Yet, we are equally capable of intervening in nature with healing intent.

In the human domain, Holodoxy is not merely a descriptive science - it expands diagnosis into therapy through desires and intentions. Expressing this truth somewhat pathetically, we might say. *In the epoch of the Anthropocene, human desires and intentions are no more and no less than determining factors of evolu-*

tion. Our future is not a fate but our own creation, originating in the dimension of human volition.

Holodoxy within the human realm thus becomes something fundamentally distinct from Holodoxy in the non-human natural sphere. While we may not know the forces that bring about equilibrium in nature, we certainly do understand the force that repeatedly strives for holodox equilibrium among humans - it reveals itself in human history. This is what I want to show in Chapter Four, "How Faber Changes His Surroundings and Himself." The brief outline of the three main epochs of human history - hunter-gatherers, agrarian civilizations, and the fossil era - is meant to name and locate the force that persistently strives for the holodox balance between the whole and its parts. As mentioned before, my term for this force is "universal moral conscience."

Having defined *Holodoxy as a doctrine that identifies the technical conditions for equilibrium states between a whole and its parts*, "universal moral conscience" represents an entirely different principle. It is human will ruled by moral ends. It represents the human endeavor to oppose all those conditions which are felt to be burdensome, destructive, and perilous with an imagined and aspired reality and, if possible, to put this endeavor into practice.

Consequently, "universal moral conscience" must be based on a clear awareness of existing problems. These can only be overcome if no longer suppressed but brought into focus. But it goes without saying that problems change with varying circumstances. Hunter-gatherers faced different challenges than the Egyptians under a god-like pharaoh. Likewise, our generation contends with other problems than our parents and grandparents at the height of fossil revolution. What unites universal moral conscience across all times is *the restoration of the lost balance*

among humans or between humans and nature - holding up the injured ideal against it.

Nature and culture

In this book, I want to discuss both scientific facts and moral conscience, each of which represents a fundamentally different dimension. The unyielding will to dominate nature, as criticized by the philosopher Max Scheler, operates within a single dimension only. Understanding the laws of nature alone should provide man with ultimate control over nature and the social sphere. In this view, desires and intentions are irrelevant, as they too will ultimately be reduced to laws. But this perspective leads to unresolvable aporias – logical contradictions. Francis Fukuyama (1992), the American historian, must have had this perspective in mind when observing:

"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. 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..."⁴

The unbridled desire for mastery by science and technology is a brainchild of the European Enlightenment. On one hand, it granted us a better understanding of truth, while on the other hand, it lured us into fundamental error. For it cannot be denied: factual knowledge on one side, and human desires and intentions on the other, belong to two distinct dimensions. Just look at how they both proceed: Science is a process of limitless expansion, while universal moral conscience postulates limits because it strives for balance.

The expansion of science is a most visible fact. Current factual knowledge extends almost infinitely across the most various fields. Even within their own fields, researchers must be content to survey only fractions – an inevitable consequence of the exponential growth of factual knowledge. Hence, an obvious conclusion arises. *If we needed to know everything to speak about knowledge, we would be silenced from the start.*

This observation does, of course, apply to the author of the present book. He is acutely aware of the limitations of his own knowledge. Thus, discussing a comprehensive topic like Holodoxy would seem impossible if it necessitated exceptionally extensive knowledge.

A crucial insight does, however, facilitate his endeavor. When speaking of knowledge, we are in fact dealing with two distinct realms. On one hand, humans acquire knowledge of processes fundamentally beyond their desires and intentions. I would like to term this nature-related or "*natural knowledge*." We cannot influence the regularities of nature, the so-called natural laws. In this sense, nature and its laws exist "objectively",⁵ independent of ourselves.⁶

On the other hand, there is knowledge generated through human desires and intentions. For this, the term culture-related or "*cultural knowledge*" seems fitting. The laws that regulate the behavior of citizens in a state are man-made, as are the languages serving human communication, and, of course, all institutions and conventions governing the life of human communities. So far as cultural knowledge was created by our ancestors in the past, we may refer to it as "objective cultural knowledge", as it arose from human will, but a will of past generations, which therefore does not depend on present desires and intentions. For this reason, it may appear to us as distant and objective as the facts of nature. However, when such knowledge currently emerges due to our

present actions or legislative institutions, it becomes "subjective cultural knowledge," freshly produced by human desires and intentions.

A fundamental contrast exists between these two realms of knowledge. The validity of natural laws is usually equated with the duration of the cosmos – hence, they are often called "eternal and unchanging." *Cultural knowledge, however, owes its existence to human freedom, allowing humans to create or abolish it in accordance with his desires.*

This is not the only divide between the two types of knowledge. Collecting cultural facts is no more challenging than exploring natural ones. However, when it comes to *explaining these facts*, the immense complexity of cultural knowledge becomes apparent. Here we inquire into the motives why individuals thought and acted the way they did. When a starving person turns to theft, that represents a universally comprehensible motive. However, why the consumption of pork is forbidden in one country whereas the consumption of beef is restricted in another, or why a certain day is considered holy in a third country, cannot be deduced from the wishes and preferences of present-day people. These rules are part of the cultural knowledge created by previous generations. In such instances, the underlying motivations often remain elusive, even though we believe that there were always reasons why people adopted or rejected certain way of thought and action.

The approach of natural sciences takes a completely different path. Researchers do not seek motives when calculating the formula for a comet's trajectory. Natural science does not attribute any desires and intentions to the comet and therefore does not inquire about complex motivation as is the rule with cultural knowledge. The immense complexity of natural science is based on the requirements of exact description. The formulas and calculations used to describe the orbit of the moon or the functions

of a computer chip are so complicated that only specialists can understand them.

But the fundamental approach of natural sciences is characterized by utmost simplicity, and this applies to all areas of nature. Alfred North Whitehead (1985), the English philosopher mathematician and lifelong friend of Bertrand Russell, succinctly summarized this approach: "*Seek measurable elements in phenomena, then seek relationships between measured physical quantities.*"⁷

This fundamental rule of scientific knowledge is elementary indeed. It enables scientists to accurately differentiate between false and true explanations, regardless of the extent of our factual knowledge. It is only because this basic rule is one and the same in all fields of the exact sciences that there can be specialists who devote their entire lives to some tiny part of reality and yet draw as valid explanations from the facts in their respective fields as their colleagues in completely different fields - the basic procedure remaining the same for all of them.

The author of this book refers to this principle as an excuse for daring to address a comprehensive and challenging topic like Holo-doxo, which encompasses a multitude of areas, from inanimate nature to the organic sphere, in each of which his knowledge is rather limited. This would be a significant handicap, if it hampers the author's ability to accurately assess *the fundamental aspects of the relationship between the whole and its parts.*

If specialization were the *conditio sine qua non* for independent thinking, we would all have to keep our mouths shut. The specialist will - rightly - notice that I have unfortunately not taken authors X, Y or Z into account and, moreover, do not say a word about problems a, b, or c. But I am not concerned with completeness (which can no longer be achieved in any field anyway), but only with saying the right thing about the problems considered, so that the expert may not raise any factual objections. *My*

audience is the person who is able and willing to think - in former times he was called "humanistically educated" or on a somewhat higher level he was even known as philosopher. Such a person does not need to know anything about the complex mathematical apparatus of quantum physics, but he or she should be acquainted with the logical basis of science formulated by Whitehead, on which all specialization rests. Holodoxy, as I understand it, addresses the fundamental problems of our analysis of reality, problems that are obvious and understandable to any thinking person.

A witty bon mot states that the specialist knows everything about nothing, while the one who knows nothing about everything is a generalist, i.e., according to Pinker, the powerless philosopher whose gaze remains focused on some elusive whole and who utters nothing but trivialities. This book on holodoxy may be seen as a bold attempt to refute this modern prejudice. I endeavor to show - and therein lies the advantage as well as the challenge of the method here proposed - that the conclusions reached by holodox analysis are anything but trivial.

Nature and Man

Undoubtedly, humans are part of nature, still we must strictly distinguish natural from cultural knowledge. All those relationships that the natural scientist establishes between physical quantities according to Whitehead's methodological guideline are either actually given or not. In other words, the findings of physical research are *either correct (true) or false*.

In contrast, we evaluate current political initiatives or the norms left to us by previous generations according to the moral

criteria of good or bad. Furthermore, we value our living space, our surroundings, architecture, landscape design, and the monuments of past cultures according to the standard of *beautiful or ugly*. Both dimensions, the moral and the aesthetic, reflect human desires and wishes and therefore have no place in "objective natural knowledge." *The facts of the physical world and the laws derived from them are trans-moral and trans-aesthetic because they are fundamentally removed from human desires and wishes.* The fact that ice becomes water when its temperature exceeds zero degrees is neither good nor bad, neither beautiful nor ugly. The textbooks of physics lack any reference to morality or aesthetics.

On the other hand, people have always been enthralled by the beauty of butterflies and daffodils and have sung the majesty of the starry sky. There have been mystics who felt completely at one with nature – insisting that they and the world were the work of one and the same divine will. Physicists usually have no sense for such a view of reality. Labelling measurement data and laws as good or beautiful, would be considered childish and arbitrary as it adds a superfluous subjective dimension to objective data.⁸

Matters do, however, get quite different when the findings of natural science are reflected in everyday consumption products such as cars, airplanes, computers, cell phones, etc. Then, the criteria of cultural knowledge, that is good versus bad, beautiful versus ugly, suddenly play a decisive role. Advertising fundamentally and rightly assumes that people buy products because they find them "beautiful" or hope to "enrich" their lives with them. Advertising thus proves that things whose function lies beyond human desires and longings ultimately only gain their value by satisfying these very desires and longings.

Max Scheler's previously quoted insight that the ultimate goal of modern humanity is to construct all conceivable machines to

gain infinite power over nature would therefore remain incomplete and incomprehensible without the crucial addition that this usurpation of power naturally serves human needs, i.e., man's moral and aesthetic desires. All "objective" knowledge of external nature ultimately serves "subjective" desires and wishes. In the last analysis, *natural knowledge derives all its meaning from its cultural counterpart - never the other way.*

This may seem self-evident and even trivial to some. But if ever larger parts of cultural knowledge, such as the sciences of the soul and society - psychology and sociology - are now treated according to the method Whitehead formulated for inanimate nature, then it becomes clear that this is by no means a matter of course. Humans are treated like machines when they are dogmatically denied the possibility of autonomous moral decisions. *Their behavior is then understood solely in terms of subhuman and subrational impulses,* as criticized by Francis Fukuyama. The essential difference between cultural and natural knowledge gets lost in the process.

Again, this is a holodox problem concerning the relationship between the whole and its parts. This time it concerns the misguided mental reflection of the external world in human consciousness as discussed in the chapter "Disturbed Worldview." The disturbance results from man's unwillingness to accept the limits of his understanding and domination of nature, even though its progressive destruction is an immediate result of such limits.

Just as, according to Ludwig Boltzmann, the practical success of modern natural sciences constitutes a proof of the relevance and correctness of their methods, the global destruction of nature in the past two centuries must likewise be accepted as a proof that these methods are limited in scope and perhaps even incorrect and dangerous when applied without supervision and restraint.

How far does knowledge go?

I start discussing the limits of human knowledge right in the first chapter, where I delve into the concept of the "anthropic" universe. This theory asserts that the whole – our world - cannot be any different than it is, provided that its purpose lies in enabling the emergence of a being that reflects it in its consciousness. According to this theory, cosmogony is directed by its ultimate and inherent purpose: the birth of humanity. This is an audacious idea, one we find harder to believe in today, as we are aware that humans can render their own planet uninhabitable. In doing so, they would not only destroy themselves but also the consciousness that mirrors the cosmos – the purpose would in this case become self-defeating.

At the beginning of our holodox investigation, we gain a somewhat more intriguing insight. Nowhere is the relationship between the whole and its parts more fascinating, challenging, and enigmatic as when we contemplate it at its grandest and minutest scales. Both, the great world religions, and major philosophers from Blaise Pascal to Immanuel Kant engaged with this initial challenge.

In our time, it is the natural sciences that continue to face the same problem. As for our factual knowledge in the realm of space research, it has expanded tremendously. Ever larger and more powerful telescopes are launched into the depths of the universe. However, an elementary question remains unanswered. Does the remarkable expansion of our factual knowledge guarantee a broader and more secure explanatory knowledge?

The answer seems unequivocal. The transition from facts to explanations encounters insurmountable barriers both in the tiniest and grandest spheres as it stumbles over insoluble paradoxes. Time and space are yardsticks for physics, which adeptly employs them within the "Middle World", that is between the two extremes of the greatest and the smallest. However, when extended to the infinite – to the "edges" of the universe or the beginning of time – these yardsticks crumble and dissolve.

Firm ground for holodox understanding can only be found when observing a smaller whole and its parts – for example, the emergence of life from tiny beginnings. In such a limited domain, rich factual knowledge informs us in detail about how species diversified in the course of the history of our planet. This knowledge was originally provided by the undisputed part of Charles Darwin's theory: the tree of life. The second part, however, where the great British explorer seeks to transform the existing factual knowledge into an explanatory one, presents the mind with immense challenges. The theory of the 'survival of the fittest' has never been accepted as a final answer to the riddle of life.

Similar problems intensify when we turn to the most successful species on the planet: to ourselves. We may easily conceive a criminal history of human offenses just as we can craft a panegyric epic of Sapiens, celebrating his lofty dreams, noble ideals, and astonishing achievements. The facts are compatible with both narratives.

How do we explain this contrast? Sapiens, whom I will refer to in this book as Homo faber, because his wisdom is questionable, while his role as a creator is not - Faber appears in history as both a saint and a devil using his reason "to be more beastly than even beasts."

For as long as he existed, Faber has always been part of a whole. Either as an individual within a family, group, or nation, or ultimately – if we consider the state as a unit – as part of the world community. Over the course of the three main epochs in his long history – from being a hunter-gatherer through the agrarian era to the ephemeral period of the fossil revolution ending just now – he has continuously adapted to new circumstances. During these successive stages, different conditions channeled his actions but never “determined” them in the absolute physical sense. In other words, culture was never completely controlled by nature. External conditions always clashed with an internal force: human desires and intentions.

This is the basis of our hopes for the coming post-fossil era. The lesson that history imparts for Holodoxy is clear: *parts must never exert their influence disregarding the whole*. When this happens in the physical realm, natural sciences talk about constants whose values lie beyond equilibrium. When the same occurs in the relationship between humans and the natural environment, we witness the latter’s rampant littering, poisoning, and destruction. And when this finally occurs between the individual and society or the single state towards the global community, we see how, in the first case, the quest for personal gain may totally obscure the common good, and in the second, the pursuit of national advantage prevails over the essential principles of international equilibrium.

If I believe that a better future is possible, it is because one constant of human activity remains visible throughout history: *universal moral conscience*, which, as I will try to show, is more than a mere mirage of idealism. Time and again it has steered human behavior out of imbalance towards a new equilibrium and thus pointed to ways out of adversity. Even in these difficult times,

we may hope that Faber will master the greatest challenge in his history: the transition to the post-fossil epoch.

The physical world

Facts versus explanation

We describe the facts of the world because we seek explanations. It's through their potential explanation that facts gain meaning. During the Middle Ages, the elite focused on matters divine, showing little interest in physical facts, as, according to the prevailing understanding, these held no significance in explaining divine matters. The wonderful teacher (doctor mirabilis) and Franciscan monk Roger Bacon, who lived in the 13th century, was an exception to this rule. He had the misfortune to be born at the wrong time, four centuries before his namesake Francis Bacon. He considered the explanation of the world through physical phenomena to be crucial - in contrast to the Church's beliefs, which contradicted and persecuted him. According to official creed, man had to know God's will, nothing was gained with the exploration of physical things.

But four centuries later, at the latest since Francis Bacon, interest began to shift away from the heavenly to the worldly order - a process that also made itself felt in art. William Shakespeare is a thoroughly pagan author, as noted by Leo Tolstoy in dismay three centuries later. A marked interest in matters of the physical world began in the early 17th century and was strengthened during the Enlightenment in the 18th. The explanation of the world based on a steadily expanding knowledge of physical facts first took hold in Europe and then spread to the United States, eventually conquering the rest of the world.

This observation leads us to the fundamental question: Why do we explain and for what purpose?

In most cases, we do so to make something hitherto foreign to us familiar and thereby render it "plain" and "clear." A classic example of this type of explanation is also its oldest. Already our earliest ancestors seemed to ponder how this overwhelming enig-

ma called the world, which confronted them daily, came into being. The answer to this riddle has been remarkably consistent across all cultures. The ability to create this world out of nothingness was attributed to gods or a single god. The radically unknown was explained by equating it with a familiar process from human experience. Humans perpetually create things where nothing had existed before. They fashioned huts from branches or stacked stones upon each other. Later, they shaped and fired clay pots, produced sounds from strings or stretched hides. From the beginning, humanity experienced itself as a creator of hitherto nonexistent things. By utilizing this image from daily experience to account for the origin of the world, the utterly unfamiliar became comprehensible.

The transfer of the familiar to the unfamiliar - *explanation as a metaphorical transfer* - is a logical characteristic of the first and oldest type of explanation, not only among our most distant ancestors, the Stone Age people, but also among contemporary physicists and cosmologists. The falling of a stone that slips from our hand is an unquestionable fact of our world. We can measure the event and quantitatively grasp it with any desired precision, but what makes it occur remains a matter of speculation. We may coin a special term like “gravity” and understand it as the effect of this particular “force”. However, this only completes the description through something we are familiar with from daily life.

On the other hand, Galileo and Newton did find an explanation when they related the previously unfamiliar behavior of stars to the fall of a stone on Earth. In this manner, they "explained" something utterly foreign - the motion of celestial bodies - through something familiar and commonplace. This discovery was to become one of the greatest “aha” moments of the 17th century and the “Enlightenment” that followed. The transfer of images from the familiar to the unfamiliar realm does, however,

not necessarily make the world more comprehensible; it merely expands the realm of what is familiar.

Let us consider another example deeply ingrained in our brains. We might not understand what acoustic, magnetic, or gravitational waves “really” are, but they become immediately familiar when we equate them with something belonging to daily experience: the waves on the surface of water. Once we have made the connection to something familiar, the mystery seems resolved.⁹

Nonetheless, explanation does not always necessitate a *familiar image* applied to the unfamiliar. In our time, most people are quite familiar with mobile phones. However, they and even the scientists themselves cannot explain its functions in the sense just described. They are not even looking for this kind of figurative explanation. It is enough for them to know that certain commands will produce the results they intend with almost one hundred percent certainty. In fact, quite often science cannot reduce the unfamiliar to something belonging to the familiar world. Perfectly real phenomena like electrons, behaving simultaneously like particle and like waves, do not count among the facts of the world for which we can find images from our daily existence. Yet, our inability to visualize the facts of the subatomic unfamiliar world through images from the familiar world does not hinder us from effectively harnessing quantum phenomena. The second form of *imageless explanation* thus surpasses the first one. It remains valid even where the first one fails us.

In his short formula for the procedure of the natural sciences, which was cited above, the philosopher and mathematician Alfred N. Whitehead anticipated the contrast between facts and their explanation. His demand: "*Search for measurable elements in phenomena*" describes the collection of facts that in themselves mean nothing, no matter how precisely the physicist measures them. Explanations only emerge when and if the scientist

produces definite results trying to fulfill Whitehead's second requirement, i.e. when he "*searches for relationships between the measured physical quantities*" and these relationships prove to be lawful, so that they may lead to predictions.

Predictions based on proven laws are in turn the prerequisite for constructing all kinds of machines, to control nature for useful or useless purposes, as Max Scheler said. Doing so, the obvious practical success of the scientific method provides, as Ludwig Boltzmann states, a most convincing proof of its correctness.

Note that Whitehead's formula makes no mention of the first type of explanation - familiarizing the unfamiliar - and rightly so, for the natural sciences have long since penetrated areas of the smallest and largest, where no image from the familiar "middle world" can be applied.

The mystery of space

Let me repeat: Holodoxy as the science of the relationship between the whole and its parts becomes simultaneously paradoxical, contentious, and intensely captivating at both ends of the spectrum - the subatomic realm of the tiniest and the cosmic realm of the grandest. Here, we confront an insurmountable contrast between the two types of knowledge: facts and their explanation. For the sake of clarity, I will focus on this contrast in relation to what is the grandest in space, namely the cosmos.

Even to the layperson, it must seem evident that here our potential knowledge of facts is simply infinite. No one knows how many galaxies exist, or how many stars and celestial bodies make up each of them. It is common knowledge that the scope of observation expands as our instruments for exploration improve. In potentially countless galaxies, we can observe an unknown number of celestial bodies in varying levels of detail - depending on

the range and precision of the instruments used. However, no number of scientific observers will ever suffice or be capable of storing as factual knowledge more than an infinitesimally small portion of the universe surrounding us.

But what about explanatory knowledge? The first type of explanation – the transfer of the known to the unknown - is excluded from the outset for elementary logical reasons. *There is no image from the finite world that can capture the infinite.* Kant's arguments in the Antinomies of Pure Reason hold true today as they did in his time. Our intuition is not suited to the concept of the infinite; any attempt to grasp it ends in forced withdrawal. We can certainly imagine a boundary somewhere in the surrounding cosmos, but not that there is no space beyond it. From our familiar world, we know that behind every boundary there must be further space. Conversely, trying to visualize an endless journey into an infinite universe is equally doomed to fail – and not just that. The mere attempt to imagine infinity causes us discomfort, prompting us to abandon it immediately. Hence, the first, fundamental, and most prevalent form of explaining the unfamiliar through the familiar is fundamentally impossible, regardless of the extent of our knowledge of facts. *No matter how much we expand it, we can never "get a picture" of the completely unfamiliar cosmos surrounding us by explaining it with something familiar from our everyday world.*¹⁰

Seen from this perspective, even the assumed expansion of the universe from a point of origin where neither time nor space existed (the so-called Big Bang some fourteen billion years ago) is not a true explanation. We might not have any trouble imagining the expansion of sound waves in the space around us, measuring it precisely, and predicting its course. But how a space and the bodies within it could arise from expansion in something that still wasn't space, transcends all possible imagination, as there is

nothing familiar in our known world to serve as an example. At most, we can claim that the measurements at our disposal suggest an interpretation *as if things were happening that way*.

The situation differs with the second form of explanation, independent of any visualization. Science allows us to successfully apply regularities of natural phenomena, called natural laws, which hold on our planet, even in the greatest distance from it. We would not be able to send rockets to the moon or measure the bending of light caused by the gravitational curvature of space if the laws that apply on Earth and in its vicinity did not maintain their validity even millions of light-years away. This second type of explanation therefore extends far beyond the first. But that does not mean it does not also encounter insurmountable barriers. The question of what preceded the beginning of space and time cannot be answered because beyond this limit we cannot even obtain facts. And yet, that is not all. Even within the continuum of space and time accessible to its instruments, science encounters so-called singularities, such as black holes.

The term "singularity" was aptly chosen as it designates something fundamentally inexplicable. We can never familiarize ourselves with what is singular, but only with events that recur or - as in experiments - may be replicated at will. By definition, singularities elude all regularity and therefore all explanation.¹¹

The procedure of holodoxy repeatedly leads us to the fundamental limits of knowledge, but never with as immediate evidence as when the whole is indeed the whole that surrounds us - that is the unfathomable universe. No wonder that all attempts at explanation undertaken here prove logically untenable. This holds true, for example, for the thesis put forward by John D. Barrow and Frank J. Tipler in their book "The Anthropic Cosmological Principle," which suggests that the universe is structured the way it is to produce observing beings like humans. If the most

important physical constants were not as finely tuned as they are - in other words, if their values deviated slightly upward or downward - then the cosmos would not exist.¹²

It was recognized early on that this statement is purely tautological. We could only prove it - or conversely falsify it - if we could observe other universes alongside our own that offer themselves for comparison. As this is not the case, the claim that our world must be exactly the way it is to produce intelligent beings lacks verifiable meaning. We only arrive at meaningful statements when we narrow the holodox frame by choosing smaller wholes and parts - only then do we have comparisons. Once these are possible, we arrive at lots of provable statements - for example, that humans cannot exist in waterless deserts, that they cannot survive without an oxygen-rich atmosphere, and so on and so forth. These rather trivial observations apply to various desert areas on Earth as well as to Mars and other extraterrestrial bodies.

The mystery of time

When we stretch the holodox framework to its furthest extent, the limits of knowledge become most apparent. While we certainly may acquire infinite factual knowledge about surrounding space, this doesn't help us achieve our ultimate goal - explanation. The same paradox applies when considering time. Science has accumulated vast knowledge of the past fourteen billion years, up to the point zero when the cosmos was born. Meanwhile it has done so to the extent that no individual can grasp more than an overview. However, explanation, the aim of these efforts, remains elusive. We lack an explanation for why the cosmos emerged from a previous state without space or time, a state we label as "nothing." We will never be able to explain it, as we lack comparisons from familiar reality. Equally, we cannot explain the sequence of cosmic developmental stages, despite our ability of detailed description. The reason why various inorganic elements emerged from the primordial plasma, and why life emerged from inorganic elements - all processes that have been and will continue to be described in infinite detail - remains unexplainable. We cannot clarify why all of this happened and why this specific nature emerged with all its specific regularities (laws) – there is nothing familiar with which to compare it.

This realization is far from trivial, for from the beginning, that is since the 17th century and Enlightenment in its wake, the greatest minds of science have been motivated by the urge to explain. The accumulation of factual knowledge was aimed at making reality first transparent and then manageable through explanation. This program was proclaimed once and again, perhaps most famously by the French mathematician Pierre-Simon de Laplace (1886): "*An intelligence which at a given moment comprehended all the forces by which nature is animated and the respective positions of the beings that compose it, if moreover it were vast*

enough to submit these data to analysis, would encompass in a single formula the movements of the greatest bodies of the universe and those of the tiniest atom; for such an intelligence nothing would be uncertain and the future just like the past would be present before its eyes."

This assertion is meant to derive the predictability of future events from our knowledge of the past – it promises nothing less than the total mastery of nature. As a matter of fact, this statement is entirely vacuous and therefore devoid of sense. This becomes clear if we go back to the beginning when there was nothing - no space, no time, no atoms, let alone larger bodies. How could we deduce what is from what is not? *The same impossibility of deducing later stages of cosmic development from earlier ones becomes apparent at every subsequent moment.* After the "Big Bang," physical regularities (laws) emerged, followed by the laws that govern the structure of elements and their possible combinations into chemical compounds. Eventually, organic forms emerged, followed by the diversity of life, bringing forth a new diversity of regular appearances. However, at no point in these 14 billion years could a scientist - even one with superhuman intelligence - predict that elements would, let alone had to arise from the primordial plasma, followed by their compounds and ultimately living beings, including humans.¹³ He would have needed a game box in front of him, in which different universes develop according to certain laws. In other words, this infinite intelligence would have had to trace cosmological evolution back to something known and familiar.

Unconsciously, Laplace had usurped the position of God, who has such a game box at his disposal, because for the ruler of the world the unknown and unfamiliar does not exist. Committed to the ideology of his time, the French mathematician let man slip into the role of God and thus turned the whole argument into

patent absurdity. Man, the newly born secular God now attributed omniscience and omnipotence to himself.

From then on, both would prove to be his obsession. It was and remains so potent that it dominated the thinking of philosophers and physicists up to the present day. For instance, Bertrand Russell (2004) argued in a manner reminiscent of Laplace: *"It is assumed that matter is composed of electrons and protons of finite size, of which there are only a finite number in the world... The laws of these changes can apparently be summarized in a small number of very general principles which determine the past and future of the world once some small section of the course of events is known... Given the laws governing the motion of electrons and protons, the rest is a matter of geography - a collection of specific facts describing their distribution in a specific section of the world."* The physicist Stephen Hawking (1988) still echoes this sentiment. *"If we find a complete theory... it would be the ultimate triumph of human reason, for then we would know the mind of God."*

This is not science, but rather scientific fairy tale, scientific religion, scientific ideology, or whatever one may call it. It is false science as it is a vision that captivates and overwhelms sober thinking. The so-called "deterministic worldview," which seeks to derive the entire future (not just the regularities that appear at each stage of evolution) from the past, is pseudo-science, yet it has continued to dominate the thinking even of great men.

The program of omnipotence and omniscience was clearly articulated by a pioneer of the new scientific worldview, Immanuel Kant: *"Give me matter, and I will build you a world from it."* Though he attributed this phrase to God, the philosopher surreptitiously adopts for himself the divine role. Half a century earlier, Voltaire had been even more direct: science was meant to replace

faith: "*Écrasez l'infâme*" (crush the infamous!) was the new slogan. Yet, in this process, it transformed into a new type of faith.

The organic world

Our knowledge of facts

Today's factual knowledge about the living world encompasses the genesis of species, ranging from single-celled organisms to the phenotypes of aquatic, terrestrial, and flying fauna. It describes their potentially infinite diversification into specific families, which propagate and, under favorable environmental conditions, thrive in their respective habitats. Species face extinction as well if conditions change and their ability to adapt to unfamiliar environments diminishes. Given that the globe has a finite surface area and that the number of living species is in turn finite at any given time, science could eventually compile a comprehensive inventory of the organic inhabitants of the planet. Nevertheless, evolution, unless halted by climate change or nuclear contamination, is always in flux. New species are constantly emerging. The evolutionary process is never-ending. Even if confined to describing facts, such as listing fossils or currently existing species, the scientific endeavor never truly comes to an end in either the cosmic or terrestrial realm.

First reliable explanation of facts: Descendance

While the description of species is based on collections of fossils and their currently living descendants, the explanation of such findings is rather new. Until the 18th century, religions explained the diversity of life as creation by an otherworldly power. In the monotheistic tradition of Judaism, Christianity, and Islam, it was God himself who had created all beings, including humans. They all came into being simultaneously, their number was finite, and the concept of development was absent.

As is well known, Charles Darwin succeeded in debunking the myth of ready-made creation. Many fossil discoveries pointed to long-extinct species and a branching tree of life. The core statement of his findings, which has remained scientifically unchallenged ever since, is that this tree springs from a common root from where it gradually unfolds. Setting aside the religiously grounded views of creationists who consider the Old Testament a divine revelation, the idea of evolution is now an established part of scientifically validated factual knowledge.

But even when Darwin introduced it to the world with his groundbreaking work "The Origin of Species" in 1859, the concept was not entirely new. It had already been advocated by Jean-Baptiste Lamarck and Alfred Russell Wallace. Moreover, outside the realm of organic life, the concept of evolution had taken hold in the minds of leading intellectuals at least a century earlier. In his work "Universal Natural History and Theory of the Heavens," Immanuel Kant had already proposed that the physical world originated from primordial nebulae. From there, it was an almost inevitable step to extend the idea of evolution to the organic world.

This step was logically unavoidable, but it would prove revolutionary, indeed it had to be revolutionary, as it was linked to the further realization that the inorganic world necessarily preceded the organic. Animals and humans could not exist without earth, the stars and other celestial bodies being already there. Evolution could therefore only progress in the opposite direction. But this insight presented a monumental challenge to previous beliefs. Life must have emerged from inanimate matter - not through a process of creation as various religions proclaimed, but through a mechanical process that could be found out by science. The idea itself was bound to excite minds to the utmost, for it was not only revolutionary, but also considered by many to be blasphemous...

The relation of the organic to the physical world

We have seen that we merely need to stretch the holodox frame wide enough - the explanation of the relationship between the whole and its parts - to encounter the limits of explanation. Space remains a mystery to us, as does time. How a universe can expand while simultaneously generating space and time where neither previously existed remains inexplicable, just like the creation of the world in seven days.

It, therefore, becomes quite understandable that Darwin's explanation of the origin of species exploded like a bomb in the minds of his contemporaries. The holodox frame now was much smaller: the whole was no longer the surrounding boundless cosmos but "merely" the planet; the parts were represented by all currently or previously existing terrestrial organisms. Darwin saw his task as *scientifically explaining* the relationship between these two: living organisms and their respective environments.

As already mentioned, the idea that living beings had emerged in an ascending and branching chain of evolution was not truly revolutionary, as it merely represented an extension of our factual knowledge. The extinct and still-existing living beings, including humans, could henceforth be arranged on a scale ranging from transitional forms between dead and living matter to the 'crown of creation', humans. But how was the unfolding of the organic world, *how was this 'evolution' to be explained?* Darwin's theory did not stop at the facts but sought to understand the causes behind them – that explains its extraordinary impact.

How organic life changes itself and its surroundings

Can mechanistic models entirely explain biological facts?

The remarkable progress in the natural sciences in the 19th century fostered the belief that science could answer any question, including that of the origin and evolution of life. To put it simply, one would need a perfect understanding of the physical nature of organic beings, to predict how they would develop and behave in specific environments. According to this perspective, the future evolution of species would be just as predictable as upcoming lunar eclipses were in the purely physical world. Taking this idea further, even the future of humans would finally turn out to become a matter of calculation. Charles Darwin had this ideal of complete explanation in mind when he published his theory of the survival of the fittest in 1859 (“On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life”).

The simplest analogy available for this ambitious goal might be a thermometer that reacts in specific yet completely predictable ways depending on the characteristics of its environment. *Modern biogenetics has since added the element of randomness in the form of unpredictable mutations to this model of complete predictability.* In such a scenario, mutations that lead to a series of non-functional thermometers could emerge, suitable for temperature ranges that do not match the specific environment. These would then be eliminated, but the behavior of the “fittest” thermometers could still be fully predicted. In living beings, including humans, genes would assume the role of thermometers, acting as encrypted information centers for the structure and behavior of organic entities. Changes in genetic material might not be predictable due to random mutations, but their selection certainly is - supposed that this process occurs under the environmental

pressure of natural selection. Thus, genes that favor survival in an arctic environment would not be selected in a tropical one, and vice versa. Darwin's theory was perceived as a reliable scientific tool to enable predictions about which genes from the pool created by mutations would prevail under given environmental conditions.

The theory seemed to complement with a valid explanatory knowledge the existing factual knowledge about the unfolding of species within given environments. Darwin's model of evolution in the organic sphere almost immediately came to be celebrated like Newton's explanation of the physical cosmos. The prevailing conviction was that science did not need to confine itself to predicting the future of the physical realm; now the unfolding of life throughout organic evolution too had been unveiled. The prospect of such a groundbreaking expansion of the scientific horizon explains the resounding success of Darwin's theory.

As we have seen, Darwin's theory consists of two distinct parts: descentance on one hand and its explanation through the mechanism of selection on the other. Only the second part, which explains evolution through selection based on environmental pressure, represents Darwin's original contribution. However, even here we must add some reservation, as the idea of selection had already been conceptualized by Denis Diderot (1749) more than a century earlier.

But Darwin did not arrive at the theory of selection, known as "survival of the fittest" (the term itself was coined by Herbert Spencer but adopted by Darwin), through Diderot. Instead, he was inspired by Malthus, who argued that food supply always falls short of food demand, leading to constant struggle as the true driving force and fundamental principle of evolution: the struggle for survival.

Darwin assumed that the evolution of species could be fully and adequately explained by the mechanism of selection. Individuals better adapted to their environment's conditions would have better chances of survival than those less well adapted. However, for different individuals to be available for this selection, the mechanism of heredity must be able to produce them – and here is where chance comes into play. The roulette of mutations provides the pool of misfits as well as of more viable individuals. This is the modern interpretation of Charles Darwin's theory of natural selection.

Some modern evolutionary theorists, like Richard Dawkins (2007), are convinced that Darwin's theory, now supplemented by the concept of mutations, can fully explain life in the future and in the past. "*Natural selection... explains all life,*" Dawkins boldly asserts. He substantiates this view by maintaining that the theory corresponds to the scientific demand for empirical verifiability. Those individuals will produce most offspring that are better equipped to survive in the struggle for existence in a specific environment.

Indeed, in isolated cases, the effect of successful adaptation can be unequivocally demonstrated. The white birch moth, which, as the name suggests, prefers to settle on the bark of white birch trees, was well protected against its predators when birch trees still had white barks. However, as industrialization led to air pollution and the darkening of birch bark in the industrial regions of England, the white birch moth suddenly became highly vulnerable. A mutation then led to the emergence of darker variants, which quickly displaced the lighter ones. Undoubtedly, this is a prime example of successful adaptation to a changing environment.

Richard Dawkins is therefore deeply convinced of the predictive value of the theory. "*We can safely predict that, if we wait*

another ten million years, a whole new set of species will be as well adapted to their ways of life as today's species are to theirs. This is a recurrent, predictable, multiple phenomenon, not a piece of statistical luck recognized with hindsight. And, thanks to Darwin, we know how it is brought about: by natural selection."

Yes, future species will undoubtedly be well adapted to the world they will inhabit. Unfortunately, this statement is void of any empirical content, as Dawkins should know, because, so far, Darwin's theory has not allowed any biologist to predict what current species will look like in ten million years. They will be equipped with new outward forms and sensory organs, and they will certainly appear as excellently adapted to future observers living at that time. Nevertheless, no evolution theorist could have predicted their emergence. Dawkins does not seem to notice the logical error of tautology he commits. As is often the case, such blindness can only be explained by an overwhelming desire – in this case, that for supposed *scientific omniscience*. Such desires are likely to partially paralyze the minds of even the most intelligent persons.

The mistake is, however, easily grasped by any thinking layperson. Predictability due to adaptation is limited to the specific environment and characteristics of a species as we know them at the respective point in time. It is understandable that the white color of the birch moth ceases to serve as effective camouflage when the bark of the birch trees turns black. In this case, a biologist educated in Darwin's theory might have predicted the adaptation – but by no means with absolute certainty. We know that mimicry of other species also serves to deter predators. Therefore, could by no means be excluded that the birch moth might have deterred its enemies with a poisonous yellow color or in a thousand other ways, as evolution has developed variable strategies

for this purpose. Prediction remains uncertain precisely because there is such a wide range of possible defensive maneuvers.

Prediction even becomes utterly impossible when we talk about defense mechanisms *that do not yet exist but will be "invented" during evolution* – this ultimately applies to all characteristics of living beings. Before the invention of the eye, no intelligence could have predicted how beings blessed with this new faculty would adapt to their environment. Before the invention of sensitivity to the Earth's magnetic field, the same scientific intelligence could not have prophesied how migratory birds would behave. Darwin's theory of the survival of the fittest through selective adaptation to the respective environment is therefore only valid within quite a limited range, namely when we examine the currently existing characteristics of a species for their adaptational value within a current environment. White color cannot serve as camouflage on a black background – that is obvious. Similarly, the beak of a bird used to pick worms off leaves would no longer be useful to the species if it were to enter a different environment where it needed to use its beak to crack the tough shells of fruits to access the edible flesh inside. A knowledgeable evolution theorist like Darwin, who studied similar adaptation phenomena on the Galapagos Islands, is indeed capable of foreseeing such changes to some extent. However, he cannot make any empirically testable statement about what previously unknown characteristics and abilities evolution will "invent" in the future to cope with the challenges of future environments. In cases like these, the predictive value of Darwin's theory turns out to be nil.

Rather than Richard Dawkins the philosopher of science Karl Popper (1980) seems justified in his skepticism toward Darwin's theory: *"I have come to the conclusion that the Darwinian theory is not a testable scientific theory, but a metaphysical research*

*program... Unlike an empirically based theory, it cannot really predict the future: "Darwinism does not really predict the evolution of diversity. Therefore, it cannot really explain it."*¹⁴

How subjective striving acts on the future

Karl Popper (1980) proposed a different solution, indeed a radical one as it entails a renunciation of scientific knowledge - an admission that we must renounce explanation. Popper states: "*Through its actions and preferences, the organism partially selects the pressure of selection that will affect it and its descendants. As a result, it can actively influence the course of evolution.*" This perspective challenges the conventional notion of passive adaptation and underscores the organism's active role in shaping evolutionary forces.

Erwin Schrödinger and Gregory Bateson express similar views. Schrödinger remarks, "*The organism seeks... a new environment, thus favoring selection towards offspring that are best adapted to it*". Gregory Bateson also emphasizes the active role of the organism. However, the French molecular biologist Jacques Monod (1971) has expressed this concept most eloquently. Hence, I will quote him more extensively:

"If terrestrial vertebrates appeared and were able to initiate that wonderful line from which amphibians, reptiles, birds, and mammals later developed, it was originally because a primitive fish "chose" to do some exploring on land, where it was however ill-provided with means for getting about. The same fish thereby created, because of a shift in behavior, the selective pressure which was to engender the powerful limbs of the quadrupeds.

Among the descendants of this daring explorer, this Magellan of evolution, are some that can run at speeds of fifty miles an hour; others climb tress with astonishing agility, while yet others have conquered the air, in a fantastic manner fulfilling, extending, and amplifying the ancestral fish's hankering, its 'dream' ... “

And in a more theoretical vein: “Behavior orients the pressures of selection. Obviously, the part played by teleonomic performances in the orientation of selection becomes greater and greater; the higher the level of organization and hence autonomy of the organism with respect to its environment – to the point where teleonomic performance may indeed be considered decisive in the higher organisms, whose survival and reproduction depend above all upon their behavior...”¹⁵

From Monod to Popper, a subjective element comes into play, an element consciously excluded by Darwin - 'actions and preferences', that is, the subjective desires of an organism, something that science cannot foresee. The mechanistic model where environmental selection pressure modifies the hardware of genes is not abandoned but has restricted validity. Overlaying this model and determining the direction of evolution is the selection pressure initiated by preferences and desires.

Staying with our previous example, this implies that a thermometer not only indicates objective temperature but may also display subjective notions of warmth and cold. *Consequently, the ambitious goal of predicting organic evolution is reduced to mere fiction, as subjective desire eludes any prior calculation.* Such preferences may lead in completely different, even opposite directions. The male peacock, for instance, has significantly compromised its fitness in the fight for survival by developing ever larger plumage to impress its hens. No biologist can assert that such elaborate plumage is indispensable for mating success; the unassuming male sparrow manages its reproduction just as

effectively. In cases like this and similar ones, we are not dealing with an essential means to achieve a specific goal, but with subjective preference and achievement. Explaining the peacock's plumage based on sexual preference doesn't make Darwin's theory of selection more meaningful; it merely proves that the pursuit of comprehensive understanding in the realm of organisms encounters pure subjectivity and hence insurmountable limitations.

Wishing and willing with humans

Statements about the subjective preferences of living beings could nevertheless be dismissed as mere speculation. Such a reservation would be justified when considering the ambitions of Monod's primal fish and the sexual preferences among peacocks. Nobody knows their preferences and desires because we can't empathize with either fish or peacocks. But the situation is quite different in the human sphere. Each of us knows why we think or act in a certain way in specific situations. This understanding extends far beyond our personal aspirations and actions, we easily empathize with our fellows and understand the motives behind significant, historically transformative events. In such cases, it does indeed often seem that the "fittest", in the sense of successful adaptation, prevails. It is by no means by mere coincidence that the term "Social Darwinism" is used in such contexts.¹⁶

In situations of extreme crisis where only survival matters, subjective preferences lose all significance. In such cases, even humans can behave like automatons, with their reactions largely predictable. If someone approaches us with a red-hot iron, the reaction is foreseeable. Advocates of the mechanistic model of the survival of the fittest are not wholly wrong when they argue

that under certain conditions, the model does possess explanatory and predictive value. In times when physical survival is under acute threat, struggle is imposed not only on individuals but also on groups and nations – much like foreseen by Malthus. The grim diagnosis that life is nothing but eternal eating and being eaten certainly applies to the behavior of people when they follow the elemental imperative of survival; otherwise, individuals and species would be extinct in a short time.

However, we can only rarely predict how people will behave *outside such borderline situations*. Today, this adaptation generally occurs through technological innovations. The necessary means are "invented" – just as evolution had invented new strategies of adaptation in unforeseeable ways. There are no limits to the practical advancements of modern science in the technical manipulation of life; astonishing results are still to be expected.¹⁷ Yet, inventions - whether those of evolution or those of humans - are fundamentally unpredictable. While science can boast exceptional achievements in factual detail, it must remain silent when it comes to the future of life. The latter will forever remain an inscrutable mystery because chance, in the form of desires and volitions, sets impenetrable limits to explanation.

How faber changes his surroundings and himself

The holistic perspective of history embedding humanity within its environment, may be traced back to the 18th century. Baron de Montesquieu aimed to explain human behavior through climatic conditions. According to his view, people in tropical regions would develop different behaviors and ways of thinking than those in the far north, where they must contend with ice and snow.

Some differences imposed by the environment are indeed obvious. In the tropics, people could move about naked, while in northern latitudes, survival necessitated fur clothing. However, this viewpoint remains superficial from the start, as it explains humans through their environment, while on the contrary, *the environment must be explained through humans*. This is illustrated by the example just mentioned: fur clothing is a tool by means of which humans used to transform their environment. They made otherwise uninhabitable regions into their settlements by protecting themselves against the cold. This use of such transforming tools enabled humans, about 60,000 years ago, to spread from Africa, their presumed place of origin, to the far north of Europe.

Regarding man, holodoxy proceeds as it always does, examining the relationship of the whole to its parts and vice versa. *For humans, the whole is not solely composed of the natural environment but also the artificial one they themselves created*. In fact, the artificial, man-made environment was to play an increasingly important role. Arrows, traps, stone tools and clothing soon constitute its significant parts. If hunter-gatherers had relied solely on their bare hands, they would have been hopelessly inferior to the major predators. Unlike apes, they could not easily climb trees. In the savannah, where prey was plentiful, wild animals

would have utterly outmatched them. Our earliest ancestors only survived thanks to the tools they created - their artificial environment. Seen in this light, labeling the human species as "Sapiens" (wise) is misleading, as with sapientia alone, they could never have survived in the African savannah. They became the most successful species on the globe because they turned into Homo faber, *creators of instruments of survival*. Therefore, in this work, I will consistently refer to man as (Homo) Faber.

Faber, who used tools to create an artificial environment, first appeared at least a hundred thousand years ago, but it was not until the Neolithic Revolution twelve thousand years ago that he gave the surrounding nature a completely different appearance with the transition to agriculture. This epoch could already be described as the first Anthropocene. From Mesopotamia and Egypt to the Indus Valley and the Yellow River, and even to the New World of Mayans and Incas, fields – often stretching to the horizon – replaced swamps, forests, or savannas. A rapidly swelling population congregated in cities that entirely buried the original landscape under artificially piled stones.

But what was to change just as much as the external image of the environment man now inhabited was the relationship of the people to each other, i.e. social structure. People in agricultural mass civilizations lived and thought differently from hunter-gatherers that were now pushed to the fringes of the civilized world. The unique environment they artificially constructed – the new “conditions of production”, we could say – shaped a new consciousness.

It's crucial not to confuse this social shaping with deterministic necessity, as if the altered consciousness – this new intellectual and social "superstructure" – were "determined" by environmental conditions, like a physical effect by its respective causes. The very diversity of social orders, even within agrarian civilizations,

proves that humans always possessed the freedom to respond to the same conditions in quite diverse ways. The most tangible proof of this freedom is that they could replace existing (production) conditions with entirely different ones, thus creating a new artificial environment. This is what hunters and gatherers did when they became sedentary and produced their own food, thus creating humanity's second stage of development: agrarian civilization.¹⁸

With the energy revolution, agrarian civilization itself switched to a new artificial environment which was within a quite short laps of time to become humanity's third stage of development: fossil civilization. Once again, Faber fundamentally re-shaped his existence. This transformation too was brought about by new tools. By the late 18th century, Faber gained access to a previously largely inaccessible treasure: energy reserves stored as coal, oil, and gas beneath the surface of the earth.

The new "fossil era" turned out to be both a climax and a terrifying disaster. It was a climax because, for the first time in twelve thousand years of agrarian civilization, the cornucopia of energy now available made it possible for most people in the world's advanced industrial nations to live not only in material security but in a historically unprecedented material luxury. Such wealth had never existed anywhere in the past twelve thousand years, except for vanishing minorities.

Yet, this is only one side of the coin. We are all aware of its dark side, for the new fossil epoch simultaneously posed the greatest threat since the beginning of history. For the first time, the extinction of the human species and the transformation of the planet into an uninhabitable place became a realistic possibility. Faber, through his new technical instruments, had created conditions capable of annihilating all life. Since the beginning of the 21st century, this awareness has come to shape human thought –

and increasingly, human action. Mankind is now aware of the existential dangers it has imposed on itself.

Our transformed awareness heralds the beginning of the fourth and possibly last stage of human development, the "post-fossil" one. Unlike all previous epochs, we possess knowledge that allows us to avert the dangers we have created. We are not "determined" by the conditions in which we live. It is up to ourselves to change them.

Using a triad of features, I want to describe the four main epochs just mentioned – first, through their respective *conditions of production*, including the immediate consequences they entail; second, through the resulting *social organization*; and third, through their *reflection in* as well as their *guidance by human thought*.

The respective conditions of production for the first three epochs are expressed through their very names: hunter-gatherer, agrarian civilization, fossil age. Immediate characteristics are the killing of living beings in the case of hunters, the cultivation of land in agrarian civilizations, and the extraction of coal, oil, and gas in the fossil age. Only our present time, which I call the "post-fossil epoch," cannot be ranged under such a convenient concept. This is because the future is not an objective fact which we can scientifically derive from our knowledge of the past – *we are free to be its creators*.

Social organization is never 'determined' by conditions of production, although some thinkers, chiefly Karl Marx, propounded this thesis. On the other hand, history proves that it is certainly influenced by them. This holds especially true for the epoch of hunter-gatherers, as well as for the subsequent era of major agrarian civilizations.

As to the reflection on the modes of production in Faber's mind, this topic confronts us with an immensely complex phenomenon.

Human thinking has never merely represented or mirrored reality. Instead, through his imagination and anticipatory thought, Faber has actively shaped it. Preferences and desires are, as we have seen, guiding forces of evolution. As shown by Monod and Popper, they are so even in the realm of subhuman life.

But preferences do not belong to the measurable entities of the physical world, that we may calculate and predict like a lunar eclipse. The ultimate goal of the sciences – prediction and the mastery of reality to which it gives rise– encounters insurmountable limits within the human sphere. Preferences and desires lead to inventions that no one had predicted as they change the living conditions to which humans must adapt. Thus, both the inventions and the resulting adaptations are fundamentally unpredictable. Throughout its historical existence, humanity has never been able to read its own future like it were written on a tablet of laws. Hunter-gatherers could not have known that their epoch would in time be followed by that of the great agrarian civilizations. Agriculturalists could not have foreseen the profound changes that would accompany the fossil age. And as to ourselves: we only know what the post-fossil epoch *should not look like*. This we do know perfectly well. Yet, the actual form it will take can only be speculated upon.

However, one constant remains, and it is of central significance. It typically does not play a role in scientific texts, even though its existence is an empirical fact. I already referred to this constant as "universal moral conscience." That this common ground, which connects all people across the four epochs, does indeed exist and that it can become a powerful force, is something that history proves to us time and again – a fact to be further discussed in the following chapters.

Hunter-gatherers – factual knowledge

How faber conquered the world

About this earliest and longest part of human history, contemporary research has remarkable negative things to report - as well as equally remarkable positive ones. Let us begin with the alarming aspect of this millennia-spanning history.

It is by now a proven fact that our earliest ancestors were by no means characterized by exceptional peacefulness. The advance of Faber across all continents (with the exception of the two poles), which began around 60,000 years ago from Africa and concluded with the colonization of all of South America about 12,000 years ago, resembled a campaign of annihilation – initially towards other coexisting human species, which existed in at least seven different variations: *Homo neanderthalensis* in western Eurasia; *Homo erectus*, who lived in the eastern parts of Asia for more than two million years; *Homo soloensis* on Java, *Homo floresiensis*, native to the Indonesian island of Flores, a dwarf that did not grow larger than a meter and weighed only 25 kg. In Siberia, yet another human species has been discovered, *Homo denisova*, named after the cave in which it was found. Africa, likely the cradle of humanity, had produced, in addition to Sapiens, the *Homo rudolfensis* and the *Homo ergaster* – and there is no reason to believe that this list will not be expanded over time. The fact remains that Sapiens spread everywhere and eradicated all rivals.

While we have only indirect evidence of this process of displacement, it is assumed that it was violent in nature. This also results from the fact that Faber not only caused other human species to disappear, with whom interbreeding occurred only excep-

tionally, but that he treated the surrounding animal world just in the same way.

An early extinction of species

We humans of the 21st century lament the rapid pace of species extinction that has taken place since the Industrial Revolution, especially during the 20th century. However, thanks to the tools he created, Faber managed to eradicate native megafauna on three continents in quite a short time.

More than thirty thousand years ago, Australia and New Guinea still had giant marsupials: kangaroos and diprotodonts - counterparts to cattle and rhinoceroses - as well as pouch-bearing leopards, flightless giant birds weighing four hundred pounds, and a variety of other large animals. Since this fauna disappeared only after the arrival of *Homo sapiens* and climate warming can't be blamed (as similar warming events had occurred before without comparable consequences), only one conclusion seems convincing: these species did not simply die out but were systematically eradicated by our early ancestors.

This suspicion becomes reinforced by the fact that the same process of mass extinction also occurred in both Americas, but only after Faber succeeded in reaching these continents via the still passable Bering Strait. Twelve thousand years ago, in North America, humans encountered mammoths and mastodons (giant proboscideans), as well as rodents the size of bears; there were elephants, lions, cheetahs, and large herds of camels and horses. The invaders managed to eliminate this diversity within a few thousand years. In Australia, this happened around 30,000 years ago, and in the Americas around 17,000 to 12,000 years ago. Historian Yuval Noah Harari (2011) summarizes the research results

in the following concise assessment: *"Even before Sapiens planted the first field, created the first metal tool, or wrote the first text, he had not only wiped out all the other human species around him, but also 90 percent of Australia's large animals, 75 percent of the large mammals in both Americas, and about 50 percent of all the planet's large land mammals."*

Considering that European settlers in North America managed to reduce the number of bison from nearly sixty million at the end of the 18th century to 541 animals by 1889, almost wiping out the species within a few decades, it becomes clear that the difference lies not in human nature but in weaponry. Modern guns significantly reduced the time required for extermination.

Propensity to violence

Until recent historical times, things hardly changed. Up to the present, hunter-gatherers are known for their propensity for violence.¹⁹ Recent research has shown that the !Kung people of the Kalahari Desert have a higher homicide rate, proportionally, than US inner cities. Ninety percent of all hunter-gatherer groups studied so far had been involved in wars at some point, and 60 percent of them engaged in warfare at least every two years. Since these societies lack a fixed hierarchical structure, anyone could take justice into their own hands.

It is reasonable to assume that the situation was no different in prehistoric times. Thus, a blemish is cast on Faber's success even in the earliest stage of history. He not only treated animal species mercilessly but was by no means peaceful with his own kind either. To borrow from Max Weber, there existed an "ingroup morality", which usually prohibited the stronger individuals from acting arbitrarily against members of their own group. However,

alongside this humane morality existed a completely different one, an "outgroup morality" that had little or no inhibitions regarding strangers let alone differing human species. The outgroup morality dictated that other groups were competitors for resources and had to be fought - at least in times of necessity. It also asserted that the group's greatest success, a large and healthy offspring, depended on abundant prey. Both demands directly stemmed from the conditions of that time and both favored a war-like behavior.

If we define the Anthropocene as the epoch in which a specific species, humans, began irreversibly altering their environment, we could place its beginning even earlier, namely with hunter-gatherers, and not just with the Neolithic or the Industrial Revolution. Faber's hallmark has always been that he actively intervened in his own environment.

Totemism – the earliest testimony of universal moral conscience

The annihilation of fellow creatures was prompted by the imperative of physical survival. However, in human history, there have been periods where the struggle for survival was not at the forefront, and killing was not done with a clear conscience. Hence it came to be restricted or even forbidden.

Everyone is familiar with the tales and myths from early epochs where, for instance, a bear or kangaroo god was asked for forgiveness because humans had to kill a member of their realm for sustenance. This is unmistakable proof of the fact that man was capable of empathy not only with his own kind but also with other living beings - at the beginning of his history no less than today.

The fact is, however, typically downplayed in our time. The reason seems obvious: Scientific theories are by no means immune to the influences of intellectual trends – and one such trend, up until today, has been Darwin's theory of the survival of the fittest. In the shape of Social Darwinism it interpretes history as a continuous and inevitable struggle of eat or be eaten. The evidence of brutality displayed by our ancestors towards their fellow beings, human or animal, fits neatly into this narrative. And the factual basis too is undeniable.

Equally undeniable, however, is the presence of conflicting, opposing evidence. There are clear indications that even our earliest ancestors were never content with cruel behavior. While they were compelled to act this way in many situations for their survival or safety, the fact that they sought justification for it proves that there has always existed an inner resistance against killing.

So-called totemism simultaneously represents an attempt at justification and an effort to transcend the unavoidable cruelty of

life. Significant anthropologists, from Baldwin Spencer and Francis J. Gillen up to Émile Durkheim and Claude Lévi-Strauss, have elaborated on this matter regarding Australian aboriginal tribes. These divided society into groups (clans), each *identifying* with certain species in their habitat: a wallaby-man with wallabies, a koala-woman with koalas, an acacia-man with acacias, and so on. The crucial aspect of this earliest of all philosophical worldviews was that it delegated *responsibility* for a specific part of reality to a specific part of human society. A koala-man was not allowed to kill a koala (except in emergencies); the killing of a koala was only permitted for others – the non-koala men and women. A koala-man was also forbidden to marry a koala-woman, as this would have constituted a form of incest. Therefore, a koala-woman could only be wedded by non-koala men. This was much more than a simple give-and-take, as practiced by all societies in various forms to this day. It was a give-and-take of a far more complex nature because those seemingly primitive tribes were firmly convinced that, *through their spiritual connection with their respective totem animals, they enabled their thriving and existence in the first place*. They saw themselves as the creators, sustainers, and nurturers of their fellow creatures, which they were obligated to share with other clans for the sake of survival.

I wonder if we should not view this worldview as *the earliest philosophical attempt to justify the wrong of killing and of human interference in the orders of nature*. The hunters-gatherers of Australia were existentially dependent on consuming plants and killing animals for their survival. However, they *justified* their consumption and killing by countering it with a conceived narrative: the belief that, after all, they were the ones who enabled the flourishing of plants, animals, and even inanimate nature. Certainly, humans had no choice but to feed on other living beings;

it was a constraint of physical survival they could not escape. Yet, they excused this taking by seeing themselves simultaneously as givers. Due to their spiritual power, they were responsible for the thriving and reproduction of plants and animals, which other clans could then consume with a clear conscience. In the world-view of these earliest philosophers, giving and taking were not limited to the small human community; it became a principle that spanned the entire cosmos.²⁰

This significant example illustrates what this book repeatedly seeks to demonstrate and emphasize: that the social existence of humans (a part of the "superstructure," as understood by Marx) is "determined" by the elemental conditions of life only in times of emergency. Once that is no longer the case, desires and wishes – human freedom – enable the most astonishing interactions between humans and of man with nature. In Australia, the early expansion of humans had reached its limit. Hunter-gatherers had to negotiate with their neighbors and nature in ways that contributed to a lasting equilibrium. Totemism emerged as a wise and exceedingly complex response to this challenge. The campaign of annihilation was thus halted, leading to a balance between humans and nature.

In the effort to achieve equilibrium within the realm of the living, totemism is perhaps the most remarkable example. At a higher cultural stage, we find a comparable expression of empathy in Indian civilization, where the belief in reincarnation made killing a sin, even earthworms were, according to Hindu belief, on the same journey of redemption as tigers or humans.

Prohibitions against killing certainly varied in different cultures, but in all of them, they were strongly pronounced when it came to killing fellow beings – humans. But there were corresponding inhibitions even when dealing with strangers.

Hospitality was and is an institution spread across the globe and throughout history. It explicitly pertains to strangers, not just to people within one's own group, clan, or city. No other custom reflects as clearly that our ancestors recognized humanity not merely in themselves but in the foreigner and the stranger. In some cultures, one might even speak of sanctifying guests and thereby foreigners. Just look at those myths where gods test hospitality when they appeared among humans in disguise.

Crime and conscience

When discussing hospitality, we should not ignore its opposite: xenophobia. It has an equally long history, and it is undoubtedly as deeply rooted. Addressing xenophobia seems particularly important because the existence of a universal moral conscience becomes evident even in the deliberate degradation of other human beings.

The degradation of others an indication of the presence of universal moral conscience? At first glance, this seems like a harsh self-contradiction. But we should ask: Why is no social trait so widespread to this day as the pejorative and sometimes downright scathing description of members of foreign clans, tribes, peoples, or nations? These are variably described and vilified as non-humans, inhumans, sub-humans, lesser humans, barbarians, criminals, alien species, beasts and so on?

It appears to me that only one conclusion can be drawn from this globally proven fact. Throughout history, people were aware that *they should act humanely, fairly, and compassionately towards their own kind*, often even under the imperative to sacrifice themselves for the sake of their own tribe members, because with them they felt from time immemorial to be of the same essence.

Hence, they needed to label those they wanted to harm, exploit, or fight as *radically different from their own group* – as non-human or subhuman, or even as "aliens" (Artfremde) as the Nazis labeled their Jewish fellow citizens.²¹

Before engaging in wars of extermination (in contrast to ritualized contests), other humans were first defamed as alien and unequal, so that the cruelties and crimes committed against them no longer counted as such – after all, they weren't perpetrated against fully-fledged humans. It is precisely this elementary and globally widespread phenomenon that seems to testify just as clearly to the existence of a universal conscience as to the ease with which people have always been able to outwit and override it.

This held true until yesterday, when the Nazis declared their Jewish fellow citizens as subhumans, and it will hold true in the future whenever a group, a government, or individuals deny the equality of their fellow humans with the intent of turning them into outlaws. It is by no means true that the Nazis did not know what they were doing. *Precisely because they knew*, they created the largest propaganda machinery of their time with the sole purpose of designating a part of the German population as subhumans. Heinrich Himmler's horrific term "decency," which he believed the SS members retained despite their blood-soaked hands, demonstrates how necessary it *was to justify mass murder to themselves and to others*.

The Nazis were concerned with justification until the end of their rule. Without their malicious and constant hatemongering, it would have been difficult for the ordinary citizen to comprehend why the Jewish neighbor he greeted daily, whom he personally esteemed as a doctor, and who often enough belonged to his circle of friends, should in truth be a person with hidden diabolical intent: a threat to the national body. The ordinary citizen did

not know that *the Nazis needed such an enemy* because people are most securely controlled when united through hatred. When Hermann Rauschning asked Hitler if he believed that the Jew must be annihilated, Hitler replied, "No, then we'd have to invent him. You need a visible enemy, not just an invisible one."²² As is known, Hitler broke with this intention after the Wannsee Conference.

The judges of the Nuremberg Trials, where the biggest Nazi criminals were brought to justice, only told the Germans after the war what they themselves had known all along. The Tribunal embodied their temporarily suspended conscience. Undoubtedly, it would have been better to have an *international court*, avoiding the skewed perspective that the victors seek revenge against the vanquished. However, in the absence of such an institution, the victor's justice was justified and welcome. It is regrettable though that most historical crimes have never been punished. If one looks at the number of victims, Stalin and Mao had many more of their fellow citizens killed than the Nazis, yet no court has ever held them accountable. On the contrary, both Russia and China are now attempting to rewrite history in their own ways. Hannah Arendt gave voice to the true, universal moral conscience when she placed left-wing and right-wing totalitarianism on the same level.

The social structure of hunting hordes

At the beginning of this chapter, I said that remarkably bad things could be reported about our earliest ancestors but equally remarkably good ones as well. I would like to turn to the latter now.

From today's perspective, the beginning of human history could almost appear idyllic. For at least fifty thousand years, Faber, i.e. humans in their present biological shape, roamed savannahs and forests in groups of ten to a maximum of one hundred and fifty companions. That great evil which would later tarnish their history so much – strict hierarchies embodying human inequality – either did not exist at that time or only existed in embryonic forms. Some even regard this early epoch as a kind of paradise and golden age of humanity. In their view, it was the later transition to a sedentary way of life that drove people out of this Garden of Eden. From then on, food was no longer provided by nature - on a richly laid table, so to speak - wherever his wanderings took him; rather, he had to obtain it by the sweat of his brow on a tiny piece of enclosed land, where he generally spent his entire existence between birth and death.

It is now an established fact that hunter-gatherers were favored in multiple ways compared to their immediate successors, the sedentary farmers. Some indications suggest that they needed less time for subsistence. The few hunters and gatherers living on the globe until the twentieth century, for example in the Kalahari Desert, one of the most inhospitable areas on Earth, spent an average of only up to 45 hours per week on food procurement. In the "Lucky Latitudes," which encompass a strip of about 20 to 35 degrees north in the Old World and between 15 degrees south and 20 degrees north in the New World, gathering yielded the greatest returns. *It produced fifty calories of food for every single calorie of physical work expended* (Ian Morris). As we know, this balance

has now reversed. Approximately 22,000 calories are needed to produce 100g of beef with a caloric content of 270 calories. Instead of being rewarded with fifty calories of food for a single calorie of physical work, *we now invest 81 calories of work to gain only one calorie of food!* Most of the expended calories are obtained from fossil fuels, which are used in tractors, fertilizers, etc.²³

Scientifically proven is also the better health of our earliest ancestors compared to the farmers of the subsequent era. People with a balanced diet are less susceptible to bacterial or viral diseases such as measles, colds, tuberculosis, scarlet fever, etc. Therefore, infant mortality among our early ancestors was probably lower. But an even more significant advantage for the first humans was that they lived much less closely together and constantly changed their locations. Many diseases only emerged in the sedentary stage. For instance, the outbreak of epidemic diseases like cholera, plague, influenza, typhus, and smallpox requires a certain population density to enable the effective transmission of pathogens.²⁴ For large cities where people crowded together in close quarters, this density posed a significant problem until the early 20th century. They relied on continuous rural migration just to maintain their population size. Despite our exponentially increased medical knowledge and the healing methods derived from it, we are once again threatened by epidemics.

Hunter-gatherers did not need to fear such evils, they were protected from them by their low population density - just like large primates living under similar conditions.²⁵

Perhaps the most telling evidence comes from body size, which, around thirty thousand years ago, averaged 1.77 meters for adult men and 1.66 meters for women. After the transition to sedentism ten thousand years ago, these values had shrunk for men to an average of 1.65 meters and for women to 1.53 meters.

Only in our time have the higher values been reached again. In 1960, American males reached an average height of 1.75 meters.

Equality in hunting hordes

The greatest advantage of nomadic life over all subsequent forms of existence must be inferred in an indirect way, as direct evidence can only be obtained from late successors like the aforementioned Bushmen of the Kalahari. However, it seems clear enough from external circumstances. These societies had virtually no permanent possessions, as they had to follow their prey. So, all belongings had to be carried on their shoulders (pack animals being domesticated much later). This lack of possession had specific social consequences.

As the entire subsequent history of humanity proves, *it is property ownership that leads to institutionalized human inequality*. Some people own much, others very little or nothing – this difference gives rise to most interpersonal conflicts. During the time of our earliest ancestors, everyone had the same negligible amount. If inequality based on the contrast between rich and poor is considered one of the greatest evils of humanity, then the earliest epoch of humanity was largely exempt from it.

In a nomadic horde where no one owned more than he could gather or hunt and carry on his own back, the survival of the group depended existentially on daily sharing to balance the unpredictable odds of successful gathering or hunting. *The early history of humanity was a time when equality and cooperation inevitably arose from the circumstances of life*. There is no reason for us to idealize the people of that time as morally superior to us, who even within the closest human community, namely the family, engage in property separation. *Mutual sharing and giving*

*were the way of life they were compelled to follow due to external circumstances (modes of production).*²⁶

Yet the people of that time were no more equal in physical, psychological, and mental terms than they are today. To be sure, a sudden illness could result in any member of the group falling behind physically or mentally. On the other hand, some individuals must have stood out from their peers – either due to greater knowledge, energy, and authority or simply due to greater experience. Such differences always existed, but nomadic groups had to rely on the cooperation of everyone. This invariably resulted in the demand for equality despite all differences existing between group members. Since mental or physical advantages are only partially inherited, they are newly acquired by each generation, so that *no hereditary privileges* arise from them.

Only in one respect were differences inherited, namely between man and woman. Unlike today, historian Ian Morris (2010) states in a rather drastic way, women were mainly breeding machines. Since half of the newborn babies died in the first year (most died in the first week) and only half of the survivors reached their forties, the stability of the population depended on women *giving birth on average to five infants*. This was the only way to make sure that one generation of parents was followed by a new pair of parents. In other words, women spent a large part of their rather short lives pregnant and caring for children. We know that hunter-gatherers were on average healthier than the farmers and shepherds, who followed them, but they still did not benefit from modern medicine, mortality may have been lower, but not much lower.

Today's women can hardly imagine this permanent occupation with their offspring, and most of them would find it quite unbearable. At that time, however, it was unavoidable since breastfeeding had to be extended for as long as possible, so that subsequent

pregnancies could be delayed by two or three years. In nomadic societies, this was essential because a mother could at best carry a single child in her arms during the tribe's constant displacements. When the next baby arrived before the last one was able to walk, this resulted in even greater stress for women.

As long as the survival of early hordes was precarious, since it remained unpredictable how much animal prey or plant-based food coming days would offer, the equality of rights and duties of all members of the horde was nothing less than an imperative of survival. Under conditions of scarcity, social order was indeed highly determined by the elemental conditions of life. However, life was not always "nasty, brutal, and short". There were notable exceptions to this rule, even repulsive ones, when food was plentiful. In this rare case, even among hunter-gatherers, radically different social conditions could be established with some individuals rising to the rank of aristocrats while others had to serve them as slaves. The Kwakiutl, a group of Native American tribes in the Pacific Northwest who inhabited the Canadian Vancouver Island and the adjacent mainland, provide an astonishing example of this deviation.²⁷ They prove to us - a proof that we encounter again and again later on - that the external conditions of production merely shape man's social existence, but never determine it in the strict sense.

Agrarian society – facts and their explanation

We do not know whether it was the pressure of population on scarce resources that led to the epochal invention of agriculture, or whether Faber experimented out of sheer curiosity and thirst for knowledge, and, so to speak, stumbled upon outsmarting nature by no longer leaving the reproduction of plants and animals to mere chance but subjecting it to his own planning and direction. Hunter-gatherers had relied on the bounties of nature, finding their sustenance in fruits and prey that were naturally available in their environment. When there was an abundant supply of food, as in the "Lucky Latitudes," hordes could even exist in large numbers – in groups of up to a hundred or more– while in less favorable climatic and geographical regions, they existed in much smaller groups. However, even in the most favorable case, population density was minuscule compared to later stages and could not be expanded beyond a narrow limit. Things were to change dramatically due to the unexpected invention of agriculture.

The leap into this new form of existence involved the *artificial production of food* – edible plants were cultivated in a chosen territory under individual control, and animals were bred in confined spaces. From then on, Faber no longer needed to roam as a wandering nomad to find sustenance in constantly changing places; he could settle down because he cultivated and harvested food in designated locations.

Up to the present day, it is difficult to imagine a more radical transformation. Its effects on population density would soon prove breathtaking. After the so-called Neolithic Revolution, the first beginnings of which probably go back far beyond 12,000 B.C., the food supply was so greatly expanded through agriculture and animal husbandry that *after a few generations, instead of a maximum of four people, a thousand people and more were*

able to live on ten square kilometers. It was the first and still the greatest upheaval in human history.

That such a radical change in the "modes of production" would have profound effects on the social structure of human societies is obvious. We understand why equality of rights and responsibilities was a principle enforced by life conditions among hunter-gatherers. Sharing of food and all other goods was a basic imperative for survival. But so was the killing of other living beings. Would both remain an imperative for the times to come? If we want to grasp to what extent social behavior can be predicted or not, the following example may provide a clue.

Let us imagine an early Stone Age philosopher observing the first successful attempts at cultivating crops. Everything suggests that he would have predicted a paradisiacal existence for future generations. In contrast with killing prey animals, humans do not need weapons for sowing and harvesting crops and fruits. Our early philosopher might therefore have reasonably concluded that future generations would renounce all cruelty towards their fellow creatures – including other humans. Roaming hordes would no longer pursue their animal prey and confront rival hordes with armed force. On the contrary, settled farmers would soon lead lives of constant peace, free from war and aggression. In the new world of agrarian civilization, there would be no reason not to live peacefully with each other and with nature. At best, our philosopher - let's not forget that he was a hunter - would have considered the coming generations to be decadent and worthy of ridicule, because under the conditions of peace, what he admired most, namely courage and physical strength, would hardly count...

Moreover, our Stone Age philosopher would certainly have been deeply convinced that equality among humans would continue to be the rule. Several thousand years later that is what his

successor, well-known American ethnologist Marvin Harris (1990), still assumed, when putting himself in the shoes of such an early philosopher:

"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."

In fact, this prediction of equality and peace would not be entirely wrong. Small "garden cultures" existed all around the world where the egalitarian tradition of hunter-gatherers persisted, albeit at a higher level of mastery over nature, allowing for much larger population density. If such societies lived in geographical isolation from other tribes and peoples, they could indeed lead lives as peaceful as the fictitious Stone Age philosopher had predicted.

However, remote and small agrarian garden cultures rare exceptions.²⁸ A historical review of the past twelve thousand years of agricultural history presents us with an entirely different picture. *It was with agriculture, animal husbandry, and property ownership that an era of constant wars and radical inequality began. Why?*

Agrarian civilization: endemic inequality

Civilization is /was!/ a parasite on the man with the hoe. *Will Durant*

Even as hunter-gatherer, Faber became the most successful species on the planet. On the one hand, he created an artificial environment using tools and, on the other hand, due to a highly developed language, groups were able to coordinate their actions.

How the first states were founded since or even before the beginning of agriculture and animal husbandry and what they looked like remains a subject of research. In this context, only the great agrarian civilizations emerging since the fourth millennium B.C.E. are of interest, as they replaced human equality with its opposite: extreme inequality. *Is this inequality as much related to the new conditions of production as was equality under the conditions of hunting and gathering?*

The emergence of large agrarian civilizations relied as much on social coordination as on the possession of technical instruments. Only through purposeful collective action could people harness the immense potential of advanced food production made available by the irrigation of previously dry or the drainage of up to then swampy areas. The regulation of the Nile, the Indus, or the Yellow River, and the reverse, the drainage of swamp areas in Mesopotamia, required the coordinated effort of large numbers of people for precisely defined purposes.

Whether state formation depended on irrigation is, of course, a different question. It seems that it does not.²⁹ But once successful irrigation had become a matter of life or death, guided collective action prevailed over individual choice. Decisions had to be placed in the hands of a higher authority, possessing not only the required expertise but also taking responsibility for the success of planning.

In other words, in "hydraulic cultures" (a term used in the controversial work by Karl A. Wittfogel), *equality could no longer be at the forefront; instead, the demand for expertise and centralized decision-making took precedence*. Due to the necessity of central decision-making, the great civilizations of Mesopotamia, Egypt, India, and China elevated human inequality to their operational principle. From there, this model then spread to non-hydraulic cultures in Europe, Asia, and Africa. However, it also developed in an extreme way in the New World, namely among the Maya, who can only be partially considered hydraulic cultures, and among the Incas and Aztecs, which cannot be classified among them.

The shift from human equality towards the extreme inequality of "hydraulic" cultures, where kings at the top of the state became living gods – as in Egypt – or were regarded as god-like – as in Mesopotamia – can be explained by the new conditions of agrarian society, in three distinct ways. In contrast to a horde of a dozen hunters, the individual practically had no significance for the survival of an agrarian mass society with tens or hundreds of thousands of people. Society continued to function, even when entire segments of the population disappeared due to epidemics, wars, or other disasters. However, it could not continue to exist without the planning and regular implementation of irrigation or the defense against expected annual floods, which required centralized coordination and the coordinated deployment of thousands of men. This new existential imperative demanded a central authority possessing complex technical knowledge.

The resulting rise of trained experts was therefore the second cause why humans were now regarded as radically unequal. The specialist, to whom the collective owed rich harvests and thus the survival of society, suddenly became much more important than any simple worker. The latter's modest task was merely to carry

out the plans of the center – that is of the king and his officials. This prioritization of experts over the mass of the population soon extended to all specialists, not just those responsible for the physical survival in hydraulic cultures. The builders of pyramids and palaces, the artists who glorified the lives and history of the elite, all of them soon established a tradition of human inequality that had been unknown among hunter-gatherers.

Above all, property was to become the third cause of inequality. We saw that wealth could lead to glaring inequality even among hunter-gatherers. This was the case among the Kwakiutl, where a society of original equals had disintegrated into a handful of wealthy aristocrats and huge numbers of propertyless slaves. But now, hydraulic cultures produced wealth and property on a scale never known before. Since that time, there were the bitterly poor at the bottom of the state while at its top we see dazzling wealth, concentrated alternately in the hands of an expert priesthood or in those of a secular power. Sometimes the two coincided, as in Egypt and much later in Khmer theocracy.

However, as previously emphasized, the transition to agriculture *did not inevitably* give rise to human inequality. In Austria, there are two adjacent provinces where agriculture was practiced for several thousand years: Upper Austria and the Waldviertel. To those who travel through them, even today, there is a noticeable difference in landscape and human architecture. Upper Austria was and still is a land of independent farmers. We observe the existence of prosperous farms, but hardly that of any castles and monasteries. In the Waldviertel, the opposite is equally evident. There are some magnificent castles and rich monasteries, but the population seems to have been impoverished and powerless, as the peasantry lived in meager dwellings due to heavy dues to their lords. Secular and ecclesiastical powers ruled in both provinces,

but in Upper Austria, the peasantry had managed to preserve their freedom and independence to a greater extent.

Small garden cultures once existed scattered across the world, mostly in geographically isolated settings. They resemble the first of the two models. The absence of a strong central power extracting wealth and often all rights from subjects resulted in a high degree of equality and probably much greater satisfaction among the people living there.

On the other hand, it can hardly be overlooked that *mankind owes a substantial part of its most significant inventions to hydraulic cultures and their successors*.³⁰ One of many examples is writing. In garden cultures, where peasants were responsible only for the land they cultivated and could work and manage on their own, no more knowledge was needed than what was passed down through oral tradition. Here, the invention of writing would have made no sense.

However, hydraulic cultures soon faced administrative tasks that could no longer be managed solely through human memory. They required written records. This was unavoidable if the central government wanted to distribute the tax burden fairly, which served both its own sustenance and that of the serfs working on its behalf. Furthermore, registering the size of property, which determined the extent of taxation, could no longer be fixed orally.

Inventions often provide answers to existing challenges that can only be overcome with their help (think of Arnold Toynbee's "Stimulus and Response"). In our time, we are experiencing similar challenges. Over the past few decades, our cities have become so vast and labyrinthine that drivers unfamiliar with them can only find through them with the help of electronic navigation devices. These devices therefore *had to be invented to fulfill an immediate need*. The same happened with writing. It was intro-

duced around 3000 BC in Sumer and Egypt due to existing pressures, around 1300 BC in China, and around 600 BC in Mexico.³¹

Different solutions to the same problem

We saw that no populous agrarian civilization dependent on mobilizing the masses for irrigation or drainage measures could do without central authority and expertise. This inevitably generated human inequality in hydraulic states, where the conditions of production clearly shaped the social structure.

On the other hand, various alternatives remained possible under such conditions. *Central authority could be hereditary or determined anew from one generation to the next.* In the first case, it was bound to solidify into lasting privileges, which could only be removed through popular uprisings or other catastrophes. In the second case, the state had to establish an education system that provided the conditions to distribute the necessary expertise to new individuals in each generation.

With one remarkable exception, all major agrarian civilizations (whether hydraulic or not) opted for the first, much simpler alternative. The outcome *was expertise and power for a minority, subservience and forced labor for a majority – with both passed down from parents to children.* Human inequality was grounded in the unpredictable chances of birth.

The most spectacular manifestation of this model was the *Indian caste society*. People were considered inherently unequal. Even if a man or woman from a certain caste was a genius, they were essentially denied the opportunity to break out of their position. However, this system, which seems extremely unjust, provided guarantees that made it tolerable for individuals, trans-

forming it – quite unexpectedly from a theoretical point of view - into one of the most stable social systems.³²

Among all hydraulic mass civilizations, where the planning of major collective projects has played a prominent role, *only China created conditions that partially overturned heredity and privilege*, thereby favoring greater equality among people. True, the man at the top of the state, the “Son of Heaven”, was allowed to inherit his position. But the administration of China’s numerous provinces was entrusted to the class of “literati,” educated in writing, philosophy and morality, whose positions were largely due to personal achievement rather than birth.³³ The administration of the vast empire rested in the hands of common people, who had to pass prescribed examinations in a state education system known as the Hanlin Academy. Without such an education system that fostered personal achievement, this deviation from the norm would not have been possible.

Weapons and the agrarian dependency formula

Hydraulic mass civilizations were the most powerful, richest, and culturally advanced states of their time. No wonder that their model would influence the shape of most subsequent states, even when the hydraulic conditions necessitating regular mass mobilizations were absent.

The reason why the model of central control and inequality deriving from it managed to spread worldwide is related to a peculiar characteristic of agrarian life. Tilling the fields requires farmers to be tied to the land for most of the year and to live scattered across the country. In other words, they were poorly organized and lacked mobility. That explains why a relatively small number of well-armed and mobile warriors had no problem subjugating

the peasant population and living parasitically off their produce. "*The class struggle between people of different status (free, submissive, slave, etc.) over rights to land, labor, and surplus was a ubiquitous feature of all agrarian societies*" (Michael Mann 1986). While small garden cultures did exist around the world and could continue the egalitarian model, they were exceptions to the norm and as a rule remained culturally undeveloped.

There have only been a few regions and only short periods of time when free peasants armed themselves, as in ancient Rome and Japan, much later in the pioneer communities of peasant settlers in the United States, and to this day in Switzerland. When Rome was in the ascendant, peasants had been able to overcome their inferiority by arming their brothers and sons. Originally, the Roman army consisted of free peasants. But not even until the end of the Roman Republic could they prevent a noble class of lords from subjugating them and eventually depriving them of their rights.

Not a single major agrarian civilization exists that did not undergo a similar process. Armed mafias seized power to live off the produce of farmers. Once in power, the elite idealized their role, declaring themselves knights and nobles. This allowed them to cloak the original violence of usurpation with an aura of divine grace. "*The real history of aristocracies,*" noted Dutch historian Johan Huizinga (2022), "*everywhere presents a picture in which pride goes hand in hand with impudent selfishness.*" Alexis de Tocqueville (1963) puts the matter even more starkly, "*It was by means of arms that aristocracy had conquered power, and by means of arms maintained it; thus its rule was based on military valor. Whatever made such valor conspicuous outwardly, was encouraged, and prescribed, often at the expense of reason and humanity.*"

Of course, the conditions of such rule were not always equally oppressive and bad. Astute statesmen were aware, of course, that a cow doesn't give milk once it's been slaughtered. Throughout history, agrarian societies oscillated between ruthless exploitation of food producers and reforms designed to maintain the loyalty of the land-bound majority. We only need to peruse Will Durant's monumental work searching for the keywords "peasant" and "serf" to track this constant flux. But the temptation to squeeze the farming population dry for short-term gain was always present, leading to a continuous cycle of mostly bloody and ruthlessly suppressed peasant uprisings.³⁴

In this context, it seems legitimate to speak of a quasi-sociobiological law, a tendency that held true throughout the entire agrarian epoch from around 10,000 BCE right up to Fossil Revolution. The *agrarian dependency formula* states that, depending on the quality of the land, the crops grown, and the technology available, at most twenty percent of the population - usually only five to ten percent - lived at the expense of a peasant majority that made up 80 percent or often more than 90 percent.³⁵ For instance, in countries like Poland or Hungary, the proportion of the nobility to the total population was around ten percent by the end of the 18th century. Even in a more urbanized society like France, around 1789, ninety percent of people still lived in rural areas.³⁶ This majority of oppressed farmers almost always led unfree lives, as both the nobility and clergy extracted surplus from them in the form of taxes; often farmers and laborers were held by their lords in slave-like subservience.³⁷ When taxes were required to be paid in money rather than goods, as was the case in developed monetary economies like ancient Rome and in Europe from the 12th century onwards, the lords were doubly empowered. The police and the military, which had to keep the farmers in servitude, could be more easily maintained with money.

In hydraulic empires, the agrarian dependency formula persisted due to the necessity of mass mobilization, whereas in Europe and beyond, extending to South and Central America, it was the temptation to live a parasitic life at the expense of the peasantry that enabled the rise of a privileged class. This phenomenon was also evident in the ancient city-states of Greece.³⁸ A small number of well-armed and well-organized groups at the top of the state could make an overwhelming majority of farmers work for them.

Urban centers like Athens and Corinth seemed to deviate from this classical pattern because they replaced direct military rule over the 90 percent of food producers with trade.³⁹ While all men in Sparta were under arms, always ready to force the subjugated Helots into labor under threat of violence, the Athenians had, in a way, *outsourced this task to foreign countries*. They delegated it to rulers in other regions, be it Thrace or Egypt, from whom they imported their food. Except in times of war, the Athenian fleet primarily served the grain trade.

The rule of a minority of rulers over a huge majority of peasants who toiled in the fields was, however, as firmly established in Athens as it was in Sparta.⁴⁰ The difference was that during times of peace the successful trading city didn't need weapons but only its economy to maintain its dominance.⁴¹

In a more or less pure form, the opposition between Sparta and Athens, i.e. between states in which peasants formed the overwhelming majority and trading powers that relied on food production abroad, persisted until the threshold of the Fossil Revolution. The tradition was obviously continued in Rome, where free farmers were replaced by slaves at the end of the Republic *"...whenever slave plantations spread, they replaced and impoverished the free farmers as inevitably as bad money drives out good money. The consequences for society consisted in a*

depopulation of the flatlands and the emergence of a parasitic proletariat in the cities, especially in Rome" (Toynbee). However, Rome didn't just sacrifice its own farming population; the new superpower simply replaced trade with plunder: "*Rome did not become the industrial or commercial but the financial and political center of the white man's world... it needed to produce nothing; it took the money of the rest of the world and paid for goods with it*" (Durant). Wheat, the staple food for the unemployed plebeians in the capital, was primarily imported from North Africa. The new superpower followed both examples at the same time: Sparta and Athens.

Outsourcing Athens too had its followers — centuries later. Think of the intellectually and materially flourishing Netherlands in the 17th century. Their food producing base consisted of the feudal governed farming states in Eastern Europe, which supplied the small North Sea country with wheat and other necessities.⁴²

Could there be an escape from the agrarian formula?

Extreme inequality, ruthless exploitation of the majority and, in stark contrast, the luxurious life of a minuscule minority were the hallmarks of agrarian empires worldwide - even those that had no historical connections like the Inca states in South America and the Indian and Chinese empires. The lure of feeding parasitically on a largely defenseless peasant population was so tempting that it was tested again and again, at least in large empires, regardless of historical precedent.

On the other hand, the fact that peasant uprisings occurred regularly worldwide leading to the downfall of established rulers provides undeniable proof that *the awareness of the basic*

equality of humans was never lost. At no time was it possible to definitively transform human societies into termite-like states where the rulers were even biologically distinct from their people. This transformation was prevented by universal moral conscience that rebelled against unbearable conditions time and again. Not only did fairy tales tell even the lowest among the oppressed that unpredictable fate could transform a peasant's son into a prince. Throughout history, upheavals repeatedly ensured that men from the common people rose to power.

However, such events provided yet another proof. Regardless of whether it was in China or Europe, *uprisings never led to significant changes* because the agrarian formula of dependence based on existing production conditions prevented any fundamental change. The formula ensured that after quite a short time everything returned to the way it was before. The rebellious upstart took power, shielded himself with military force against other aspirants, and then did what his predecessors had done: he and his followers lived parasitically off the majority toiling in the fields.

In Europe alone, there were hundreds of peasant uprisings and religious movements that called for justice. Protestantism gave this goal a religious expression, and the Enlightenment finally turned it into a command of pure reason. Why should a few people - the nobility and the clergy - demand all privileges for themselves? The 18th century resembled a sudden awakening — questions that people previously not dared to ask were suddenly on everyone's lips through books and the press. *But it is important to note that such awakenings had occurred repeatedly in the past, even without books and the press.* Universal moral conscience that allows people to distinguish between right and wrong had always remained alive.

India's reverence for life

Our thoughtful Stone Age philosopher quoted above, resurrected, as it were, in the guise of American ethnologist Marvin Harris, had argued entirely rationally when he praised the supposedly paradisiacal time of peace and equality he anticipated with the advent of agrarian civilizations. It was subsequent history that proved how much reason can deceive us. No epoch of humanity brought forth such extreme inequality – and none produced so many wars.

Yet, even regarding war, we encounter curious exceptions to the rule – this is particularly true for the Indian subcontinent. Since the time when the concept of reincarnation conquered the Hindu mind that is two or three centuries before the Christian era, humans began to perceive themselves as kin to all living beings. From blades of grass to elephants, even up to the gods, they were all wandering souls on the path to salvation. Everyone, regardless of caste, saw himself as an embodied soul in the midst of a nature that was pulsating with and shaped by the forces of will and desire. Through their decisions for right or wrong actions, Hindus held the power to intervene favorably or adversely in the cycle of rebirth. Opting for a morally exemplary life, as stipulated by their respective caste, held the promise of a correspondingly higher station in the next life. Eventually, one could even ascend to the highest rank by assuming the position of one of the many gods in the Indian pantheon. Conversely, engaging in morally reprehensible behavior caused a downward slide in the hierarchy of beings. This could lead to becoming one of the "Pretas," the terrifying hungry spirits. The profoundly moral worldview of the Indians transformed the entire realm of the living into a single worldwide web.

It was this theory of an all-encompassing community of all living things that turned classical India into a land of peaceful coexistence among all creatures. Naturally, it was also a land of vegetarians. While China never had reservations about consuming meat – a luxury, however, that the majority could rarely afford – and while in Europe, the killing of animals was taken for granted and industrialized since the 19th century, high caste Indians regarded the killing and consumption of living beings a crime.

But this abstention came with a strange exception that pertained specifically to humans. A member of the Kshatriya caste, the order of warriors, was indeed allowed to kill – that is to kill humans. It was even considered *a duty and a right of this caste*, as explicitly stated in one of India's holiest texts, the Bhagavad Gita!⁴³ Apparently, the oppression of the lower ninety percent by the happy ten percent at the top could never be guaranteed by faith alone: faith in the deserved and just karma. In addition, it required violence or the threat of it. The highest caste, the Brahmins, denied themselves the exercise of violence by delegating it to the soldiers - not unlike the way the church in the Christian West left the execution of heretics and witches to the secular power.

When discussing the “enchantment of the world” and India as its outstanding example, this is connected to a peculiarity closely linked with authority. While the empires of Mesopotamia and China sought maximum uniformity within their realms and managed to achieve it to a high degree⁴⁴ – through linguistic unification, customs, economic systems, etc. – *Hinduism not only allowed diversity, but it made pluralism of worldviews and traditions its very foundation*. Truth was relative, but not in the sense of Paul Feyerabend, suggesting that there can be no ultimate and unassailable truth. Rather, according to Hindu belief, humans differed regarding their state of salvation, the highest truth could

therefore be understood only by those of the highest caste, that is by Brahmins, all others would simply be unable to grasp it. The result was tolerance and an infinite variety of minds and ways of life. As long as the spiritual authority of Brahmins and the secular authority of warriors (Kshatriyas) remained unchallenged, each caste was free to find bliss in its own way; their rank in the social order was determined by their distance from the Brahmins. Hinduism underpinned diversity and made India what it was until a century ago: a land of inexhaustible material and intellectual diversity – “*a country greater than the world*”, as the eminent poet George Louis Borges so eloquently put it. Within the confines of the agrarian order, human freedom unfolded there into an astonishing intellectual cosmos: “*The Wonder that was India*,” as described by the Asia scholar A. L. Basham in a book of the same name.⁴⁵

Plato and the totalitarian state

The present book frequently refers to “universal moral conscience.” I used totemism as an example to illustrate that killing has never come easily to humans – not only the killing of members of their own species but also of other living beings. The best evidence for these inhibitions is provided by the frequent justifications sought for it, or - as happened in India - the outright banning of killing.

Some 2500 years before our era, we find an equally explicit testimony to moral conscience in Plato's Republic. However, the focus is not on the killing of living beings; rather, it pertains to social justice, a concept so visibly undermined in agrarian societies.

Plato's testimony is significant in two respects. Firstly, because the Greek philosopher was well aware that a society is unjust if it condemns some to lifelong toil while allowing others to live in luxury and abundance simply because of the chances of birth. Plato refused to accept this injustice and proposed a radical solution to eliminate it.

He was, however, a realist. So he recognized that under the production conditions of his time, a society could only provide a minority with space for intellectual development and higher cultural activities, if a majority generated sustenance for the few privileged ones at the top. *Injustice of the hereditary assignment of social roles on the one hand and on the other an insurmountable constraint to put a majority in the service of a privileged minority* - this was the starting point for Plato's philosophical reflections.

In a clever manner, the great Athenian attempted to defuse this fundamental conundrum by two different stratagems. First, by abolishing the hereditary nature of functions. But how could this be achieved? Wasn't it quite natural indeed that our innate parental love would lead to giving our children all the benefits enjoyed by ourselves? A king bequeathed his own position to his son, the crown prince, in such a way. Similarly, the children of slaves and laborers assumed the same roles from their parents. Plato deduced from this observation that if a just state was to exist, this hereditary mechanism must be eliminated.

From this first insight, the philosopher derived a second one: the demand that all children in his imagined ideal state be taken away from their families immediately after birth and entrusted to the care of the state. There, they would be educated and *allocated to various classes according to their abilities*. At the top of the state, the ruling minority would consist of philosophers and sages, alongside the warrior class responsible for defense (don't forget

that in classical Greece there was an endemic state of war between city states). At the base of the social pyramid stood the broad mass of sustenance providers, including craftsmen, farmers, and traders.

Plato's solution for a just society resembles the Chinese approach in that both sought to regulate access to different classes *based on objective qualities of knowledge and skill*. However, there remains a fundamental difference between the two: the Chinese system did not subject human nature to coercion, while Plato's conception did just that: it sacrificed human nature to abstract logic. Philosopher Karl Popper even labeled Plato's vision, which involved breaking up families, a blueprint for a totalitarian state. The fact is, only a few mothers would willingly let their child be taken away by the state without utmost resistance. This resistance is biologically so deeply ingrained that a society can only overcome it by applying brutal force. Accordingly, Sparta, the original and model for all highly militarized totalitarian states, provided the historical blueprint for Plato's Republic.

The greatest thinker of Greece had veered onto an erroneous path with this proposal, one that not even dictatorships follow today. However, his genuine concern for justice is evidenced by another recommendation, which, on the contrary, deserves serious consideration even in our time. Plato insisted that the highest class leading the state, the philosophers, should largely forgo material wealth. The philosopher recognized that power and money tend to coalesce into an indissoluble bond at the top of the state, and that it is this very fact that so often makes rulers the target of suspicion. Power is pursued for the sake of money, and money pursued for the sake of power. Plato sought to break this unfortunate bond – his insight was that wisdom can and should liberate itself from all greed for material possession.

Unlike Plato's flirtation with totalitarianism, which has never improved people's fate, this recommendation could have very positive effects indeed - if genuinely heeded by a ruling class. In Greece and Europe, this has never been the case. Nonetheless, history knows at least one major agrarian civilization that largely realized Plato's ideal. The intellectually leading class of classical India were the Brahmins, spiritual leaders similar to Plato's philosophical class. For more than two thousand years wealth rarely concentrated in their hands; instead it belonged to the Kshatriyas, the warriors who formed the second-highest caste. Only kings and their vassals lived in magnificent castles and palaces, flaunted harems and luxury without restraint, and incessantly waged war against each other to claim larger portions of the rural population as providers of sustenance and servants. In contrast, the Brahmins did not stand out for their wealth. On the contrary, the sacred texts produced under their guidance expressly advocated renouncing wealth, just as Plato did. Thus, we may conclude that universal moral conscience led the Greek Plato and the Brahmins of India to similar conclusions.

The Indian religious philosophers at the top of the state held tremendous power for over two millennia, and it was never seriously shaken. They owed their spiritual dominance primarily to the fact that, like Plato, they followed the demands of justice. It was this renunciation of material wealth by India's intellectual leadership, breaking the otherwise ubiquitous link between money and power, which granted the Indian caste system its extraordinary stability until the 19th century. In India, human equality was fundamentally denied, yet the equation of power and money prevalent almost everywhere else in the world did not hold for the spiritually leading class.

In contrast, the leading class of Chinese literati considered it natural to accumulate greatest wealth for themselves even though

accepting the fundamental equality of humans. They never tolerated too much wealth in other hands, such as those of traders and producers.⁴⁶

Universal moral conscience in Christian religion

Power seeks perpetuation – in the great agrarian civilizations, this aspiration is evident from the outset. The kings of Egypt believed that even beyond death they would continue to be kings and their subjects would remain their servile slaves. There are texts from the early Egyptian dynasties that suggest the social inequality present on Earth would persist in the heavens. An example is provided by the so-called Pyramid Texts, inscribed on the walls of pyramids built by kings from the 5th and 6th dynasties (circa 24th to 22nd century BCE). Opposition against this doctrine was impossible so long as the art of writing remained in the hands of a small caste, which itself enjoyed great privileges. Universal moral conscience could have no independent voice. The elites claimed all power not only on earth but even in heaven exclusively for themselves.

Universal moral conscience could only rebel where the central state possessed less comprehensive authority. With world-historical implications, such rebellion occurred in Buddhism five hundred years before Christ and at the turn of the era in Christianity. The founders of both religions insisted that inequality on Earth was a temporary phenomenon because before God or within the consciousness of the enlightened (buddha), all humans were equal. There were no kings and no slaves.

These two major religions, emerging on the fringes of hydraulic power structures after three thousand years, showed through their very genesis that universal moral conscience had never been

extinguished. Social inequality in this world was an undeniable fact, but the comforting message they conveyed was that this inequality did not concern the essence of humanity. It could be actively overcome by individuals, as people recognize their true nature through introspection and thus realize it in the here and now, or it would be overcome in an afterlife, as the differences between low and high do not exist in the realm of God.

Christianity went further in this relativization of power than any other religion. Seen from this perspective, it gave universal moral conscience its clearest expression. The New Testament leaves no doubt that before God, there are no kings, no slaves, no differences between nations, not even between women and men. Wealth and power, which hold great significance among humans, are considered worthless in His eyes. On the contrary, the poor and powerless count more before Him than the domineering mighty or the rich. Among the many passages that unmistakably express this viewpoint, let me mention just two or three.

"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). "Blessed are ye that hunger now: for ye shall be filled" (Luke 6:21). "But woe unto you that are rich! for ye have received your consolation" (Luke 6:24). "Now when Jesus heard these things, he said unto him, Yet lackest thou one thing: sell all that thou hast, and distribute unto the poor, and thou shalt have treasure in heaven" (Luke 18:22).

The rebellion of universal moral conscience in Christianity demonstrated both the possibility and the goal that lay before humanity: perfect equality among humans as aligned with God's will. However, it also revealed the practical limits imposed by prevailing production conditions (in the form of the agrarian dependency formula). The Christian rebellion had to content itself

with promises of the hereafter or, as in Buddhism, mere states of consciousness. Equality could not be realized in this world, while a privileged minority at the top had to be sustained by an overwhelming majority at the base. As we have seen, this was the case in all major agrarian civilizations. The rebellion of conscience, as articulated by the New Testament with unprecedented clarity, did not change existing inequality. Until the advent of a completely new epoch, the Fossil Era, which occurred nearly two thousand years later, universal moral conscience remained powerless against the constraints of circumstances. Rich and poor, power and powerlessness, remained irreconcilably opposed.

It testifies to the realism of this great uprising at the height of Roman power that Christians, from the beginning, were careful enough to draw a clear line between this world's possibilities and the promise of the hereafter. To demand equality for this world would have exposed them to annihilation. So, they emphasized that believers should hope for it only in paradise after death and up to that time accept earthly conditions as they were. Their realism went so far that in some places the existing inequality here on earth was even explicitly described as God-willed - a clear contradiction to the wording and intention of other passages.

"Render therefore unto Caesar the things which are Caesar's; and unto God the things that are God's" (Matthew 22:21). "Let every soul be subject unto the higher powers. For there is no power but of God: the powers that be are ordained of God. Whosoever therefore resisteth the power, resisteth the ordinance of God: and they that resist shall receive to themselves damnation" (Romans 13:1-2). "Submit yourselves to every ordinance of man for the Lord's sake: whether it be to the king, as supreme; or unto governors, as unto them that are sent by him for the punishment of evildoers, and for the praise of them that do well" (1 Peter 2:13-15).

The rebellion of universal moral conscience against human inequality, as attested by the New Testament, is a historical breakthrough. However, the contradictions that emerged during this heroic rebellion also reveal the barriers it could not overcome even in a border region of the Roman Empire – and not even when Christianity came to power after its collapse. Nevertheless, it was an enormous success ensuring that human conscience could never be silenced again. If people's hope for equality couldn't change prevailing conditions, it could at least come true in the afterlife or in individual consciousness. The power of rulers, which until then had been boundless – particularly because, as in Egypt, writing was in the hands of specialists – was decisively relativized.

Let us resume: the conditions of production and the resulting social order rendered social equality de facto impossible – in this regard, both the Christian and the Buddhist rebellion plainly failed. It merely took place in the consciousness of believers but did not change their social position. However, apart from the intellectual ferment triggered by the relativization of wealth and power, the change in consciousness itself constituted a great achievement. It gave believers the sense of belonging to a community of the enlightened. Their lives might have been harsh due to persecution, but the conviction of belonging to a spiritual elite was so powerful that it withstood persecution and death. A doctrine that does not provide its followers with any material advantages - Christians remained a persecuted and despised minority in the Roman Empire - nevertheless has great appeal when it provides its followers with such a sense of belonging. Whatever Karl Marx might have said, such movements prove that human thinking could always resist the constraints of production conditions – these never had absolute power.

Rebellions of universal moral conscience against the prevailing conditions of inequality did occur throughout history, but they were not recorded before the invention of writing, and they could not be recorded afterward when the art of writing was solely exercised by specialists in the service of power.

After the spirit was liberated from this bondage both in Athens and in Lumbini near the Nepalese border, and - half a millennium later - in Rome, it would take nearly two thousand years for universal moral conscience to resurface in a new way – this time without reference to an afterlife. The question of social justice was posed with unsurpassed acuity in the Enlightenment, and more clearly than ever before it was answered.

European Enlightenment

Enlightenment led to a notable intellectual evolution wherein universal moral conscience expressed itself more vocally, with greater historical acumen and profundity than in any previous epoch. If we include the 17th century, which in many aspects was even more radical than the subsequent 18th century,⁴⁷ the intellectual representatives of the Enlightenment span from Francis Bacon and Descartes to Leibniz, Voltaire, Rousseau, and Kant.

I would like to choose a presentation that is more oriented towards logic than history, by demonstrating the complex way of thinking characterizing that time by emphasizing its logical counter-positions, which I summarize in two theses, using today's terminology. The question of justice may be illustrated through two opposite theses that lead to contradictory ethical demands.

Thesis:

People are equal, so they should enjoy equal rights.

Antithesis:

Each human being is genetically unique, and each possesses certain abilities in the intellectual or emotional field to a greater or lesser degree than others. This inevitably results in different rights.

From this paradox result the formidable contradictions of social constitutions. In their extremes, they range from communist fraternity, where people basically share all available goods, to the ant or bee state, where a single individual - the queen - enjoys all rights, while all others only serve or fulfill slave-like functions. The first of the two constitutional models was realized among hunter-gatherers up to the agrarian garden cultures, the second in hydraulic cultures. Between both extremes we find liberalism which justifies personal self-realization together with the development of different dispositions.

Thesis and antithesis are both correct. People are so similar to each other that a surgeon only needs to know one single specimen of man or woman to operate successfully all of them. It is the same with the psychologist. Once he has catalogued the most important mental diseases, he can heal everybody, regardless of whether they are New Zealanders, Bantus, or Russians.

But the opposite is equally true, *everything depends on the distance from which we view the object of our investigation*. When looking at blades of grass from a distance, we can hardly distinguish one from the other. But if we take a magnifying glass or even use the electron microscope, each one becomes a unique, unmistakable individual...

The decisive, quite topical and at the same time age-old question is of an altogether different kind. May any social rights be derived from the fact of fundamental equality or relative inequal-

ity? Should all people have the same amount of money and social standing because - seen from a distance - they are fundamentally equal, or should there be great differences between them in terms of possessions and social recognition because - seen from nearby - they are quite unequal? The answer to this question, so fundamental for the construction of societies, has caused the greatest conflicts in religions as well as in modern secular ideologies - up to devastating civil wars. Karl Marx had a different answer than Louis XIV or the Church. Hinduism offered a different solution than classical China.

For the philosopher, history holds only one answer to this central political paradox. *All solutions offered so far necessarily spring from arbitrariness, namely man's desire to organize societies more in one direction or the other.* Humans are free to steer and organize societies more in one direction or the other. With the conception of a just society, both thesis and antithesis can be reconciled, just as both can lead to inhumane conditions, as they often have. From painful historical experience, we have long learned that any societal system that seeks to enforce absolute equality incites as much resistance as any opposing system that accepts any degree of inequality. For even the latter can be maintained permanently only by force.

Examples of the instability of the two extremes are legion. We know from recent history that communism under Stalin and Mao Zedong sought to establish equality using state violence - and that it failed. Equally, we know that when neoliberalism pushes social and material inequality to fantastic heights, it faces growing resistance. U.S. society is currently in danger of breaking down as a result.⁴⁸

European Enlightenment sought a just solution for both equality and inequality. It aimed to completely detach social status and material wealth from inherited privileges, basing both solely on

individual ability. Just as it is contrary to common sense for a son or daughter to inherit their father's doctorate or professorship, it is considered equally unreasonable to inherit material privileges - such as wealth - or immaterial prestige such as social status. The Enlightenment envisioned a classless society where educational institutions ensured that all advantages passed to new minds in each generation – depending on individual knowledge and skills. *To this day, there is no other model that can boast of a higher degree of fairness.*⁴⁹

It is furthermore a realistic model, as it does not deny human differences but explicitly uses them for the benefit of the whole. The great men of the Enlightenment never denied that people are different. Among them there are small and large, there are musically gifted and technically skilled; those who like to read books and others who find them soporific.

On the other hand, societies require specific skills in accordance with their degree of development. In competition with other societies, physicists, mathematicians, and engineers may play a crucial role, while bakers, blacksmiths, or postal workers could be easily replaced, leading to the former earning higher salaries and enjoying elevated social status, while the latter are poorly compensated and overlooked. Therefore, everyone understands that certain professions and their practitioners receive special support and enhanced monetary rewards. However, such privileges are never inherited in a classless society; instead, the relationship between material reward and individual abilities is redefined with each new generation.

This vision of a just, classless society based on personal merit emerged with the Enlightenment. It was not just a timeless vision of social justice, but also one of nonviolence. The classless society of the Enlightenment did not require, as Marx was later to

demand, a violent "expropriation of the expropriators," achieved on the bloody path of revolution.

Karl Marx himself has been a mouthpiece of universal moral conscience. But he and his followers never understood that political power is perfectly compatible with a classless society without hereditary privileges. This was, of course, not true of the major agrarian civilizations, where the serving majority was always at risk of becoming a class or even a caste from which there was no escape. But the new knowledge-based fossil-industrial society that in Marx' time already existed for more than half a century was able to overcome precisely these constraints for the first time in human history as it provided the necessary conditions for the primacy of knowledge and skills over the accidents of birth. There could and would be no class of engineers, linguists, entomologists, or quantum researchers in modern society as these skills cannot be inherited but must be acquired anew by everyone through extensive education. *The assertion that a society based solely on knowledge and skills can exist without classes is therefore logically sound and to some extent, empirically proven.* Provided that all individuals gain equal access to learning institutions, such as schools and universities – thus assuming equality of opportunities concretely realized – there should be no classes in modern society. Every person in each generation is given the opportunity to achieve the exact social position that his or her education warrants.

The powerlessness of Enlightenment

From Francis Bacon to Descartes, Leibniz, Voltaire, Rousseau, up to Kant, the greatest thinkers of their time entertained lofty thoughts about the expansion of knowledge and justice. However,

none of them could solve the central problem of how, under the existing conditions of production, a society could emerge in which, unlike in the past, eighty percent or more of the population would no longer have to work in the fields to produce food to support themselves and the top twenty percent, thus freeing them for other kinds of work.

None had a recipe or even an inkling of how to overcome this barrier. One of the most influential intellectuals of that era, Thomas Robert Malthus, who would significantly influence the greatest biologist of the next century, Charles Darwin, firmly believed that these conditions would indeed never change because the increase in human population would always surpass the availability of food.

Thus, the *formula of agrarian dependency* seemed solidified for all time. If there were to be occupations beyond servile agrarian labor, then the division of society into a favored class of masters and a large majority of agricultural laborers subjected to it would exist for all eternity. At best, the ruling class could be determined by individual achievement, as seen in classical China, rather than through hereditary privilege. However, this would only mitigate the social consequences of the agrarian dependency formula without abolishing it.

Until the end of the 18th century, when England was in the process of finding a practical solution to this seemingly insoluble problem, nobody had any idea how or whether such a solution would ever be found. Malthus was still developing his pessimistic prophecies. In other words, no one knew, let alone predicted, that after at least twelve thousand years of agrarian civilization, a radically new epoch was just then emerging.

The thinkers of the 17th and 18th centuries gave rise to astonishing intellectual achievements. However, just as in former times, intellectual feats alone do not initiate social

transformations. None of these thinkers foresaw that it was a material fact - *the unforeseen and unforeseeable abundance of energy* - that would give rise to a profoundly transformed society. Without this unforeseen influx of energy that nobody had anticipated, the ideas of the Enlightenment would have remained mere sparks in the heads of inspired intellectuals - much like all the earlier visions of greater social justice.

Fossil Revolution

Knowledge of nature versus mastery of nature

Knowledge of nature, including scientific knowledge, did not just emerge in the 17th century. Mathematics, its most important branch, dates back to early Indian and Greek history. No raw materials or energy were needed to create mathematical formulae; a thinker like Euclid was able to develop his findings on a slate without any material inputs. The Babylonians, Indians and Incas had already acquired solid scientific knowledge about the path of the stars through mere observation and mental operations. Since mathematics provides the basis for all modern science, we may therefore claim that basic research - in the true sense of the word - has been around for several thousand years, but without achieving or even aiming to achieve a better mastery of nature.

This was to change fundamentally from the 17th century onwards, initially hesitantly, but then with increasing speed. The peculiarity of knowledge, which was born in the 17th century and anticipated by Francis Bacon, is that from then on it was more than mere *knowledge of nature* consisting in purely ideal, immaterial processes. Now the endeavour is directed towards *mastering nature*⁵⁰ – that is the systematic *transformation of matter*, which, according to such knowledge, is to be converted from a natural state into any state or process desired by man. This, however, requires raw materials and energy, both, as we know today, in unlimited amounts.

Pure thinking alone would never have been able to free mankind from that age-old dependency that had forced all major agrarian societies to have a majority produce food for themselves and for a minority so that the latter would be free to engage in other activities. In other words: without the utilisation of fossil fuels and the resulting tsunami of energy, this historic liberation would have been simply impossible.

But the reverse statement is also true. This liberation would not have happened solely because of this energy cornucopia. *The two had to come together, a **knowledge of nature** systematically pursued on the one hand, and a **mastery of nature** conducted with an ever-increasing expenditure of energy on the other. Both were required to set the industrial revolution in motion and change the globe in just three centuries more than any previous historical epoch.* Obviously, the material transformation of the world is never a work of mere knowledge but presupposes its practical application. It is therefore a direct and unavoidable consequence of our mastery of nature.

In fact, the expansion of scientific and technological knowledge occurred in parallel with the fossil fuel revolution and the extraordinary supply of energy that it provided. It was this supply of energy that made possible the practical application of most inventions, which then "verified" the scientific thinking behind them. As Ludwig Boltzmann had stated in an insight quoted above, the verification through practical success was necessary to give the new knowledge worldwide credibility. How this expansion of scientific and technological knowledge proceeded in detail and which methods proved particularly successful has been dealt with by others in encyclopedic expertise.⁵¹ In the chapter on the "Privatisation of knowledge and power", I try to shed light on its profound social preconditions and effects.

First, however, I will talk about the domination of nature and its causes and consequences. As a material counterpart to the knowledge of nature, its mastery consists, as already mentioned, in the transformation of matter into states or processes desired by humans. This process requires, firstly, energy and, secondly, raw materials. Thirdly, all end products or processes turn into waste after some time.

As far as the second dimension is concerned, the exploitation of raw materials has almost come to an end in old industrialised nations, where it has been taking place for centuries, primarily in the form of mining. Deposits are largely depleted. That is why, in the meantime, global mining on land and in the seas is threatening to disfigure the last remaining unspoilt areas of land while the oceans too are at risk. Since the publication of "The Limits to Growth" in 1972, the focus has been on the depletion of raw materials, but by now most people would agree that the third dimension, waste in all its forms (such as CO₂), represents the real threat to nature and mankind. This will be discussed in the chapter "The disruption of balance with nature".

Here I would first like to talk about the energetic prerequisite for the world-historical change that took place in the late eighteenth century: the exploitation of fossil fuels.

Fossil Revolution

Despite the collective wisdom of enlightened philosophers and early scientists, it would not have been possible to liberate the agrarian majorities from their existing state of subjugation and subsistence if the conditions of production had not changed fundamentally toward the end of the 18th century. *Within a few decades, the exploitation of fossil reserves provided an immensely vast and ever-growing supply of energy.* What reason and conscience had hitherto demanded in vain, namely the transformation of social structures into a constitutional state in which every citizen could apply for all available jobs, was to be firmly established when the fossil revolution created the necessary conditions. It was only through and after the unexpected influx of fossil energy that for the first time since the Neolithic Revolution the theoretical demands of the French Revolution started to be

implemented in mass societies. By gaining access to the coal deposits buried underground (already extracted in wood-scarce England from near the surface)⁵², Europe started a radically new way of life.⁵³ The data on the relationship between energy and GDP leave no room for doubt.

From then on, the curve of total social product sharply surged upwards. While global GDP, converted into 1990 US dollars, was around 650 billion in the year 1800, by 1900 it had reached approximately 1.98 trillion, nearly tripling in value. By 1990, global GDP had grown to 28 trillion dollars, a *fourteen-fold increase* in less than a century (Maddison).

This development closely mirrors the exponential increase in global energy consumption (composed differently depending on the industrial phase, including water and wind power, biomass, coal, oil, natural gas, nuclear power, etc.). In the year 1800, this consumption amounted to about 400 million tons of oil equivalent. A century later, it had already risen to 1.9 billion tons, nearly five times as much. Over the next ninety years until 1990, consumption increased by *a factor of sixteen* to reach 30 billion tons (McNeill). A characteristic of exponential growth is its constant acceleration: it starts gradually and becomes faster over time. Thus, half of all fossil fuels ever used (as well as half of all fossil CO₂ ever produced) were burned (emitted) in the last 35 years.

The connection between these two exponential curves should be evident. Coal and oil would certainly not have had any substantial impact without the invention of the steam engine and later the diesel engine and the electric motor. But these machines could embark on their triumphant journey solely because humanity had ignited the fossil fire. The industrial revolution and the use of fossil resources form an inseparable unit.

The sudden energy boom had spectacular social consequences as well. The eightfold population increase since the end of the

18th century would never have occurred without this revolution. And the lot of common people would change just as fundamentally over time. *The free choice of career for all, not only for the privileged few at the top, became possible because human slaves who had previously worked in agriculture could increasingly be replaced by lifeless slaves, namely fossil-powered machines.* This trend began in the second half of the 18th century in England and then rapidly gained in momentum. Around the mid-nineteenth century, twenty-five men needed a full day to harvest and thresh a ton of grain; today, a single person can do this with the help of a combine harvester in just six minutes!

The fact that it took such a huge injection of energy to awaken Europe from its slumber and catapult tiny England into the rank of a world power is now widely documented. *In 1775, India and China together accounted for two-thirds of global economic output, with Asia as a whole contributing around 80 percent.* In other words, Europe was an insignificant appendage to the Eurasian continent, with little economic significance.

But what did the situation look like in 1950, almost two centuries later? At that time, Great Britain and the United States together already generated more than half of global economic output, while China's share had dropped to a negligible five percent. The factor responsible for this historical shift in global weight was the utilization of the energy reservoir stored in the Earth's crust over millions of years: first coal then oil and gas. French historian Fernand Braudel estimated the energy output for Europe before the Industrial Revolution to be around thirteen gigawatts, derived from animal labor, watermills, and wood combustion. This value has since grown by over a hundredfold, with about 85 percent of it being of fossil origin.

The extraordinary contribution of fossil sources becomes truly evident when comparing how many people would have been

needed to achieve the same output using muscle power. As calculated by another historian, Ian Morris, England's steam engines around 1870 generated the equivalent of four million horsepower, which is about the power of forty million people. *If British industry had still relied on muscle power at that time, the United Kingdom's population would have needed to be twice as large. But those additional forty million would have consumed three times the amount of the British wheat harvest for their nourishment!* Perhaps no other figure so clearly demonstrates the fundamental impact of fossil impact.

A similar development took place in the United States. Around 1900, about a quarter of all farmlands was still dedicated to feeding horses. However, by 1927, gasoline-powered tractors were already providing the same amount of energy as horses, freeing up a considerably larger area for human sustenance.⁵⁴ The productivity gains enabled by fossil revolution soon extended to all economic activities. Rolf Kreibich (2021) summarizes the outcome of scientific and technological innovations in the 100 years between 1920 and 2020 in the following figures: productivity increases in the production sector: about 4000%; productivity increases in the service sector: about 4500%; productivity increases in agriculture: about 3500%.

Growth - that came to be the new magic formula. Without growth, the upper strata can raise their own material standard of living only at the expense of the lower - and vice versa.⁵⁵ The fossil blessing made growth possible for both the rich and the poor - that was the real turning point in comparison with more than ten thousand years of agricultural civilization.

On the one hand, a world-historical success for the parts - i.e. individuals

Equality through competition

The effects of Fossil Revolution on the social structure, specifically the relationship between people, are as profound as its impact on nature. We saw that in no epoch of human history has such a high degree of equality been achieved as in the time of hunter-gatherers. Due to the imperatives of survival in a threatening environment, our early ancestors were compelled to a significant level of equality in rights and responsibilities. On the other hand, no era in human history has disregarded equality as much as the great agrarian empires from Egypt, India, and Europe to the New World. This had clear consequences for the social structure, which, to my knowledge, have never been adequately recognized.

The pursuit of equality included competition, while the retention of inequality and privilege excluded competition.

Competition is not particularly popular in our time, often associated – at times rightfully so – with notions of social ruthlessness, hardship, and struggle.⁵⁶ In contrast, there is a modern tendency to emphasize and idealize the sense of community in earlier rural communities. This is historically misleading. To the extent that it did in fact exist in agrarian civilizations, it was rather born out of necessity. In general, peasants had no interest in competition. It usually made no sense for them as any extra effort leading to increased output would only mean higher taxes, bringing them nothing but disadvantages. Under such circumstances, personal initiative would have been counterproductive. The individual farmer could only hope to have a modicum of influence

with the powerful if he united with his peers. Among farmers, competition was thus out of the question: unconditional solidarity was required when dealing with those in power. This stance was to be repeated much later in the labor movement: *Competition weakened; solidarity made strong.*

These conditions underpinned the compulsive conservatism of the lower ninety percent. If every advance in agricultural productivity only led to increased taxes for the individual food producer, progress through innovation was out of the question. The greatest protection was to fight tooth and nail against all changes.

For up to 90 percent of all people, life was not devoid of competition because they saw it as an evil, but because any innovation brought them nothing but disadvantages. Everyone cowered, kept a low profile, suppressed their own and their neighbors' initiatives, and clung stubbornly to the familiar because traditions offered the best protection against the arbitrary power of the ruling class. No wonder that all over the world the conditions of production in all great agrarian civilizations made poverty endemic. Around 1800, as the industrial revolution was just beginning, the average income was as low as it is today in the poorest countries of the African continent (around 500 international dollars per year). Almost 95% of the population lived on less than \$1.90 a day. Today, that is considered "extreme poverty."

The desire for active change invariably originated from urban minorities that faced less pressure from rulers because "citizens" were harder to monitor and more capable of building counter-pressure. Yet, even here, competition was regularly frozen by organized guilds of merchants and craft guilds. Markets were territorially divided, profits were divided among masters, journeymen, and apprentices according to specific rules.

In a society where an overwhelming majority saw no point in competition, the latter even tended to be regarded as unlawful and

antisocial because it offered a few the opportunity to break out of the existing order. People generally accepted the powerful and their claims, as authority seemed to be one of the eternal and unchangeable facts of human existence; however, stark differences in wealth between citizens, that is between people like you and me, aroused envy, and aversion. Private competition as an antithesis to solidarity and subordination always aroused great distrust in agrarian cultures, especially among the lower classes. This explains while the established elite could easily take brutal action against upstarts from below.

It was only with the breakthrough of fossil fuels and changed production conditions that the material prerequisites were created *to break the rule of privilege through generalized competition*. As we have seen, the theoretical insight, springing from universal moral conscience, that all men are born equal in rights, had made itself heard again and again in history; in the Age of Enlightenment it was even triumphantly proclaimed. But it was the fossil fuel revolution tapping into the huge reservoir of underground energy that made it possible to put this ideal into practice. The hereditary nature of professions and social positions was abolished; everyone should have equal access to the various functions of a highly complex state – *a demand that could be fulfilled to a greater extent than ever before, through institutionalized competition*.

This marked a significant social change, as *cooperation and competition became the two equally important principles of modern societies*. The interplay of thousands of functions – i.e. cooperation between professions – could only be realized by making private competition its foundation.⁵⁷ This, however, required the creation of several basic institutions. To establish a society where the access to all available social positions up to positions of power was determined by individual merit, not privilege, a

system of examinations was required, in short, a system of institutionalized competition, which put cooperation on an equitable basis. Equal opportunity, which had been realized to a certain degree in China for two thousand years, was now introduced worldwide through general education and – on a higher level – through state universities.⁵⁸ The knowledge and skills of everybody were to benefit the welfare of the whole. This led to a development that I would like to call the "*privatization of power*."

The privatization of knowledge and power

In discussions about the modern economic system, the latter's peculiarity is usually registered under the keyword "capitalism" - a system aimed at increasing private profit. However, on closer examination, the economic aspect of this development is embedded within a comprehensive transformation that began with the mercantile societies of the late Middle Ages but only reached its full realization by the end of the eighteenth century: I am referring to the *privatization of knowledge and power*.

In business, politics, in the field of theoretical as well as practical knowledge, everywhere power gradually passed into private hands. The power that was originally concentrated at the pinnacle of the state in all major agrarian civilizations, was gradually distributed among an ever-increasing number of individuals. Capitalism denotes only one – albeit a significant and crucial – dimension of this profound revolution. In the economic context, it signifies the privatization of available capital.

But the privatization of power runs much deeper; it soon extended to all aspects of social life. *Since the beginning of the Industrial Revolution, the privatization of knowledge and power*

has become the core of a social change that seeks to achieve the original equality of people through equality of opportunity.

Has this social reconfiguration been successful? The question can be best addressed by comparing societal transformations in terms of their respective starting and provisional endpoints. What did society look like prior to this new, all-encompassing privatization?

As described in the chapter "Agrarian Civilizations," three hundred years ago (depending on soil fertility and the state of pre-industrial technology), 80 to 95 percent of people lived in rural areas. They had to produce food for themselves as well as food and services for the 5 to 20 percent at the top of the social hierarchy. Under these circumstances, there could be no question of sharing knowledge and power. *Peasants living in rural areas were devoid of power and, therefore, largely bereft of rights in the face of their lords who lived off their yields.* As a rule, they were deliberately kept in ignorance by their secular and spiritual masters.

This was true of all major agrarian civilizations. At best, the majority was granted a certain degree of local self-governance, but free choice of occupation was out of the question. Peasants were not allowed to leave their land as otherwise the food supply for the ruling elite would have been insufficient.

Under such circumstances, the privatization of power – its division – was unthinkable. This applied to the whole stretch of time from the Neolithic era to the industrial revolution, at least in the major, populous agrarian civilizations. It was almost a miracle when, from time to time, the son of a farmer managed to ascend to a higher status due to exceptional talent or support (in Europe, this largely occurred through the Church). These rare exceptions were counteracted by the prevailing rule: *whoever was*

at the bottom was condemned, together with his children and his children's children, to remain at the bottom.

The injustice of this situation was something that people were always aware of. Human societies never turned into termite states, where different castes are biologically distinct. For over five thousand years, since the rise of major agrarian civilizations, the lower classes were never content with their miserable fate – they knew quite well how the upper echelons lived. Therefore, there was never a shortage of designs for a new and better order, but these were easily suppressed and rarely brought to public attention. Wishful thinking remains confined to utopia when encountering the constraints of production conditions.

The demand for liberation of talent and private initiative only had a chance of realization when, since the late 18th century, *the material conditions for such a profound transformation* were ready – the exploitation of a vast and seemingly inexhaustible reservoir of fossil energy. That was the true cause leading to the redemption of the bottom 90 percent. In due time, more and more people got a chance to choose activities that best aligned with their personal talents or skills acquired through education. No longer did a rigid traditional hierarchy dictate the social roles of individuals from birth to death; now, individuals – in principle, the entire population – had the opportunity to take their fate into their own hands.

The division of power – its privatization – became particularly visible in the economic sphere. In principle, everyone could now become an entrepreneur and, if they possessed the necessary skills, achieve prosperity and recognition. Hence, it is not surprising that economic transformation, right from the outset, received the most attention. Think of famous chroniclers like Adam Smith or the Marquis de Condorcet. Economic success, in other words, material wealth, would now spectacularly influence social

relationships. Suddenly, industrial captains, nouveau riche merchants, or even speculators displaced the old holders of power – the aristocracy and high clergy. The economic restructuring of society since the industrial revolution was the first visible expression of a comprehensive privatization of power.

It was this economic restructuring that provoked not only different but downright opposite reactions. Ardentely supported by some, it was vehemently contested by others. Its proponents saw it as liberation from the shackles of state monopolies. To this day, they advocate for a lean and minimal government. Previously, all power had been concentrated in the hands of a few who appropriated the economic surplus from the majority. Now, individuals were free to sell this surplus turning it into a benefit to themselves and to others. Only the framework of this market exchange had to be regulated by some superior authority like the state, but the economic activity itself lay in private hands. Economic thinkers from Adam Smith to Friedrich Hayek interpreted the new economic system in this way – as liberation of the individual from state coercion. An overwhelming sense of liberation from the bonds of the past fueled the optimism of the eighteenth and nineteenth centuries.

Yet, critical voices were soon to emerge. Historians are aware that the sharpest psychological insights are often foreshadowed at the beginning of social changes. Bernard Mandeville, an English physician and writer of Dutch origin, who recorded his observations nearly a century before the industrial revolution, saw a nation's wealth as grounded in vice, or at least in the egoism of its actors. A government that makes the majority work for low wages can produce its trade goods more cheaply, be more competitive internationally and accumulate wealth faster than another that takes a more humane approach.

Unfortunately, this observation is by no means incorrect; even today, nearly two hundred years after the industrial revolution. Germany's Agenda 2010, pushed through by Chancellor Gerhard Schröder, helped the "sick man of Europe" to stand back on its feet for exactly this reason. The social system was made cheaper and made the German export industry more internationally competitive.

In any case, the close connection of capitalism, freedom, and vice has persisted since Mandeville. This link was even encapsulated into an accessible formula by none other than Adam Smith. Smith insists that we should expect less from the virtues of a baker than from his egoism. "If he /the baker/ is selfish and wishes to make a high profit, he ultimately has no choice but to produce consistently good and tasty baked goods." Here, egoism is not just tolerated as the price of freedom but is declared a positive principle.

The opponents of capitalism view this new personal freedom - which I call the privatization of power - as a rejection of the spirit of community and social justice, as well as a rejection of equality. Karl Marx championed this position with worldwide historical success. Not with logical consistency, however, because the 28-year-old Marx envisioned a classless society that presupposes unrestricted and indeed impossible freedom. According to him, this new type of society would allow each of us to "*do one thing today, another tomorrow, hunt in the morning, fish in the afternoon, rear cattle in the evening, criticize after dinner, just as I fancy, without ever becoming a hunter, fisherman, herdsman, or critic.*"

How to realize this ideal in a high-tech society that already existed during his time, Marx never explained. He is deliberately talking about hunters and fishermen, not railroad engineers, university professors or quantum physics researchers, who would have ridiculed this ideal as a childish utopia. His notion of a

classless society, where everyone can switch their occupation at will, may have existed ten thousand years earlier - among hunters-gatherers (critics were undoubtedly found even then).⁵⁹

However, Marx was more receptive to a further change in society. The freedom gained under capitalism had indeed eliminated an old ruling class - the nobility and the clergy - but had put a new one in its place: the bourgeoisie, i.e. those private forces that now placed themselves at the head of the state, sometimes through personal ability - but often only by virtue of particular ruthlessness.⁶⁰ One did not need to be a Marxist to recognize a new tendency toward the concentration of power. From Henri de Saint-Simon to Joseph Fourier, Max Weber, and Thomas Piketty, it was clear to the astute observer that a new ruling class was forming, leading to new inequality.⁶¹

But the tendency towards renewed class formation was by no means inevitable - a fact that Marx consistently overlooked. The Enlightenment had aimed to abolish all privileges that could not be justified by reason. A state, if it were to prosper, had to rely on the active participation of its citizens - this was a dictate of reason. It could be realized by allocating prestige and material benefits to every citizen exactly to the extent to which he increased the common good through his knowledge and skills.

In principle, this laid the foundation for a classless society, as *classes only emerge when privileges can be transferred from one generation to the next*. Marx saw this differently. He resorted to a rather simple, if not primitive, solution. Instead of accommodating human differences he wanted to make material benefits equal for all. Everything: the means of production, the ownership of houses and land, furniture, books etc. should belong to the state and thus to everybody. No individual should dispose of these at his own discretion.

The German thinker from Trier could not claim to be the inventor of this model. In some way or other, it had existed throughout human history, namely in the biological core of all societies: the family. Where the latter was organized in a patriarchal manner, as happened in most agrarian civilizations, it existed at least in the relationship between mother and child and among siblings. And not only there: common ownership can still be found in some religious sects today (even if only so long as these do not exceed a few dozen members for then the common ownership tends to crumble).

What was possible within families and will likely always remain so, since the sharing of goods in a love-based small community appears as an ideal, has never been transposed to mass societies for more than a very short time. Love that binds a handful of people together cannot be transferred to millions of fellow citizens even within a single state. Under such conditions, strict material equality and communist sharing can only be established through terror and violence, as practiced in France by Robespierre, in Russia by Stalin, in China by Mao. Just as Karl Marx understood freedom in a way that was only possible among hunter-gatherers (hunt in the morning, fish in the afternoon...), he also understood the relationship between humans and property only in a way practiced within families and small religious communities.

The ideal of a classless society is historically linked to the name of Karl Marx, but unjustly so. The Enlightenment thinkers had presented a feasible vision, while Marx proposed an unrealizable one. *Marx intended to achieve anarchy, the ideal of a society without rulers, through the detour of dictatorship.* The proletariat was supposed to seize power and then become the only remaining class. The realization of this program was unlikely even in Marx's time and it is entirely inconceivable today. As

everyone knows, the Marxist proletariat exists in dwindling remnants only, its victory is completely impossible today. The lasting effect of Marx' social doctrine is to foster animosity between classes - especially between the working class and the bourgeoisie - when the real goal should be to prevent the emergence of classes altogether by eliminating hereditary privileges, as demanded by the Enlightenment. Marx's teachings directly led to dictatorship, while the teachings of the Enlightenment could lead either to the rule of experts – replaced with each generation - or to democracy.

Knowledge, science, and skill

For the longest time in history, the highest prestige was enjoyed by people who explained the meaning of world and life. These were mainly priests and wise men (philosophoi), because such meaning lay in the decree of the gods or the eternal orders of nature, which in turn conditioned correct moral action on the part of man. Secular rulers could enjoy an equally high reputation only if people were sure that they too acted according to divine rules. Not infrequently, secular, and spiritual power coincided. Theocracies claimed to directly implement the directives of higher powers for the benefit of the ruled.

We find this reference to morality and the will of higher powers in the three largest civilizations of Eurasia, in China as well as in India and in Europe. In India it was the Brahmins, in China the literati-governors, in Egypt the priests who enjoyed the greatest prestige. In the Christian Occident, until the French Revolution, it was the Church that not only gave people a world view and an understanding of reality, but even prescribed it. Its aura of prestige and power was based not least on the fact that until

modern times it was mainly priests and monks who mastered the magical art of reading and writing. Until modern times, it was mainly priests and monks who mastered the magical art of reading and writing and, through organised, systematic activity, turned some monasteries into quasi-capitalist enterprises.

It is unlikely that the religiously prescribed understanding of the world and its mediators were accepted anywhere unreservedly and without contradiction. There have always been doubts and dissenting voices, but during the past ten thousand years they never achieved a lasting breakthrough. This only happened after the fossil industrial revolution. Then, however, this change occurred overnight, as it were. *Within a few generations, the people considered most competent were completely replaced.*

Now, a different kind of knowledge emerged that for the first time awakened in people the hope of not merely understanding but changing and improving this world. The new knowledge was not based on beliefs, moral convictions or philosophical principles, but on *knowledge of the regularities of nature - its so-called laws*. Nature, however, was the same across all borders, its laws could be recognized and used by all in much the same way. A different breed of people now moved to the forefront: scientists and the manufacturers and inventors of technical devices - people who had been considered as little in the world of priests as craftsmen and practically active people in general. Scientists now produced a completely new kind of literature, based predominantly or entirely on formulae, i.e. on measurements and mathematics.⁶² The technicians, on the other hand, produced those new devices that correspond to these formulae. Both scientists and technicians were expected to change and improve the world in a way that was no longer credited to the administrators of superhuman knowledge.

It is no coincidence that one of the first to proclaim and propagate this new worldview in an almost clairvoyant way lived in a time of unbelief, the time of William Shakespeare, about whose godlessness Leo Tolstoy complained so much. In his unfinished utopia "Nova Atlantis", Francis Bacon (1638) formulated the vision of a *man-made new world* - no less than two hundred years before its actual genesis! - in an uncannily modern way conjuring up the coming paradise of industrial society *"We have also engine-houses, where are prepared engines and instruments for all sorts of motions. There we imitate and practice to make swifter motions than any you have, either out of your muskets or any engine that you have... We imitate also flights of birds; we have some degrees of flying in the air. We have ships and boats for going under water, and brooking of seas; also swimming girdles and supporters. We have divers curious clocks..."*

Nova Atlantis – that is a whole new world just emerging. No longer are statues of stone or bronze erected for people who explain the meaning of life, but excellence and greatness are measured by those numerous little technical instruments they have invented. It took almost half a millennium for this new conception of meaning to be summed up and satirized by a great American economist. John Kenneth Galbraith says: *"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."* So it is. The explainers of meaning were first pushed aside, finally they were considered not merely superfluous but harmful crackpots.

But Francis Bacon and even the French Revolution still had quite a hard time with these "mousetraps". Material progress through more knowledge and mastery of nature *remained a mere thought experiment* for the time being - energy sources were simply too sparse. Although there had been mills of water and wind in large parts of Europe since the beginning of the second

millennium AD, with England even mining some coal above ground, these were the only sources of energy besides the ancient muscle power of man and animal. Such a meager potential was just enough to imagine another world in Bacon-like vision – *but not to actually bring it about.*

The real breakthrough came not from these prophetic musings but from Fossil Revolution of the late eighteenth century. Bacon's prophecy finally came true. Statues – no mere literary ones but made of bronze or stone - were erected to technicians and inventors, to basic researchers and in general to all those who referred to the new doctrine of salvation, the natural sciences. On these men – much later on women too - the highest honors were now bestowed. At the end of the 19th century, this shift in meaning was even turned into an official ritual. The Nobel Committee in Sweden does not honor philosophers and priests but primarily people who decipher the laws of nature in view of dominating the latter.

The rise of engineers and the demise of priests, philosophers and other world explainers are two sides of the same coin. Religion was soon relegated to a secondary role. This also applies to their secular offshoots, philosophy, and the humanities. Once again, I would like to quote U.S. psychologist Steven Pinker (2003). "*Philosophy,*" he says, "*today gets no respect. Many scientists use the term as a synonym for effete speculation.*" And elsewhere, "*Universities have disinvested in the humanities: since 1960, the proportion of faculty in liberal arts has fallen by half, salaries and working conditions have stagnated...*" (Pinker 2003).

In this perspective, the designation of the new doctrine of salvation as “science” is misleading as it insists on “scire” that is on mere knowing. It would be more correct to speak of “doence” meaning an *action-creed*. For it was precisely priests and

philosophers who embraced mere knowledge without aiming at changing nature. Nature appeared to them as a finished work that man should accept as God-given creation. From their point of view, it was downright blasphemous to change God's work (remember that Francis' strange doppelganger, the monk Roger Bacon, had been punished by his superiors for his experiments as late as the 13th century). By contrast, the new "doence" or action-creed aimed from the beginning beyond mere knowledge. Practical success was its highest goal, as recognized by the great Austrian physicist Ludwig Boltzmann (1990): "*I do not consider the achievements of technology as incidental byproducts of natural science; I consider them as logical proofs.*"

At this point, we again encounter the privatization of knowledge and power - that is, its distribution. From then on, practical success was open to everybody. Unlike the Holy Scriptures, accessible only to the initiated and literate (with its reading for a long time even expressly denied to the masses), the book of nature is open to all, everyone could read it and learn from it. *All people were now called upon to participate in the constant changing, reshaping, and revolutionizing of the physical world.* When, after the end of the 18th century, the cornucopia of fossil fuels poured first over Europe and then over more and more countries and continents, so that the newly acquired theoretical knowledge provided ever more spectacular proof of its eminent usefulness, the exploration and mastery of nature became a collective human project that superseded all previous ones with incredible speed.

Why has the new doctrine of salvation, the new action-creed been so much more successful than all previous ideologies? The main reason was given by Ludwig Boltzmann. There is no need to *believe* in science - technology provides us with practical proof of the correctness of its statements. But there are two more

features of almost equal importance. One is the potentially infinite extension of science. The exploration of the laws of nature and their practical application knows no limits - it can be extended to infinity, even beyond man's limited habitat right into the boundlessness of the extraterrestrial cosmos.

And a further feature: the new method can be adopted by all traditional cultures and even by deadly hostile ideologies. For science presupposes neither aesthetic nor moral criteria. *By its very nature, the exploration of nature is extra-moral and trans-aesthetic*, therefore it effortlessly overcomes all existing cultural barriers. Mongolian shamans, Indian gurus, the followers of ISIS and the Witnesses of Jehovah have no inhibition to use modern gadgets like cell phones, computers – and of course – the newest and most deadly bombs.

The temporary expansion of democracy

The sciences of nature are fundamentally accessible to all humans. Knowledge is not inherited; it must be acquired through individual effort. In this regard, science and enlightenment were inherently democratic from the beginning. However, democracy as a political form of governance does not necessarily arise from the demands of enlightenment. If knowledge and skills are to replace privileges, we may well argue that the leadership of the state should be in no other hands than those of educated experts. Given this premise, it is by no means surprising that leading figures of the European Enlightenment, such as Montesquieu, Locke, Voltaire, Hume, Rousseau, or Kant, widely differed as to their opinions on this matter.

The demand for democracy did not seem to logically derive from the principles of enlightenment. Governing a state requires knowledge and experience – much more than overseeing an

individual enterprise, like a foundry, bakery, or shoemaker's workshop. There, nobody would think of entrusting leadership to somebody without experience. So, why should all individuals in a state have an equal say when it comes to decide matters of good governance? Why should all people be equally eligible as candidates for the highest positions of power - for example president and prime minister - even if they have no idea of the tasks that await them? Does such an understanding of democracy align with the goals of European Enlightenment?

The question is even more relevant because the most important institution of democratic states is almost immune against democratic influence. *In the most advanced states, modern industrial enterprises were only exceptionally organized democratically* - at times this was the case in the former Yugoslavia and during the first post-war decades in Japan. The aversion to democracy in business had a sound reason, for this central institution of the Western world and beyond *owes its extraordinary success precisely to its non-democratic structure*. In efficiency-driven institutions, what matters is expertise and the ability to use it rationally to achieve planned goals. *The industrial enterprise, as the economic powerhouse of all modern states, is a consciously anti-democratic, hierarchically devised organization, which by its very omnipresence presents an alternative model to political democracy.*

Hardly anyone protests this anti-democratic stance, as it appears to be reasonable and even indispensable. It is generally accepted as a matter of course that in a rationally managed company, the voice of a layperson without specialist knowledge should not carry the same weight as that of a trained expert.

This insight suggests that the classic family business is at best a prudently managed autocracy for the benefit of the employees, and at worst a dictatorship that wears people down. The modern

joint-stock corporation is no exception to this rule. Being mostly controlled by shareholders, that hardly makes it a healthier place for employees, as it generally aims to serve the interests of investors. The effects of such an undemocratic organizational structure extend still further. Those who resist the directives of corporate management may not be sent to Siberia, imprisoned, or outright killed, as is the norm in political dictatorships. Corporations have a simpler solution: *dissenters or the inept are simply fired*. The principle, however, remains the same. Like in a political dictatorship, the dissident is excluded from the ranks of recognized group members.

This leads to a serious problem. The Enlightenment insisted on expertise and competence, and this program was faithfully adopted by business. So why do we need political democracy, *if the core organizational structure even of democratic states, is and will certainly persist to be anti-democratic given that its extraordinary efficiency is owed to this very fact?* The great 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.⁶³ 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 – history

repeatedly provides evidence of this tendency. Indeed, history teaches us that *under certain conditions(!)*, a political dictatorship may function as successfully 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 maximum 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 fulfill 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?

It seems that lots of people in Western countries are asking themselves this question, certainly those in the economic sphere like the many CEOs doing business in Russia or China. There can also 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 readily forego this freedom if in exchange they can hope for material progress.⁶⁴

German history offers a stark example of such voluntary renunciation of freedom. Between 1924 and 1928, the share of votes for the Nazis had decreased from 6.6% to 2.6% – as Germans were gradually experiencing better times. They could afford democracy and freedom of speech. Then, the Great Depression of 1929, which had swept over from America to Europe, hit Germany, undoing in an instant the modest economic recovery of the previous four years. Between May 1928 and September 1930, the number of unemployed skyrocketed from 270,000 to about 1 million. By 1933, it had multiplied to 5.5 million. Desperation drove people to clamor for a savior.⁶⁵ The share of Nazi votes surged from 18.3 to 43.9 percent in these three years. The freedom promised by democracy - and largely granted until then - no longer played a role for family men queuing in front of soup kitchens. They were ready to follow any populist who promised them salvation. Democracy had lost.

The same may happen in the United States. There the outsourcing of the past thirty years has caused a significant portion of the working class to drift into precarity.⁶⁶ 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 *most Americans read less than a single book per year*. 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.

The state – a moral purpose with technical means

Let me summarize: The attitude of the European Enlightenment toward democracy was ambivalent, depending on whether governance was based on privilege or on knowledge and ability. Privilege was embodied in ruling dynasties that had for centuries stood at the head of states availing themselves of hereditary power. This was unacceptable to all great thinkers of the 18th century. In a democracy, an inept statesman can be voted out, whereas in a dictatorship, removal is only possible after catastrophic defeats or devastating civil wars. Despotism typically involves an entire nation paying the price for one individual's madness, with no institutional mechanism to remove the latter in case of incompetence. This difference alone is so significant that democracy – to borrow from Winston Churchill – is indeed the worst form of government, except for all others that have so far been tried. The Enlightenment rejected all forms of privilege

which it consistently replaced with knowledge and skills – much like any modern corporation. Sons and daughters do not normally rise to managerial positions, just as the children of a Nobel laureate do not inherit his honor.

Well, could this not be an argument for not electing our statesmen but elevating only those individuals to such ranks who have passed specific examinations, like ancient China's literati governors? And could we not overcome the distinction between democracy and dictatorship by following the example of today's China, entrusting the state to science, and running it, like Western companies, exclusively by experts with specialized knowledge?

Many would certainly answer this question in the affirmative, but they commit a fundamental error, *because they assume that states may be equated with corporations*. But this is by no means the case. A crucial difference between the two immediately becomes apparent. A company can replace its employees at any time since they are no more than functions in the service of pre-defined tasks. If these are no longer performed by the existing staff, or if they are no longer performed sufficiently well, people must leave. There is no legal right to be part of a company.

This reduction of humans to carriers of specific functions characterizes the nature of economic enterprises and all other organizations like bureaucracies, where predetermined goals are realized through rational means. But these rules evidently do not apply to a state. *It cannot choose its citizens, let alone replace them with others. They have a right to belonging.*

Certainly, states also consistently set goals achievable only through rational means – in this respect, they resemble enterprises. That explains why, in our time, they increasingly rely on the knowledge of experts. When a single, clearly defined goal determines state action, such as the imperative of economic growth to overcome poverty, and this goal supersedes all others,

the state may indeed be ruled like a company. While it cannot replace its citizens, it can imprison them or even execute them if they defy state mandates. This continues to occur in China to this day.

But only in developing nations plagued by extreme poverty may such a clearly defined and one-dimensional goal displace all other objectives. Once basic human needs are met, other needs take precedence – and these are only partially rational, so they resist realization through rational means. The moment humans are more than functions, entirely different perspectives come into play: they seek respect and spiritual well-being, they want to have a voice in matters of public interest and decisions. Likewise, they want to explore new horizons of knowledge and experience for themselves and others. They contemplate the distribution of wealth, rights, and responsibilities and desire to have a say in it. *Such moral choices precede all rational knowledge – they are universally human.*

When functioning correctly, democracy grants its citizens this participation. *Experts have a say wherever specific moral tasks subsequently require rational means for realization, but they have no say in the moral decisions themselves.* This is the case for nearly all public issues and problems. Whether same-sex marriage should be legally equated with heterosexual marriage, or gender-neutral language should be permissible; to what extent differences in the distribution of wealth should be acceptable – these and almost all questions related to human happiness or suffering elude rational explanation. They express moral or aesthetic preferences or aversions, which resist rational justification. Nevertheless, decisions are always made one way or the other: in a dictatorship, through decrees from above; in a functional democracy, citizens decide in a manner perceived as just.

European Enlightenment was focused on reason, which made it unable or unwilling to see that *moral decisions precede reason*: they should have the first and the last word – and this word belongs to the whole community. Therein lies the fundamental justification for democracy. All people together should decide on the fundamental goals of a state, while their execution remains in the hands of a state bureaucracy legitimized by knowledge. In this perspective, *the state is a moral purpose with technical means*. Ultimately, all state action is shaped by moral (plus aesthetic) purposes, using rational expertise only as its – often indispensable – means. This constitutes the fundamental difference from enterprises. Enterprises have no moral purpose or rather assume it as given when offering certain goods to customers. As soon as entrepreneurs – private individuals – behave like statesmen, they become a threat to the state.⁶⁷

Democracy and dictatorship are the two extremes between which political reality positions itself on a scale with open ends and fluid boundaries. There is no pure democracy or absolute dictatorship; rather, in every democracy, dictatorial tendencies lurk, and conversely, every dictator relies on loyal followers, thus requiring participation from below. We saw that all Western democracies are built on a broad base of undemocratic enterprises that constantly threaten to spill over into the political realm. So long as a majority is largely content with the existing conditions (primarily wealth distribution and upward mobility), the moral dimension of state action is tacitly accepted and presupposed. The state's role then seems to be solely technical: it is expected to support and promote these conditions effectively through rational means.

However, when a majority perceives the existing conditions as burdensome and unjust – lack of upward mobility opportunities, wealth distribution based on privilege, acute threats to the

standard of living such as climate change, etc. – the moral dimension immediately regains prominence. People are asking questions about justice and about the moral legitimacy of state leadership. In such times of turmoil, a figure like Franklin D. Roosevelt may emerge, who - openly criticizing monopoly rule and plutocracy - redirected institutions toward the common good. Moral impetus and the ability to implement it through rational means were balanced during his governance. Democracy and the common good were again reunited.

Contemporary dictators like Vladimir Putin and populist leaders like Donald Trump also call loudly for moral renewal, finding resonance among the masses. However, the American real estate speculator could hardly be more different from Roosevelt, his great predecessor: with him the notion of making America great again through rational means is entirely absent. The common good is of no concern to the man, and even self-interest matters to him only insofar as it concerns his own person. On the other hand, the new Tsar in Russia certainly knows how to utilize and promote expertise, but he cherishes the moral impetus in its most archaic form. Just as the Germans were the chosen people for the Nazis, the Russians are, in his view, the chosen people on the Eurasian continent. In Putin's view they have the right to force other nations under the Russian yoke. *This diabolocracy is more dangerous than the modern plutocracy of the Americans.* Putin is more akin to Hitler. His brutal rule will only endure if he can rely on the unconditional loyalty of his followers. But by stressing loyalty, he loses many people whose expertise would be important for his country. Russia is suffering from intellectual emaciation. The delusion of a single man drags an entire nation into the abyss.

The great transformation

Knowledge and skill, democracy, abolition of privileges – these demands, some of which are directly, some indirectly rooted in the ideals of the Enlightenment, have reshaped the world after the fossil revolution created the necessary material conditions. Comparing energy output, population, nutrition, health, and life expectancy before and after fossil revolution, it is evident that the past two centuries have transformed the world more rapidly and thoroughly than any previous era in human history.

Remarkably quickly, population density adapted to the new trend, even anticipating the emerging optimism. Around 1700, there were about 700 million people on the globe; a century later, the number was already just under a billion. By 1900, this figure had risen to slightly over one and a half billion, and by the year 2000, the planet's population had skyrocketed to six billion people, now nearing eight.

The most crucial factor for a development later referred to as the "population explosion" was and remained the availability of food. In developing countries, about 13 percent of people still suffer from malnutrition, but 45 years ago, it was 35 percent, and the corresponding figure for the year 1947 was estimated to be as high as 50 percent worldwide. However, it should not be forgotten that this progress is even more remarkable considering that the world population increased by about five billion people during the same period.⁶⁸

The driving force behind this development was technological progress. The green revolution quadrupled crop yields between 1950 and 2000; only in this way was it possible to provide sustenance for a rapidly increased population, rising from around 1.5 to six billion people during that time.⁶⁹

Although nearly a million children still die from pneumonia each year worldwide, half a million from diarrhea or malaria, and hundreds of thousands from measles and AIDS, overall health is much better today than a hundred years ago. Medical progress has made many diseases curable and eradicated, some entirely, such as smallpox, an extremely painful and disfiguring disease that claimed the lives of 300 million people worldwide in the 20th century. In many countries, people now suffer more from diseases of affluence, primarily caused by excess calories.

The life expectancy of Europeans has increased by about a third over the past century. During the last two centuries, child mortality rates have been reduced from over thirty percent to less than five percent, and in developed countries, less than one percent.⁷⁰ *Just two hundred years ago, the life expectancy even in the then-richest country in the world, the Netherlands, was only forty years; nowhere in the world was it higher than forty-five.* However, even the poorest countries today, such as the Central African Republic, have a life expectancy of fifty-four, and in no present-day country is life expectancy less than forty-five years. A hundred years ago, the average American died at the age of fifty-one, whereas today they retire at sixty-two.

Around 1800, no country in the world had an average life expectancy higher than forty years. By 1950, it had risen to about sixty in Europe and America.

Overall, we have become more peaceful as well. The contrast between times when mere survival was paramount for humans and those when their existence was so secure that they could pursue purposes beyond mere survival can be gleaned from the numbers summarized by Steven Pinker (2018). Uncertainty and the constant struggle for survival take a much greater toll than a peaceful life in orderly conditions. A full stomach doesn't necessarily make good people, but those who are hungry are more

likely to commit crimes. Today, in the mostly peaceful countries of Europe, there is an average of one murder per 100,000 people. The world average is nine times that much, with a significant portion attributed to economically unstable states like Colombia or Somalia. In the feudal states of medieval Europe, as many as twenty to forty people out of 100,000 died from murder.

The material success of Fossil Revolution also includes Europe's temporary domination of most of the rest of the world. Until 1914, Great Britain - a tiny island with a small population – succeeded in controlling a quarter of the Earth's land area reaching its greatest extent in 1921. Altogether, the industrially armed states of a small corner of western Eurasia had conquered entire continents (North America and Australia) and subjugated the rest of the world, including the two advanced civilizations of China and India. This was not because Europeans represented a new race of superhumans - although since the late 18th century some of them believed exactly that – it rather was a direct result of formidable new inventions as Jared Diamond (1997) was eager to prove. There could be no doubt that weapons played a crucial role in this spectacular conquest. Efficient weapons, however, were the immediate fruits of the newly acquired scientific knowledge and skills.

On the other hand, an existential failure for the whole: nature and mankind

How the parts endanger the whole

The dream of a congenial world commonwealth has long sparked the social imagination, yet throughout our fractured and bloody history it has remained a utopian abstraction. *Paul Raskin*

Holodoxy is the study of the relationship between the whole and its parts. This relationship was fundamentally disrupted during the more than ten thousand years of agrarian civilization. In some of these, up to 95% of the population led a powerless and rightless existence. All this was changed by Fossil Revolution. The privatization of power, its distribution among many individuals, was its greatest achievement. It began in the second half of the 18th century, and, by the end of the 20th century, it had almost conquered the entire world. For the first time since the era of hunter-gatherers, a dignified existence became possible for most people on earth. In hindsight, we may perhaps say that in Western states, the whole and its parts were never as well aligned as during the three “golden decades” after the end of World War II.

Why has the privatization of power, so beneficial at its beginning, distorted this relationship again? Why do we have to acknowledge two serious aberrations? On the one hand, privatization instead of enhancing equality is now destabilizing the social fabric. Keyword: a handful of super-rich individuals own as much wealth as half of the world's population.⁷¹ On the other hand, the human relationship with the whole of nature is so severely damaged that it threatens man's very existence.⁷² If we

were to satisfy our current demand for energy by burning wood, as mankind did almost exclusively until the 18th century, we would have to destroy an area of forest equivalent to twenty times the size of the European continent every year. Ulrike Herrmann illustrated the prospects arising from the growth compulsion of capitalism with the following calculation: "*The world economy recently grew by an average of 2.8 percent a year. This sounds harmless, but it is frightening. Because it follows from this rate that global economic output doubles every 26 years. By the year 2100, the flood of goods would then have increased 16-fold compared to the beginning of the millennium.*"

In the previous chapter, I described the bright side of the fossil era quoting some key development indicators from the internationally renowned optimist, Steven Pinker. Unfortunately, we know, especially since the climate crisis, that mere whitewashing won't get us any further. The task of holodoxy is to show the reasons why, since about the second half of the 20th century, the relationship between the parts and the whole has again fallen into a dangerous imbalance.

The privatization of power, which initially brought such great progress to mankind, has meanwhile led to seven and soon ten billion people seeing their highest purpose in rapidly transforming *the first nature*, which has grown over billions of years, into a second man-made nature: *an artificial world of all kinds of machines*. This process entails continuous material transformation; we may call it a constant and exponentially accelerating digestion of nature. Growing amounts of natural resources are first transformed into countless machines of daily use.⁷³ Soon after, a second transformation occurs. Modern throwaway society converts all this into waste - waste that poisons the air with CO₂, the seas with plastic, and the soil with pesticides.

Until about half a century ago, this process was still celebrated as liberation from the constraints of nature, it was seen as a constant upswing and miracle of endless growth, promising an earthly paradise at the end: a guaranteed better life for all. We have seen that this promise has indeed been partially fulfilled. But we now realize that the guarantee of a better life is limited to protected enclaves, while surrounding nature is being sucked dry, devastated, or poisoned. Kohei Saito (2023) puts it in a nutshell. "*Ironically, it is precisely economic growth... that is undermining the foundations of human prosperity.*"

Spaces of protected living and intact nature are shrinking, while the desolation of nature is spreading. Thus, Fossil Revolution unleashed an *exponentially swelling avalanche*, the inevitable consequence of which, if not slowed down in time, will be the complete destruction of man's natural habitat. Suddenly we realize that science and technology, precisely because they are trans-moral and trans-aesthetic, *can bring about both the better life and its exact opposite, the end of all life.*

Just to mention a single example, we still celebrate the discovery of atomic energy as an outstanding intellectual achievement (which it undoubtedly is), but the realization that humanity, due to this insight, could risk bringing about its own demise is swept under the rug, as if it were forbidden to connect pure knowledge with its practical consequences.

Yet, that is the outstanding failure of our time. We close our eyes to the consequences, as if we would defile our intellectual achievements by doing so. Thus, we have created a world where in millions of laboratories and even in private garrets and garages research is done not only on "useful mousetraps" but equally on chemical, biological and nuclear weapons of mass destruction. We forgot that *the privatization of power also leads to the privatization of absolute evil.* The expansion of our knowledge of

nature and its mastery *has become an end in itself* - much like in former times the knowledge of God and his intentions. The most capable, the pioneers, the role models, some of them honored annually by the Nobel Prize Committee, are, according to our modern worldview, those millions of scientists and engineers who are ceaselessly busy developing yet more "mousetraps" and other devices. Most of them do so without even realizing that through countless interventions in the cycle of life they are making the globe increasingly uninhabitable or even creating the conditions for finally blowing it up.

Certainly, the world can no longer do without science and technology. This point should be stressed unequivocally. Without science and technology, not just hundreds of millions but billions of people would starve instantly! However, with science and technology as they are pursued today by every state and millions of individuals, we ruin the climate, destroy the soil, and ultimately even kill life in the oceans. *Shouldn't this uncanny perspective motivate us to ask again about the meaning of it all and to redefine excellence?* Let me modify the insightful statement of the great economist Galbraith. In the post-fossil era, the inventors of "mousetraps" can no longer save us. On the contrary, they are steering us ever closer to collapse. In our time, we can only hope for salvation from those supposedly "crazy" individuals who persistently question the purpose of this runaway enterprise.

Yes, the sciences rely on truth having set new, irrevocable standards, but truth must no longer merely refer to the trans-moral and trans-aesthetic knowledge of nature; it must also - and must above all - ask *what research and technology mean both for man and for nature*. In the field of armament, where mere errors in the interpretation of signals announcing an impending missile attack may lead to a nuclear conflagration and the extinction of the species,⁷⁴ research and technology obviously lose all value.

There, they are not merely trans-moral but unmistakably amoral. Likewise, research and technology turn into destructive forces when they ruin global equilibrium - namely, those biological cycles to which nature owes its previous homeostasis. It is time to ask again for the meaning of human actions, as people have always done when they listened to the voice of universal moral conscience.

The disruption of balance with nature

We are giants in planet-sized boots trampling the land, plundering the sea, and altering the chemistry of the biosphere. *Paul Raskin*

Holodoxy is confronted with its most extensive field of research when it examines the relationship between the whole and its parts in nature. Just like living beings, the green planet possesses - or rather, possessed - the remarkable ability of *homeostasis, that is self-regulated equilibrium*. If too much carbon dioxide was produced, vegetation flourished to absorb the excess. Conversely, if a global cold snap occurred, burying large parts of the world under ice, conditions were created that eventually reversed this process - this is known as negative feedback. Without greenhouse gases, the Earth would freeze at minus 18 degrees Celsius; on the other hand, if the atmosphere consisted solely of greenhouse gases, Earth would be as warm as Venus, where temperatures of over 400 degrees Celsius make life impossible.

The existence of living beings, including humans, was made possible by this kind of self-sustained holodox equilibrium. A relatively stable homeostasis had been established since the end of the last ice age about twelve thousand years ago, as the climate

has hardly changed from then until now - at least, that was the case until recently.

Homeostasis - an equilibrium oscillating around a mean value - characterizes not only the relationship between the climate and the factors determining it, but also applies to that of the entire fauna in relation to individual species. If one species proliferated excessively, their predators were favored to such an extent that they soon eliminated this excess. Predators therefore fulfill an important biological role. As research now knows, when predators are exterminated, herbivores reproduce to such a degree that they may destroy natural vegetation over large areas. All living species thus contribute to the task of maintaining the whole in a balanced state.

This observation even applies to the two poles of the living and the dead. All deceased life, whether dead trees or animal carcasses, is decomposed by organisms that create new life from dead substances. Over millions of years, a system of equilibrium-oriented self-regulation has established itself on the green planet, maintaining a cycle that - measured by human standards - could extend infinitely into the future.

The existence of humans on the planet would not have been conceivable without these various cycles. That is why it is so disturbing that for about two hundred years, we have been on the verge of destroying this balance. Hunter-gatherers already succeeded in largely eradicating most of the species that posed a threat to them. The major agrarian civilizations continued and accelerated this process. Since then, other biological species either depend on human mercy in areas that are difficult or impossible to cultivate, or they serve as livestock for consumption or labor. Since the human population crossed the billion mark and more and more areas serve human needs, "useless" species only survive because we are powerless against them - this applies to most

insects, bacteria, and viruses - or because we tolerate them as museum pieces in national parks. In this way, Faber caused a great extinction of species, which could make him soon quite lonely on the globe. But the problem of disturbed homeostasis does not end at this point.

Waste: Disrupting Natural Metabolism

The fossil epoch jeopardizes the balance between humans and nature in multiple ways. It wasn't always like this. Up until the 18th century, our ancestors largely conformed to self-regulation through homeostasis, meaning they didn't significantly disrupt it. The materials they used were primarily plant or animal-based foods, or durable natural substances like stones, wood, or fired bricks for building houses. Even the use of iron or bronze merely involved a transformation of natural elements, without deeply altering effective homeostasis.

But a massive interference with nature occurred with fossil-industrial revolution. Since then, not just a few hundred but hundreds of thousands of new inorganic and organic substances have been invented and manufactured. The EU alone currently produces about 300 million tons of man-made substances each year.⁷⁵

This presents a significant problem because evolution was not prepared for the inundation of the ecosphere with artificial substances. Within millions of years, it had created an armada of organisms that were able to compensate for any disturbance of the equilibrium - in this way biological toxins created in a natural way are decomposed by countless small and micro creatures and returned to the cycle. *Evolution had not, however, created organisms to break down the hundreds of thousands of toxins and new substances that humans have burdened nature with over the past two hundred years.* Most of these substances cannot be broken

down and reintegrated into the natural cycle. They remain foreign bodies, increasingly threatening the existing equilibrium - the natural homeostasis.

This holds true especially for the most infamous toxin of our present time, the greenhouse gas CO₂. Nature could deal with a limited excess of carbon dioxide through decomposition or absorption, but the vast quantities resulting from the combustion of fossil fuels overwhelm natural processes, endangering mankind with irreversible climate tipping points.⁷⁶

As dangerous though much less discussed are all those synthetic substances - chemical products like plastics, biocides etc., - which cannot be broken down or naturally absorbed. I spend most of my time in a rural village, where the ever-growing tide of waste is much easier to observe than in cities where it remains almost unnoticed since it seems to mysteriously disappear overnight. In the countryside, no one fails to notice that the mountain of garbage is growing as much as consumption does.⁷⁷

The problem is that most of this waste is bound to remain waste for centuries - in some cases, perhaps even millions of years. Nature hasn't developed processes and organisms for its disposal. We only shift it by burying it or removing it from our immediate surroundings, but that doesn't erase it. Just how impossible such a removal may be, can be seen in the immediate vicinity of our planet. In the spatial environment, known as the satellite orbit (between 160 - 40,000 km above Earth's surface), technical waste from thousands of satellites, rockets, and other remnants accumulates in such density (one more exponential trend!), that space travel may become increasingly hazardous and eventually even impossible in the foreseeable future due to the exorbitant cost of removing spatial waste.⁷⁸

True, on Earth, there are more alternatives at our disposal. Recycling by breaking down unusable industrial products into their

constituents is a method to emulate natural homeostasis through scientific means. However, this process requires a significant amount of energy, much more in any case than will be available after the end of the Fossil Age.⁷⁹ Incineration is often touted as a second-best and much cheaper solution to the problem, but as chemist Ugo Bardi notes, the resulting end products are often more dangerous than the waste itself, which is only seemingly destroyed by fire.

Hence, a third option is extensively used: disposal. On one hand, the oceans worldwide serve as sinks for plastic and many other waste materials, causing increasing damage to the marine ecosystem - not just to the Mediterranean Sea once so rich in fish. On the other hand, a significant portion of household and industrial waste is buried or piled up on land. The resulting landscape consumption - often coupled with groundwater contamination - has reached alarming proportions. Both methods of disposal run parallel to the growth of fossil society. The more income and goods, the greater also the downside of this wealth: the accumulation of waste. And its removal becomes more and more expensive.⁸⁰

Among affluent industrialized nations, a convenient pseudo-solution to the problem has been adopted. They delegate this toxic and mostly foul-smelling burden to poor developing countries in Africa or Asia in exchange for payment. From Germany alone, around 70,000 tons of waste were sent to India in the course of 2018.

However, more and more countries are no longer willing to serve as garbage dumps for industrialized nations, as they understand that they are trading dangerous long-term problems for short-term gains. According to the environmental organization Blacksmith Institute, the massive e-waste landfill in Ghana's capital, Accra, is one of the ten most toxic places in the world.

Moreover, more and more developing countries have themselves begun to follow the path of industrialization - they are now in turn becoming producers of landscape-destroying waste. For instance, Mumbai, India, still generates 500 cubic meters of plastic waste daily, even though the city administration reduced daily waste from 9500 to 7200 tons between 2015 and 2018. Across India, over 10,000 hectares of urban space are now occupied by landfills. Delhi's waste mountains in Ghazipur are 69 meters high, in Okhla 55 meters, and in Bhalswa 56 meters, all far exceeding the permissible limit of up to 20 meters.⁸¹ The most distressing image comes from Sri Lanka. Amid a landscape of breathtaking beauty, a waste mountain spanning several football fields defaces paradise - and amidst the waste, one can see an elephant herd scavenging for revolting remains.⁸²

Environmental devastation is being carried out on a global scale. *In all industrialized nations, the increase in gross domestic product can be measured by both production or consumption and by its unsightly counterpart: the generation of waste.* Global environmental poisoning becomes truly eerie when we consider how short-term the benefit derived from consumer goods usually is. "According to investigations by the American National Academy of Engineering, in the United States, 93!! percent of extracted resources are never converted into sellable products, 80!! percent of all products are discarded after a single use, and 99!! percent of the substances within products become waste within six weeks of being sold" - a colossal cost factor for the economy and for nature. This disheartening information comes from a reputable agency and is cited by a knowledgeable scientist.⁸³

A global glut of man-made materials

The privatization of power results in greater freedom for individuals. Free choice of occupation, which for most people never

existed in populous agrarian civilizations, is one of its great achievements. Hardly anyone denies that this was a historic act of liberation. But the distribution of power was not only an opportunity, from the outset it was also a danger. It was an opportunity only *if individuals used their newfound freedom for the benefit of the whole. However, from the very beginning, they also had the opportunity to harm the whole for their private benefit.*

How private companies misuse their freedom by releasing toxins into rivers, the atmosphere or the soil has been known for a long time. But the abuse of freedom now takes place in a thousand different ways and is becoming increasingly difficult to control. In fact, *the privatization of power threatens to completely upset the relationship between the whole and its parts.* I would like to devote some more lines to the flood of artificial substances that embody much of what is called progress in the "most advanced" states.

In our brave new techno-world, there are now hundreds of thousands of synthetic substances that neither the state nor the public can monitor let alone control. In his thought-provoking book "Green Lies," German chemist Friedrich Schmidt-Bleek notes: *"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 damages induced by technology and the possibilities to control and contain them. There cannot be a checklist that claims completeness and ensures safety regarding the chemicals we produce and use."*⁸⁴

This checklist cannot exist because *the state's regulatory bureaucracy would then need almost as many heads and departments as the entire private business landscape.* Furthermore, it

would need to be financially equipped as well as the entirety of companies to assess every new product's environmental compatibility. Finally, it would need access to the mostly confidential data of products, which appears unlikely due to the rules of competition.⁸⁵

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 clearly have harmful effects is there any control at all. In all other cases, it has become an impossible task, due to the immeasurable number of produced substances.⁸⁶ This fact explains why the state long ago delegated control to the companies themselves. They are required by law to proactively assess impacts on health, environment, climate, etc. But it goes without saying, that their short-term business interests tend to cause them to overlook the long-term consequences of their products. As the old saying goes, making the fox a gardener has always been questionable. It is no secret that some enterprises intentionally manipulate scientific results if they threaten the sales success of their products.

However, it would be short-sighted *if we were to blame this loss of control exclusively on much-criticized capitalism.* In truth, we are confronted with something much more fundamental: the indirect consequences of our immensely increased knowledge and technical capabilities. It was to be expected that the privatization of power would increasingly channel science and technology in private hands. In turn, this would render public control more and more difficult.

Respected experts like Schmidt-Bleek see this as a major problem that is threatening to overwhelm us. The chemist was, however, a lone voice in a desert where typically very different sounds are heard. In the media and in political statements, the abundance of materials produced, their labor-supporting

production and, of course, their consumption are generally taken as a positive yardstick for assessing the respective degree of progress and growth. The more cars circulate, the more houses and roads are built, the more goods department stores sell - generally speaking, the greater the gross domestic product - the higher a state ranks on the international development scale.⁸⁷ Where people produce only what is necessary for survival disturbing the balance with nature as little as possible, extreme poverty prevails according to today's standards.

We will see that the greatest challenge for the post-fossil era will be to counter the privatization of power with state control, so that freedom is not abused to the detriment of the whole but is used for its benefit. Until now, we did not want to admit that *the privatization of power - the increased freedom of individual citizens - requires not less but substantially greater control by the state, so that its effects do not prove destructive.*

Overcomplexity – a danger for equilibrium

All countries that have the means to do so see the digitization of information and its rapid transmission as one of the most important technical tasks for the future. In this way, growing volumes of data can be exploited in ever shorter time intervals. Nuclear power plants, ballistic missiles, drones, driverless cars, surgical procedures can all be controlled remotely. State surveillance of entire populations is just as possible as influencing the voting behavior of perfectly screened citizens.

It has, of course, been a trivial truth for thousands of years that knives can be used to cut open pumpkins or murder people. It should therefore not come as a surprise that Google may help us to gain encyclopedic insights into thousands of facts, while at the same time it subjects us to constant observation. Therefore, I do

not want to criticize digitization because, like all other technological achievements, it can be both used and abused. Instead, I would like to focus on a completely different aspect - one hardly ever considered: *the increasing complexity of that new artificial world we have created.*

Such complexity means, first, that an overwhelming majority no longer understand the things they routinely use every day. While a car still belongs to the analog world, so that most of us can explain how and why it moves, more than ninety-nine out of a hundred people have no idea what happens in everyday gadgets like a cell phone. At first glance, this fact need not cause concern. Our body and brain provide us with the most amazing services every day, but even the greatest luminaries of medicine and neurology have only just unraveled some of the processes that take place within them at any given moment. In other words, the natural world has always been a mystery to man, but this lack of understanding has not prevented even Stone Age people from subjecting it to their needs. Indeed, the complexity of the natural world stretching from atoms to cosmic galaxies never affected human survival.

But what about the artificial world of computers, robots, nuclear-powered intercontinental rockets, and the like, which we created ourselves? Is their growing complexity just as insignificant? Apparently not. The artificial world confronts us with existential problems that never existed in the past.

Here we encounter a disturbing truth that no society can avoid. The number of people who, due to their mental abilities and training, are capable of developing, maintaining and monitoring the hardware and software of this artificial new world *will be decreasing to the same extent as the latter's complexity is increasing.*

This is an inevitable consequence resulting from the fact that the Gaussian normal distribution of technical intelligence does

not depend on our needs but is a constant (in every population there are only so and so many percent of people whose technical IQ exceeds a certain value). From the outset, therefore, only a fraction of the population can be considered as pioneers and waiting personnel for this need. Even if this potential is up to now far from being exhausted in countries with large populations such as India or China, the contradiction between exponentially growing demand and constant supply means that the latter will shrink more and more in the future, because the increasing complexity of the technical world will be driving the demands on technical intelligence ever higher. Not merely today's 99 percent of people will no longer understand the cell phones of the n-th generation, but the remaining one percent will also melt down to a residual value.

Complexity will be increased in two different ways. In the analog age, no special technical skills were required to run a private institute like for instance a bank. This situation has changed in a fundamental way. In our time, every financial institution must expect to become inoperative from one moment to the next unless highly paid specialists set up, maintain, and update the programs that electronically manage and control the flow of money around the clock. Since national boundaries have long been crossed, international networking is further increasing complexity.

And this is only one part of the story. Specialized attackers - on the one hand brilliant amateurs, on the other hand highly paid experts from competing countries - do their utmost to gain unauthorized access to these systems. Such ongoing attacks are another driving force behind *the spiral of complexity*. Not only banks are affected by this trend, but manufacturing companies too. They are becoming larger and larger as otherwise they would not be able to afford the required number of defense professionals.

This gives rise to a second no less disturbing truth. *The compulsion for size is not merely caused by the imperative of producing more cheaply, it also serves to reduce the costs of increasing complexity.* The consequences for society can no longer be overlooked as they are anything but harmless. I can still remember the fun I had as a child using the square beer coasters on the table of some restaurant to build a tower that could grow up to five stories high, but usually collapsed after the third. What will our future look like when the artificial world around us grows more complex with each passing year? The danger of a system collapse increases with every floor we add to the tower. To prevent this from happening, the demands on maintenance and monitoring must be increased at least to the same extent.

At this point a third consequence comes into force, namely, the need to massively expand technical education, especially in computer science, so that the potential of technical intelligence available in each population is exploited to the greatest possible extent. From elementary school (perhaps even kindergarten) to universities, technical education will take up an ever-greater share of the curriculum, pushing the traditional subjects, first and foremost, the humanities, more and more into the background - a process already noted by Steven Pinker for the US and that now spreads all over the world.

What a strange development! Does it not contradict the original intentions on which the technological boom was based in the first place? *We once believed that technology would simplify life, relieve people of the tiresome everyday material worries thus freeing their minds for higher purposes.*

These expectations came true in many respects. For a mother in Vienna, it is undoubtedly a tremendous relief to be able to call her son in New York at any time or transfer money electronically. At least in its initial phase, technical progress was really what it

was meant to be: a breathtaking advance into a fantastic world previously imagined only by storytellers.

By now, this fairytale time lies somewhere in the past. Not only revolutions devour their children, so does complexity. We know, for example, that fast breeders may significantly stretch the uranium reserves. That is the reason why China is sticking with this technology. Other countries such as Germany have turned away from it because the extraordinarily high complexity of such plants extremely increases the risk of wholesale nuclear contamination.

This imposes on us a fourth truth that is even more disturbing. The awareness of extreme risk results in extreme measures of control, that is the creeping transition to the surveillance state, as it is penetrating all areas of life, not only in China. Even among sociologists, it is common practice to interpret such surveillance by the state primarily in political terms, as if it were based primarily on evil intentions and lust for power. Undoubtedly, this is often enough the case, but *an increasingly large part of central supervision is due to the progress of technology, that is to the growing complexity of our modern artificial world.* With the consequences of sabotage becoming more and more devastating and costly, governments strive to prevent them from happening in the first place by means of complete surveillance, which of course increasingly restricts human freedom. The fourth inconvenient truth therefore states that *it is not just the desire for political power that is to blame for the surveillance state, but technical progress itself.*

Just consider, for instance, the quantum computer, a product of outstanding technical intelligence. The moment it will be marketable, so that every private individual can buy it, it will be just as elementary a threat to society as the many nuclear arsenals that meanwhile even small countries like North Korea can afford to

develop. From one day to the next, banks will lose their protection against hackers because the new technology will be able to crack all existing codes in a matter of seconds. All money is then on the plate for all the world to take away, so to speak.

In the end, technicians will, of course, develop counter-strategies. As of now, the largest banks are already looking for these in the field of quantum encryption. But the unavoidable consequence will be a further increase in complexity and much higher costs. Mankind is rapidly approaching the point where the tower collapses, because constant increases in complexity will no longer be either manageable or affordable.

The global arms race has already reached this stage. With every passing day, our contemporary "Brave New Artificial World" faces a growing likelihood that something might "happen" because of mere chance or human failure as nuclear missiles become faster and faster so that *the advance warning time for their impact becomes smaller and smaller*. In the case of a first strike on the part of the opponent, both Russians and Americans will no longer dispose of about half an hour after its discovery as was still the case a couple of decades ago. Now that Russia successfully demonstrated to the world the test flight of "Zircon", a rocket of nine times supersonic speed, *this already minimal period has shrunk to a few minutes (depending on the location the nuclear missiles are fired from)*. And what must worry us even more: more and more states are striving for the ultimate bomb or have already developed it.

Fortunately, the likelihood of an arbitrary first strike by a superpower is so small that an optimist may neglect it. No president is so powerful that he would not have to consult with his military beforehand - and the military knows the consequences quite well. *The situation is quite different with the second strike, which may be triggered by sheer misinformation*. That is exactly what

happened in the Soviet Union in 1983. At the very last moment the apocalyptic counter strike was prevented by the Lieutenant Colonel Stanislav Petrov.

As for the US - after Kennedy and the Cuban Missile Crisis - an auxiliary (currently female) must follow an American president wherever he goes with a special black suitcase, so that he is able to give the final order for a nuclear second strike in case an inimical first strike has been spotted. Since a first strike only makes sense if it destroys the enemy's entire nuclear arsenal, the second strike must likewise be of maximum strength. Due to the minimal time window of meanwhile five minutes, a serious consultation with the military has, of course, become all but impossible. The president of a superpower must either rely on computers or on his guts to decide whether or not he will reduce the globe to rubble.

So, finally, we must acknowledge a fifth very inconvenient truth. The growing complexity of the artificial world we have ourselves created has *increased our freedom only in specific cases, but has radically restricted its scope*, since the self-extinction of the human species - the maximum loss of freedom - hovers over our heads for the first time in history as a real danger and undeniable perspective. Even if - for reasons of mental health - we suppress this sinister possibility from our consciousness, we can no longer overlook the prospect that *growing complexity is pushing humanity towards a systemic collapse and therefore towards a total negation of freedom*.

In the field of armament, where each superpower forces the other to respond to growing speed and deadliness with ever faster and more lethal systems, the state of *unstable complexity* has already been reached. The banking system will soon reach that point when all codes can be deciphered effortlessly. The technical progress in genetics is also heading in the direction of a

complexity that threatens to elude the control even of experts, since we will probably never know for sure the long-term effects of selective interventions in the genetic material. As for artificial intelligence, the future will teach us how great the increase in complexity will be when laypeople all over the world can easily create false images and voices that baffle even the expert. If practically anyone can obtain the relevant software, this may turn out to be one of the most dangerous consequences of the “privatization of power”.

Decomplexation thus becomes a main objective. If we do not want to fail because of the self-created complexity of our new artificial world, only *conscious reduction of complexity* will save us. Of course, this does not entail a revolt against technology, as if we had to regress back to the early Stone Age, where only a few thousand people in small hordes passed through Europe. Technical intelligence has long been our destiny and the artificial world is a subsystem that we can no longer do without. But this system needs strict control in order not to become completely uncontrollable.

Once humanity regains control over the subsystem of technology it has not only the right but the duty to distinguish between ethically valuable and ethically dangerous knowledge - to promote the one and bring research on the other under its sway. For knowledge and truth are by no means neutral seen from the ethical perspective. We owe to a philanthropic science that service of truth which, in the 17. and 18. centuries, the times of Enlightenment, had successfully eliminated so many dogmatic lies. But knowledge and truth, which serve the development of weapons of mass destruction or increase complexity to the point of uncontrollability, retrospectively call into question all previous achievements that science and technology conferred on man. Just as, according to the eminent physicist Ludwig Boltzmann, the

practical success of modern natural sciences constitutes a proof of the relevance and correctness of their methods, the global destruction of nature in the past two centuries must likewise be accepted as a proof that these methods are limited in scope and even incorrect and dangerous when applied without supervision and restraint.

Disturbed equilibrium in the human world

Alienated Man in privatized Society

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

The privatization of power not only impacts the relationship between humans and their natural environment in a historically unprecedented manner but also profoundly intervenes in the mutual relations among people.

In this regard, Karl Marx demonstrated great acumen. He recognized that the social changes of his time left their marks on people's psyche. Marx primarily conceived his concept of alienation as the separation of the worker from the means of production due to ownership being held by entrepreneurs rather than the workers themselves. The rift that Marx thereby created within companies persists up to the present day and has caused far more harm than good. However, when understood in a broader sense, alienation exposes a fundamental ailment of modern societies. The privatization of power has erected thousands of barriers and partitions among people – and continues to do so.

The dispersion of power brought about by its privatization only makes sense when private individuals enrich society through their respective knowledge and skills. In other words, *specialization is the predominant feature of any high-tech society*. Just two centuries ago, an Indian, Chinese, and European farmer shared a common reservoir of experience. The basic techniques of tilling the land showed such broad similarities that after a short time each of them would have found his way in the other milieu. Most people therefore possessed about the same collective reservoir of knowledge and skills.

Evidently, this is no longer the case. A lepidopterist has nothing to discuss with a quantum physicist; an IT expert specializing in programming bank security systems intellectually resides on an island inaccessible to most other individuals. Such intellectual islands are multiplying with each passing day.

We may assess this development positively, as we use to measure the progress of a knowledge-based society by precisely this criterion: the deepening of knowledge and the ensuing progress of specialization. What this assessment overlooks, is its socially disturbing aspect: the increasing alienation that eventually translates into silence. Despite living in the same apartment building, city, country or nation, human closeness is eroding. A quantum physicist may communicate intellectually with colleagues across the globe in the US, Japan, or China, but they have nothing to say to their immediate neighbors. Among them, the physicist lives in growing intellectual isolation. In a highly technological and increasingly specialized knowledge society, progressive isolation becomes a social problem, affecting a growing portion of the population.⁸⁸

The resulting intellectual vacuum is a novel phenomenon. In earlier societies, a common religion and shared traditions united people and bound them together. A collective pool of shared thinking and feelings existed, defining a village, city, region, and nation, even if this sense of shared identity rarely surfaced, or only did so in the interaction with strangers.

Today, such unspoken cohesion is scarcely present. Science has discredited and marginalized religion, and the mechanization of everyday life has largely marginalized or even eradicated shared traditions. In place of unity, silence prevails. However, such silence is by no means a natural state but rather an extremely painful or even unbearable condition. When individuals, despite physical proximity, have nothing to say to each other, a society

disintegrates.⁸⁹ We see how this process currently corrodes society in the US.

The need for communication and community is an anthropological constant – scarcely less potent than the sexual drive. Even in our overly complex modern techno-societies, people continuously attempt to overcome this silence. This may be seen as an *ongoing search for identity* reconnecting them with their fellow human beings.⁹⁰

Such basic connection is established through shared feelings and sensations. However, in the cosmos of science and technology where more and more people spend their intellectual existence, emotional coldness prevails. At best, temporary enthusiasm arises, such as when a researcher or engineer garners respect from peers through great knowledge or new discoveries. This is a powerful incentive as it appeals to ambition, but ambition is a human trait that has little to do with knowledge itself. *Knowledge itself is emotionally sterile, and even more so the fewer people we share our knowledge with.* This holds true for research in the natural sciences anyway, but more and more for the humanities as well.

Empathy hitting on borders

Socrates proclaimed, “I am a citizen, not of Athens, or Greece, but of the world.” Two centuries later, the Stoics built an ethical framework that centered on the notion of cosmopolis—a world polity in harmony with reason and the universe. *Paul Raskin*

A shared history binds people together when they draw on collectively celebrated events, “narratives,” respected figures, or a shared understanding of meaning, as in former times conveyed

by religions. This creates a sense of belonging. The quest for identity is, first of all, a response to growing silence. It manifests differently depending on where and how different social strata locate their own identity.

If materially in a secure position, the educated class tends toward cosmopolitanism. They understand that humans all over the world have been genetically (almost) identical for at least hundreds of thousands of years, and that cultures mold this basic biological identity through their traditions. Due to this knowledge of human equality, a cosmopolitan opposes any politics that create or exacerbate artificial rifts with other people – especially those beyond their borders.

Those who are not only educated but privileged to a degree that they possess the leisure to look beyond daily issues and consider the broader world, may be attracted in a deeper way by people beyond the border. They do not just recognize human equality. *Diversity itself appears to them as a virtue.* For them, different languages, cultures, creeds, and traditions and hence different culturally formed identities are particularly valuable, because it is here that human freedom finds its visible expression. The great poets and thinkers of Europe and the New World – Shakespeare, Montesquieu, Voltaire, Kant, Herder, Goethe, Schiller, Heine, Marx, Nietzsche, William James, Will Durant, Lewis Mumford – were all cosmopolitans. Nothing was more foreign and suspicious to them than hatred towards strangers.

This perspective is still prevalent today, particularly among educators, namely in universities, high schools, and other educational institutions, as well as in the so-called liberal professions of interpreters, journalists, tax consultants, experts, notaries, lawyers, designers, musicians, actors, and medical doctors. Left-leaning political circles often pride themselves on their own global openness – sometimes unjustly. This openness often ex-

tends only to people in general and to migrants, while far less understanding and empathy is shown for the poverty of nearby neighbors – poverty in one’s own country. And we should not forget: cosmopolitanism has always been a privilege of those whose material situation is relatively secure.⁹¹ In environments where this prerequisite is absent, radical tendencies also emerge among intellectuals.

Indeed, intellectual freedom based on material security is a privilege of rather few people. Most of them experience the privatization of power in a different way. While it has liberated them from their former lifelong dependency, it has also left them in a new state of uncertainty. Modern societies were built upon knowledge and skills, but these are subject to incessant rotation. The better engineer, IT specialist, scientist, and laborer consistently replace those who are less skilled in the same fields – just as better (or cheaper) devices – mobile phones, cars, computers, etc. – consistently displace inferior ones.

While the privatization of power has liberated people from their previous dependence, it simultaneously subjects them to tremendous psychological pressure. It is nothing new that an ignorant person will be considered worthless or even dispensable, but now this also applies to those whose knowledge and skills no longer meet current requirements. Individuals are at risk of being reduced to their utilitarian value for the production apparatus.⁹² This is alienation as it characterizes our time.

Such alienation does, of course, particularly apply to socially disadvantaged segments. Being engaged in a constant struggle – the struggle for their own social status, which is always susceptible to slipping downwards - they lack material security and hence the leisure to feel solidarity with people in other parts of the world or to view cultural differences as enrichment. *People belonging to disadvantaged segments will hardly be cosmopolitans. On the*

contrary, unfavorable living conditions often drive these people into the hands of populists, and even dictators. The greater the social disparities perceived as unjust, the more likely one finds a willingness within this segment to look for scapegoats beyond or even within national borders. The desperate search for identity as a means to overcome alienation also explains why democracy holds so little value for these segments, while demagogues like Donald Trump are revered as messiahs. Trump gave a newfound sense of self-worth and togetherness to the disdained, the "deplorables," as Hillary Clinton disparagingly labeled them. I fear that they will still revere the man even if they were to suspect that he consistently deceives them.

In truth, Donald Trump is not one of them; he is a representative of the opposite side. While Fossil Revolution eliminated the privileges of nobility and clergy, *it has created a new hereditary elite that owes its position not to individual skills and knowledge but to the mechanisms of asset accumulation.* In the social sphere too, the relationship of the parts to the whole is disturbed. These mechanisms are nothing short of the social Achilles' heel of the Fossil Era.

Disturbed social equilibrium within states
High-tech societies not only offer their citizens longer and better education, they even must demand it from them, otherwise they will not be able to keep up in international competition. But the average intelligence quotient is growing at a much slower rate than these rapidly increasing demands. That is why the leading industrialized nations have embarked on global headhunting. Their success depends on the willingness to pay ever higher salaries to highly specialized scientific and technical experts to attract them to their country and keep them there. This promotes inequality in both material compensation and associated prestige

with tensions between the local population and recruited foreign specialists likely to increase. In the United States, Asian students and researchers are distinguished by exceptional achievements. As is well known, this has already led to crimes of racial hatred.⁹³

High material compensation and social prestige based on individual achievements are in line with the demands of the Enlightenment and, as I showed earlier, are compatible with the ideal of a classless society, because knowledge cannot be inherited; it passes on to new individuals with each generation. *But this does not apply to money and wealth.* Soon after Fossil Revolution, the inheritance of money and assets apart from personal merit gave rise to new privileges and classes.

No social revolution is so comprehensive that it turns societies into a tabula rasa, erasing not only all previous habits but also eliminating all preceding institutions. Achieving such a radical new beginning would have been possible for the fossil-industrial revolution only if it had first abolished that age-old institution which enriches individuals independently of talent and education – an institution that regularly destabilized agrarian civilizations, incited revolts, and toppled thrones. This institution, furthermore, violates the elemental sense of justice as it not only questions the fundamental principle of Enlightenment – knowledge and skill – but ultimately eradicates it over time.

I am referring to the mechanics of debt. It is a mechanism that nullifies the principle of knowledge and skills because the wealthy, who lends money to those in need and then charges interest on the use of their property such as land, resources, food, or money need only possess sufficient surplus wealth. Perhaps their ancestors had acquired such wealth by means of personal abilities and labor, but in a society of heirs, this condition may date back to the distant past. In the form of goods or money, credit automatically increases existing wealth – and this has been due

to interest (and later, dividends).⁹⁴ Thus, credit provided an age-old yet still highly relevant *counter-principle to gaining wealth and social recognition by means of knowledge and skills*.

Though inherited from the distant past of agrarian civilizations, this counter-principle has been perfected in Fossil Society. Instead of the entire community – the state – providing support to the needy without recompense, the better-off members of society offer their help in exchange for payment (interest). The result has been consistently and globally the same after but a few generations: the poor get even poorer, while the rich become richer.⁹⁵ The mechanism was repealed only when in "jubilee years" all debts were cancelled, or some ruler ordered the same measure by decree.

For a tiny class at the top, the mechanism of automatic money multiplication makes knowledge and skill superfluous. The fact explains, why a society, the basic principle of which was the abolition of estates, classes, and castes, creates precisely these social differences anew.⁹⁶ The upper one percent of the super-rich in the United States and a somewhat broader segment in European countries have already solidified themselves as a new class, a new feudal elite.⁹⁷

How does this accumulation of private power come about, given that it would not be possible if knowledge and skills – distributed anew in each generation – only temporarily granted positions of power to individuals, families, and even nations?

Discussions about parasitic, unearned wealth are hindered in three ways. First, this transfer now occurs so covertly that only its effect – wealth concentration – is noticeable, while the underlying mechanism is largely obscured. Second, Karl Marx, otherwise the most outspoken critic of capitalism, chose to overlook this kind of parasitic accumulation.⁹⁸ And third, the profit derived

from ownership of scarce goods or money can, in exceptional cases, even have positive effects that should not be criticized.

How ownership of scarce goods like land, resources, water, money etc., can make individuals wealthy without work is easy to understand. Let's focus on the mechanism of how ownership of money achieves this. In a modern economy, private companies mostly finance a significant portion of their investments through borrowed money and incur debt for that purpose.⁹⁹ If the investment is successful because it yields the expected returns, they repay the borrowed sum along with real interest (interest minus inflation) to their creditors. *Successful investments through borrowed money have proven to be the driving force behind industrialization and growth.*¹⁰⁰

Even at this stage, a factor comes into play that separates small from large creditors and thereby increases inequality. The amount of loans is crucial. A lender offering a million dollars can expect higher interest than another who provides only one hundredth of that sum – in the second case, higher processing costs account for the difference. Thus, great wealth is favored from the start. Additionally, wealthy lenders can insure themselves against losses, whereas with smaller amounts, insurance would largely offset interest gains – another advantage for wealthy creditors over the smaller ones.

However, the most significant yet least visible difference between poor and rich savers (creditors) has not yet been mentioned. The truly poor have no excess assets but often nothing but debts. So, they cannot save at all and earn from saving, because their incomes are just enough to cover their living expenses. The mechanism of interest clearly works against them.

This brings us to another more deep-lying aspect of bottom-up redistribution, that occurs without regard to knowledge and ability. Companies taking on debt must somehow cover the costs of

the interest (and dividends) to be paid. If they cannot slash wages, acquire resources, or produce more goods at cheaper prices, they are compelled to pass interest costs to the prices of their products, which means consumers must bear the burden. But not all consumers are affected to the same extent. The burden primarily affects the poor. This is because the extra price of products is paid primarily by those *whose incomes are largely eaten up by essential consumption* - and these are always the most disadvantaged people. Conversely, it affects the rich the least, as only a fraction of their income is needed for essential consumption.¹⁰¹ This contrast reliably ensures a continuous flow of wealth from the poorer majority to the wealthy top.¹⁰² Instead of eliminating or exposing the root of this antisocial mechanism, welfare states only attempt to counter it through reverse redistribution.¹⁰³

The discussion of capitalism's community-destroying Achilles' heel – unearned incomes – is further hindered by the fact that during the initial stages of industrial development, interest and dividends can indeed have positive effects. As long as there are *no significant differences between rich and poor*, small lenders too benefit from the accruing interest – the initial transfer from the bottom to the top remains insignificant (in fact it resembles a zero-sum game where everyone gives as much as he takes). During this initial stage, the common people can only be motivated to save – and thus finance business – by enticing them with such reward. Surplus capital in private hands is channeled into development and thus favors rapid industrial growth.

However, shortly after this initial phase, the divide between small and large creditors will inevitably widen, *causing the interest gains of small savers to be more and more offset by the higher costs of consumption*, which makes them de facto poorer rather than wealthier.¹⁰⁴ In this way - unfortunately quite legal - the transition from the feudal society of the great agrarian civilizations

to the fossil society brings forth a new nobility, a new monied “aristocracy”.

Today's money and wealth aristocracy profits from all significant loans. Meanwhile it has the financial power to acquire media and publishing companies on a large scale and manipulate public opinion for its purpose. Alongside the large industrial capitalists, this class represents the "deep state," from where significant money covertly guides politics and public discourse. In the United States, power is still much more dispersed than, for instance, in Russia, but the sovereign – the people – has increasingly less influence. When Noam Chomsky labels the United States' form of government a "plutocracy," this is not inaccurate. Apart from rare exceptions, individuals from below who stand as presidential candidates only have a chance if their campaigns are financially sponsored by the top one percent of the most powerful corporate magnates and their donors.

The aristocracy of knowledge propagated by the Enlightenment now stands shoulder to shoulder with this new aristocracy of birth and wealth. Knowledge aristocracies do not produce class societies, because only money but not knowledge can be inherited. The new money aristocracy is the untimely embodiment of a new ruling class of privileged heirs. As soon as the most powerful strata of fossil-industrial states no longer owe their influence to performance but to accumulated wealth, the age-old feudal principle of birth privileges comes into force again.

Hobbes' state of nature: Disturbed equilibrium between states

Wherever people must get along with each other, they face the task of creating an order that coordinates their actions – with the most basic requirement obviously being a common language,

which is the spontaneous work of interacting individuals. Languages do not require coordinated governance to arise. But the latter is needed for that higher kind of order, which establishes a balance between the interests of individuals and the common good.

In the chapter on hunter-gatherers, we saw that this task was probably best fulfilled when the institution of government did not yet exist. It was rather easy for a handful of individuals to agree on a common course of action. But this picture was to change fundamentally during more than ten thousand years of agrarian mass civilizations. These could not exist without institutional governments. Due to the agrarian dependence formula these did not primarily act for the common good but invariably represented the interests of minorities. From this perspective, the short-lived Fossil Revolution achieved a remarkable breakthrough. After all, it was temporarily successful in giving priority to the interests of a majority so that we may speak of a victory of the common good over personal interests. During the three "golden" post-war decades, probably *the greatest approximation of a holodox balance between the interests of the whole and those of individual citizens was achieved in Europe as well as in North America.*

Thomas Hobbes, the British social philosopher of the war-torn 17th century, had justified the necessity of the state by arguing that people in the "state of nature" would attack each other because each person only has their own survival and interests in mind. Whether such a state of nature ever existed is doubtful, but this doubt would only confirm Hobbes' thesis. No community has ever tolerated individuals pursuing their interests so relentlessly that they jeopardize the existence of the community as such. For this reason all states defended themselves against murderers and thieves in their ranks.

It is for this reason too, that no state is in a state of nature - except when it descends into civil war and thus into chaos and is no longer a functioning organism. Under normal conditions, the whole and its parts are brought into some equilibrium through constitutions and laws, creating a characteristic balance for each nation and state.

However, this only applies to individual states, not to the relationship between them. On a global level, such a balance has never existed up to the present day. The individual nations do not form a community where a superior entity weighs the interests of the whole against those of its parts.

The present world community therefore finds itself in that dangerous state of nature described by Hobbes - each state follows its own interests: a war of all against all is possible at any time. As Vladimir Putin is proving to the world right now, there is no entity that can prevent one state from suddenly attacking any other.

This is not as surprising as it may seem at first glance. During the past ten thousand years, a global entity that advocates the interests of all of humanity against those of its parts - the individual states - had not or rarely been needed. Europe remained separated from India and China by high mountains and wide seas, at best they were connected by modest trade flows. Intensive contacts between widely separated states and cultures were sometimes achieved through technological breakthroughs, but they had only temporary effects. The "world government" of the Mongols over the Eurasian continent was nothing more than a transitory raid based on a technological invention: highly mobile mounted archers. The colonialism of European nations was also more like a raid, made possible by technological innovations: the invention of firearms and large sea-going ships. Without Fossil Revolution,

geography would have continued isolating the major nations of the Globe from each other.

All this was to change at the latest since the beginning of the 21st century. The situation of the global community of states now very much resembles that which existed in Europe before its unification. *Unlike in the past, almost all states have become so closely interconnected by modern technology that their military, economic, and social interests constantly collide with each other.* And people too have come very close to each other. Whether they are at home in Tasmania, New York, or Svalbard, each of them can see in real time what is happening in almost any other part of the globe. The metaphor of a tiny spaceship, densely packed with a human race that has swollen to almost ten billion people, a ship moving lonely through the vastness of space, corresponds to both perceived and intellectually understood reality.

And this situation is at least as dangerous as the one that existed in Europe before its unification. The parts - that is, individual nations and states – continue to be committed almost exclusively to their own particular interests. They are not only indifferent to the interests of other states, but - and this has even more dramatic consequences - also to the interests of the whole, that is, the world community.

On the military level, this “state of nature” is particularly evident. Any state may at any time become a wolf to its neighbor. *It is fear that drives people against each other, even though universal moral conscience binds them together.* Fear has the effect that no one reduces their own arsenal of weapons so long as others still have them. Every state that does not yet dispose of the ultimate weapon believes itself safer if it also develops and acquires it.¹⁰⁵

Unfortunately, this is sound reasoning: one's own security is increased by deterrence. It is the security of the entire world

community that is increasingly endangered, just as individual weapon ownership benefits the individual but ultimately undermines the state as a whole. *Sound reasoning of individuals or individual states may thus become utterly unsound in relation to the whole.* So far it is only fear that prevented states from using nuclear weapons - the fear of nuclear contamination, which affects the attacker as much as its victims.

In the economic sphere, philanthropic cooperation and fear-driven competition are subtly intertwined. The need for philanthropic cooperation prompted the United States, for example, to share a large part of its scientific research results and the technology based on them with other states, largely free of charge - even though these achievements were financed with American taxpayer money, and no international agreement obliged them to do so. There can be no doubt that today's powerful and self-confidently rising China owes most of its technological progress to the knowledge developed in Europe and the US. Only the most recent achievements had to be purchased through licenses or patents. This generosity, i.e. the willingness to support and help each other, is of course completely absent in the global arms race. Here, fear hinders cooperation and intensifies murderous competition.

Free trade was and is a visible expression of a philanthropic mindset and a progressive approach to the ideal of greater equality. Economic competition, which initially acted as an engine for the dismantling of privileges and for equality of opportunity, was thus transferred to entire states. The industrially underdeveloped among them had less knowledge and skills, but they had the opportunity to offer labor at lower cost. In this way, Germany caught up with the world power England; Japan and the former "Asian Tigers" kept up with Europe, and China is currently on the verge of economically surpassing the United States.

Thus, competition not only enables equality of opportunity within a state; through free trade it can also bring it about between them. But there it soon exhibits the same flaw as competition within a state. If government does not regulate it for the benefit of all citizens, then the initial equality will soon be abolished and classes with inherited privileges will gradually emerge. After some time, wealth will once again concentrate in a few hands.

This vicious circle happens between states as well. China is channeling an increasingly significant portion of the wealth it acquired through the adoption of Western technology into its military. It pursues an expansionist policy, challenging the previous alpha state, the US. The latter suddenly becomes aware that its generous transmission of technological achievements resulted in something quite different from an equal and grateful partner. The United States is facing a new emerging alpha state that is poised to rise past it to the top. While free trade, unlike military buildup, awakens some of the finest human qualities such as altruism and willingness to help, there can, unfortunately, be no doubt that it eventually produces the same effects as the armament race. It strengthens some – as a rule the successful latecomers – and weakens others – the former pioneers. More than a hundred years ago, the latecomer Germany surpassed the British empire in industrial strength - a decisive factor in the outbreak of World War I. Today, the latecomer China is on the verge of surpassing the American empire. Once again, the specter of war is being invoked. A military confrontation between nuclear world powers such as the US on the one hand and China and Russia on the other would have unimaginable consequences.

Therefore, the United States is now applying the emergency brake. The Biden administration intends to prohibit further American investments in China, especially in areas of high technology where the USA still holds the lead. This is a decision in the

interest of the American common good, because the American standard of living, which has already suffered greatly from outsourcing much of the country's industrial capacity since the late 1980s, will continue to decline as China takes over ever larger portions of US production. But while Biden's decision certainly serves the common good, it contradicts the interests of private US companies as well as those of a minority of wealthy investors who benefit greatly from the reduction in production costs through outsourcing and the corresponding increase in profits. Unregulated free trade has empowered China and a privileged minority of US investors, while causing great harm to a large part of Americans, that is to the entire country.¹⁰⁶

China is now crying foul, as if it had a right to free trade, *even though it systematically protected its own industries so long as they weren't competitive on the global market – doing everything to suppress free trade*. This too illustrates the “state of nature” governing international relations. States readily adapt their ideology to their specific interests.¹⁰⁷ A beneficial free trade that benefits all will only come into being once a supernational authority favors its positive effects in the interest of global welfare, while at the same time curbing its harmful effects. In other words, if such an international agency acts in the same way on the global level as does a good government within a single state.

All against all: the cyberwar against truth and reason
Hardly any thinking person today would still claim that the "progress" of weapons technology makes the world a better let alone safer place, but this was precisely the prediction made with regard to the internet and the social media. The interconnectedness of all with all appeared to its creators as a promise of worldwide dissemination of truth and knowledge. The fact that everyone could now express their opinions and that these could, in prin-

principle, be heard by everyone else on the globe was even hailed as the dawn of a new global democracy.

In the course of our previous philosophical reflections on predictions in history, we did, however, realize that even prophecies that have the weight of the most reasonable arguments on their side often turn out to be spectacularly wrong. This failure of rational “futurology” was most vividly demonstrated by our fictional Stone Age prophet (and his later mouthpiece Marvin Harris), who saw a time of peace and equality dawning with the new agrarian way of life. Subsequent history was indeed to prove the exact opposite.

The same applies to the benefit of the internet with regard to peace, democracy and truth. It turns out that sabotage as a form of cold war weapon became possible by the internet – but now on a global scale. In February 2009, for example, the Americans succeeded in destroying fifty Iranian uranium enrichment centrifuges with the help of the Stuxnet virus.

“Described in the press as ‘the most sophisticated cyber weapon in history’, Stuxnet is the first major offensive in global cyber warfare” (all quotes of this section are taken from David Colon 2023).

What the Americans failed to consider. The new weapon allows for a new type of asymmetric warfare, as its use is incomparably cheaper than researching and developing conventional weapons systems. As a result, it was immediately adopted by the US' adversaries such as China, Russia, Iran and North Korea - and with equal success.

“... on May 12, 2017, North Korea launched one of the most massive cyberattacks of all time, infecting 230,000 computers in 150 countries with the WannaCry virus, designed from an NSA tool revealed the previous year by the Russians: "Eternal Blue", which exploited a vulnerability in older versions of Microsoft

Windows... The virus affected numerous hospitals, paralyzed the British healthcare system, and brought production to a halt at several assembly plants of the car manufacturer Renault. Because it affects civilian infrastructures massively and indiscriminately, the North Korean WannaCry virus has emerged as a new form of international terrorism.”

In comparison, it seems almost harmless that modern information highways enable not only sabotage but also espionage on an unprecedented scale. Meanwhile China seems to have surpassed the US in this respect.

“There are two types of large companies in the United States, summarized James Comey, then director of the FBI, in 2014. There are those that have been hacked by the Chinese and those that don't know they've been hacked by the Chinese... Not only is the number of Chinese cyberattacks not decreasing, but they are now affecting some of the US government's most secret data.”

The Internet crosses all existing borders, provided they are connected by the highways of information (Russia and China have largely severed outward links). It therefore opens up the new perspective of globally influencing people's minds. This is where optimistic predictions have proven to be particularly wrong. Today, less than half a century after its invention, we already know that the internet does not serve the cause of peace, it does not serve the dissemination of truth nor the consolidation of democracy. On the contrary, it is proving to be one of the most dangerous and effective instruments for destroying truth and weakening democratic nations.

For the same need which, in a world stuck in a Hobbesian state of nature, causes all nations to strive for the ultimate weapons, also causes each of them to spread the best possible image of themselves - the image of a peace-loving, selfless state concerned with the well-being of the rest of the world. As this propag-

andistic self-portrait rarely corresponds more than partially to the facts, states try to “correct” the facts through their propaganda by embellishing and falsifying them. This observation now applies to all states, even to Western democracies - although to a much lesser degree.

“On April 9, 2003, images of a jubilant crowd dismantling the statue of Saddam Hussein in Baghdad's Firdos Square went around the world. It was a pseudo-event, organized by the American army with the help of a few dozen militants of Ahmed Chalabi - the head of the Iraqi National Council - in front of journalists gathered for the occasion.”

No doubt the collection and verification of facts is playing an increasingly minor role even in Western democratic states. French historian David Colson draws on relevant scientific studies when he remarks.

“In 2006, the U.S. media as a whole had just 141 foreign correspondents worldwide... And yet, while the number of journalists is falling, the PR industry continues to expand. By 1990, in the United States, the number of employees in the PR industry (162,000) was three times higher than that of journalists (50,900).”

As is well known, the PR industry's task is to advertise, regardless of whether the advertised product is a washing machine, a car or a state. The more people a national self-image created by the PR machinery reaches abroad, the greater its impact. Such impact is no longer achieved by the traditional disseminators of news, i.e. newspapers, radio or television, but by social media. Social media are used (abused) by all states to create in the minds of a global audience an ideal image of themselves and the most negative possible portrait of their enemies.

“In the 21st century,” observes Joseph Nye /a US-American political scientist/, “conflicts will be less about which army wins than about which narrative prevails.”

Although this kind of war is taking place below the threshold of hot gun battles, history teaches us that contests of words and incitement have always been the prelude to the war of deadly weapons.

Social media, above all Facebook and Twitter (now X), are the active promoters of such a development, because messages that incite hatred and anger have a far greater impact than moderate statements.

“... anger emerged as the most powerful emotion, because it generates the most engagement (likes, shares, comments). The previous year, Chinese scientists had reached the same conclusion by analyzing 70 million messages distributed among 200,000 users: "Anger is more influential than other emotions such as joy."

In the interests of greater profit, social media CEOs therefore tend to give free rein to calls for distrust and rebellion, even in democratic countries. The right to freedom of expression - a *sine qua non* of democracy - is, of course, violated when, for the benefit of business, incitement and the distortion of facts are allowed to take on disproportionate weight.

We know the effect of hatred and anger. They paralyze reason and the pursuit of truth. It is therefore not surprising that such feelings serve as preferred vehicles for spreading misinformation.

“By studying the lifecycle of 126,000 rumors spread by 3 million people on Twitter between 2006 and 2017, American researchers at MIT established that fake news spread six times faster than real news and reached far more people: ‘Fake news is spread significantly farther, faster, deeper and wider than truth, across all news categories,’ they conclude.”

The most effective instrument of state propaganda benefitting itself but harming others, is the tactic of sowing doubt about the government and institutions of competing or hostile states.

Authoritarian states such as Russia and China are using this tactic with great success because - unlike Western democracies - they are not hindered by an independent press and research institutions or by legal requirements.

Russian propaganda gives a sounding board to all centrifugal forces, to all critical voices, as well as the greatest possible resonance to social tensions and terrorist attacks... Russian propaganda seeks to undermine the European Union from within, devalue the West and turn democracy against itself. In 2014, it supported the proponents of Scottish independence in the referendum, and when the "no" vote won, Russian media and trolls broadcast videos purporting to show electoral fraud. In the Netherlands, it interfered in the April 2016 referendum campaign on the association agreement between Ukraine and the European Union, notably by broadcasting fake videos claiming to show Ukrainian terrorists wreaking havoc in Dutch cities. In Spain, the Kremlin supported Catalan secessionists in the referendums of 2014 and 2017... Across Europe, Russia actively supports far-right parties, including Bulgaria's Ataka Party, Austria's Freedom Party, Belgium's Vlaams Belang, the Finnish Party, France's Front National, Italy's Northern League, Greece's Aube Dorée and Hungary's Jobbik Party. In Germany, Alternative für Deutschland (AfD) has been financed and media-supported by Russia since its creation in 2013... In 2020, the Russian propaganda machine is engaged in a worldwide disinformation campaign about the Covid-19 pandemic. At the same time as Vladimir Putin is encouraging his population to protect themselves and vaccinate, he is spreading covidoskeptic and vaccinoskeptic theories in the West. RT propagates the thesis of an imaginary pandemic conceived by Bill Gates to extend his influence.

In the meantime, China has developed its own social platform, TikTok, to influence minds worldwide.

„Today, the spread of TikTok around the world appears to be China's historic revenge, weakening the great Western powers by massively capturing the attention of their youth and diverting them from more useful activities. In many ways, the hypnotic, dreamlike state of some TikTok users evokes that of opium-addicted Chinese as described by numerous 19th-century writers.“

No wonder that the Party prohibits its use within China itself. „If you're under 14, they'll show you scientific experiments to reproduce at home, museum visits, patriotic or educational videos. And they limit usage to 40 minutes a day. They don't release this version of TikTok to the rest of the world. They know that technology influences the development of young people. For their domestic market, they sell an impoverished form, while exporting opium to the rest of the world.“

Meanwhile the effects of TikTok consumption are well proven. „In December 2022, an IFOP study showed that daily TikTok users were far more likely than the rest of the population to subscribe to false information and conspiracy theories.“

Nevertheless, TikTok has proved to be a resounding success. „...when it comes to addiction, TikTok far outstrips its American competitors, resulting in unprecedented and spectacular growth in the number of users worldwide. Just five years after its launch, the app has 1.7 billion monthly active users worldwide, including 100 million in the U.S., where 30% of adults and 67% of teenagers are using it by 2022.“

There is no need to emphasize that the Communist Party, true to the best Stalinist tradition, does, of course, deny its own citizens the right to think freely and express their own opinions.

“The CCP's document 972 published the same year lists ‘seven taboo subjects’, deemed disruptive, that Internet users are forbidden to discuss: universal values, freedom of expression, civil

society, civil rights, the CCP's historical errors, crony capitalism and the independence of the judiciary.”

For the time being, however, the Russian dictatorship goes even further than the Chinese one, because the Putin regime is keen to present the facts themselves as arbitrary, as if they had always been the mere inventions of certain opinion-makers.

“The disinformation campaigns of Russia's external intelligence services systematically attack the guardians of factual authority, whether journalists or scientists, with the aim of blurring the line between fact and falsehood... ‘Objectivity’, says Dmitri Kisselev in 2013, ‘is a myth that is proposed to us and imposed on us.’ Challenging the very idea of an ‘objective truth’ enables Russia, through the massive dissemination of contingent alternative truths, to gradually erode the confidence of Western public opinion in all sources of information... In 2015, one of Russia's leading disinformation specialists, Ben Nimmo, summed up the Kremlin's strategy with the “4 Ds” formula: dismiss the critic, distort the facts, distract from the main issue, and dismay the audience...The advent of social media has thus enabled the Kremlin to accelerate the abolition of any distinction between truth and falsehood, hacking into freedom of expression, public space, digital platforms, destroying in the process the very possibility of conceiving of the Internet as a democratic space and a source of reliable information. ‘Today,’ exclaims Russian nationalist Vladimir Zhirinovskiy triumphantly, ‘we're succeeding in what we've been trying unsuccessfully to do for five hundred years! We're changing the Occident.’”

Disturbed Worldview - the Blind Spots of our modern Religion of Science

Holodoxy is, as its name suggests, the study of wholes. It therefore transcends all boundaries that are normally drawn between disciplines. The social constraints to which man has been subjected during the three past epochs of humanity had to be addressed in this book, as well as their respective relationship to the environment. But it is just as important to describe the spiritual foundation that characterizes each of them, because civilizations base their social order and their interaction with nature on their respective world view.

The latter has a special role to play because it serves to justify both the interaction of humans and their dealing with nature. The fossil epoch owes its intellectual foundation, its particular world-view, to the European Enlightenment. I would like to call this spiritual foundation "science-religion".

Nature and Man viewed as machines

The holodox perspective is as old as man himself, even if it has lacked this name until now. It manifests itself most clearly in religion, which has always held out the prospect of access to the whole and the highest: to individual salvation or enlightenment, where the individual will be absorbed into the greater whole.

In contrast, an undogmatic science tended towards great modesty. This was precisely what set it apart from religions and their promises. But right at the beginning, as early as the 17th century, dogmatic science was born - better described as a "*science religion*" - that not only continued the tradition of dogmatic religion but took it to a new climax. Science was understood as a process to achieve omniscience and omnipotence over man and nature.

It is this dogmatic science-religion that is critically examined by Francis Fukuyama in the passage quoted at the beginning of this book. The religion of science understands not only external nature but ultimately also human beings as computable mechanics and machines - reducing them to such.

"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 sub-human and subrational impulses."

Fukuyama is neither a scientist nor a doctor. The latter could rightly object that the astonishing successes of scientific healthcare would be neither conceivable nor possible if humans could not be repaired - just like machines. Just as in the rest of nature, medicine looks for laws in the human organism and then applies them. Although such laws only apply at the human level and to some extent among primates and other higher creatures, this in no way invalidates their lawfulness, it just makes them less universally valid than those of chemistry and physics, which were already in force before there were organic beings on the planet.

It is a truism indeed that *humans also behave like machines*. That makes it even more important to emphasize that this is a relative truth, which becomes absolute and obvious nonsense the moment it is generalized. Then it leads to the claim *that man is nothing but a machine*, since he, like all of nature, is throughout governed by laws – an assertion which is not true even for non-human nature, because in nature chance is the omnipresent counterpart to law.

Nevertheless, many neurologists are convinced that human behavior is as determined as - in their view - the processes in the

external world.¹⁰⁸ If they were correct, future science would not only, as is currently the case, precisely predict the trajectory of a rocket, but will one day do the same with regard to human behavior and intellectual activity. According to these neurologists, freedom of thought and action is nothing more than a subjective delusion. The processes in a human brain are just as strictly determined by laws as those of the rest of nature.

The problem with this view: it suffers from an irresolvable contradiction. *An all-knowing science that could predict the thoughts and behaviors of scientists and experimenters would have to abandon its role of science, as its omniscience would inevitably nullify its omnipotence.* Theology had been struggling with the same problem for at least two thousand years.¹⁰⁹

Why do scientists want to uncover a law, as for instance the precisely defined ballistic curve of a cannonball? Unless they are specifically focused on celestial trajectories, they want to apply this *law at any location, at any time, and for any purpose.* The same applies to a seemingly trivial process like heating water in an electric kettle. The regularity of the process (the consumption of a specific amount of electrical energy to heat a certain amount of water to a specific temperature in a specific time) is well known, and the entire course of the process is *strictly calculable.*

But our aim in analyzing such a predictable event is to realize it in a *completely unpredictable* manner, namely at any location and any time thus opening new fields for human freedom.

This is a fundamental principle of theoretical holodoxy that may be formulated as follows: The laws of physical nature exist *independently of human will and desires* – they are discovered but not invented by scientists. These laws describe the existing order of nature, over which we have no control. However, their entire value for humans – the reason why we search for them – is that *we may use them according to our will and desires.* A rocket

to the moon doesn't build itself and doesn't launch on its own; a specific government makes the decision to embark on and finance this extraterrestrial endeavor.

As we saw right at the beginning, the mathematician and physicist Alfred North Whitehead summed up the procedure of the natural sciences in the simplest possible formula. "*Seek measurable elements in phenomena, then seek relationships between measured physical quantities.*"

So long as the scientist remains with unconnected measurable elements, he is dealing with facts; as soon as he discovers relationships between them, he moves on to explanations, because he is demonstrating existing orders in nature, which he describes in the form of laws.

Whitehead's formula does, however, merely summarize the procedure of science - there is no mention of its purpose, i.e. why people want to practice it. This is a serious shortcoming as it is that purpose which gives the procedure of science its meaning in the first place (the practical evidence for its truth, as Ludwig Boltzmann put it). Seeking the "relationships between measured physical quantities", has meaning for humans because events are made predictable and many of them controllable as well.

Nor does Whitehead's formula provide any information as to whether all measurable elements of this world or only some of them stand in lawful relationships to one another. It therefore says nothing about whether we live in a completely determined world or in a world where we are confronted with chance and freedom, so that many measurable elements will never be brought into a lawful relationship.

It is the prerogative of Holodoxy to be able to make the following unequivocal statement. *Logically it is impossible for all measurable elements to have law-like relationships.* If this were

the case, there could be no science. The proof is of a logical nature and therefore precedes any concrete experiments.

It was already given above. The search for and the use of natural laws describing *calculable events* only make sense in relation to that freedom that allows us to apply these laws in a *non-calculable, unpredictable way*, at any location and any time, for human purposes. But the reverse conclusion holds just as true: Freedom only has meaning because it enables us to apply laws. This mutual dependence of freedom and necessity can be expressed in a general way as follows. Freedom – chance in outward nature – means much more than a temporary lack of knowledge, as it had been defined from Voltaire to Laplace, Bertrand Russell and Albert Einstein. *Freedom – chance - is no more and no less than the logically necessary counterpart to necessity.*¹¹⁰

If freedom too were calculable and obedient to laws, then the efforts of scientists would fade into illusion. Not only would all of nature be a deterministic machine, but humans too would be machines, unable to think and act differently from what they do. Together with the abolition of freedom, we would also discard the concept of scientific truth, as every statement would be as necessary as its opposite. *Strict determinism is manifest logical nonsense, as it leads to irresolvable contradictions.*

To some, these simple considerations will seem trivial. However, they must then explain what is perhaps the greatest mystery in the history of science, namely the fact that even some of the greatest minds remained unaware of the logical absurdity of strict determinism. In my view, this mystery can only be explained by viewing the deterministic vision as *desire and delusion*. If humans (scientists) aspired to God-like knowledge this was only possible if they eliminated both freedom and chance.

To a certain extent, this delusion continues to persist, and that is where another psychological factor, human vanity, comes into play. The absurdity of denying chance and freedom is obvious to anyone with some training in critical thinking - let's call him a philosopher - while the elaborate experiments of biogeneticists or quantum physics require years of study together with most expensive instruments. That makes experts in these disciplines look down on philosophers with a condescending or even mocking smile. Thinking alone does not satisfy them, even though it is the necessary foundation for all scientific engagement with nature. Mere thought-experiments without figures and formulas are not considered credible, in the first place.

Nevertheless, it remains true that chance does not need to be “discovered” by quantum physics, biogenetics, or any other applied science. *It is logically required as the foundation of science.*

Two perspectives

Not long ago leading German neurologists like Gerhard Roth and Wolf Singer considered all those naive, if not downright stupid, who failed to recognize that from a scientific point of view man does not possess the freedom of will.¹¹¹

To be sure, such conviction is nothing new. The Babylonians thought that human destiny was determined by the stars. Church fathers like Augustine, Luther and Calvin justified their rejection of human freedom with the omniscience of God. To God, the entire future including the thoughts and intentions of men must be known since the beginning of creation - ergo, human freedom cannot exist.

Philosophers like Democritus, Spinoza, Voltaire, Schopenhauer up to Bertrand Russell also belong to the vocal deniers of freedom. They are opposed by thinkers such as Gottlieb Fichte

and Martin Heidegger, who – not less pathetically - proclaim human freedom. In the middle between these two opposing camps usually stands the unbiased layman, who has always known to be at the same time free and exposed to multiple constraints. Among the great philosophers who convincingly argued this point of view we find William James, Karl Jaspers, and Karl Popper.¹¹²

The opposition between these two positions not only manifests itself in the history of religion and philosophy, but is inherent, as it were, in each of us. When observing other people, we intuitively ask about the motives of their behavior, i.e., about the limits of their freedom, so that we may respond to them in an appropriate way. This is the case with feared adversaries anyway, but even with people we love. The better we know their respective likes and dislikes, the more likely we are to anticipate their reactions, and the less danger there is that there will be friction in dealing with them. In the same way, this *object perspective* is assumed by all writers of novels when they endeavor to make us understand why their protagonists act just the way they do (those writers describe the conscious or unconscious compulsions to which their actions obey).

In contrast, we adopt the subject perspective when analyzing our own personal actions. Yesterday I spontaneously decided to embark on a trip to the Kulm, a nearby mountain, the autumn morning being so fresh and beautiful. This was of course a free decision. Nobody forced me to do so not even I myself - it could be revoked at any moment. Such awareness of one's own freedom of thought and action may go so far that some people deliberately do the opposite of what others expect of them or even what they expect of themselves.

The two perspectives of object against subject relatedness are based on opposing needs, which are fundamental for individuals as for societies. *Security* in dealing with nature and other people

we only gain when exploring the rules and laws to which they obey. Regarding nature, we have succeeded so well in this endeavor that we are now able to retrodict the history of the cosmos back to the Big Bang and to predict it until the sun will have burned its last hydrogen fuel.

But security has never been the only human concern. For children and all people who have retained their natural curiosity into old age, the unexpected, the surprise, the mystery of existence is a constant challenge without which life would lose its charm and color. Complete security, i.e. predictability, would enclose us within a straitjacket that suffocates all spontaneity. As long as we live, we constantly look for the attraction of the not yet known, the emergence of things new.¹¹³ A world, in which we would know everything, would be a mere machine, devoid of freedom. It would be dead and frozen.

I venture to say that the need for security on the one hand and for mystery on the other, i.e. for the challenge by the unknown and the new, dominated man from the very beginning of history. They are no more and no less than the two constituent features of the human condition.

The paradox of our *conditio humana* is that we alternately - and with a kind of inner necessity - strive for security and for freedom, with these two elementary needs closely linked to the opposition of the object and the subject perspective. The contrast attains its maximum expression when man becomes a researcher, i.e. when he questions nature and himself not only intuitively like any layman but systematically. Psychology as a science would be of no avail if all our emotional or intellectual reactions were the result of mere chance, so that research would only meet with chaos instead of recognizable regularities. The same observation applies to sociology. And, of course, it is only worthwhile for neurological science to investigate the biological foundations of

the brain because it exhibits an abundance of such regularities (some of a law-like nature).

At this point the paradox becomes particularly clear. *The same neurologist who regards man as an object revealing to him an abundance of regularities or even laws, holds the second role of a subject when becoming aware of his role as their active observer and discoverer.* In this role, he not only feels free - he must be free, because otherwise his approach would be subject to an insurmountable contradiction. If the human beings he studies would be completely predictable - in popular diction bereft of free will -, then the same would apply to the observing researcher himself. In other words, he would condemn himself to the role of automaton controlled by impersonal laws. We have seen that his scientific statements would equally be conditioned by impersonal laws, which means that the distinction of scientifically true in contrast to false statements would become meaningless.

So long as science assumes that basically all human thinking and acting can be interpreted in a law-like way (provided we would only carry on our research for a long enough period), this paradox is unsolvable, because we are faced with an insurmountable logical contradiction. In our time it is fashionable to deny any credit to purely logical considerations. Scientists prefer to carry out physiological experiments like Benjamin Libet or turn to quantum physics to clarify the problem in a very elaborate and costly way.¹¹⁴ *But the elementary rules of logic and scientific truth are at the base of all research and experiments,* so the logical paradox remains crucial, even if its recognition costs us no more than a little more than average thinking ability.

The insight itself is unambiguous: *Even when discovering more and more regularities or even laws in the thinking and acting of man, it remains nevertheless evident that these rules and regularities never determine him completely.* Besides being

conditioned by rules or laws, our freedom originates from the opposition of subject and object perspective, both of which are inherent in each of us.¹¹⁵

Prescribed meaninglessness

Any human worldview has always been and remains holodox: it encompasses the whole as well as its parts. Until the European Enlightenment, the whole was understood as a divine power or God himself. From there, the parts received their sense of life and the ultimate goals they should pursue. Since the French Enlightenment, humans placed themselves at the center. Now the parts – individuals and states – derive their sense of life and their goals from this new center.

Initially, this shift of center seemed to yield no significant changes. The promises for the future remained equally optimistic. God had promised believers a paradise in the afterlife, provided they were willing to follow his commandments. Based on secular scientific knowledge, the Enlightenment now promised humans – all humans – a paradise on Earth. The success of this new promise was undoubtedly greater than that of religions, as it was visible to all. The majority of 80 to 90 percent previously toiling in agrarian civilizations could now lead a dignified life for the first time after over ten thousand years.

Yet, this success was not without controversy – the dark side of Fossil Revolution became evident to the world at the end of the twentieth century at the latest. Worldwide species extinction, resource exploitation, environmental pollution and climate change quickly turned the fervent optimism of the fossil era into militant pessimism, which saw its mission in saving the world.

Pessimism is nothing new, it had existed much earlier, already since the beginning of the Enlightenment. From the beginning, it

concerned the new doctrine itself: the meaninglessness of existence, which resulted from the scientific worldview. This fundamental flaw was disturbing as it had never afflicted religious creeds. God and his plan of salvation guaranteed the meaning of human existence together with that of the world. But where was the plan of salvation science could offer, abstracting from its concrete achievements? Could such a plan of salvation even exist?

In 1970 Jacques Monod's seminal book "Le Hasard et la Nécessité" (Chance and Necessity) was published, on the cover of which the renowned biochemist summed up in a single and concise formula the worldview which since the 17th century was to dominate first Europe and then the entire world. For objective science, so Monod's message, the world is *nothing but* chance and necessity. For there is nothing in the world but these two principles alone: on the one hand, necessity representing that order, which the natural sciences explore in the shape of laws, and on the other hand, chance, which denotes the void within this order - in other words, a meaningless nothing with which science does not know what to do.

Since the time when Monod established this formula, neurology has made tremendous progress, his book is certainly no longer "up to date", but the view that reality has nothing else to offer but these two dimensions has become even more entrenched. According to a now prevalent view, our world is made of calculable mechanisms of the physical and neuronal world, and the yawning emptiness of meaningless chance.

But is this worldview as unassailable as Jacques Monod and the mainstream of science believe? Undoubtedly, it is correct to concede that the exploration of order (laws) has always been the true task of knowledge. On the other hand, chance was perceived as so disturbing and superfluous that its very existence was called into question - and in two different ways. France's prince of

enlightenment, Voltaire, was convinced that chance was but temporary ignorance - it merely refers to what we do not know yet. This opinion can be based on solid arguments, because an infinite number of findings that still seemed random events to our ancestors - like for example cholera epidemics or lunar eclipses - can be deduced by modern science from quite specific causes and are thus conforming to definite natural laws. At first glance, it seems therefore quite convincing that all events we still call random are so only because of gaps in human knowledge. To the extent that the progress of science gradually fills these gaps with increased knowledge, we would be able to eliminate chance altogether and, in the end, recognize everywhere and at any time nothing but lawful order.

That had already been the conviction of Baruch de Spinoza and was likewise accepted by his great admirer, Albert Einstein, who famously expressed his rejection of chance: "God does not play dice." In other words, the good Lord creates order because order conforms to reason, order is rational. Chance, on the other hand, carries with it the odor of the worthless and the irrational. No doubt the idea that in chance we are encountering something quite useless and superfluous resonates in its disparagement.

However, this notion is based on a misunderstanding: chance is more than just a gap in our knowledge. Towards the beginning of the 20th century, it was physics, the supreme discipline of natural sciences, that was, finally, forced to accept randomness - the absence of order. The basic principle of classical physics, according to which every definite effect could be attributed to some definite cause, had to be abandoned. Werner Heisenberg (1959) expressed the revolutionary insight in the following way.

"Let us consider a radium atom, which can emit an α -particle. When we observe the emission, we do not actually look for a foregoing event from which the emission must according to a rule

follow... If we wanted to know why the α -particle was emitted at this particular time... we would have to know the microscopic structure of the whole world, including ourselves, and that is impossible."

Chance added the dimension of unpredictability to the world of classical physics, which up to then had been considered thoroughly predictable.¹¹⁶ Jacques Monod (1970) put this view in a nutshell when describing evolution (once understood as a process of divine creation) in the following way.

"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."

The French biochemist, would not have insisted so emphatically on the sole validity of this hypothesis, had he not kept its opponents in mind, the religious "animists", as he calls them, who want to give some ulterior meaning to the events of evolution. But this meaning, Monod adamantly insists, does not exist. The scientist, no matter whether physicist or neurologist, cannot see anything else in the history of dead or living matter but lawful mechanisms that owe their unfolding to blind, meaningless chance. And just to be absolutely certain that even the most stubborn reader correctly grasps the extent of such total absence of meaning, Monod refers to chance as mere 'noise'. "... we may say that the same source of fortuitous perturbations, of 'noise', which in a nonliving... system would lead little by little to the disintegration of all structure, is the progenitor of evolution in the biosphere and accounts for its unrestricted liberty of creation."

In these crushingly bleak lines, Monod summarizes the world-view of modern science. But in case they are not bleak enough, they may still be complemented by the passionate statements of Bertrand Russell, one of the most influential philosophers of science of the 20th century, alongside Karl Popper. Russell:

"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."

Such hopeless pessimism was new. According to the prophets and religious founders throughout history, a poet like Dante sat at the typewriter, composing the divine comedy, except that this poet was God himself, creating the cosmos according to a plan of salvation that his creatures may understand. *In the view of great thinkers since the 17th century, who no longer believed in a creative God, this role now fell to a monkey mindlessly hitting keys.* Over eons and eons pure chance mechanically generated the cosmos without meaning and purpose. Whereas to the religious view, God embodied wisdom and intelligence, the monkey symbolizes the exact opposite, embodied non-intelligence, a case for the madhouse.

In my opinion, both metaphors say more than we may legitimately assert, *the first cannot be proven, but the second must be labeled as incorrect – incorrect according to the standards of truth and of science itself.* The idea that God created a universe with a plan of salvation rationally accessible to humans was soon rejected by scientists. Giordano Bruno as well as the mathematician and philosopher Blaise Pascal were awestruck by the

boundlessness of a universe beyond all human comprehension. Even Albert Schweitzer, a great theologian and an even greater man, openly confesses to this insight with admirable candor.¹¹⁷

But what about the counter-image of blind and meaningless chance? It is by no means correct; we must even render a much harsher judgment. The image of a monkey mechanically hitting keys is simply "unscientific," and it remains so even if a great scientist, like Monod, merely insists on calling chance "blind" and "meaningless." Unscientific in this case means that we assert more than we can ever know. When attributing properties to some object we must, of course, be able to know it, in the first place. Yet, that is precisely not the case with chance. *We don't know what chance is, and we cannot artificially create it* (certainly not through so-called "random generators!").¹¹⁸

This is a simple and yet decisive insight. It states that we can form a mental image of chance only insofar as it represents the opposite of what we do and can know. *To human understanding, chance is the ultimate unknown, the inexplicable, something that science cannot fathom. In this sense, it remains an unsolvable mystery.*

The philosopher as well as the critical scientist therefore feel compelled to call Monod's worldview not only naive but scientifically untenable. The world is not a realm of meaningless chance and necessity, but *its two fundamental dimensions are order and mystery*. Reality presents itself to us in two ways: as the object of our (presumably infinite) knowledge, and at the same time as the unknown and unknowable - the limits to human knowledge being set by chance.¹¹⁹

Chance and the limits of science

The hurried reader may skip this and the following two chapters up to "Power Science and Power Religion". The interested reader will find in them the basis for an in-depth interpretation. Without a solution to the problem of freedom, our view of reality remains distorted. The following three chapters deal with the same basic issue in different ways.

Quantum physicist Anton Zeilinger, recently celebrated chance as the most significant discovery of the 20th century.¹²⁰ Doing so he directly opposed a tradition that goes back to the Babylonians and, of course, to all those practices spread all over the world, by which man wanted to find out the future by consulting celestial constellations (astrology), by examining the liver and other oracles, believing that the course of things was fixed since the beginning of creation. In the seventeenth century, this belief - for a mere belief it is - had been turned into a scientific dogma and decree. *Chance was not allowed to exist as it was considered a mere synonym for human ignorance.* Classical physics even gave a Latin name to this revolt against chance, it spoke of "determinism" - from Latin *determinare* - thus making the deterministic belief sacrosanct and unchallengeable for three centuries. When Professor Zeilinger calls chance the greatest discovery of the 20th century, I assume he meant to say that with this discovery three centuries of scientific misconception were finally laid to rest.

Fully developed we meet the nightmare of determinism already with Descartes (1595-1650) around the middle of the 17th century. *"I wish, therefore, that all the functions which I have attributed to this machine /a machine which exactly imitates the human organism/, such as the digestion of flesh, the beating of the heart... the perception of light..., the impressions of memory... the external movements of the limbs.... ; I wish, I say, that these functions be conceived in such a way that they arise in this*

machine in a quite natural way from the arrangement of the organs alone - just as the movements of a clock or other automaton arise from that of the weights and wheels." Descartes precedes all later scientists and thinkers in that from the outset he also declares man to be a machine (apart from the soul in the pineal gland. This concession could hardly be avoided, for Descartes had the funeral pyre before his eyes on which poor Giordano Bruno had been burned).

Leibniz remains faithful to this line. *"Everything comes about by necessity; this is as certain as three times three is nine. That is because necessity makes all things follow each other like in a chain so that what still must happen will happen in a definite way, while what has already happened could not happen otherwise.... so that you only need a sufficient insight into things combined with an appropriate degree of memory and reason in order... to be a prophet who, looking at the present state of things, would foresee all their future relations like in a mirror."*¹²¹ A century later, David Hume (1779) expresses himself in the same manner: *"Look round the world, contemplate the whole and every part of it: you will find it to be nothing but one great machine, subdivided into an infinite number of lesser machines."* His younger contemporary, the French mathematician Laplace (1886), only repeats the central idea of Leibniz when he asserts: *"An intellect, which, at a certain moment, would know all forces that set nature in motion, and all positions of all items of which nature is composed, if this intellect were also vast enough to submit these data to analysis, it would embrace in a single formula the movements of the greatest bodies of the universe and those of the tiniest atom; for such an intellect nothing would be uncertain and the future just like the past would be present before its eyes."* And even in the twentieth century, long after the findings of quantum physics, Bertrand Russell (2004) continued to cling to the common dogma

of classical physics. *“It is thought that matter consists of electrons and protons, which are of finite size and of which there are only a finite number in the world... The laws of these changes can apparently be summed up in a small number of very general principles which determine the past and the future of the world when any small section of its history is known.”*

Werner Heisenberg (1959) was one of the first who considered the world view of classical physics to be obsolete due to the new findings of quantum research. He provided concrete reasons for this rejection. *“A radium atom, for example, can emit an /alpha-/particle. When observing the emission of the alpha-particle, the physicists... no longer ask for a preceding event... Logically it would be quite possible to look for such an... event... Now, why has the scientific method... changed in this very fundamental question?... If we want to know the reason why the alpha particle was emitted at this very moment, we would have to know the microscopic state of the whole world, of which we ourselves are a part, and this is certainly impossible.”*

Fritjof Capra and the followers of the New Age movement took up this idea with enthusiasm. They believed they had discovered a fundamental turning point that would split the history of science in two parts, as it were: the previous age of the mechanistic worldview and the new age of indeterministic quantum physics. Even people who understood next to nothing about quantum physics were intoxicated by the "Tao of physics" and believed that this was something like a doctrine of salvation. Classical physics had turned the world into a dead mechanical clockwork, but the new physics would give freedom and life back to it. Rarely did scientific findings, the understanding of which largely eludes the layman, have such an immediate and strong effect on thinking.

Professor Zeilinger speaks of a significant “discovery”. But chance can by no means be discovered in the same way as the physicist discovers a new element in the periodic system or the biologist discovers a new species. Of course, everyone who is not a trained physicist let alone a member of the elite of quantum researchers, lacks the necessary competence to comment on the subject. But everybody may quote the opinion of competent scientists. And here again we may turn our attention to Werner Heisenberg. In the above-quoted passage he says literally that “*logically it would be quite possible to look for such an... event...*” /that is for a cause/ preceding the emission of an alpha particle. If we don’t do so it is because “*we would have to know the microscopic state of the whole world, of which we ourselves are a part, and this is certainly impossible.*”

This is quite an astonishing explanation indeed! *The reasoning of the quantum physicist Heisenberg, who helped chance make its breakthrough in physics, is almost identical to the reasoning of the classical physicists who so persistently denied it.* Laplace explicitly said that an intelligence which at a given moment surveys the whole world so that it grasps all the forces at work - that is, a divine intelligence far superior to man - would recognize strict causality in all events: every cause would have its necessary effect and every effect its necessary cause. Heisenberg does by no means reject this argument. Instead, he maintains that it would still be logical to look for causes. If we refrain from doing so in the case of radium emissions, it is because human intelligence is far too limited. Thus, for Heisenberg, determinism does not fail in any fundamental way – certainly not because of logical untenability - but *only because human intelligence is incapable of grasping the whole.*

The man considered to be the greatest physicist of the 20th century, Albert Einstein, had never given up determinism anyway.

With his famous dictum *God does not play dice* - in which he probably oriented himself on Spinoza, whom he particularly admired - he went even further than the mathematician Laplace. Einstein imputes to God the intention to have constructed the universe as a calculable machine where chance can have no place at all. Following Werner Heisenberg and Albert Einstein, we must conclude that even modern physics never really invalidated the deterministic world view.

These considerations take us very close to the motif that prompted scientists since the 17th century to imagine the universe as a deterministic machine. They had to do so if science was to replace and supersede religion. For God there can be no chance, because as the creator of all things he knows their future course in all eternity. Therefore, in science too, chance was not allowed to exist, because otherwise scientists would have to admit that their knowledge was limited in scope and could never equal that of religions.

Classical physics owes its origin not to experimental evidence – neither a single nor all experiments taken together can ever provide a logical proof of determinism. It owes this origin to unscientific wishful and delusional thinking. *The scientist as a reborn Homo Deus would one day be able to grasp reality as a whole; he would explain everything because he would discover the causal mechanics hidden in all things.*

Delusions can be very powerful - even if thoroughly distorting reality. Anton Zeilinger, the Nobel Prize winner, is undoubtedly right when he assigns such a significant role to chance. But Werner Heisenberg and Albert Einstein are also right when they insist that there can be no empirical proof for chance, because, after all, a superhuman intelligence might still be able to trace back every event to a cause. So, is the question undecidable? Will we never be able to answer it?

Austrian biologist Rupert Riedl (1988) made exactly this point when he wrote “*but... no organ seems to have been formed that is capable of directly proving chance.*” In his words, we are programmed exclusively to recognize order, that is the laws of nature, and to make use of them, because this is necessary for human survival. The recognition of chance is without survival value. It merely designates the blanks between laws. This argument is still along the lines of Monod and Russell. Is it truly indisputable?

Truth and delusion in science

What about reality itself, if we leave aside three centuries of deterministic delusion and wishful thinking? The fact is that without this blinker we get a completely changed perspective. Chance is an omnipresent reality - none of us can predict our own actions and thoughts even for the next day as exactly as it is true for many lawful phenomena of nature. Of course, such a statement is merely based on intuition. But we already did go much further by proving that *the investigation of calculable regularities (laws) in nature gets its meaning solely by the fact that we may use these laws for human purposes by applying them - in an arbitrary, i.e. basically incalculable way - to bring about desirable effects.*

This is what physics and with it all sciences researching for laws have been doing for three hundred years. They explore thousands of laws to construct pumps, railroads, radios, airplanes, computers, cell phones etc. on the basis of recognized laws; but they do this solely for the purpose of opening up new fields of activity *for human freedom.* Freedom, however, is nothing else than that unpredictable and incalculable dimension which in nature outside of ourselves we call chance.

It seems important to me to illustrate the fundamental and, at first sight, by no means self-evident relationship between

necessity and freedom (chance) by a concrete example of such a simple kind that everyone understands it immediately. The example illustrates the elementary logic on which even the most complex science is ultimately based. It can hardly be surpassed in its ordinariness because it describes the typical situation of a scientific experiment and our search for truth.

A group of scientists have calculated the trajectory of a rocket to the moon. If their calculations are correct, its launch at time 't' from location 'l' will certainly lead to the spacecraft arriving at the target point at time 'tn' and location 'ln'. Due to the fact that since Isaac Newton the trajectories of earthly and celestial bodies can be calculated with increasing accuracy, scientists may be confident that their predictions will come true. At some point, such missions cease to be experiments to confirm (or falsify) recognized laws, but instead become routine processes based on well-established knowledge.

At the end of all preparations, it is a person named Mr. So-and-so who stands in the control room, counting down three, two, one, zero, and finally presses the red button that ignites the rocket and sets its precisely calculated flight in motion.

So far, everything seems perfectly clear, trivial, and simple - yet at this very point, we are confronted with the fundamental problem of human knowledge. We would acquire total knowledge only if apart from accurately calculating and predicting the trajectory of the spacecraft, we would also know (and could therefore predict) when and where which person will press the button. Total knowledge would furthermore imply that we could predict which societies at which historical moments will decide on a lunar mission. With such total knowledge, the entire future would be known to us - not only to the extent that it can be derived from lawful processes in nature but also because we could predict human intentions and actions.

At this stage, an all-knowing science would indeed occupy the role of an all-knowing God. This was the vision of determinism constructed in competition with God's omniscience from Laplace to Russell and Albert Einstein. It was and is the quintessence of a world view for which chance and freedom do not exist. And it is precisely this line of thinking that gives rise to the irresolvable paradoxes mentioned above. An omniscient neurologist could predict his own discoveries, i.e. the future functioning of his brain, since its course is also determined, i.e. governed by laws.

Still, an important question remains to be answered. What do we gain from considering chance a necessary component of reality, since our search for laws would otherwise be meaningless? What are the changes in our worldview when we realize that most events in our lives and in the unfolding of nature obey randomness?

First and foremost, we distinguish our potential knowledge from our fundamental lack of knowledge. The stages of development from the point zero of undifferentiated primordial plasma about 14 billion years ago to our present time, where fantastic things like bloodthirsty ticks, Mozart's musical world, and a human consciousness reflecting this existence have emerged from this primordial matter – this process we may depict by means of a potentially infinite knowledge, as it allows us to delve deeper and deeper into any level of detail and doesn't even end with the present, given that evolution may continue indefinitely. On the other hand, *the evolutionary process is merely known to us as something given. Why it unfolded the way it did, why it happened this way and not differently, that "why" remains a mystery.* From the properties of undifferentiated primordial plasma, we can neither “derive” the bloodthirsty tick, nor the wonderful C-major Piano Concerto No. 21 by Mozart, nor even the human consciousness in which the world would once reflect. And this impossibi-

lity of derivation does not only apply to the creative process of evolution as a whole but also to each of its individual stages.¹²²

The disparity between facts and explanation is evident at every stage. *Our knowledge of facts may be infinite, but our explanatory knowledge is extremely limited in comparison.* Even if a Mozart scholar knows all the musical influences the composer was exposed to during his time and knows every detail of his life down to the type of coffee he consumed on the day of composition, this factual knowledge – no matter how extensive – cannot explain, let alone derive, the wonder of this composition.

If, as Professor Zeilinger says, the greatest discovery of the 20th century is chance, then another equally significant discovery must be added to this statement. Just as chance stands as the second ontological dimension next to necessity, so does non-knowledge stand as the second epistemological dimension next to human knowledge. *Science may acquire potentially infinite factual knowledge about the world, but its lack of explanatory knowledge extends just as infinitely.* All creative processes, whether in natural evolution or in the life of individuals, point to the unpredictable, the unexplainable, i.e., to non-knowledge.¹²³ We may speak of "élan vital," the vital force, as Henri Bergson did. Regarding the artist who creates a poem, the musician who composes a piece or the scientist who makes a discovery, we may further speak of "inspiration", but in doing so, we merely apply a convenient label to our fundamental *lack of knowledge*.

It is foolish, however, to call chance blind, as did great and astute scientists like Jacques Monod and Bertrand Russell. If our explanatory knowledge fails before the unknowable, if we are blind to it, that is not a reason *to devalue the unfolding of reality itself as blind and meaningless*. The randomness that allowed human consciousness to emerge from undifferentiated primordial plasma is neither blind nor meaningless. It would be more

accurate to call this process *an incomprehensible miracle, the subject of never-ending amazement*. The most foolish thing we can say about it is if we use the image of a monkey typing Dante's *Commedia* into a machine "randomly" bringing about the unfolding of the universe. In this case, we pretend to know how the miracle comes about. But that is by no means true. Chance is synonymous with human non-knowledge.¹²⁴

Once we leave behind the talk of blind and meaningless chance, we are left with only two options: Either we give up our desire for total explanation or we accept the image of some higher intelligence. The determinists of the 17th century did not want to tolerate God at the top of creation. Such a supernatural being could have arbitrarily intervened in earthly events at any time through miracles and thus overrule the laws of nature.¹²⁵ But this is not an evident conclusion. We have seen that *science must assume as logically necessary that humans use natural laws (the predictable order of nature) in unpredictable ways for their own purpose. So, humans are not acting against the laws of nature; they simply prove that alongside these laws, there exists an equally large realm of chance*. Assuming that God would be more than a mere metaphor and a mere result of human speculation, his actions would remain just as hidden supposing that he constantly interferes with earthly events (without violating the laws of nature). These actions would be just as unpredictable; indeed, *we would not even be aware of them*.¹²⁶

Power-science and power-religion

Let us summarize: The Enlightenment spread truth as well as delusion. Out of ideological bias, it did not take seriously its own grandiose concept of truth. That shortcoming transformed it into a double-edged sword. Initially, it simply denied the existence of

chance as it did not fit with its conception of God-like scientific omniscience - chance (freedom) imposing insurmountable limits on human knowledge and power. When science was finally forced to acknowledge its existence, this resistance still did not abate. By labeling it as “blind” and “meaningless” evolution became the work of a monkey randomly pressing keys.

Admitting its own ignorance has consequences for religion too. If God created the world, then a critical believer like Albert Schweitzer had to admit that he is unable to understand the meaning and purpose that God gave to his creation. This admission does not imply that meaning and purpose do not exist. After all, *there is a fundamental difference between something not existing as such or not existing for human cognition.* The Austrian biologist Rupert Riedl found the fitting analogy for this difference. *"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."* Science is now capable of explaining countless things in ever greater detail, such as why a bee stings us, a volcano erupts, or how a cellphone works, but it cannot tell us why this world and its order exist at all, and what meaning we should assign to human existence.

Religion and science share the potential to become either *power religion or power science*, claiming to know more than they possibly can. Religion then masquerades as science, while science mutates into religion. Both seek to provide comprehensive, total explanations. Throughout history, power religion believed it knew the goals and purposes of an almighty God. Similarly, power science either insists that future science will eventually be able to precisely predict all possible events (as does the perfect intelligence envisioned by Laplace in the early 19th and by Russell in the 20th century), or it acknowledges the existence

of chance and then dogmatically asserts that chance dooms the world to meaninglessness.

The moment science took this path, it resembled its adversary, becoming dogmatic power science. Both behave in an astonishingly similar way towards their critics. The church of the all-forgiving Jesus Christ, who preached a religion of love, had pyres burn for centuries to destroy heretics. Power-science uses more subtle means, but destroys its opponents equally mercilessly. Instead of “heretical” the ban that it hurls at critics is called "unscientific". Anyone bearing this condemnation is not a thinker who should be taken seriously. For those who believe that truth can only be found in the measurable and in experimentation, philosophers are particularly prone to the suspicion of being "unscientific".

Yet, there were always critical scientists who took a different path. From purely logical considerations, mathematician Kurt Gödel concluded, that no system can transcend itself - due to inherent incompleteness (incompleteness theorem). If a system still attempts to do so, it behaves, as pointed out by Rupert Riedl, like a police dog imagining the international drug scene.

In contrast to power religion, which, as Albert Schweitzer criticized, gives us an unproven optimistic worldview, power science offers people an exceedingly gloomy perspective. Can there be a more desolate vision than the *philosophy of Nothing-But* where humans and the cosmos are *nothing but* mechanisms determined by blind and meaningless chance? And could one deviate more sharply from the principles of science itself? Because that's the kind of valuation scientists usually refrain from, when for instance describing the combination of H and O to H₂O. There is no talk of greatness or desolation – the phenomenon is simply presented as a trans-moral fact. Science cannot do more if it does not want to slide into ideology.

If we refer to chance as a mystery, *that does not constitute a judgment but a statement of fact*, as we don't know what chance “really” is, apart from it representing the opposite of all recognizable order. Thus, we must firmly reject the worldview of Monod, which is also that of most scientists today, and replace it with a different one. Reality is an architecture of unknowable mystery and knowable order - whereby the latter too remains an inexplicable fact.

This insight is new only for power science and power religion. *Critical religion*, exemplified by mystics like Meister Eckhart has always been aware of it. And so has *critical science* represented by men like Kurt Gödel, William James, the supposed positivist Karl Popper, Karl Jaspers, biologist Rupert Riedl (and many others). But due to the fear of admitting their limitations, power religion and power science insist on total explanation. The first does so when pretending to know the divine plan of salvation, the other when it devalues the world into nothingness.

The dogmatism of power science is refuted in still another way. It would have sufficed to seek the mystery of chance within ourselves. Evolution takes place here and now, in every living being. The moment we explore it within ourselves, we experience it not as meaningless but on the contrary as the essence of meaning - for instance in music. Its elemental effect on our psyche is based on resonance, recognition. We love the beauty of musical architecture, a sonata by Mozart or Bach, not merely because it comes to us as an external sequence of tones but because the elements of such order are already within us, leading to a feeling of reunion and recognition. Musical enjoyment comes from both external and internal sources. Without resonance, that is without our active participation, music would have no effect on us.

But music is far more than just a certain order or architecture that we have internalized as part of our culture; it is at the same

time an outbreak from this order, an unpredictable play with basic architectural elements. Music becomes poor, boring, or kitschy when it seems predictable, lacking new tonal or rhythmic elements. Great music surprises us precisely because we constantly discover what we already know, yet find it utterly unpredictable, as we can't foresee or calculate the incoming inspirations, variations, and sudden discoveries. *In this context, unpredictable freedom (chance), when experienced firsthand, gains a superior quality. We perceive it as the highest meaning, revealing itself as a source of happiness. It reveals itself as liberating creation – not of meaninglessness but of unsuspected abundance.*

This applies not just to music but to all cultural creations, representing our human contribution to evolution. Such happiness and abundance remains a mystery we cannot submit to any formula, yet its impact is no less real. Real enough, in any case, to significantly modify Monod's bleak worldview, which largely prevails today.

21. century: the Postfossil Era

From a holodox perspective, Fossil Revolution has established an era of imbalance. Through the privatization of power, the parts have become autonomous compared to the whole. They have developed a momentum that not only disrupts the relationship with the whole but threatens to destroy it altogether by rendering the globe uninhabitable for humans. The mass extinction of our fellow creatures proves that Faber has become a disastrous destroyer for many other species.

Simultaneously, this era has - in a truly fantastic way - exponentially increased our knowledge of nature and humanity, complementing this knowledge with corresponding skills in almost all fields. *All the problems mentioned in the previous chapters, including those that threaten mankind's very existence, could be eliminated almost overnight, at least within one or two generations, with the help of our superior knowledge and skill.* Even with its hope-inspiring abilities, our time stands out above all others.

So what should we call this new era? Should we allude to the threat associated with it or to the hopes it has to offer? For lack of a better term, I would like to call the coming epoch "post-fossil", since we know with certainty only of that characteristic which it should not have - we will have to do completely without the burning of fossil fuels.

Let me illustrate the incredible prospects offered by our outstanding knowledge and skills with a few examples. First, consider the problem posed by the so-called *population explosion*. It may sound unbelievable, but the statement is by no means exaggerated that *we could eliminate this problem in a completely painless manner within two generations, without causing harm to any individual, and without humanity being plagued by disasters such as wars, pandemics, famines, and the like.*

Let's not forget that the various disasters just mentioned have historically been nature's preferred instrument for rectifying population imbalances. Prominent American anthropologist Marvin Harris attributed endemic wars in so-called primitive societies primarily to the competition for food, which always became particularly intense when there were too many mouths to feed and a meager food supply. Famine was the sad norm in large agrarian civilizations until the threshold of modern times.¹²⁷ Towards the end of the 18th century, Thomas Malthus still assumed that population growth would occur in geometric progression, while the supply of food could at best be increased arithmetically. At the end of the 18th In his book "Söhne und Weltmacht" (Sons and World Power), German sociologist Gunnar Heinsohn (2006) reached similar conclusions regarding the states of North Africa and the Middle East.¹²⁸ And a critical observer like Bertrand Russell (1952) had already in 1949 warned of the dramatic consequences of a continuously increasing world population. If humanity couldn't limit its own numbers through rational planning, then nature would do it instead through wars, famines, and epidemics. The large streams of refugees that besiege the gates of Europe and the US are partly due to the fact that ever larger parts of the globe are no longer able to adequately feed the people living there. If the rich countries, whose ecological footprint is far too heavy for this planet, were to operate sustainably, the same conclusion would apply to them too.¹²⁹

So, we certainly describe Faber's past quite correctly when we conclude that an increase in population over the available food supply has generally been brought back to equilibrium in bloody ways. Furthermore, it seems obvious that the climate crisis will substantially increase this threat.

That's why it may seem like magic that, for the first time, Faber's knowledge and skills offer him the opportunity to significantly reduce population in the shortest possible time and without physical pain. Less people inhabiting the globe may, of course, substantially reduce their carbon dioxide and other toxic emissions, revitalize biodiversity, and eliminate almost all the damage done to nature and fellow humans. They may even do so while significantly increasing wealth!

This doesn't require a miracle if man decides to use existing knowledge and skills. If all women in all countries use contraceptives, then the world population could be reduced from eight billion to, let's say, two billion within two generations, without a single casualty in the process. On the contrary, millions of people who would otherwise be condemned to painful deaths from wars, hunger, and malnutrition would be spared. The pressure on nature would decrease dramatically, just as it temporarily decreased during the COVID-19 pandemic when there was hardly any traffic on the streets in areas most affected. After relinquishing uncontrolled growth, the remaining population would undoubtedly be much wealthier, as they could utilize all the devices, buildings, land, and resources now freely available for their use.

But how realistic is the assumption that humanity will use its knowledge and embark on this path? The fact is that it has already done so in the most populous country, China, three-quarters of a century ago, in China. At that time, the leadership recognized that any increase in prosperity was quickly offset by uncontrolled population growth. That is why the ruling party limited fertility by imposing a strict one-child policy, which soon proved to be a historically unique success. Not least because of this policy, China became what it is today: a world power that has, arguably, already surpassed the United States as the leading economy.¹³⁰

Undoubtedly, its one-child policy saved China from those regular outbreaks of famine and wars, which it had suffered from in the past. By this measure alone it immensely alleviated misery and enriched the country. However, this policy, although entirely bloodless, had to be enforced from above with constant surveillance since people perceived it as a severe infringement on fundamental rights. Until today, the freedom of the individual to reproduce at will is understood as a fundamental right - even if it results in a catastrophe for one's country and for the rest of mankind.

In fact, voluntary and peaceful population reduction would be the most beneficial measure for the good of the planet and its inhabitants. It need not even change the existing balance of power if all nations participate proportionally. Nevertheless, any observer informed about the present world situation will smile at such a proposal as totally unrealistic, if not simply fantastic. To this day, we are incapable of applying our knowledge and skills for the benefit of the whole.

Transportation

Let's explore another example: the decrease of the climate pollutant CO₂ through a drastic reduction in transportation. In the Federal Republic of Germany, with its approximately 80 million inhabitants, there are currently about 60 million cars in use. If we subtract the young, not yet capable of driving, and the elderly no longer able to drive, there is almost one car for every resident. In China, almost half of the German car fleet entered the market as *new cars* in 2016 (approx. 24 million), i.e. during merely a single year.

Where this development will lead is easy to see. As soon as the whole of humanity achieves the same luxury for itself as the

Germans, five and eventually up to ten billion motor vehicles will be driving the globe instead of today's approximately 1.3 billion - and all of them will require energy, up to now mainly oil. Currently, transportation accounts for approximately 15% of global fossil energy consumption. Cars thus significantly contribute to the greatest crisis of our time, climate change. If the number of passenger cars multiplies by a factor of ten in the coming decades - a development that Western car companies and the previously disadvantaged citizens of developing countries are vigorously promoting - there will be no escape from ecological collapse.

The taxation of fossil fuels combined with tax incentives for electric power is not a solution because it creates social imbalances. As long as renewable energy is only available to a modest extent while electric cars are still much more expensive and their costly batteries become unusable after a few years, this alternative is out of the question for the majority.

On the other hand, humanity will still need this means of transportation in the future. The simplest solution - giving up cars altogether - is hardly an option in modern societies where places of work and residence tend to be far apart. Even public transportation can only partially meet the need for individual mobility. Many have long called for the expansion of public transportation systems, which have been relegated and, in some countries, even neglected to the point of decay due to the prevalence of automobiles.¹³¹ Expansion will undoubtedly be necessary, but by itself does not provide a solution to the problem, as a public transportation system connecting every point to every other would become unwieldy. Expansion makes sense only where the largest human flows occur; all other routes must be covered by other means: walking, cycling, or using cars.

An ecologically satisfying solution to the problem lies in our current knowledge and abilities. It has been made possible by a

technological breakthrough achieved in this century: by artificial intelligence. (AI). This technology offers us a solution that effectively complements public transportation, significantly reducing resource consumption and potentially decreasing the number of necessary cars - all without compromising freedom of movement. Technology offers us a solution that complements public transport so effectively that resource consumption is decisively curbed, and the number of cars needed can be reduced to about one tenth - all this without sacrificing freedom of movement. This requires five technological innovations:

1. Electric cars with a minimum range of four hundred kilometers.
2. Driverless autonomous control of these cars to and from any point connected to the public road network.
3. Artificial Intelligence to control these cars.
4. A widespread G5 system enabling control in conjunction with onboard computers.
5. Mobile devices allowing every citizen to order such a car and specify their destination at any time.

We know that private cars remain idle for approximately ninety percent of the time, which means that their number may be reduced to one-tenth when all are in constant use.¹³² This principle has already been tried and tested in many cities on electric scooters and to some extent on bicycles, albeit in an imperfect way, because scooters and bicycles have to be parked somewhere - they cannot be summoned by the customer on request. With cars, this becomes possible. The nearest unused vehicle may be called by the customer and autonomously driven near to him.¹³³

Conclusion: The entire car fleet in Germany consisting of approximately 60 million cars may be reduced to about one tenth

without citizens suffering a loss of mobility, and the same reduction may be applied to the rest of the world.¹³⁴ CO₂ emissions would be reduced to one-tenth, even if the fleet continues to operate on fossil fuels for the time being.¹³⁵

*This could indeed be a beneficial measure for the planet and its inhabitants. It will not even change the existing power balance between states if all participate proportionally. Nevertheless, any informed observer of the current world situation would dismiss it as completely unrealistic, if not simply fantastic, because it would be perceived as a serious blow to car industries, employment, salaries etc.*¹³⁶ Conclusion: to this day we are incapable of applying existing knowledge and skills for the benefit of the whole.¹³⁷

Farewell to Disposable Society

Radically altering production and consumption practices within a conventional framework would be akin to trying to climb up a down escalator. *Paul Raskin*

Modern throwaway society is responsible for rapid resource depletion and environmental pollution that, if not stopped in time, will inevitably lead us to ecological collapse. Here again, available knowledge and capabilities offer a solution that is as straightforward and effective as the one proposed for transportation: equivalent performance with minimal resource consumption.

The required strategy is by no means revolutionary, as it will be immediately understood by everyone, but its practical application would have revolutionary consequences because *it goes against the practices of disposable society and the prevailing imperative of growth*. We need a transition to durable and repairable products, a shift towards an economy that aims for sustainability

rather than novelty. Regarding cars, we saw that there would be no compromise in mobility if we reduced the existing fleet to one-tenth. Similarly, we do not need to lower our current standard of living when applying the same limitation to all other products!

This time, the limitation does not concern the quantity of currently available products but the quantity of goods used over an extended period - it is achieved by *significantly increasing their lifespan*.¹³⁸ Assuming that, on average, all products have a lifespan ten times longer, *the effect is the same as a tenfold reduction in population*: we would need one-tenth of the energy and raw materials for their production.

Technically, it is already possible to exceed this factor of ten by a significant margin.¹³⁹ The oldest Egyptian pyramids are nearly five thousand years old; until the start of the industrial revolution, the wealthy all over the world placed a great emphasis on the durability of their property, whether it be castles and palaces, swords, furniture, or other items of everyday or lifelong use. As for the poor, it went without saying that they maintained and preserved their few possessions for as long as possible.¹⁴⁰

Our modern buildings and consumer goods could also attain biblical ages, especially if all devices are designed in modular fashion, making it easy to replace faulty components. Currently, this is not the case. Rather, industry and trade are interested in the exact opposite of durability; they aim for the shortest lifespan possible – at least so long as such a policy can be maintained in global competition. Whether it's mobile phones, computers, toothbrushes, razors or television sets, durability goes against the interests of producers because it reduces sales. The faster a product turns into waste, the sooner a customer will replace it with a new one, leading to higher profits and growth.

If German industry were to increase the durability of all products by a factor of ten, then economic output and income could

likewise shrink up to a tenth; if, conversely, it were to reduce durability by half (in agreement with global competitors), economic output and income could double - *growth through greater waste production*.¹⁴¹

The connection is so obvious that we easily understand why companies are so eager to introduce their products with ever-changing, new designs. Using sophisticated techniques of psychological and aesthetic seduction, sometimes even with the help of advanced technical intelligence, both the economy and society work together to make resource conservation through reduced consumption appear as an elusive mirage. Nor should we forget that it is precisely the fastest-growing companies and countries that have the greatest scope for research and innovation. *In fact, our generally so dubious progress is closely intertwined with throwaway society*. At the moment, this can be observed most clearly in China. The far eastern giant is always waving its green cloak, but at the same time it is not only fueling the consumption of 1.4 billion people at home, but also everywhere else in the world through the forced export of its products.

In this context, it is important to maintain perspective because it would not be fair to solely blame the economy (capitalism). Ultimately, the economic life rests on an openly assigned mission from society and the state. Short product lifespans mean higher sales, greater economic output and growth - which in turn leads to higher salaries for all working people. What sense does it make if, on the one hand, government tries to attract companies with high subsidies and tax breaks, but at the same time imposes a shrinkage cure on them with regulations on the durability of products? The *citizen as a consumer* might welcome such measures. When asked about their preferences, most consumers would likely vote for durable products and enthusiastically welcome the resulting reduction in waste. On the other hand, the consumption

of these same citizens depends on their available income – and they earn this income as employees of the companies selling such products. *The position of the citizen as a worker or employee is, therefore, opposed to that of the same citizen as a consumer.*¹⁴²

However, what tends to be overlooked in such assessments is the balance between profit and loss. It is true that an increase in the average lifespan of all products, say, by a factor ten, would lead to a corresponding shrinkage in economic output and income - in extremis to a tenth, if sales decline accordingly.¹⁴³ But after such a radical transformation, each product will be purchased much less frequently - for example, only once every ten years instead of every year as before. Therefore, for the individual citizen, there is neither a profit nor a loss: they now get by with one-tenth of their original income. Therefore, they do not need to make any compromises on their accustomed standard of living. *Negative growth – or degrowth as it was called by Herman Daly - does not necessarily result in a lower standard of living.*

On the contrary, such a simple measure *raises the standard of living* because it ends the war against nature. A sick industrial economy that systematically engages in resource destruction and pollution has become a sustainable one, where services for maintaining health and social cohesion largely replace the production of material goods. Such a service-oriented society preserves nature while people still enjoy prosperity.¹⁴⁴ The overall effect achievable through significantly extended product lifespans is substantial enough to avert ecological collapse, provided it goes hand in hand with a transition to renewable energies.¹⁴⁵

*This measure would, indeed, be a blessing for the planet and its inhabitants. It will not alter the existing power balance between states if all participate proportionally.*¹⁴⁶ However, anyone informed about the current world situation will dismiss it as

entirely unrealistic, if not simply fantastic. Again, we are incapable of applying our knowledge and skills for the benefit of the whole.

The British war-time economy model

We have seen: a painless reduction in fertility saving an infinite amount of suffering, has been carried out in China; the reduction of traffic may be achieved by means of existing high-tech in a similar way as it is now realized with electric scooters and other borrowable driving devices. Ulrike Herrmann is to be thanked for drawing attention in her book "The End of Capitalism" to an economic model that implemented a radical restriction of production and consumption in a similar painless way, indeed in a way that was extremely popular among the citizens affected by it: the sacrifice met with general approval.

While Hitler was invading England with his blitzkrieg, "*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, /however/ it will not work without interdictions. 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... government-imposed egalitarianism proved a boon: 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, with the fitness of babies and schoolchildren particularly standing out... Consumption fell by a third then - 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."

Not only German consumption but the consumption of all countries operating above sustainability would have to be curtailed in this way and much more - and such a curtailment would be quite possible, as shown above, but is it feasible given the prevailing circumstances?

In fact, the introduction of the British war-economy model would be a beneficial measure for the good of the planet and its inhabitants. It would not change the existing balance of power between the states if everyone participated in it proportionally. Nevertheless, any observer informed about the present world situation will reject it as completely unrealistic, if not simply fantastic, because it consists in sacrifices, which – under present circumstances - no nation is willing to accept in times of peace. Once again, it seems evident that we are incapable of applying our knowledge and skills for the good of the whole.

Nuclear Arms

If this deliberately repeated refrain still does not make sense to you, I would like to open your eyes with an even more drastic example. For none highlights the vulnerability of our world and the threat to our existence as drastically as the global arsenal of nuclear weapons, which we almost completely delete from our everyday consciousness. The United States, Russia, France, China, Great Britain, India, Pakistan, Israel, and North Korea possess an arsenal of approximately 6,450, 6,850, 300, 280, 215,

130-140, 140-150, 80, and 10-20 nuclear warheads, respectively. This adds up to a total of about fourteen thousand bombs.¹⁴⁷ The full significance of this number only becomes apparent when compared to the statement by U.S. experts that the modest quantity of a total of three hundred nuclear bombs would be more than sufficient to deter any potential adversary from attacking the United States. A retaliatory strike with three hundred bombs would render its own territory uninhabitable for centuries.

It is true that the United States and Russia, by mutual agreement, succeeded in temporarily interrupting the arms race. In the U.S., the nuclear arsenal was reduced by 85% compared to 1967, in Russia by 89% compared to the maximum in Soviet times. This was a historic breakthrough, a temporary victory of reason and goodwill. There are now 54,000 fewer nuclear bombs than in 1986, which is remarkable even when one considers that three hundred bombs would have sufficiently contaminated the earth anyway, and that much was scrapped that had already become unusable through obsolescence.

But reason unfortunately got stuck halfway. The goal of progressive reduction leading to a complete abolition of the nuclear arsenal, to which the nuclear powers had explicitly committed themselves in Article VI of the 1968 Treaty on the Non-Proliferation of Nuclear Weapons, remains a dead letter to this day. Instead, it seemed obvious from the outset that any power venturing too far in reducing its weapons becomes vulnerable and disadvantaged relative to its rivals. That is why the arms race is now taking place again. Defense expenditures for the purpose of modernization and innovation are being further escalated – especially since the time of Donald Trump. The world collectively spends nearly \$1.7 trillion on arms - about 70% more than at the beginning of this century, or as much as the entire GDP of Canada.

A further disturbing factor is *the increasing likelihood of an accidental technical mishap*. Mere probability becomes almost certainty in a polycentric nuclear-armed world where more and more nations acquire the end-time weapon. In 1983, the planet narrowly escaped a first strike by the Soviet Union.¹⁴⁸ As Noam Chomsky rightly states, it is almost a miracle that a nuclear war has not yet occurred. In fact, we must expect that due to mere chance or human error, "something will happen," because the carriers of the bombs - supersonic rockets - become faster and faster with each generation, thanks to our remarkable technological progress.

This is by far the greatest danger, as the warning time for their impact is consequently reduced. In the event of a first strike by the adversary, neither Americans nor Russians still have half an hour to decide, as they did a decade ago; this already minimal time frame has now (depending on the rocket's launch position) shrunk to fifteen to five minutes.¹⁴⁹ Within this minimal time interval, the Russian or American president must determine whether his country is faced with a deadly attack warranting an immediate counterattack, or with nothing more than false alarm. Obviously, such a brief time frame is insufficient for human decision-making – especially since it will continue to shrink in the future due to inevitable "progress."

In concrete terms, this means that *the president and his advisory staff can no longer respond to the challenge of a first strike – they simply lack time*. The decision about whether to ignite global fire or not must therefore be left to computer systems and the monitoring systems from which they receive their information!¹⁵⁰ This is where the real danger lies. The prospect that the fate of humanity will soon be entrusted entirely to machines rather than humans is probably the most distressing of all future

perspectives because machines are fundamentally indifferent to our fate, and they are, of course, fallible.

Yet, even in this case, knowledge and capability provide us with clear directives. Humanity would only need to decide to collect all nuclear weapons under global supervision on a specified date and properly dispose of them. Then, the currently greatest threat would be eliminated without altering the existing power structure to the disadvantage of any country. Such a measure would trigger global jubilation because it corresponds to what universal moral conscience commands us to do for the benefit of mankind.

This would be the most beneficial measure for the well-being of the planet and its inhabitants. Nevertheless, any observer informed about the present world situation will judge it as completely unrealistic, if not simply fantastic. Under prevailing circumstances, there is not the slightest prospect of its realization. Once again, we must admit that we are not capable of applying our knowledge and skills for the benefit of the whole.

What is it that causes our conscience to fail?

We must now turn to the question of why, under current conditions, it seems impossible to implement even a single of the above measures. Obviously, we are dealing with a disturbance of the holodox equilibrium between the whole and its parts. The hope of overcoming the existing crises remains unrealistic as long as the whole - the world community - is not able to assert itself against its parts - the states. To speak with Thomas Hobbes: *The*

world community must overcome the state of nature, where everyone fights everyone else.

This state of nature – the fight of all against all - had led to the great European civil war between 1914 and 1945, during which – over a thirty-year period - its leading powers tore each other apart. Wars between them had occurred since the Roman Empire, but technological progress had brought them much closer to each other, causing their military, economic, and social interests to collide more frequently and intensely. Today's situation is confusingly similar to that of the past.¹⁵¹

In such a case, there are only two possible strategies. Either such a confrontation leads to unending wars where the whole, along with its parts, is ultimately destroyed, or *a common regulatory authority is established to create and maintain a new balance*. It was the horror of war that gave birth to such an authority in Europe after World War II, today represented by the EU.

Much earlier, the Habsburg Empire and the United States of North America had already established such regulatory authorities, which reconciled the regions or nations united under their auspices. The nations of Europe re-adopted this principle. The European Commission is a government-like central institution that looks out for the common good. Its emergence sheds light on the external pressures that lead to the creation of transnational entities, which liberate competing nations from the "state of nature" by imposing a minimum of common rules on them.

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 interdependence of the parts on the whole and the whole on its parts has been brought about by technological progress and now encompasses the entire globe. All nations are interconnected by the need for raw materials and are harmed by the production of toxins across borders. Such interdependence can no longer be cut off. A sudden interruption of global trade would result in famine and social unrest in most countries.

The mutual dependence extends even further. Since the second half of the 20th century - the zenith of Fossil civilization - every militarily advanced state has acquired the capability to reach and, in case of necessity, destroy any other point on the globe, i.e., any other state, by means of missiles and nuclear weapons. The interdependence between the whole and its parts has thus become truly total and irrevocable for the first time in history.

Conversely, this fact implies that the future of every state and its citizens now only partially depends on domestic political ambitions and decisions. Regardless of whether they are idealists, pacifists, militarists, saints or criminals, their fate is primarily determined by whether the states and citizens in other parts of the world are idealists, pacifists, saints or militarists and criminals. Everyone anywhere on the globe depends on other people in other parts of the globe to follow the dictates of reason and humanity in their decisions. Like themselves, other people have the power to do lasting damage to the whole by poisoning the common atmosphere and oceans, polluting the satellite orbit, turning the Internet into a forum for global disinformation etc. This is an entirely new situation.

Locally – that is merely through initiatives from the parts - a solution to the many crises threatening humanity is no longer possible. The old principle of "think globally, act locally" has lost its validity. Whether we want it or not, the Fossil Era has welded humanity into a whole with a common destiny - in the post-fossil era, it is forced to think and act as one single community. *In our time, the holistic principle states that all changes in the parts are only effective if at the same time the whole changes as well.* Therefore, it is of no use for the United States to destroy its nuclear arsenal, while Russia or China do not do so, but perhaps even seize the opportunity to gain an unassailable arms advantage for their part. Nor is it of any use for France or Germany to reduce their own population through birth control if more children are born in Africa.

The same considerations apply to climate change. Suppose the "climate activists" in Germany were successful in shutting down transportation and manufacturing industries, or climate "terrorists" finally forced entire cities to cease all fossil fuel combustion. As long as such actions only affect a single country and others do not follow suit - perhaps even exploiting the unused resources more extensively - the global balance remains unchanged. *The climate crisis can only be averted through collective action.*

One world: a global community

The Planetary Phase clamors for a global movement: an encompassing cultural and political awakening united under the banner of Earthland. *Paul Raskin*

Against their own will, states and people across the globe have grown into a unity. No one foresaw this development, let alone

actively promoted it. It is the result of technological progress that largely unfolded without any planning. On one hand, this progress has brought significant benefits to many people. Even in the remotest parts of the world, they now benefit from the fundamental blessings of modern medicine, live longer, and can afford many technical tools that significantly ease their lives. The bright side of fossil revolution was extensively discussed above. Whether we may also count it as a blessing that undersea cables and satellites now connect all continents, allowing an Inuit in Greenland, a Papua in New Guinea, or a resident of the Marshall Islands to be as informed about global events and catastrophes as an American or a German remains open to debate. There can be no doubt, however, that all people have been bonded together into a planetary community for better or worse for the first time in history.

China's leadership must be credited for not only being aware of this new common destiny but also for constantly invoking it like a mantra. However, this destiny is understood in a very limited sense, namely as a call to export its industrial goods to the entire world and, in return, extract and import the raw materials of other countries. The global offensive is supported by loans that primarily deepen mutual dependence for the benefit of China. The new doctrine is called "Fa zhan" - development - and is spread with the same missionary zeal as it had been by Europeans in the 19th and by Americans in the 20th century. The belief in the redemptive power of science and technology has likewise been inherited and adopted by China, but only insofar as it pertains to the natural sciences. The humanities are suppressed because they could challenge the belief in eternal progress and encourage dissent. From the Chinese perspective, their own country advocates for the equal rights of all states, while the United States seeks only its own global dominance. This is pure hypocrisy,

because China is simultaneously doing everything it can to break American dominance and become itself the leading power.

The seemingly altruistic policy was and is very lucrative for China, its development mission proves to be a global success and its authoritarian model is gaining widespread acceptance in the developing world. China's commitment to a global common destiny is correct, but it follows the model practiced in the West for two hundred years without offering a new perspective.

Europe assumes the universality of its own values with equal conviction. At the same time, it is increasingly renouncing independence. The old continent has made itself dependent on Russia for energy (now reduced), on China for a substantial part of its industrial needs, and on the United States for its military protection. No other large and wealthy region owes its security and prosperity to such extent to the benevolent policies of other nations. When President Trump threatened to withdraw military protection by NATO, that is, by the U.S., panic spread across Europe. When Putin's Russia reduced gas supplies, prices skyrocketed, and Europe painfully became aware of its dependence. If China were to pursue a similar policy, the European prosperity model would be on the brink of collapse.

The only chance to mitigate the consequences of this dependence lies in collective action; on its own, each European nation would be hopelessly vulnerable to external pressure. It therefore seems absurd that it is precisely in Europe that the disunity and the striving of member states for more independence are particularly pronounced. How far our continent has strayed from its greatest achievement, Enlightenment! Since its inception, the latter aimed to transcend the boundaries of nation-states. Today, there is little evidence of this aspiration. In the far-right camp, there is no awareness of European community, let alone the global one that must and will become our destiny.

The US has been the leading global power for a century. This did not happen because it intended to become so - on the contrary, even today there is a strong isolationist trend. Rather, this role was and is forced upon it by technological progress, as this has brought all nations so close that they are constantly colliding with each other. In such a situation, the Hobbesian state of nature must be tamed and controlled. It is not surprising that the strongest state prevails and defines the rules. Until today, that state has been the US.

Superior strength is both an opportunity and a curse. It is an opportunity because coexistence among people is only possible in a regulated manner. This is why only groups of a few dozen people can do without government, while any larger political entity falls apart in civil wars if people cannot agree on a binding order. Today, the globe has become so small and the devastation a single state can inflict on the entire planet through weapons and toxins so existential that mankind must rely on some binding international order if the globe is not to tumble into chaos. As the strongest power on the globe, the United States had no choice but to assume this role, *or else another power would have done so*. In this way, the dollar became the world's reserve currency, the standards for economic enterprises and technical processes were largely set by the U.S., and military bases emerged in all regions to enforce - even in the face of resistance - the order determined by the Americans.

The U.S. has made many mistakes - the war against Vietnam and 2003 against Iraq were probably the biggest, but compared to previous world powers, their regime cannot be said to be worse. Few would want to trade their rule for the fascist dictatorship of today's Russia or the authoritarian government of China. Nevertheless, leading powers are never loved - they must live with this curse.

Why we may hope

The most controversial question - What should be considered irreducibly global? - has provoked a tug-of-war between contending camps advocating for either a more tight-knit world state or a more decentralized federation. *Paul Raskin*

Fossil Revolution has created the technical prerequisites for a life of prosperity, at the same time it has given us the potential to destroy all life: nature and ourselves. We must now live with this dual perspective. However, hope lies in the fact that we dispose of the necessary knowledge and skills to avert the danger. We know that all people inhabit the same small and vulnerable boat that carries us through the cosmos. None of us can retreat to a secure niche, as was still possible a century ago. We thrive together, or together we perish. Since everyone recoils from the second perspective, we may hope to achieve the first.

But this outcome is only likely to happen if we take the concept of a common destiny literally by creating the conditions that make us masters of our own fate. Unfortunately, this is not the case at present. The truth is that bad luck and arbitrariness may have the last word. Since the nuclear powers confront each other, any technological mistake resulting from false warning signals is enough to ignite a global conflagration - this could have happened several times in the past. Arbitrariness is no less threatening. Any state can pollute the environment as it pleases and thus block the future of all others, without any international organization being able to take effective action against it. *Government*

with its binding order that makes life possible within a state is absent between them. Far from being a community of destiny, fate still pits all nations against each other.

Due to the numerous threats mentioned above, we find ourselves in a much more dangerous situation than Europe during the time of Immanuel Kant, when the German philosopher called for the establishment of a federal league of states. He feared that otherwise, the nations of Europe would tear each other apart in constant conflict.¹⁵² In Europe, all states were geographically close to each other being so well-armed that only some kind of transnational authority could enable a lasting peace among them. Meanwhile, two and a half centuries later, Europe has almost realized the vision of the German philosopher. Not so our present-day world. Although the global spread of technological civilization has made it more outwardly united than ever before, its political division conjures up the specter of a global conflagration and that of ecological catastrophe. This is the condition lamented by Thomas Hobbes, where everyone (in this case, each nation) strives to achieve maximum material and ideological power for itself, even if it does so at the expense of all others. When this happens within a single state, we are talking about political chaos, which easily degenerates into civil war. In the case of mankind as a whole, people tend to use a euphemistic term calling this situation "Multipolar World Order."

Max Weber did, however, already teach us that a state can only establish peace among its citizens if it possesses a monopoly on violence. *By its nature and purpose all functioning governments are monopolar, even when democratically granting maximum freedom to particular interests.* Multipolarity leads to chaos and civil war, the war of all against all, as described so vividly by Hobbes in his classic "Leviathan."

Within two centuries, Europe and its offshoot, the United States, have exponentially upgraded technologically. Today, the entire globe is copying this process in just a few decades. Technology has brought all states so close together that none can separate themselves from the others. Communication and data flows bridge all distances at the speed of light, supersonic nuclear missiles can reach any point on earth in the shortest possible time. Hackers from Korea or South Africa are just as close to us as those from the neighboring city. Our species *Homo faber insipientissimus* has become a single people through technology, but a people in a cold war that can turn into a hot one at any time.

People in civil war live without a functioning government because there is no authority with a monopoly on violence; instead, order and violence are multipolar, distributed among many conflicting forces. This may apply to the citizens of individual states as well as to the entire world community. Until about the beginning of the new century, the United States was the undisputed leading power, which, as Arnold Toynbee noted, represented a kind of benevolent world government defining the rules of the game.¹⁵³ The United States now lacks the economic strength to maintain this position against rising China and nuclear-armed Russia. Seen in this light, the war in Ukraine - that often-tormented buffer state - is just one more chapter in the fight for supremacy. This struggle will only end when one of the superpowers, several in joint coordination, or the UN can assert itself as a functioning world government. Until then, the dominant alpha power will strive for a unipolar order, while the beta powers call loudly for a multipolar order.¹⁵⁴

Without a universally recognized authority with a monopoly on the use of force, there can and will be no lasting peace. Albert Einstein saw this even more clearly than Immanuel Kant, who knew nothing of nuclear armament with which all life on the

planet can be destroyed. "*The only salvation for civilization 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.*" Regardless of whether we want such a world power or abhor it, *technological 'progress' is forcing it on us*, otherwise it will bring ecological or nuclear disaster.

The future world order must not and will not be multipolar. Does this mean that those are right who conjure up a dictatorship - an "eco-dictatorship" in view of the climate crisis? The fact is that every state imposes dictates – usually we call them laws. The only question is whether this is done in the name of individuals or a ruling minority, as in feudal agrarian civilizations in the past or in Russia and China today, or whether these "dictates" are based on the democratic decision of majorities. In the latter case, the global community conforms to the definition I previously gave to the state. Both should act as "a moral end with technical means".¹⁵⁵

We may draw hope from the fact that universal moral conscience is alive in all men and all nations; nowhere do people want to pollute the planet with nuclear or chemical toxins. Many are taking environmentally friendly measures. But that alone offers no solution as all are reluctant to adopt those measures that would significantly weaken them in international competition allowing others to overtake them. It is for this reason that the parts do not respect the whole. *No part – single nation - will scrap its own armament or limit its resource consumption and toxin emissions to the extent necessary for the survival of the whole.* Today, the world stands at the same crossroads as Europe at the beginning of the last century: either murderous war or unity for the sake of peace. Europe followed its conscience only after two bloody world wars. We must learn from the past and do everything to ensure that the post-fossil era takes the right direction.

The time has not yet come - on the contrary. The parts do not want to give up to the whole even a single shred of their own sovereignty. For the time being, they are still openly hostile towards each other - just like Europe before its unification.

Towards new consciousness

The post-fossil era faces a formidable challenge. It must not only renew the institutional foundations of man's collective existence; it must furthermore reject the dogmatic worldview that is to blame for the dark side of its predecessor, the fossil era. The European Enlightenment bestowed upon the world a new concept of truth - this was its great achievement, which, in the form of science and technology, has conquered the entire globe. It is an achievement we cannot and do not want to do without. There is no turning back to a world without enlightenment, without science, because even the existential problems created by them can only be overcome through their conscientious use.

But the second part of the challenge is no less weighty and urgent. Science, as understood by the Enlightenment, was flawed from the beginning. It aspired to be a new doctrine of salvation - one that claimed the same omnipotence and omniscience that humanity had previously attributed to God. This flaw has persisted to the present day and is a major reason for the mistrust of science. For it will neither attain omniscience nor omnipotence. It only makes statements about being - in other words, it studies the orders of nature (its laws) as it finds them in the past. It cannot make statements about what should be, i.e., the future and how humans can or should shape it. What "should be" cannot be derived from what "is."

But men are living for what they want to be and to do. Universal moral conscience always rebelled against intolerable conditions. In the guise of totemism, we encountered this conscience among hunter-gatherers; in agrarian civilizations, it manifests itself in religions and its prescriptions. The Enlightenment rightly ridiculed religious superstitions, Voltaire's rallying cry, "Écrasez l'infâme" (crush the infamous!) was in our time continued by Richard Dawkins with his "God Delusion". But the Enlightenment was not aware that religion, whenever it fulfills its highest and truest purpose, is a mouthpiece of universal moral conscience and, thus, of what humans should do – a task that science cannot assume.

Science has repeatedly made such attempts, however. It tried to derive what "should be" from what "is," as if laws could enlighten us about what we would like to be or to do. That explains why willing itself was time and again declared a pseudo-reality and its basis, human freedom, expressly denied. This aberration is "scientific delusion", which entangles thinking in insurmountable self-contradictions and paradoxes. Human freedom – or chance in nature – is just as much a constitutive feature of our world as is the order of nature and its laws. *We must recognize moral conscience, and thus desires and intentions, as a second pillar alongside the knowledge of laws.*

With the help of Fossil Revolution, Enlightenment liberated the individual oppressed for more than ten thousand years, by promising equal access to knowledge for everybody. Science thus produced a democratic form of knowledge. Everyone had equal access to it, no one could acquire knowledge because of inheritance or other privileges. The new doctrine replaced all previous privileges granted to favored minorities with individual effort and personal ability.

The empowerment of individuals vis-à-vis a state that had held them in bondage for millennia was the great achievement of European Enlightenment. A new equilibrium between the whole and its parts had been established to an astonishing degree.

Unfortunately, this progress did not last long. The privatization of power – its initially liberating and beneficial distribution – led to a new imbalance between the parts (individuals) and the whole (the common good represented by the state). It was not long before private corporations and wealthy investors increasingly disregarded the common good, demanding instead unlimited freedom for themselves, i.e. for the parts. Similarly, individual states, indifferent to the well-being of the global community, exclusively pursued their own advantage. This is the imbalance that is troubling the world today - and it stems directly from a one-sided understanding of the Enlightenment.

We should remember that "religio," the Latin word for bond, refers to the relationship of people to universal moral conscience and thus to the common good. Only by drawing on such a new consciousness can we restore the fragile balance between the parts and the whole. Only in this way can we limit the destructive effects of science and technology - which is undoubtedly one of the most important tasks of our time.

For the human community - be it the individual state or humanity as a whole - is a moral end with rational (technical) means. The means, including the trans-moral, trans-aesthetic sciences, must never become an end in themselves. The purpose of life in its moral and aesthetic dimension may make use of rational means, but not vice versa. Reason must be at the service of life and thus of universal conscience

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Annotations

¹ Even though he broadened his own cultural horizons through a total of several years of study abroad (France, Italy, England, Japan, Taiwan and India), dealt in his dissertation with Sanskrit poetics, and reads and understands Mandarin, Japanese, Russian, French, Italian and English (speaking some of these languages too).

² However, the holodox change of perspective can be illuminating. From the point of view of the individual - the part - death makes no sense, while it is beneficial for the whole - the species -, because better adapted individuals strengthen its survival.

³ In modern times, practical usefulness was seldom the motor of inventions. Cf. Jared Diamond (1977): "It may come as a surprise to learn that... inventions in search of a use include most of the major technological breakthroughs of modern times, ranging from the airplane and automobile, through the internal combustion engine and electric light bulb, to the phonograph and transistor. Thus, invention is often the mother of necessity, rather than vice versa."

⁴ Similar critical statements can be found in William James, Will Durant, Lewis Mumford.

⁵ But all human knowledge has emerged historically and thus from subjective sources, as the historians of science Thomas S. Kuhn and Jürgen Renn insist. "Even the most fundamental aspects of the classical picture of science - evidence, experiments, data, objectivity, rationality - have been shown to be profoundly historical" (Renn 2020). I think this statement requires a certain qualification. The facts of nature, which exist independently and in this sense in an "objective" way, may and indeed must be described by means of different and thus "subjective" conventions

(just as human groups speak about nature in different languages), but these conventions must fit the objective sphere if we want to achieve the desired results.

⁶ The fact that we consider it useful at all to uncover the laws of nature does, of course, originate from subjective will. For the longest time in history, it was considered much more important to take care of personal salvation and the God-willed duties deriving from it. In this view, measuring natural processes seemed superfluous, if not sacrilegious. This explains the failure of Roger Bacon in the 13th century.

⁷ It does not matter whether we still attach to the measurable events any qualities characteristic of immediate perception. "For Schrödinger, too, it is certain that there is not and cannot be any other definition of physical [being] than through the medium of [laws]. That electrons 'really' exist and that they pass through certain orbits: this, as Schrödinger himself once explicitly expresses, cannot mean anything else than that those laws apply which we derive from experiments with cathode rays and other observations. There is no other physical 'reality' for us than the one which is conveyed to us by the physical determinations of measure and the determinations of law based on them and in this respect 'objective'" (Cassirer 1957).

⁸ However, the mystical tendency is not completely absent among physicists either. Albert Einstein explicitly praised the simplicity and elegance of some formulas as beautiful and even attributed the simplicity of fundamental physical laws to a divine will. This conforms my thesis that there is always subjective cultural knowledge in the background of all objective knowledge of nature.

⁹ Some (as for example Karl Popper) have drawn from this the conclusion that questions about *the essence of physical phenomena* are inadmissible and should therefore be forbidden as

unscientific. The essence of a force, i.e. what it actually is, need not interest us, it is sufficient that we describe its effects in detail and use them for our purpose.

No doubt, we may forbid ourselves to think about the riddles of this world. Others, such as Blaise Pascal, have not done so. The latter describes man and his position in the following famous terms: “*A Nothing in comparison with the Infinite, an All in comparison with the Nothing, a mean between nothing and everything. Since he is infinitely removed from comprehending the extremes, the end of things and their beginning are hopelessly hidden from him in an impenetrable secret.*” David Hume, Immanuel Kant and elsewhere Karl Popper take a less pathetic but all the sharper view of the limits of knowledge. The fact is that our ability to explain surrounding reality applies only to the “Middle World” – that is to the world between the infinitely small of atoms and the infinitely large of the universe. We will see, however, that even within this reduced holodox framework we encounter the singular and the accidental, that is facts which we register but which science is unable to explain.

¹⁰ Even such elementary orientation standards as below and above, which do not puzzle us if we determine the holodox framework in such a way that the whole is identical with our respective place on earth, lose their validity and become paradoxical if a different whole becomes the reference point: e.g. the spherical earth. When people still believed that the earth was a disk, a cosmic up and down existed for them. The sky above their heads indicated the upward direction. Whoever reached the edge of the disk would fall down – that was the downward direction. But since we know about the spherical shape of the earth, there is no fixed below and above. Or more correctly, for an Australian the sky over his head designates just as much the upward direction, as does the sky for a European, although, in the Australian

perspective, we are undoubtedly situated "below". This is to say that the conception of above and below, so familiar to us in our usual surrounding, loses all validity for the cosmos. This conception is as incomprehensible as is the force, called gravity, which makes Germans stick just as firmly to the planet as the Australians on the opposite side.

The paradox of gravity represents a most customary fact, to which in everyday life nobody wastes even a thought. Nevertheless, we could apply Richard Feynman's statement about quantum physics to gravity with equal justification: "If you think you understand gravity ... then /that's proof/ that you don't understand it." It is true that physics can state *the effects of gravitation quantitatively with the greatest accuracy* for any distance from the center of the earth. Nevertheless, the invisible force itself eludes our understanding. We know that it exists and has exactly measurable effects, but what it "really" is and why this invisible force succeeds to hold us reliably on the globe and governs the courses of the celestial bodies, about that we know nothing.

¹¹ In the so-called black holes, all those laws seem to be suspended which are valid in the rest of the cosmos. But it would, of course, be conceivable that within singularities too regularities prevail which - if they could be investigated - would in their turn be laws, even if other than those known to us. But if it is basically impossible to make observations in black holes from the outside, then such a statement must remain purely speculative.

¹² They illustrate this with the following natural constants, among others:

Gravitational constant (G): The gravitational constant determines the strength of the gravitational force between masses. A slight change in its value would affect the structure and evolution of stars, galaxies, and entire cosmic structures.

Fine Structure Constant (α): The fine structure constant is a dimensionless value that describes the strength of the electromagnetic interaction. It affects fundamental processes in atomic and nuclear physics. A slight variation in this value would affect the stability of atoms and molecules, which would have implications for chemistry and biology.

Cosmological constant (Λ): The cosmological constant is a parameter associated with dark energy that drives the accelerated expansion of the universe. A finely tuned cosmological constant is necessary for the universe to have a sufficient lifetime to allow the emergence of life.

Mass of the neutron (m_n) and proton (m_p): The masses of protons and neutrons are critical to nuclear physics and the stability of atomic nuclei. A slight change in their masses would have an impact on the chemical composition of the universe.

Electric charge of the electron (e): The electric charge of the electron influences the electromagnetic interaction in atoms and molecules and determines the properties of chemical bonds.

¹³ The so-called layer theory (Schichtenlehre) recognized that in cosmological evolution it is impossible to derive the later from the earlier. Wilhelm Dilthey, Nicolai Hartmann and Konrad Lorenz are its most prominent advocates. See also Jenner "Creative Reason".

¹⁴ Those who do not want to concede that science, too, is always in danger of slipping into mere belief, indeed into dogma, should consider the fierce opposition that the philosopher faced from biological experts as a result of this insight. Popper committed an act of blasphemy.

¹⁵ And Monod (1971) continues: "It is known that certain very precise and complex kinds of behavior, such as the prenuptial ceremonies of birds, are narrowly linked to certain especially conspicuous morphological features... One is therefore quite

right in saying that the sexual drive – or better still, *desire* – created the conditions under which some magnificent plumages were selected.”

¹⁶ Darwin's teachings were soon understood to mean that not only in the animal kingdom, but also among humans, there are those superior races that displace their inferior counterparts and - from a biological point of view (being better adapted) - have a right to do so. Darwin himself did not invent the slogan of the "survival of the fittest" - it goes back to Herbert Spencer - but he had adopted it together with the thesis of Thomas R. Malthus, according to which more offspring would always be produced than food was available. Thus, there would inevitably be struggles in which the weak would be weeded out, while the strongest would be left as the victors. "Living beings are...", German psychiatrist Joachim Bauer summarizes this doctrine, "by their inner nature fighters in a struggle of displacement."

Like a sinister shadow, this doctrine was to settle on Europe and its leaders. Hitler's call, popularized by Karl Haushofer, for "Lebensraum", which a strong nation had a right to acquire by force, goes back to the thoughts of Darwin's disciple Herbert Spencer. The idea that the world will be dominated by whoever makes himself master of the Eurasian continent was originally conceived (1904) by the Englishman Halford Mackinder, then adopted in 1919 by Karl Haushofer, who derived from it the demand for Lebensraum (see McCoy 2017).

So-called "Social Darwinism" was still upheld as unquestionable dogma by almost all serious science until around the middle of the last century. Even a genius like Max Weber was no exception to this rule. In the 1890s he adopted the Darwinian view of nature, including its violent facade. In Freiburg, he spoke of a perpetual "struggle for existence" (Joachim Radkau). But not only in Hitler's Germany did the murderous consequences of this doctrine

become apparent, in countries like the US, Canada or Australia they determined the policy of immigration. There, the influx of immigrants was limited to the supposedly more developed white and Protestant people. That was yesterday. Meanwhile, Asian, especially Chinese, students and scientists are among the best at American universities, and China itself is just about to become the leading world power. But a century ago, Chinese and other Asians were tolerated at best as labor slaves, for menial jobs. The colonization of foreign countries by Europe and the thirty-year European civil war of the last century took place against the ideological background of a racial mania that would have been inconceivable without Darwin's doctrine of the survival of the fittest.

¹⁷ Our powerlessness regarding explanation is quite compatible with the progress of technological manipulation. Thus Popper (1980) says regarding so-called reductionism: "*I consider it not only possible, but even probable, that we will one day be able to produce living things from dead things. Although this, of course, would be extraordinarily fascinating in itself... it would by no means prove that biology could be reduced to physics or chemistry...*"

¹⁸ The artificial environment created by man did not only consist in tools but in food as well. Cf. Jared Diamond (1977): "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."

¹⁹ Ian Morris (2010): "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."

²⁰ Claude Lévi-Strauss described totemism in "The Savage Mind" (*La pensée sauvage*) and the incredibly complex rules of permissible and impermissible marital unions among clans in "The Elementary Structures of Kinship" (*Les Structures élémentaires de la parenté*). In this book, I will not go further into the moral inhibitions that people at different times and in different cultures felt toward killing and eating animals. It seems more important to me to highlight the inhibitions toward killing conspecifics, i.e., humans. Nevertheless, it is interesting to note that the rationale for prohibiting the killing of animals is pretty much the same everywhere. When people become vegetarians, it is because they are aware (a point long proven by science) that humans and animals are branches on the same family tree of life and that higher animals feel pain just as we do, being similar to us in many other ways too. Along with the totemism of Australian aborigines, who did not renounce the consumption of meat but tried to appease their conscience with a complex justification, the Hindus of classical India deserve special mention. They renounced the consumption of meat because animals were for them the embodiments of souls carried along by the wheel of reincarnations. Again, it is the idea of a common ancestry or destiny of all living beings that underlies such beliefs.

²¹ "Objective science" appeared to Carl Schmitt, the Nazi head of German legal theorists in the first half of the 1930s, mere delusion. "An alien to the species /he has Jews in mind/ 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).

²² It is possible that this is a conversation Rauschning invented. It would, however, fit in with Hitler's general views.

²³ The sources for these facts can be found in Jenner "Reflections on Meaning and Purpose in History". Maja Göpel quotes the calculation of the Czech-Canadian ecologist Vaclav Smil: "When people still roamed the earth as hunter-gatherers, that is, more than ten thousand years ago, each of them needed about five gigajoules of energy per year to survive... Today, the average energy consumption per person per year worldwide is almost eighty gigajoules... In fact, the population of Germany... per year per person... consumes about twice the global average. Those living in America, in turn, consume twice the German average."

²⁴ This was true even of primitive garden culture. Cf. Jared Diamond: "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."

²⁵ Cf. Jared Diamond (1997): "If the Americas eventually came to hold hunter-gatherers at an average 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."

²⁶ Cf. Joseph Henrich (2019): "Social norms dictate that he /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." Seen in this light, we do not necessarily have to marvel at the philosophy of a hunter-gatherer from the Inuit tribe when he gives the following response to a European's expression of gratitude to whom he had given a lavish gift of captured 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).

²⁷ The Kwakiutl did not need to migrate to siphon off the sea's abundance of fish. They were among the few *sedentary hunter-gatherers* - for these too existed when at some given place food supply was particularly abundant. The Kwakiutl had created a highly unequal social structure in which, alongside a hereditary aristocracy, there were also slaves. Nevertheless, the original tradition of sharing persisted, notably in regular festivals where the aristocrats distributed accumulated wealth in the form of blankets, furs, canoes, slaves, and food. But now sharing was restricted to the happy few on top of the social pyramid, i.e. to other members of the aristocracy. After a year or two, these peers would host similar festivals with the intention of reciprocating with gifts of at least equal value. This custom, known as Potlatch, gradually lost its original meaning of distributing wealth within the tribe. It became a mere display of power, culminating in orgies of destruction. The most powerful would set blankets, furs, etc., on fire in front of their competitors, humiliating them because they were incapable of reciprocating such gifts. This was a perversion of the original act of sharing. "*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.

²⁸ But even garden cultures could be quite inegalitarian. Cf. Jared Diamond (1977). "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.”

²⁹ Cf. Jared Diamond (1977): “However, detailed archaeological studies have shown that complex irrigation systems did not accompany the rise of centralized bureaucracies but followed after a considerable lag.”

³⁰ In Germany, this fact probably contributed in no small measure to a "cult of genius" that culminated in Friedrich Nietzsche's contempt for the masses and the mass man and the blind veneration for the violent man – see his Zarathustra - who places himself at their head.

³¹ Cf. Jared Diamond (1977): “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.”

³² Cf. Gero Jenner *Reflections on Meaning and Purpose in History*.

³³ Cf. Hallpike (1988). “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 lacking from this scheme: priests, nobles, soldiers, and slaves.”

Mencius had set out on this path early on: “Some labor with their brains and some labor with their brawn. Those who labor with their brains govern others; those who labor with their brawn are governed by others. Those governed by others, feed them. Those

who govern others, are fed by them. This is a universal principle in the world. (Mencius Ilia, 4).”

³⁴ Between the end of the 14th century up to the French Revolution, peasant uprisings flared up at least once every ten years, later almost every year at some place of the subcontinent. It was a never-ending series: Jacquerie (France, 1358), Peasants' Revolt (England, 1381), Maillotins Uprising (France, 1382), Engelbrekt Uprising (Sweden, 1434-1436), Peasants' Revolt in Transylvania (1437-1438), "Outrage following the Timpanist of Niklashausen" (Hans Böhm, Tauberfranken, 1476), Carinthian Uprising (Carinthia 1478), Bundschuh Movement (Southwest Germany, 1493-1517), Peasant Uprising of György Dózsa (Hungary, April-July 1514), Poor Konrad (Württemberg) (1514), Windisch Peasant War (Carinthia, 1515), German Peasant War (Southern Germany, Switzerland, Austria; 1524-1526), 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)

³⁵ For the 16th century, Immanuel Wallerstein (2004) describes the lower 90% in the following way: "*There were slaves who worked on sugar plantations and with simpler mining methods (e.g. by scraping the soil). 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 laborers. These groups accounted for 90 - 95% of the European world economy.*"

³⁶ "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 were rural" (Will Durant).

³⁷ Oswald Spengler (2014) is aware of this fact - and yet tries to deny it again and again. "All real history begins with the primitive estates, nobility and priesthood, forming themselves as such and rising above the peasantry." The lot of the peasant is therefore almost everywhere the same: "The peasant is without history. The village stands outside world history... And the peasant stands helpless on the pavement, a ridiculous figure, understanding nothing and understood by no one, good enough for comedy and to create this world's bread." But on the other hand, Spengler wants to idealize the peasant, to elevate him to the very origin of soul and culture: "The peasant house is the great symbol of sedentariness. It is itself a plant; it sinks its roots deep into its 'own' soil. It is property in the most sacred sense." But this is true at

best where there was a free peasantry – it was never true for the great agrarian civilizations.

³⁸ For example, in Sparta. The number of Helots kept like slaves there at the beginning of the 4th century B.C. is estimated at about 200,000, that of the free Spartans at about 9,000, which corresponds to a ratio of about five percent (Cartledge). A small number of free people thus lived parasitically on 95 percent Helots, who had to earn not only the daily food for themselves, but in addition that surplus, which, under constant threat of violence, was extorted from them by their masters, the free Spartans. Helots could be killed by the secret state police at any time without reason or trial (Durant).

³⁹ Grain was obtained from Thrace and Egypt and paid for with luxury goods as well as with the silver from the mines under Athenian rule - the silver mines of Laurion were only 60 km away from Athens. But it was also exchanged for products of the crafts, which the free Athenians originally produced themselves, but later had mostly produced by slaves. These were goods like wine and olives as well as the many luxury products of a flourishing industry: jewelry, ceramics, art. The luxury items were, of course, intended for the great lords of the exporting countries, not for the little people who had to deliver the wheat to their masters. The silver mines of Laurion employed only slaves, possibly between ten to twenty thousand (David Graeber).

⁴⁰ But even the population living in Attica was very mixed. Of the approximately 315,000 people by whom Attica was populated around 431 B.C., only a little more than a tenth (40,000) enjoyed the status of free citizens; the remaining nine-tenths were largely lawless foreigners or slaves, the number of the latter being estimated at least at 200,000 (Brockmeyer, Durant). Estimates vary widely, however. Keith Roberts (2011), drawing on Sallares (1991), assumes a total population of 150,000 for roughly the

same period, with 20,000 slaves and 10-30,000 unfree. Will Durant comes close to Brockmeyer's estimate. In ancient Attica, out of a total population of 315,000 souls, 115,000 were slaves, and only 43,000 were citizens with the right to vote.

⁴¹ Compared to Sparta, the commercial city of Athens was much less militarized, although the basic agrarian law was equally in force. Like the free citizens of Sparta, the free citizens of Athens represented the favored five to ten percent at the top of the food pyramid. But in Sparta, the ninety-plus percent Helots were the immediate neighbors of the free Spartan citizens, while the ninety percent food producers who supplied the free Athenians with food lived mostly far away, in Egypt and Thrace.

Wherever the military and a constant propensity for violence set the tone, the voice of critical intelligence was silenced because any protest was considered dangerous to the state. When talking about the Axis period 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 already Jacob Burckhardt noted 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 colors” (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.

⁴² The conditions that characterized the trading city of Athens were to be repeated more than two thousand years later in the Netherlands of the 17th century. For "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" (Durant).

⁴³ Cf. Basham: "... 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."

⁴⁴ However, until 2011, China was never such an unyielding dictatorship insisting on uniformity as the Communist Party under Mao and, more recently, again under Xi Jinping. The governor-literates enjoyed a fair amount of freedom in their respective

provinces and were also largely dependent on local forces for the usual administrative tasks.

⁴⁵ Hinduism had no problems with the existence of other religions, provided they could be spiritually integrated. Christ or Mohamed were simply seen as avatars of certain Indian deities. However, if the monotheistic religions resisted this appropriation, then Hinduism's tolerance also came to an end. Islam never allowed itself to be appropriated in this way and fought Hinduism, which was not considered a "religion of the book", with extreme brutality. "The Muslim conquest of India," says the great American historian Will Durant, "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 is said to have celebrated for three days every time the number of Hindus slaughtered in one day exceeded twenty thousand.

⁴⁶ In his monumental work "The Protestant Ethic and the Spirit of Capitalism," Max Weber points out that China would never have developed capitalism on its own. Under the moral guidance of the literati, there could never have been legal security for traders and producers. This, however, was the prerequisite for the emergence and existence of the new economic order emerging in Europe.

⁴⁷ See Delumeau 1978.

⁴⁸ Cf. 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 savior in Donald Trump."

⁴⁹ See Francis Fukuyama 1992: "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." I would add that it is even a necessary one.

⁵⁰ As Max Scheler had recognised with the greatest clairvoyance. See endnote 3.

⁵¹ No one has reported on the nature and expansion of this knowledge as comprehensively and thoroughly as Rolf Kreibich in his 1986 book "Wissenschaftsgesellschaft" /Knowledge Society/. Such an encyclopaedic presentation was still possible at that time, but precisely because the process proceeds with feedback self-acceleration, only artificial intelligence would be able to provide a similar summary today.

⁵² Ian Morris: "... by 1650 more than half of Britain's fuel energy came from coal."

⁵³ Why was it the English who initiated the fossil revolution? Ulrike Herrmann (2022) summarizes the research on this question. *"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 industrialization proper, coal was used in energy-intensive trades... So, England had the most expensive labor and the cheapest energy. This combination was unique in the world... Capitalism arose in Britain unintentionally. Machines were developed and used only because labor was so expensive."* Herrmann likewise refers to serious historical research when she rejects the myth that colonialism encouraged or even enabled this process. *"Paradoxical as it may sound,*

exploitation does not make you rich. This was the experience of all colonies that relied on slave labor. Brazil remained just as backward as Jamaica or the US state of Mississippi... It is no coincidence that only the north of the US industrialized, where there were hardly any slaves... Europe did not have colonies because its economy would have collapsed without them. Rather, it was the other way round: the colonies existed because Europeans could economically afford global expansion.”

⁵⁴ Nevertheless, the development had an unattractive drawback. The tremendous increase in energy input was matched by a much smaller gain in additional food. While in 2000 *eighty times as much energy* was used per hectare as a hundred years earlier, the harvest was *only four times as large*.

⁵⁵ Ulrike Herrmann (2022) puts this in a nutshell. "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 pauperization wrongly assumed that this zero-sum game would also apply to capitalism.

⁵⁶ "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, thus confirming research findings that observe a decline in social solidarity in Western civilization, and in Europe in particular... Today, as in the past /i.e. in Rome during the first century B.C./ the systematic self-destruction of traditional groupings in favor of the... material self-interest of individuals has a shadow side: the end of emotional attachment to the community. This leads to the loneliness of individuals and to an increasing

but unreal idealization of the concept of individual friendship" (David Engels 2012).

⁵⁷ Even such an everyday event as a soccer match demonstrates the fundamental dualism of human action based on both competition and cooperation. The winning team is admired for its superior efficiency. In a feigned struggle for existence it has won, but it owes its victory to perfect cooperation, where successful interaction provides the members of the team with a special degree of spiritual satisfaction. Cooperation precedes the fight and is a *conditio sine qua non*.

⁵⁸ By the twentieth century at the latest, the success of the new social order could also be demonstrated quantitatively, namely by comparing states that had taken the path of competition with those that refused to do so for ideological reasons. The latter patronized their citizens and forced them into a corset of uniformity. The socialist states, in which a politburo dictated to the population the right way to think and act, continued the tradition of feudal regimes. Just like these, they condemned the population to inaction and stagnation: the logical consequence of any uniformity imposed from above. The figures speak for themselves. In 1988, shortly before reunification, West Germany's per capita gross domestic product was DM 36,200, while in the GDR it was less than half that amount (DM 14,000). West Germany proved to be a state in which the inventiveness of its citizens could develop freely.

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. Since then, it 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.

⁵⁹ Kohei Saito (2023) continues to harbour such unrealistic ideas. See pos. 3361-64 of his book "Systemsturz" (english: Slowdown).

⁶⁰ As an idealist, Marx strove to abolish all power of man over his fellows. Strictly speaking, his classless society amounted to anarchy - the abolition and end of domination. But Marx was at the same time a keen-eyed realist, so it was perfectly clear to him that no ruling class would voluntarily renounce its prerogatives. For this reason, Marx insisted on bringing about *the end of domination and violence by force: through the dictatorship of the proletariat*.

This radical self-contradiction persists to the present day. Marx is portrayed as an idealist with the intent to embellish his ruthless pragmatism. The real-existing communist systems of the former Soviet Union and present-day China sanctify Marx as an idealist who wanted to build a society without rulers and classes. But when it comes to realize that dream, all that remains is bloody dictatorship.

But with his strange doctrine Marx only confirms a historical rule. Whoever wants to eliminate the rule of man over man, including rule by the means of representative democracy, logically ends up with violence and dictatorship. Except in families, sects and family-like small structures, the leveling of all social differences and material advantages can only be imposed by force - and this is

usually concentrated in the hands of a party, a politburo, a nomenclature.

⁶¹ If we continue this trend into the present day, where an industrial society based on the use of fossil fuels allows for the accumulation of wealth on a massive scale, the close connection between property and human inequality seems to be spectacularly confirmed. *According to a 2016 Oxfam study, just eight privileged individuals - Bill Gates, Amancio Ortega, Warren Buffett, Carlos Slim Helú, Jeff Bezos, Mark Zuckerberg, Larry Ellison, and Michael Bloomberg - currently possess the same wealth as 3.6 billion of the poorest people, which is half of the world's current population!* Such a high level of material wealth and, at the same time, such a high degree of inequality existed never before. Today's inequality surpasses all previous excesses in its extent because its foundation, material production, has also expanded in an unprecedented way. Both have grown exponentially: prosperity as well as inequality. It is, therefore, surprising that this evil, although it outshines all its predecessors, provokes comparatively little resistance. The Occupy Wall Street movement primarily mobilized the educated, urban segment of the population. The truly affected, that is millions of workers living in the Rust Belt of the United States, who were displaced from their jobs, were hardly interested. While they live in poverty, the latter is relative, as unlike in earlier times, their physical survival was never in question. They elected a populist president, Donald Trump, in the hope that he would improve their situation, but they did not launch a civil war like the uprisings born of hunger that regularly shook Europe between the 14th and 18th centuries.

⁶² Rolf Kreibich (1986): "Since 1750, when there were about ten scientific journals in the whole world, the number of scientific publications has obviously increased tenfold every fifty years with great precision."

⁶³ Ulrike Herrmann (2022) aptly and only seemingly paradoxically describes the role of unions when she states, "Unions are the saviors of capitalism."

⁶⁴ Francis Fukuyama is quite outspoken when he states: "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."

⁶⁵ And it doesn't matter whether this messiah has a right-wing or a left-wing hue. Cf. Francis Fukuyama 2018: „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.“

⁶⁶ Fukuyama 2018: "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."

⁶⁷ Google, Facebook, Twitter, Amazon and Starlink are privately owned, but for several decades, the individuals leading them have wielded power equivalent to that of medium-sized nations. Elon Musk, for instance, boasts a personal fortune of over \$200 billion, while in 2021, the tax revenues of the German state amounted to \$354 billion. This comparison has multiple limitations, but it does highlight the actual power in the hands of a leading private entrepreneur.

One indication of Musk's significant influence is the fact that he is courted by leaders and heads of state worldwide, as if he were one of them. Even more significantly, we realize the extent of private power when we consider that Ukraine owes its survival as an independent state to this man. In the early days of the Russian invasion on February 24, 2022, Russian attacks on the infrastructure practically crippled the Ukrainian internet. Under these

circumstances, centralized defense would have been impossible, and Russia would likely have swiftly executed its plan to subdue Ukraine entirely. Musk prevented this by providing Ukraine with his tightly woven satellite network, Starlink. Communication channels between the central command and the front lines remained intact, enabling a centrally coordinated Ukrainian defense.

We may wonder what might have happened if this man's personal inclinations had leaned toward Russia instead. Musk has already made it clear that he would not approve the use of his satellites if Ukraine were to utilize the internet connection to reclaim occupied territories. The fact that Elon Musk uses his private power to exert substantial political influence and pressure even within his own country is no secret. X, the reborn Twitter, is allowing Donald Trump back on its platform. With his enormous power, Musk elevates himself to oligarchic status thus undermining democracy.

⁶⁸ The figures in this section come largely from Steven Pinker's book *Enlightenment Now*, where the author summarizes the achievements of the Fossil Era.

⁶⁹ Such figures do not invalidate the dark side of a development that Jean Ziegler warned about. They only indicate that material development has on the whole taken a positive direction. Today, hunger has not been eliminated, it is still a threat in underdeveloped countries, but the problem of fossil civilizations is not hunger, but the exact opposite, namely overfeeding with calories, which is responsible for a new widespread disease: obesity. In 2014, 850 million people suffered from malnutrition, while around 2.1 billion suffered from overweight.

⁷⁰ In London around the middle of the eighteenth century, only one child out of 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" (Will Durant).

⁷¹ <https://www.oxfam.org/en/press-releases/just-8-men-own-same-wealth-half-world>. Cf. Tim Jackson (2017): "The poorest half of the world's population earn less than 7 per cent of the total income. The top 1 per cent by contrast earn about 20 per cent of global income and own almost half of global wealth."

⁷² It is the special merit of Rolf Kreibich's "Wissenschaftsgesellschaft /Knowledge Society/ to have clearly identified the destructive effects of the new social system back then - in 1986! - at a time when business and politics were still dreaming of eternal progress.

⁷³ Maja Göpel: "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 or biomass - everywhere the curves are going up. The same is true for global consumption of water and energy."

⁷⁴ "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." Carl Sagan quoted in Schlosser 2013. In 1983, the world narrowly escaped a supposedly retaliatory nuclear strike by the Soviet Union. Cf. https://de.wikipedia.org/wiki/Stanislaw_Jewgrafowitsch_Petrow.

⁷⁵ The European Chemicals Agency estimates that there are more than 144,000 man-made chemicals. The U.S. Department of Health and Human Services assumes that 2,000 new chemicals are released every year. Chemist Friedrich Schmidt-Bleek suspects "that at least 300,000 substances and whole cocktails of various, continually changing compositions are released into the outside air, soil and water." For production volume, see:

https://ec.europa.eu/eurostat/statistics-explained/index.php/Chemicals_production_and_consumption_statistics.

⁷⁶ “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” (Tim Jackson 2017). The trend has become particularly acute recently, as more than half of the CO₂ emissions entered the atmosphere after 1990.

"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. For the most part, the aim is to make fossil energy, especially oil, significantly cheaper for domestic consumption than the official reference price in the respective country" (Ernst Ulrich v. Weizsäcker).

Even Marxists are now recognising the problem. "Of course, there are attempts to reduce emissions in all countries, but these are insufficient, which is why it is said that we can expect an increase of 3.2°C at the end of this century." And: "There is therefore no realistic prospect that the target of 2°C can be even approximately achieved through sufficient absolute decoupling /of production and emissions/." (Kohei Saito, 2023).

⁷⁷ “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” (Tim Jackson 2017).

⁷⁸ Theoretically, there could be catching devices that collect the garbage particles one by one, bring them back to earth or let them burn up below 400 km. The Swiss company ClearSpace wants to make big money on this project. But the already extraordinary amount of energy required for each space launch would multiply

if such a space cleanup were to be pursued seriously. More and more fossil fuels would then have to be used for this purpose alone, while the imperative to save the climate demands that we limit this consumption as quickly and as drastically as possible. How illusory such disposal actually is can be shown by its costs. *120 million Swiss francs would currently have to be spent to remove even a single particle.*

⁷⁹ Some see virtually costless and radiation-free nuclear fusion as the solution to all the problems that beset us. It may not be unrealistic to assume that one day we will succeed in generating energy in this way. However, it seems very likely that this would be the greatest of all conceivable disasters. Our attack on nature would then really begin as free energy would allow us to exploit nearly free of cost the last corners of the earth and the remotest depths of the seas. *The run of mankind on the last still existing non-energetic resources would be unleashed at the very moment we have Pandora's box of nuclear fusion at our disposal.*

⁸⁰ "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).

⁸¹ Cf. "Atlas der Globalisierung" (2019).

⁸² (<https://www.gmx.at/magazine/panorama/elefanten-muelldeponie-tiere-schuetzen-moechte-36515302>)

⁸³ Quoted from Friedrich Schmidt-Bleek 2014.

⁸⁴ In his book "Grüne Lügen" (The Lies of the Greens), the German chemist was referring, among other things, to the tendency of the green party to target almost exclusively the poisoning of the air by CO₂. Schmidt-Bleek rightly insisted that the exponential pollution of water and soil is less immediate but just as consequential in its long-term effects.

⁸⁵ Rolf Kreibich's demand: "In principle, all new product and technology developments must be put to the test of impact assessment and evaluation" seems unrealizable under the given circumstances.

⁸⁶ Prof. Schmidt-Bleek already revealed this fact. "Given the testing capacities available in (West) Germany, one would have to estimate about 400 years for the originally planned testing of the chemicals already on the market. However, this did not take into account that many new chemicals would enter the market during these 400 years."

⁸⁷ No wonder that growth has turned into an imperative. "When demand stalls, for instance, unemployment typically rises, tax revenues typically fall and debts rise. These impacts tend to create a 'growth imperative'" (Tim Jackson 2017).

⁸⁸ Specialization proves to be a powerful driving force for material progress. Adam Smith had already regarded the division of labor as the most important cause of the wealth of nations. He illustrated this insight with the example of needle production, which could be multiplied almost indefinitely if the total manufacturing process was not concentrated in the hands of single individuals but distributed among as many people as possible, each of them undertaking only a specific, easily performed task. This principle now dominates all industrial production and serves as the essential foundation and prerequisite for the mass production of goods. Without the progressive division of labor, the modern economy would be inconceivable.

The flip side of this success is psychological desolation, the "alienation" from a kind of work whose meaning for the individual is barely perceptible. A painter who creates an entire painting, a writer who completes a full novel or a craftsman who produces an entire cabinet from start to finish view their work like a child whose growth stages they experience step by step. In contrast, a

typesetter who merely arranges letters on a composing stick to print a novel by an unknown author is just a cog in a large production machine - a cog that can be replaced and substituted at any time. The larger and more complex the industrial mega-machine, the greater the number of people who experience their own work as meaningless activity driven not by inner motivation but solely by the necessity of livelihood. According to a Harvard Business Review study, this applies to fifty percent of American professionals, while 37% of Britons consider their work completely pointless. A cross-sectional study of 142 countries found that no more than 13 percent of all wage earners are satisfied with their work.

Such a state of "alienation" is perhaps not as new as the term used for it by Hegel and Marx. *For thousands of years, ninety percent of the population in agrarian cultures have experienced it in those phases when the whip of their masters relentlessly drove them to produce.* However, the infinite branching out of specialization in industrial production has made it a fate for a large portion of the population even in our time. I believe that the only way of escape is through another revolution: the digital one, which takes individual tasks away from people's shoulders and transfers them to machines that are indifferent to the question of meaning.

In addition to alienation as an inevitable consequence of specialization, the erosion of responsibility must be added as a further predicament of Fossil Revolution. When people experience their actions as meaningful, it is laden with responsibility. The novelist bears responsibility for his work, the scientist must take responsibility for the theses published under his name. When meaning gets lost because work processes are fragmented a thousandfold, responsibility also shatters into a thousand individual pieces. The senselessness and aimlessness that many lament in

modern society are based on this vacuum of responsibility. No one seems to know any longer what purpose material progress is meant to serve - except that in this way more and more people are supplied, who in turn make greater material progress possible, so that even more people can then be supplied - and so on and so forth.

⁸⁹ Francis Fukuyama 2018: “The extreme example of what can happen absent national identity is state breakdown and civil war.”

⁹⁰ Cf. Fukuyama 2018: „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.“

⁹¹ This is what the German-Iranian essayist Navid Kermani overlooks when he reminds Germans of their grand tradition of cosmopolitanism.

⁹² This is not really a new phenomenon. When the survival of the community was at stake, earlier societies dealt quite ruthlessly with individuals who were seen as nothing more than a burden. In the poorest regions of Japan, the old (especially old women) were sent to the mountains to die, because the food was not enough for both - the newborn and the old. In Europe, until the Industrial Revolution, beggars were locked out of the cities to starve. People did this with a guilty conscience because religion had made all people equal before God, but they did it anyway.

In today's secular society, all values beyond knowledge and skills have been increasingly dismantled. A person who is ignorant, incapable, or merely old, so that his knowledge is no longer useful, will soon be aware that he loses his place in society. *In our modern societies of personal knowledge and ability, the fear of no longer having a place is rampant.* The solution our society has found for the elderly is unique in all history. If in earlier times they lived in the family until their death, today they are shunted

off to institutions of custody. Nor seems there to be any other solution. The young would not be able to use their abilities in the right place at any moment if they had to drag the old along with them until the end. This relinquishment - let us say more precisely: this cruelty - is inherent in a radical privatization of power: the individual sees himself called upon to suspend even biological ties.

⁹³ High technical intelligence is a precious commodity. That's why it's precisely the best-earning people who will have to work more rather than less. I therefore cannot agree with Paul Raskin when he says: "The contemporary way of life depends on the abundance of a once scarce commodity: free time... The social labor budget - and therefore the necessary work-time per person - has steadily decreased." To me this rather seems to be a temporary and passing phenomenon. The reduction of work-time is only possible if and as long as a state is at the forefront of the technological race between nations.

⁹⁴ Interest and dividends must always be mentioned in the same breath, because the one may fall towards zero or even below zero, and then it will be the other to which the wealthy must switch in order to continue earning without performance.

⁹⁵ Just as great havoc as within states has been wreaked by unearned income between them. With the mediation of the IMF, loans were virtually forced upon Third World states (or rather upon the dictators who ruled them). Often inflated by interest to several times the amount originally borrowed, the debt had then to be repaid by selling off available resources and imposing immense hardship on populations not responsible for it. Cf. David Graeber. "I launched into historical background, explaining how, during the '70s oil crisis, OPEC countries ended up pouring so much of their newfound riches into Western banks that the banks couldn't figure out where to invest the money; how Citibank and

Chase therefore began sending agents around the world trying to convince Third World dictators and politicians to take out loans (at the time, this was called "go-go banking"); how they started out at extremely low rates of interest that almost immediately skyrocketed to 20 percent or so due to tight U.S. money policies in the early '80s..."

⁹⁶ In this sense, I define capitalism as a system that tends to substitute parasitism for performance. And I agree with David Graeber (2012) when referring to classic China he distinguishes between a market economy and capitalism. „The Confucian state may have been the world's greatest and most enduring bureaucracy, but it actively promoted markets, and as a result, commercial life in China soon became far more sophisticated, and markets more developed, than anywhere else in the world. This even though Confucian orthodoxy was overtly hostile to merchants and even the profit motive itself. Commercial profit was seen as legitimate only as compensation for the labor that merchants expended in transporting goods from one place to another, but never as fruits of speculation. What this meant in practice was that they were pro-market but anti-capitalist... From this perspective, China was for most of its history the ultimate anti-capitalist market state... merchants were driven by greed and basically immoral; yet if kept under careful administrative supervision, they could be made to serve the public good. Whatever one might think of the principles, the results are hard to deny. For most of its history, China maintained the highest standard of living in the world - even England only really overtook it in perhaps the 1820s, well past the time of the Industrial Revolution."

⁹⁷ This kind of parasitic exploitation was most clearly recognized by Silvio Gesell in Germany and Henry George in the United States. Helmut Creutz has added considerable theoretical depth to these insights, and I believe I have also made a small

contribution to them. David Graeber has pointed out the historical dimension of parasitic enrichment. At present, it is above all the U.S. economist Michael Hudson who takes a clear, even if somewhat radical position. But mainstream economic science studiously ignores these voices. Even Maynard Keynes' remark, quoted a thousand times, that we have more to learn from Silvio Gesell than from Marx, has not been able to produce any change of mind.

⁹⁸ In this regard, Marx profoundly misunderstood reality. For him, the real infirmity of industrial society lay not in the origin of power - whether based on inheritance or on knowledge and skill - but in the fact that power was unequally distributed between workers and entrepreneurs. This led him to overlook the real problem; it should have been evident from the outset that there would be significant disparities in the exercise and distribution of power even if the latter were solely based on knowledge and skills. Both managers and workers must meet these requirements, albeit to different degrees. Consequently, differences in knowledge and skills inevitably affect their respective powers and determine their material rewards.

Marx neglected this point, as he solely conceived the contrast between workers and entrepreneurs from the perspective of exploitation. While exploitation is always possible when it comes to power and material compensation, *reducing the differences in knowledge and skills to exploitation was a theoretically erroneous path with disastrous consequences*. Marx and his followers were led to pit the less knowledgeable and skilled against the more knowledgeable and skilled – in other words, the numerically significant but politically powerless working class against the entrepreneurs. *In doing so, he failed to recognize the true destroyers of a classless society of knowledge and skills, namely those who siphon wealth from others and often wield exorbitant*

power without being entitled to it through their abilities. Marx did not want to see this parasitic layer, perhaps in part because they are in fact largely invisible.

This situation persists to this day. Even Occupy Wall Street was largely ineffective against the top one percent – the blindness of the German revolutionary continues to have disastrous effects. By drawing a red line within the camp of producers – that is between entrepreneurs and workers, both of whom make indispensable contributions to the common good – Marx has from the start misguided the protest against the privatization of power. Instead, he should have directed it against *the real exploiters: the parasites who derive unearned incomes from the labor of others.*

For over a century, social democrats were preoccupied with attempting to defuse the conflict ignited by Marx. The supposed expropriators were not expropriated – that would have led to the devaluation or even abolition of the most valuable social asset, namely greater knowledge, and skills. Rather, social democrats have seen their primary task as giving workers a fair share in the success of businesses. As we know, their endeavor was most successful for a brief period in the post-war decades and has failed since then. Meanwhile, financial parasitism has grown into an exponential avalanche.

⁹⁹ When selling part of their substance in the form of shares to investors, to whom they then distribute dividends, the same process of indebtedness to private individuals takes place in an analogous manner.

¹⁰⁰ In my view, Ulrike Herrmann exaggerates a valid insight when she says, "Growth can only occur when loans are taken out – but these loans can only be repaid when there is further growth." This is not entirely accurate. Growth does not arise "only" from loans but can also result from the use of one's private capital or significant corporate profits. It is true, however, that

these resources too can only be repaid due to growth. With this qualification, it is correct when Herrmann continues to assert, "The pressure for growth is triggered by loans because they must be paid back." However, what she says about interest in this context does not necessarily follow from this premise. "Interest is not the problem; from a macroeconomic perspective, interest is self-financing." Yes, in macroeconomic terms, domestic debt naturally cancels itself out: Assets and debts inevitably have the same value, but *the mechanism of interest and dividends makes the rich richer and the poor poorer.*

Herrmann's misunderstanding stems from an example of Mathias Binswanger, who argues that growth cannot result from savings because these always entail a reduction in consumption: savers are reducing their normal consumption when they make their deposits available to investors. On the other hand, growth cannot happen without new money injected into the economy. Since the savings of individuals do not represent new money, they cannot drive growth - this is the essence of his argument.

It is true in so far that new money is not created by savings, but it is incorrect to conclude that for this reason savings cannot stimulate growth. It makes a fundamental difference whether citizens spend all their money on consumption or make a portion of it available to businesses through banks for investment. John Maynard Keynes' groundbreaking economic theory is famously based on this distinction.

But then where does the money come from, without which growth would lead to deflation and therefore extinguish itself? The matter has been a subject of debate for a long time. Keynes himself viewed this differently in his "Treatise on Money" of 1930, where he attributed the ability to create loans out of thin air to private banks, as opposed to the "General Theory" where central banks are responsible for the creation of money. As for

myself, let me just remark that central banks manage money creation in a very elegant way by creating money out of thin air, that is *out of nothing but by no means for nothing*, as they only inject it into the economy against securities, i.e., tangible assets, and charge interest for it. These interest payments can easily be repaid when investments prove to be successful, and growth does indeed take place. But if the economy shrinks - which generates a surplus of money, i.e. inflation - then the securities are repurchased, as the interest rates would otherwise quickly become unaffordable for the economy.

¹⁰¹ To this day, the classic account of this mechanism is *The Money Syndrome* by Helmut Creutz. An author who describes with equal acumen the same transfer of wealth for the United States is Michael Hudson. Creutz and Hudson are both outsiders. By contrast, Thomas Piketty enjoys the advantage of being taken more seriously as a recognized member of the economic guild. But his findings fall short of those of the first two authors. Piketty advocates progressive taxation, but this alone is by no means sufficient, because *it makes no distinction between wealth acquired with or without personal effort*.

¹⁰² This is an exponential progression that can be calculated exactly. The standard example repeatedly found in the relevant writings concerns a saver who, in the era of Emperor Augustus, would have invested a modest sum of a few ounces of gold at two percent interest and whose heirs would then withdraw this deposit in our time after it had grown uninterrupted by interest and compound interest in the intervening two thousand years. It turns out that no bank would be large enough to hold the accumulated wealth. The heir could not only claim a right to our entire globe consisting of pure gold, but as a bonus he would get a dozen more gold planets on top.

¹⁰³ I am not talking about speculation, e.g. the price gains of shares, although its effects are much more eye-catching. Insofar as speculation is a pure game of chance, the profit of one speculator is always paid for by the loss of another. However, if the losses - as is usually the case - mainly affect the poorer players, then illegal insider knowledge is usually involved, i.e. an illegal form of private enrichment. *Here, I am only considering the legal transfer of wealth from the bottom to the top.* This alone is quite sufficient to disintegrate a society, even without the need for illegal machinations.

¹⁰⁴ John Maynard Keynes saw one of the main economic evils in the unearned income of rentiers. But, as already said, debt in and of itself is not an evil but indispensable. It only leads to unearned income if the wealth of investors is increased instead of merely preserved.

¹⁰⁵ Francis Fukuyama 1992: “Any state that hopes to maintain its political autonomy is forced to adopt the technology of its enemies and rivals.”

¹⁰⁶ Cf. Gero Jenner „Die Arbeitslose Gesellschaft“ 1997. New edition titled „Nach der Coronakrise – keine Arbeitslosigkeit durch Auslagerung und Automation“ Amazon Kindle.

¹⁰⁷ This adaptation to national needs causes freedom - in the form of free trade - and its massive curtailment – protectionism - to be mutually interdependent. This observation could already be made more than a century and a half ago in the second half of the 19th century when Japan began its rise as an industrial nation. The Far Eastern nation could never have built its own industries; the tiny island would never have become the world's second-largest economic power - a position now inherited by giant China - if it hadn't curtailed a significant portion of its citizens' freedom. Japan did not become a democracy at that time because that would have hindered its ascent. Back then the Japanese government could not

grant its citizens the democratic right to make their own purchasing decisions. All industrial products from the West, primarily those of the world power England, were either not yet manufactured in Japan or were still far back in quality. If Japan had allowed the import of Western products and their free consumption, then its own fledgling industries would have had no chance. Any state that wants to hold its own in the international race against far superior competitors feels compelled to make such authoritarian interventions. It restricts the current freedom of its citizens to be able to provide them with greater freedom in the future.

The United States itself had followed this path during the 19th century, when competing against the then-world power, England. Japan and China later followed in their footsteps. So long as there are significant differences in technological development in the economic race of nations, *freedom is a luxury that only the leading states can afford*. This may seem evident, but the beneficiaries of such freedom usually prefer to conceal the obvious truth. Yes, they even go to great lengths to impose the freedom that is so useful to them on the rest of the world with siren songs. They seem to do this out of philanthropy, but as a matter of fact, they just cling to their interests. When Japan was building its industries, English propaganda painted Japan's protectionism as a sign of political backwardness. Later, China's protectionism was criticized for the same reason. The truth is that all catching-up states owe their success to a policy that necessitates the temporary limitation of civil freedom.

The dialectic of free trade versus protectionism emerges a second time when the former catch-up countries reach the technological top, and their products are now in demand everywhere. At this moment, a radical change takes place, their attitude toward freedom changes so-to-speak overnight. Until the Great Depression at the end of the twenties, the US was a staunchly protectionist

state. After the end of World War II, they suddenly became the greatest proponents of economic freedom and the most vocal opponent of protectionism. This change of heart was in line with their interests, as their competitors' industries were largely eliminated and they themselves took the technological lead in several fields by the end of the last century.

This dialectic demonstrates once again that in modern times no single state has sovereign control over its own destiny. On the world stage, the nations of the globe are trapped in a network of mutual dependencies. Citizens are likely to be told by their politicians that their fate lies entirely with them and their political leadership. This, however, is increasingly becoming mere propaganda and self-deception.

¹⁰⁸ Cf. Gero Jenner "Creative Reason".

¹⁰⁹ The logically irresolvable contradiction of God's postulated omniscience and omnipotence had tormented theology from Augustine to Martin Luther and Calvin. Regarding free will, Augustine followed a rather meandering path. In his book *De libero arbitrio* (about free will), he had still taken the side of freedom against Manichaeism, but later he changed his stance. In his later doctrine of grace, expressed in a letter he wrote in 397 to Simplician (*De diversis quaestionibus ad Simplicianum*), Augustine emphatically denies that man could by his own force achieve what is good or avoid what is evil. In *De dono perseverantiae* he takes the same position: We will, but God "works the willing in us". (2010: 244) 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 honored history of nonsense."

¹¹⁰ Therefore, the great science theorist Karl Popper (1980) can be only partly right with the following remark: "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, - which may be true, for example, if probability predictions satisfy us. In no case, however, we can assert with absolute certainty that there can be no laws in a certain area ... I speak of chance when our knowledge is insufficient for predictions." Here Popper finds himself - for once - in contradiction to himself, because he resolutely opposed historicism, i.e. the transfer of determinism to man and history.

¹¹¹ His colleague Lüder Deecke (2012) comments on this: "Gerhard Roth, who worked predominantly on salamanders, is trying to persuade us to give up responsibility... Another neuroscientist,

Wolf Singer, an expert of 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."

¹¹² In "Creative Reason", I deal more extensively with these arguments.

¹¹³ The Polish philosopher Leszek Kolakowski (1973) expresses this inborn tendency most convincingly: "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 'dehumanized,' 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..."

¹¹⁴ The Freiburg psychoanalyst Joachim Bauer has questioned the arrangement and the measurement results of Benjamin Libet's well-known experiment - we may call it the "anti-freedom exper-

iment". But even if Libet has posed the question about freedom correctly and his measurement results do not leave any doubt, human freedom is still by no means disproved. Why? I try to explain this in my book "Creative Reason". Here is my argument in a nutshell.

In his famous experiment, Libet measured the temporal sequence of a conscious act of will and the corresponding release of muscular activity. "In these experiments it could be shown that muscular activity *preceded* volition on average by 550 to 350 milliseconds... it never coincided with the latter nor followed it." In fact, the "act of will occurs *after* the brain already decided on the movement to be produced" (Gerhard Roth).

My objection is straightforward and quite simple. Oddly, neither Libet himself nor his fellow psychologists seem to have raised this rather elementary objection: *If both the inner act of volition (e.g. my conscious and linguistically framed decision, "I will now raise my hand"), and its objective manifestation (e.g. the corresponding gesture) are but two different manifestations of an unconscious, non-linguistic cause situated at a much deeper level then nothing is proved by Libet's results.*

Let us turn to what happens in any elementary act of thinking. Before words and phrases begin to be built up in my brain, in other words, before there arises something like the conscious intent, "Now I want to turn on the radio," something else must already have happened on a deeper unconscious and, therefore, pre-linguistic level. Two hundred years earlier than Freud, Leibniz had already discovered this unconscious realm. According to him, our conscious thoughts are but "small islands in a sea" (1873). This means that linguistically expressed acts of consciousness do not come from nowhere; they rest, so to speak, on a pre-linguistic and pre-conscious basis. We may designate this elusive X or preconscious plane as 'non-manifest volition'. It is

important to note that non-manifest volition precedes both: the linguistically marked conscious or manifest will and the visible act of its execution (e.g. the actual movement of my hand).

At one point in his book *Mind Time*, Libet (2004) describes the unconscious braking act of a driver who, all of a sudden, sees a child in front of his car. He activates the brake 150 milliseconds after the sensual impression, while the driver's conscious awareness of the endangered child only pops up after 500 msec, that is, 350 msec later. The temporal sequence matches my interpretation. If immediate reaction is required in a situation of utmost danger, the brain would indeed offer a very bad service to survival if it were first to activate conscious awareness.

¹¹⁵ Human freedom, its complexity and multidimensionality, remain intact even when its limits are sometimes determined by very simple factors. Throughout history, humans have formulated the most absurd theories about natural disasters, plagues, and diseases. Witchcraft and magic, the wrath of the gods, or personal enemies were held responsible, leading to the persecution of countless innocent people due to such imaginary causes. It wasn't until the 19th century that the existence of bacteria, and even later, viruses, was discovered. At that point, these correct monocausal explanations immediately swept away the incorrect but often highly complex multicausal explanations of earlier times. Obviously, human freedom sometimes encounters its limits in a single cause, such as bacteria or viruses.

¹¹⁶ The fact that chance probabilistically understood may range from zero to one, i.e. from total unpredictability to the certain occurrence of an event, only says that the transition from recognizable order to unrecognizable chaos is a gradual one.

¹¹⁷ *"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. Against this admission the mind rebels with the courage of despair, because it fears to face the problem of life helplessly. What /moral/ sense to give to the human existence, if we must renounce to recognize the /moral/ sense of the world? But there is nothing left for our mind but to submit to the facts."

An unequivocal statement! The greatest critics of religion could not have expressed themselves more clearly than Albert Schweitzer in these lines, where he even calls the moral interpretation of evolution "deceitful". For thousands of years people attributed plans of salvation to their gods, they invented a meaning for the world, but the scientifically sober observer is forced to admit that the facts are not in accordance with any of these mythological constructions.

¹¹⁸ Every algorithm, even the most complex one, by which we try to represent randomness, necessarily produces repeatable orders - i.e. the exact opposite of randomness. Who knows the algorithm in question, is therefore able to predict its result. We can imitate real chance only by including reality, for instance by triggering a certain algorithm whenever a real coincidence happens, e.g. when a sensor by which it is activated notices something like a woman with a yellow shirt passing by on the street. This is then just as random an event as when a passerby crossing the street is struck dead by a tile that suddenly falls on his head from above (Monod uses this example to illustrate chance).

¹¹⁹ This insight bears consequences for believers too. If God created the world, then we must acknowledge with Albert Schweitzer that we do not understand the meaning he gave to his creation - but that is, of course, not the same as Monod's statement that the world is devoid of meaning. *It makes a crucial difference whether something does not exist in an absolute sense or only when seen from the perspective of the human mind.* Austrian

biologist Rupert Riedl (1988) hit on the right metaphor for expressing this truth. "What presumption would it be if the tick wanted to imagine the blood vessels of a mammal, the dog the international drug scene or we /humans/ the laws beyond the cosmos." Science is now able to explain so many things in detail, e.g. why a bee stings us, a volcano erupts or how a mobile phone works, but it cannot tell us anything about why this world and its orders exist at all and what sense to give to human existence.

¹²⁰ Unfortunately, I do not remember on which occasion I heard of this statement. On the Internet I found the following source from the pen of Prof. Zeilinger, which at least comes close to this formulation: https://medien.umbreitkatalog.de/pdfzentrale/978/344/215/Leseprobe_1_9783442153022.pdf

¹²¹ Cf. Cassirer 1957.

¹²² What I summarize here in one sentence has filled entire volumes in the history of philosophy and, to some extent, also in the history of science. The strata theory (Schichtenlehre) was developed in the German-speaking world by Wilhelm Dilthey, Nicolai Hartmann, Konrad Lorenz and Rupert Riedl. In France, Henri Bergson established a similar tradition. The great difference to the biogeneticist Jacques Monod lies in valuation. For the latter, chance is blind, for others it is a creative force.

¹²³ British philosopher A. C. Grayling (2021) remarks on non-knowledge. "If the question 'Are there limits to knowledge?' is meaningful, it is at best a defeatist one in implying that there might be such limits. But it is not a meaningful question, because it is not an answerable one." In the present section I try to explain why the admission of non-knowledge (as distinguished from mere ignorance) is by no means defeatist and why the question about it can very well be answered quite unambiguously.

¹²⁴ On the other hand, our potentially infinite knowledge also includes the realization that the physical conditions that make our

survival on Gaia possible are highly specific and thus extremely improbable. We are riding through the cosmos on a ball glowing with fire, whose crust must be neither too cold nor too hot, whose gossamer mantle of gases, which we need to breathe, must have exactly the right mixture to protect us from an incessant particle bombardment from outer space. The improbability of our existence on this ball in the middle of a largely hostile universe awakens in us the obvious thought that the miracle of evolution can by no means be the mere result of a blind and meaningless chance.

This conclusion seems irrefutable. We saw that chance is neither blind nor meaningless; it is the synonym for our not-knowing - no more and no less. At best we can imagine an intelligence for which all this makes sense - then we would be speaking of an "intelligent design". God, or whatever we may call this higher intelligence, would have made sure that on our planet the conditions within a narrow corridor are so exactly coordinated that we, *Homo faber*, are able to exist on it. This too is but a metaphor, but a more convincing one than that of an ape blindly hacking at a writing machine....

¹²⁵ The reaction of "enlightened" theologians to this objection was the so-called "deism", which recognizes God only as the creator of the laws of nature. Once he had set these in motion, he had to say goodbye to his creation: the machine now ran all by itself. This view is echoed in the reproach which Pascal (1955) raised against Descartes. "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."

¹²⁶ At this point, however, we are once again facing a serious challenge. This higher intelligence would not only have been responsible for the conditions that allow our improbable existence

on Gaia, but we would also have to hold it accountable for the fact that we survive on Gaia in a very precarious manner. As so vividly described by Schopenhauer, 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. They would have liked to declare a benevolent, a "loving" God as the sole ruler of the world (and parents still present this world image to their children), but that is only possible if they close their eyes to so much evil that undeniably belongs to this world as well. Therefore, most religions chose to oppose the loving God with an evil force, which they called devil. Yet, in doing so, they once again sidestepped the question of "why" - the question that tormented Job. Whether science or God, the mystery remains.

¹²⁷ Until the 18th century, famines depopulated entire landscapes all around the world. "Between 1692 and 1694, while Louis XIV, the Sun King, indulged with his mistresses, 2.8 million French people starved to death – 15 percent of the population. In the following year, 1695, famine struck Estonia, where it killed one-fifth of the population. In 1696, it was Finland's turn, where between one-quarter to 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," noted Israeli historian Yuval Harari. These are just randomly chosen examples of a devastating scourge that regularly afflicted humanity. In India and China, it was not uncommon for between five and ten percent of the population to fall victim to famine. Right until the 20th century, this was still happening in the Far East. 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!

¹²⁸ Even if food supply was sufficient, there was a severe lack of jobs for the younger generation.

¹²⁹ William E. Rees (2019) - together with Mathis Wackernagel the inventor of the ecological footprint - has calculated that humanity should not exceed the two billion mark at current resource consumption levels if it wants to operate sustainably. Otherwise, it would need five or more planets - but that would be unsustainable without ecological collapse.

¹³⁰ It is a different matter that by now the party would once again be happy to compensate for the ageing population by having more children. But women are no longer playing along.

¹³¹ In the United States, an excellently functioning public transport system of railroads and streetcars was deliberately destroyed after 1929 to make way for the automobile industry (Kemfert 2020).

¹³² "On average, each car rests unused for 23 hours a day" (Kemfert 2020).

¹³³ The providers of these cars are private companies charging customers with a usage and maintenance fee plus automatically calculated travel costs – as they do now with scooters or bicycles. Accordingly, the vehicles are no longer individual property. It would indeed be a major social and environmental advance to eliminate personal ownership of cars altogether - just as public transportation may be owned by the state or by private companies. This is not a vote for nationalization; on the contrary, competing private companies should seek to offer this fleet of cars, with government making sure that their total number be adequately reduced and prices for their use kept to a minimum through competition.

¹³⁴ Is such a drastic reduction in the automotive fleet realistic? It assumes that traffic can be evenly distributed over 24 hours so that the existing vehicles are constantly in use. This assumption does not align with reality because most of the traffic occurs at the beginning and end of a workday. The minimum number of cars is determined by the number of employed individuals whose workplaces are not near their homes or cannot be reached quickly or conveniently by public transportation. Currently, there are about 45 million people employed in Germany. Assuming the worst-case scenario where only a tenth of them use bicycles or public transportation to get to work, Germany would still need 35 million cars during peak hours.

However, it is not unreasonable to assume that on average, three people who live relatively close to each other, could share the same car to commute to work. In that case, we would only need a total of one-third of the vehicles, which is roughly 15 million cars.

For the sake of environmental conservation, it would also be feasible to stagger office and factory start times at the beginning and end of the day, where one-third begins work at seven, another third at eight, and the final third at nine (similarly staggered for closing times). In this scenario, a fleet of 5 million cars would be sufficient to handle the morning and evening rush-hour traffic.

¹³⁵ The advantages are evident. Only one-tenth of the parking spaces would be needed because all vehicles are in use almost around the clock (parked in designated large garages at night). Urban spaces currently occupied by parking lots and parking structures could be used for greenery, playgrounds for children, and other amenities. The resource burden from car manufacturing would be reduced by a whopping ninety percent, and daily energy consumption in transportation would also be significantly reduced, provided that three or more people use the same car or

small buses to commute to work at the beginning and end of the day.

Under such conditions, transitioning to electric cars would not pose a hurdle in terms of social injustice. The cost would be borne by the entire population, spreading the burden evenly. It also makes sense to gradually increase the cost of fossil fuels in step with this transition so that eventually, it is in everyone's interest because owning a car becomes more expensive than renting one and ordering and using it on a short-term basis. To prevent the system from being abused by those who can afford to reserve cars for themselves continuously, a basic quota of driving kilometers should be available to everyone at minimal rates (expanded for professional use). Beyond that, driven kilometers should be progressively more expensive to encourage the use of public transportation for longer distances.

¹³⁶ It should be added that the automotive industry, especially the German one, excelled in producing engines powered by fossil fuels. Electric cars are technologically less demanding. Therefore, there is justified concern that this transition may not provide advantages to a leading sector of the German economy but instead lead to its decline and the destruction of many jobs.

¹³⁷ "It is not the case that renewable energies are used as a substitute for fossil fuels, they are just an additional supplement for the constantly growing energy demand due to economic growth," says Kohei Saito, who is much more pessimistic and also refers to the corresponding figures: "According to the International Energy Agency IEA, the number of electric vehicles will increase from the current two million to 280 million by 2040, but the global carbon dioxide emissions that would be reduced as a result are estimated at only 1 per cent." However, reducing - degrowth - the car fleet to a tenth would result in much better figures.

¹³⁸ In this regard, the prophetic Kenneth E. Boulding stated as early as 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."

¹³⁹ Cf. https://en.wikipedia.org/wiki/Centennial_Light.

¹⁴⁰ Refer to Erich Fromm (2000): "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.' Whether it's a car, a piece of clothing, or a technological device, they purchase it, and after using it for some time, they grow tired of it and eagerly seek to acquire the newest model... the motto is: 'New is beautiful!'"

¹⁴¹ Cf. https://de.wikipedia.org/wiki/Kaufen_f%C3%BCr_die_M%C3%BCllhalde

¹⁴² Additionally, many products are expected to deliver more than just the advertised features - they also serve as *status symbols*, as so many people in our time define themselves through consumption. More than a century ago, Thorstein Veblen already referred to this phenomenon as "conspicuous consumption."

¹⁴³ So, it may only be true with regard to the past when Naomi Klein (2016) and economist Nicholas Stern equate the reduction of emissions resulting from an economic downturn with the worst economic catastrophes: "... a decline in emissions by 8 to 10 percent year on year is practically unprecedented since we began powering our economies with coal. In fact, reductions of more than 1 percent per year have historically only been associated with economic recession or upheaval, as economist Nicholas Stern articulated in his 2006 report for the British government... It was only immediately after the Great Stock Market Crash of

1929 that emissions in the United States dropped by more than 10 percent annually for several consecutive years, but that was the worst economic crisis of modern times."

¹⁴⁴ However, service-based economies are departing from the growth trajectory, as Tim Jackson (2017) observes: "... the returns on service-based investments are lower than those in manufacturing, for a very specific reason: they resist increases in labor productivity... Ultimately, Baumol and Nordhaus are aware that an economy insisting on preserving (or even expanding) its service sector is heading towards zero growth... When demand, for instance, stalls, unemployment typically rises, tax revenues fall, and debt increases, all of which negatively impacts international competitiveness! These effects tend to lead to a 'growth imperative.'"

¹⁴⁵ The model of this farewell to growth and a disposable society is simple and comprehensible to everyone, but its implementation will meet with fierce resistance as it requires a fundamental restructuring of the existing economic order and geopolitical reality. *Growth mania* may be corrected by better insight and even be removed altogether through the awareness of obvious ecological hazards (cf. Miegel 2010). However, this does not apply to *growth compulsion*, because this emanates from existing institutions and grown economic habits and structures. I agree with Tim Jackson in England and Ulrike Herrmann in Germany that the growth imperative is inherent in the capitalist economic system. It is therefore much more difficult to eliminate.

¹⁴⁶ However, this is also a *conditio sine qua non* because the slump in industry's production naturally means that its research budget is reduced to a minimum, if not to zero, while the state lacks money for defense due to steep drop in taxes.

¹⁴⁷ These figures were given by Japan's JSTV in a February 10, 2019 broadcast. SIPRI

(<http://www.sipri.org/yearbook/2013/files/sipri-yearbook-2013-chapter-6-overview>) comes up with a higher figure: "At the beginning of 2013, eight states possessed around 4400 operational nuclear weapons. Nearly 2000 of these are kept on high alert. Counting all nuclear warheads - ready warheads, spare warheads, warheads in active and inactive storage, and intact warheads scheduled for dismantlement - the United States, Russia, the United Kingdom, France, China, India, Pakistan, and Israel together possess about 17,270 nuclear weapons."

¹⁴⁸

Cf.

https://de.wikipedia.org/wiki/Stanislaw_Jewgrafowitsch_Petrow.

¹⁴⁹ Nuclear-equipped submarines can take up positions in the immediate vicinity of the enemy's national territory, e.g. off the U.S. East Coast. In this case, the warning time is close to zero. For this reason, Vladimir Putin warned the West not to position its missiles in Ukraine. In this case, too, the warning time of a first strike in Moscow could be reduced to less than five minutes.

¹⁵⁰ 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. Add to that the fact that machines have always been fallible, then you know what existential risk we are exposed to today. In the past, we have had to experience this fallibility several times. Even a company as large as Boeing had a faulty control system implanted in one of its airplanes (Max 737). In two successive crashes, close to three hundred people were killed. 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, in those of artificial intelligence*. Nevertheless, the will to put an end to this madness seems to be on the retreat. Donald Trump, an ex-

president of the United States after all, could even ask. "Nuclear weapons? If we have them, why don't we use them?"

¹⁵¹ The situation before the First World War presents to us pretty much the same situation as today. Germany had experienced a brilliant industrial rise during the previous three decades. The States of Europe had attained greater prosperity than ever before, but each of the leading powers of the old continent saw itself threatened, envied, cornered by its rivals. England, still the leading economic and military power at the time, feared the rising Germany, which was challenging British supremacy with its rapid build-up of arms. In this situation, all the major European powers began to ask themselves whether it would not be better to pre-empt their rivals with their own military strength, if not by striking first. When mutual suspicion becomes psychotic, war seems like a cleansing thunderstorm - hence the enthusiasm of many people, so difficult for us to understand, when war actually broke out in 1914.

We find ourselves in a similar situation today. The rising powers in and outside the so-called "Global South" are about to teach the old industrialized countries of the North a lesson in fear. First and foremost, China and Russia are contesting and fighting the leading role still played by the US. They are doing this with growing success, just as Germany formerly did when confronting the world power England. "The BRICS format (Brazil, Russia, India, China, South Africa) ... has managed to overtake the G7: at the end of 2022, the BRICS accounted for 31.5% of global GDP in purchasing power parity (PPP), 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%." Their economic catch-up is 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."

Economically, the US is stagnating at a high level. But what still counts is its "ability... to maintain its unique position on the international stage thanks to its network power and to its adaptation to a new age, the age of competition and interdependence: 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%." In contrast, the eurozone's share has fallen noticeably. "In 2008, the USA and the eurozone had the same level of GDP (around 14 trillion US dollars). Fifteen years later, European GDP was only 80% of US GDP."

Thomas Gomart (2024), to whom I owe these quotes, comments on the military supremacy of the USA. "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." /But/ "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 /also/ the only permanent member of the Security Council that continues to produce fissile material for military purposes."

China is not only expanding economically and militarily by leaps and bounds, it is also asserting ever more far-reaching territorial claims. Following the incorporation of Tibet and the once Uyghur Xin Jiang, it is pushing for a further expansion of its borders. "At the end of August 2023, the Chinese Ministry of Natural Resources published the "National Map of China", which encroaches on the territories of India, Malaysia, the Philippines, Vietnam, Taiwan and even Russia, sparking fierce protests. On this document, Taiwan is an integral part of the PRC."

A leading power that feels threatened and, on the other side, stragglers who feel humiliated in their role. That was the starting point for the war back then. It could be again today.

¹⁵² It should be noted that no thinker from Kant to Russell argued in favor of a politically united humanity because they believed that size, in and of itself, was an advantage over the self-determination of smaller political units. The thesis "Small is beautiful," proposed by E. F. Schumacher in 1973, went unquestioned by anyone. Instead, the focus has always been on eliminating the greatest evil, which is war. This intention is also evident in Kant when he inquired about the *possibility and conditions for "Perpetual Peace."* Kant aimed to delineate the boundaries within which political action must operate to achieve this goal. Precisely because the philosopher from Königsberg had no illusions about human nature, he called for a restraint on political arbitrariness. "Man has a tendency to socialize because in such a state he feels himself more as a man, i.e. 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."

Kant advocated for the association of free states: federalism - not a world government that merges separately existing states into a single superstate, causing them to lose their sovereignty. According to Kant, such a union would only result in a "soulless

despotism." There should be merely some higher authority acting as a mediator among sovereign nations in the event of conflicts. The UN, which American President Woodrow Wilson sought to establish as the League of Nations after World War I, was supposed to fulfill Kant's vision. But today, it is evident that the UN cannot meet the expectations placed upon it. A superpower - any superpower, not just the United States - must fear that a supranational, genuinely democratic forum will compel it to relinquish its privileges. This would also apply to its military dominance. Why should other states allow the superpower the privilege of possessing nuclear, hydrogen or neutron bombs just because, due to a historical accident, it was the first to invent and acquire them? If other states could democratically decide on this issue, they would undoubtedly demand the same right for themselves - as not only Russia, China, France, and England have already done, but now a dozen other states, including North Korea. If the UN could democratically prevail over the superpowers, as its charter actually demands, then only two decisions would be possible: Either the United Nations insist on the general abolition of all weapons of mass destruction, so that superpowers do not enjoy privileges over other states. Or, based on the tacit consensus of its members, the UN assumes the same right for every nation, allowing all to acquire weapons of mass destruction.

We may exclude the first of these two democratically arrived-at possibilities as unrealistic from the outset. Neither the United States, nor Russia, nor China will accept a UN vote that prohibits them to possess weapons of mass destruction.

Hence, only the second possibility remains, which, for obvious reasons, never comes up for a vote but effectively determines the actions of most states. All great powers regularly bribe smaller states or even threaten them to gain approval in the UN Security Council or General Assembly for sanctions that they impose on

emerging nuclear nations. Smaller states rightly perceive such restrictions as a violation of their democratic rights, which they should have as equal members of the world community. Thus, it becomes understandable that the UN, has been powerless until today and will remain powerless in the future regarding the greatest challenge of our time, the existence of weapons of mass destruction and their proliferation. Instead of the UN, it is the superpowers, primarily the United States, that seek to prevent such proliferation by force or the threat thereof.

The UN is also powerless when it comes to curbing growing environmental pollution. It will be unable to restrict the high resource consumption of leading powers any more than their arsenals of bombs. Most countries will insist on their democratic right to first achieve the same standard of living for their own country that the leading powers already possess – on this point they will not even enter negotiations. This does, of course, mean that *the UN cannot effectively intervene against the two historically greatest threats to humanity.*

Taken together these facts demonstrate that Kant's recipe for a voluntary federal self-government of states has completely failed - and furthermore, it has no prospect of ever being realized. The UN is as powerless in the face of the threat of self-annihilation of humanity as it is in the face of the destruction of the natural environment. But today we know that the prevention of nuclear proliferation and unlimited growth are the primary tasks of the 21st century - and that the only institution able to accomplish them is a world government.

The idea seems logically compelling, yet it still appears to most people as a pipe dream, born from the minds of unrealistic idealists. In truth, it is these scoffers who must be accused of being blind to reality. They failed to realize that since the end of World War II such a government already exists. Although it does not

operate under the name "world government", it acts as a de facto forerunner of such an institution. Whenever the UN Security Council makes binding decisions, it acts as a kind of embryonic world government - the first in human history.

¹⁵³ The great British historian (Arnold Toynbee) acknowledged the United States to have largely been a benevolent hegemon. Whether he would still have said that after the war in Vietnam and the invasion of Iraq under Bush Junior is, of course, an open question. For here we recognize the potential fatality that goes hand in hand with the role of hegemon. The strongest nation is always tempted to exploit its superiority by dictating rules to the others that humiliate them in their self-respect or exploit them ruthlessly in material terms. The U.S. has been a benevolent hegemon toward Europe to this day (we rarely thanked them for it). But towards the states of South America and other "backyards", their private corporations often acted with utmost ruthlessness. As the Swiss political philosopher Jean Ziegler repeatedly points out in his books, the West has lost much of its credit in large parts of the world.

¹⁵⁴ The same hypocrisy can be observed here as with free trade. So long as a state is unable to cope with international competition, it unabashedly - and quite rightly - pursues protectionism. As soon as it has become competitive on the world market, it immediately changes its ideological shirt and becomes a champion of free trade.

¹⁵⁵ Kohei Saito (2023) has also pointed out the two alternatives. The first: "The principles of the free market and free democracy are abandoned and a centralised dictatorship is established, which may push for more "effective" and "egalitarian" climate protection measures. Let's call this scenario Climate Maoism." He calls the second alternative "degrowth communism". In late notes by Karl Marx, he found a certain disappointment with the ruthless

treatment of nature brought about by the industrial revolution. However, the attempt to portray Marx as a discoverer and propagator of degrowth is no less fantastic than when states in the past endeavoured to understand the teachings of Christianity as a call to violence (against pagans or other religious communities). Saito himself basically knows better: "Degrowth with Marx? Is he /Saito/ still in his right mind?"

Degrowth has nothing to do with Marxism - as we know it from Marx and from actually existing types of socialism - but it is certainly compatible with humane communitarianism.

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