

1 THE ULTRASOCIAL ORIGIN OF OUR EXISTENTIAL CRISIS

Humanity today is like a walking dreamer, caught between the fantasies of sleep and the chaos of the real world. The mind seeks but cannot find the precise place and hour. We have created a Star Wars civilization, with Stone Age emotions, medieval institutions, and god-like technology. We thrash about. We are terribly confused by the mere fact of our existence, and a danger to ourselves and to the rest of life.

E. O. Wilson, 2012, *The Social Conquest of Earth*, p. 7

Professor Wilson eloquently describes the mismatch between evolved human emotions and the institutions and technologies we depend on today. There is indeed a conflict between human nature and the technological civilization we are embedded in. But Professor Wilson's quote is misleading. The fault lies not in our Stone Age emotions but rather with the Star Wars civilization we stumbled into through a quirk of social evolution. With the reorganization of the economy that accompanied the adoption of agriculture, human society became *ultrasocial*.¹ It began to resemble a superorganism – an autonomous, highly integrated network of technologies, institutions, and belief systems dedicated to the production of economic surplus. The human economy began to operate *as if* it were a self-referential organism whose requirements take precedence over the well-being of the individual humans within that system. Our current social and environmental crises are not the fault of human nature but rather

the fault of the surplus-producing economic system that came with the agricultural revolution some 10,000 years ago.

The accomplishments of civilization are impressive. We have answered many of the questions that puzzled us for ages. We have a good understanding of the origin of the universe and the evolution of *Homo sapiens*. We know the structure of the human genome, we have sent scientific instruments to the far reaches of the solar system and beyond, and we are on the brink of solving the riddle of the origin of life itself. On the other hand, our rapacious economy and our burgeoning population are destabilizing earth's biophysical systems and now threaten the continued existence of the complex technological world we are so proud of. We recognize and carefully document the existential threats of climate change, biodiversity loss, and increasing inequality, and we formulate feasible solutions to these problems. Yet so far, with a few limited exceptions, we have been incapable of effectively dealing with any of them. Why is there such a disconnect between understanding and action? The answer lies deep in our evolutionary history. For some 300,000 years *Homo sapiens* lived in small groups of a few dozen people within the confines of local ecosystems. Humans lived, as other animals do, from the day-to-day flows from nature. The human population grew and shrank with changes in climate and in the resources flowing directly from the natural world – the hundreds of plants and animals our hunter-gatherer ancestors depended on. The human presence on earth, and our place within the web of life, changed dramatically with the Holocene, a geological epoch that began about 12,000 years ago. An unprecedented combination of climate stability and warm temperatures made possible a greater dependence on wild grains in several parts of the world. Over the next several thousand years, this dependence steadily increased and eventually led to permanent agricultural settlements and large-scale state societies. It took only a few thousand years after sedentary agriculture began for it to spread and become dominant.² Within that relatively short time period, the human population exploded from a few million to more than 200 million by the beginning of the Common Era (CE) 2,000 years ago.^{3,4} Such a large population required radical changes in economy and society.

The economic structure required to support agriculture changed the place of individuals in human society and the relationship between

humans and the natural world. Social evolution took a path in many ways inimical to the evolved characteristics that made us human – compassion for others, sharing, cooperating for the common good, and a spiritual connection to the natural world. The agricultural way of life created a mismatch between the demands of the ultrasocial system and the well-being of most individuals within that system. The last ten thousand years of human history can be seen as a struggle between the requirements of the surplus-generating economy and the fundamental human biological, social, and psychological characteristics we evolved during the Pleistocene.

Agriculture and the resulting population explosion dramatically changed the human impact on the natural world. Competing species were driven from human settlements or exterminated altogether. Diverse local ecosystems were radically transformed and simplified as humans cleared forests and meadows to produce crops. The effect on human society was also dramatic. As agriculture evolved, small-scale egalitarian bands were eventually replaced by large-scale, hierarchical, economically integrated, and interdependent city-states with extremely complex divisions of labor. These rigidly hierarchical societies were reinforced by caste systems, state religions, and the economic and military power of elites. Ironically, as the Darwinian fitness of *human groups* increased (as evidenced by the huge population increase), the well-being of most *individuals within the group*, as measured by health and quality of life, decreased dramatically.⁵



With agriculture and the active control of food supply, humans followed the path of the ant and termite civilizations that came some 40–60 million years before us to evolve societies so complex, stratified, and interdependent that they act as if they are single organisms. The evolutionary drivers of ant, human, and termite ultrasocial societies were the same – the economic requirements of surplus food production. The results were also the same – the domination of planet earth and the subjugation of individual autonomy to the needs of the new economic order.

Species populations rise and fall with external changes in the flow of food from the natural world. Individuals can catch or gather more or less food, but they cannot augment the flow. With the adoption

of agriculture the food supply became endogenous, that is, under the control of the species engaging in it. A complex level of economic organization enabled agricultural societies to aggressively manage their environments to produce an abundance of food. Economic activity was transformed from using resources directly for immediate livelihood to large-scale resource management to produce future surpluses. Human groups began to actively manage food production by tapping into the stock of fertile soil that had built up over eons, extracting water for irrigation, protecting crops from predators, and redirecting the flow of solar energy away from nonhuman nature in order to grow crops. Agriculture allows a species to create its own food supply.⁶ The need to produce surplus food to meet unexpected emergencies means that there is usually more food than the existing population needs to survive. Surplus food triggers population growth, which requires further expansion of agricultural production. This positive feedback loop is how agricultural ants, termites, and humans came to dominate the planet in terms of sheer numbers and total biomass. Most of the earth's land area animal biomass consists of ants, termites, and humans. Why do these three lifeforms dominate the natural world? Their incredible success is due to the direct control of the birth, growth, and management of food sources.

The resemblance between social insect and human agriculture is remarkable.⁷ Leafcutter ants, for example, (1) produce a specific kind of fungi using a variety of complex management techniques and organic inputs; (2) use manure to stimulate growth; (3) eliminate weeds mechanically and with carefully manufactured antibodies; and (4) trade crops and antibodies with other ant colonies, sometimes with different species. Like humans, the insect farmers became dependent on cultivated crops for food. They developed carefully articulated task-partitioned societies cooperating in gigantic agricultural enterprises. Agriculture ultimately enabled the social insects to rise to major ecological importance. Ants account for 15–20 percent of the world's terrestrial invertebrate biomass.⁸ In the Brazilian rainforest, ants and termites comprise about 75 percent of the insect biomass.⁹ Ants and humans have roughly the same total global weight.^{10,11} Like humans, agricultural insects have complex societies dominating the ecosystems they reside in. As Bert Hölldobler and E. O. Wilson¹² put it, “Social insects hold the ecological center; solitary insects occupy the periphery.”

Human and Social Insect Behavior

Ant, termite, and human societies are unique on planet earth. They dominate in terms of total population, the size of their cities, and the number of occupations in their colonies. They are also unique in terms of the complexity of their social organization dedicated to the production of economic surplus. Their societies have key features in common originating from the existence of surplus. Like human societies after agriculture, social insects must defend their stores of wealth. Ant wars between colonies can last for decades resulting in battle deaths numbering in the billions. Ant suicide bombers rush into enemy lines and blow themselves to pieces to inflict casualties. Ant warfare tactics are so sophisticated they are used as models for training West Point cadets. “Untouchable” ants dispose of the waste products of the colony and are not allowed to come into contact with other ants. Because of a slight genetic modification, ant societies are now experiencing globalization. Argentine ants are forming global communities numbering in the trillions, such that ants from North America, Europe, and Japan are accepted in each other’s colonies.

“But wait,” you say, “How can ant behavior be relevant to human behavior? Human behavior and indeed human society are the products of biological evolution, how can our behavior be compared to that of distantly related insects? We should learn about human social evolution by studying our genetically closest relatives, the great apes and other primates. Similarities with insects are coincidental and irrelevant.” The study of primates has greatly enriched our understanding of human behavior but consider this thought experiment. Suppose we discovered, deep in the Congo, a chimpanzee society with complex agriculture including the sophisticated use of antibiotics and monoculture, a complex division of labor, occupational castes, highly organized warfare with other agricultural chimp groups, cities, and a sophisticated communications network to manage their economy. Such a discovery would shake the foundations of the social sciences. Why are ants and termite societies with these characteristics relegated to the category of mildly interesting analogies with little relevance to human society?



The human economy after agriculture became a kind of self-organized ultrasocial system with its own dynamic of expansion,

resource exploitation, and control. But human society has not yet become an ant colony. Human societies have one critical difference from those of the social insects. Ant and termite occupations are based on differing phenotypes and life cycle stages. Unlike ants, human societies have castes based on hereditary wealth. Human classes are the result of social institutions and the consolidation of entrenched political and economic power, not genetics.

Just as an ant colony acts as if it is a single organism, so too does the global market economy act as if it is a single living entity constructing its own ecosystem niche within which to survive and flourish. One need not be a rigid historical materialist to recognize that the parallels in human, ant, and termite societies were driven by similar evolutionary forces and similar economic drivers. The most important consequence is the fundamental conflict between the rules that favor the requirements of the global market superorganism and the basic needs of individual humans embedded in that system. The dynamics set in motion by early agricultural state societies led directly to today's global market economy. The history of state societies shows regular patterns of environmental overshoot, and increasing inequality leading to deterioration and sometimes a total social collapse. Early state societies the world over showed similar patterns of intensive resource exploitation and a concentration of wealth and power.^{13,14,15} The rapacious exploitation of nature frequently led to the demise of early state societies, but these collapses were regional. Populations were able to regroup, move to other areas, or were absorbed by outside conquests.¹⁶ Some societies were able to change the course of their histories, but most did not. Agriculture did not inevitably lead to global capitalism. Agricultural societies followed many different paths. But today's global socioeconomic system arose directly from the early state societies of the Middle East.

Today we face two broad existential crises: the rapacious economic exploitation destabilizing the natural world and staggering inequality. Individual well-being and the health of the earth's ecosystems are being sacrificed to the needs of the global market. With agriculture, nature and people became impersonal inputs to support the production of economic surplus. Agriculture dramatically changed human society and the natural world. Another dramatic change came with the intensive use of fossil fuels that ushered in the industrial age. This intensification accelerated after World War II with the

globalization of the market economy and explosive increases in population and economic growth. This period, termed the Great Acceleration, has been characterized by unprecedented changes in the earth's atmosphere, geochemical processes, and the annihilation of the nonhuman biological world. Impacts are now global, not merely regional. These impacts will change the course of biological evolution and the earth's geochemical processes for millennia.

The Absorption of Nature by the Human Economy

The first major consequence of agriculture was the human domination of local ecosystems. For most of human history we were a minor player in the earth's biosphere. Human biomass was a tiny fraction of total terrestrial vertebrate biomass. At the beginning of agriculture, the human-wild animal biomass ratio overwhelmingly favored wild vertebrates. This changed dramatically when humans began to control food production. By 1900, humans and their farm animals made up the bulk of terrestrial vertebrate biomass. The total biomass then was about the same as it was before agriculture, but by redirecting the flow of solar energy, water, and soil fertility, humans expropriated the bulk of the land's productive potential. Another major transition in the relationship between humans and the biosphere occurred with the fossil fuel revolution. With the fossil fuel supplement to solar energy, the ratio of humans and their livestock compared to wild terrestrial mammals is now 23:1 in favor of humans and their livestock. The biomass of domestic poultry is three times greater than that of wild birds.¹⁷ Moreover, the total land vertebrate biomass increased severalfold as fossil fuel-driven agriculture came to dominate the solar-powered biological productivity of the planet.¹⁸ Today, the human impact on planet earth is so unique that the present era in earth history has been dubbed the Anthropocene, the age of humans.¹⁹ Humans are now changing basic atmospheric and biophysical processes on every part of the planet.^{20,21,22} Furthermore, with the Great Acceleration of the economy since World War II we seem to be entering a new, more virulent phase of the human impact on planet earth. The numbers of birds, fish, insects, and mammals have declined by more than half since the 1970s. The human population is now 7.7 billion and is projected to reach 9–10 billion by 2050. Catastrophic climate change looms as an existential threat.

The Subjugation of Individuals to the Requirements of the Economic Superorganism

The second major consequence of agriculture was a loss of individual well-being and autonomy resulting from the regimentation, fragmentation, and hierarchical control of food production. The complex division of labor increased the productivity of food production and supported the evolutionary success of humans in terms of sheer numbers. But individual autonomy and self-reliance were suppressed to support easier control and coordination of food production. In contrast to hunter-gatherers, a large part of the day-to-day lives of agriculturalists was spent in specialized, monotonous activities. Although the variety of occupations increased, the roles of individuals were much more narrowly defined. People were born into rigid and distinct hereditary classes that determined their occupations and life prospects. The economic structure of human society began to resemble that of an ant or termite colony. Of course, humans have only recently started down the path to ultrasociality and the suppression of individual autonomy is far from complete compared to social insects. The physical type and age of ants and termites determine their occupation. The proportion of different occupations in social insect colonies is adjusted according to the requirements of the colony. Ants do not have hereditary castes. By contrast, human societies are divided into castes and occupational classes based on culture, customs, social institutions, and political power.

A common feature of human and insect agricultural societies is that individual behavioral complexity and flexibility, what insect biologists call *totipotency*, is in general not as great as individuals living in societies relying on foraging alone. Individual behavior in human and insect societies with an elaborate division of labor is simpler even as the society itself grows more complex. Increasing social complexity is associated with a decrease in individual behavioral complexity. There is no conscious “hive mind” in ultrasocial societies. Humans, ants, and termites are not evolving into Star Trek Borgs with the ability of individuals to tap into a kind of collective intelligence. Complex agricultural ant and termite colonies are successful because they evolved, through natural selection working on groups, incredibly efficient social structures to produce and manage agricultural surpluses. But individuals within the system come to resemble cells in a body, doing simple

tasks within complex systems. Individuals are expendable cogs in an ultrasocial machine. With agriculture, the human species started down the same path as social insects toward increasing societal complexity and decreasing individual autonomy.^{23,24,25}

In human ultrasocial societies individuals are dependent on the economic superorganism for employment and well-being. This loss of autonomy and individual independence has led to socially constructed hereditary class and caste systems. Inequality is a human phenomenon. There are no genetic reasons why an individual human should be a king or laborer. But extreme inequality has plagued our species for millennia and is one of the most well-documented consequences of the agricultural revolution. It seems to be an inevitable consequence of production for surplus.²⁶ Walter Scheidel has documented the existence of inequality over the past 10,000 years and makes a convincing case for a near-universal tendency for inequality and exploitation to increase until it is halted by natural or human-caused catastrophes like wars, depressions, plagues, climate disruption, and resource depletion.²⁷ The level of inequality seen in past and present human societies is remarkable. Today, the sixty-two richest individuals have as much private net wealth as the bottom half of the human population, some 3 1/2 billion people.²⁸

Although the beginnings of inequality can be seen in some hunter-gatherer societies, egalitarianism was the norm before agriculture. Extreme and persistent inequality is a defining feature only of the last few thousand years. This is important because it shows that rapaciousness and greed are not the result of human nature. For most of human history we lived in harmony with nature and not under the domination of an elite few. We lived as immediate-return hunter-gatherers with simple technologies and a limited division of labor based on age and gender. It was during our pre-agricultural Pleistocene past that we evolved our basic human characteristics – large brains, language, complex culture, and an ability to cooperate extensively with nonkin. Judging from archaeological evidence and historical accounts of hunter-gatherer societies, our Pleistocene ancestors lived equitably and harmoniously without destabilizing their habitats.



The adoption of agriculture caused human and social insect societies to evolve broadly similar characteristics for the same reasons – the

economic requirements of food production. Economic drivers highlight the importance of mechanistic forces in the social evolution of our species. They suggest that the broad structure of current human society is the result of forces not under conscious human control. This leads us to question the degree of human intentionality and control over society and its economy. The similarities between ants and humans are not merely interesting but inconsequential analogies. The ultrasocial forces that took hold when agriculture began 10,000 years ago continue to mold, constrain, and direct human society in the twenty-first century.

The drivers behind the evolution of large-scale agriculture were the physical laws of economic production. The agricultural transition was propelled by the selection of groups that could best capture the advantages of (1) more efficient management of food production; (2) a more complex and economically efficient division of labor; and (3) increasing returns to a larger scale of production and to larger group size. After the establishment of agriculture, populations expanded as these economic drivers opened up new opportunities for the exploitation of resources and a more intensive management of economic activity. Group-level competition encouraged larger populations and more intensive resource exploitation that provided competitive advantages. The result was what E. O. Wilson termed the “social conquest of earth.”

The economic origin of ultrasociality has significant implications. It shows the importance of evolutionary processes in the human economy and the current human predicament. It also demonstrates the importance of moving the analysis of social evolution away from an obsession with individual autonomy and voluntary choice. It leads to a greater appreciation of the group itself as an evolutionary force and the importance of the physical and social organization of production as a driver of social evolution. The agricultural revolution transformed human material and social culture. The ultrasocial group became the dominant unit of natural selection. The complex relationship between humans and the biosphere changed as the nonhuman world was reduced to a one-dimensional input to surplus production. The interactions between individual humans changed from personal face-to-face cooperation to large-scale impersonal coordination of economic activity. The human propensity to cooperate was harnessed to facilitate the coordination of economic activities. Human embeddedness within the confines of local ecosystems was replaced by the domination and

exploitation of nature for economic gain. The value of individuals and nature was reduced to being mere economically productive inputs. The door was open for rapacious environmental exploitation and social hierarchy and inequality.

Understanding the economic mechanisms behind the transition to agriculture is key to understanding the forces behind past and current episodes of explosive population growth, the ravaging of the natural world, the expansionary tendencies of human societies, and extreme material inequality. Complex human societies are the products of coevolutionary processes that are entirely consistent with the principles of biological evolution, especially the principles established in recent work in extended evolutionary theory.^{29,30} Groups that could best capture the economic factors driving efficiency in production had a competitive advantage over other groups. As agriculture took hold, those societies having group traits most favorable to surplus production out-competed other groups. Some groups gained a competitive advantage through the evolution of institutions – from religion and divine right to rigid caste systems – that supported surplus production. The requirements of the higher-level superorganism began to override the behavior, organization, and functions of hunter-gatherer customs, human relationships, and ethical values that made us human. Complex human societies are integrated systems consisting of technologies, power relationships, institutions, and belief systems that act to ensure the coherence and survival of the system as a whole, not necessarily for the benefit of individuals. These social variants are the products of evolution. Natural selection favors those variants that are successful at a particular time in a particular place. Evolution cannot see ahead. Successful variants in one context can become dysfunctional in another.

Post-agricultural belief systems have taken various forms from the early beliefs in the divine right of humans to “subdue and conquer the earth” to the more recent faith in the upward path of human progress and technology. One of the most powerful institutions to come out of the agricultural mode of production is the market that has become the worldwide embodiment of human ultrasociality. A variety of belief systems have sprung forth to support and protect the market as the ultimate organizer of human affairs. Today, neoliberalism is the dominant ideology promoting the market economy as a kind of superorganism whose information processing ability is far beyond that of individual humans.^{31,32}

If we step back and look at the world around us, it is apparent that the increase in material well-being has come at considerable cost. In spite of our awareness of our precarious situation, we are unable to take control of the economic trajectory we find ourselves on. The expansive and highly integrated production economy that characterizes us as an ultrasocial species makes it difficult to disengage from it, even as it becomes increasingly unstable. The superorganism doesn't care about fairness or the environment because it is not a conscious, morally concerned entity. As we look around we tend to see everything as examples of human choices. As individuals we make choices every day, sometimes life-changing choices. But what if the social "we" does not choose? What if blind evolutionary mechanisms are largely responsible for human civilization and its consequences. This leaves us to question what we have become as a species and how much meaningful control we have over the direction of human society. It also points to the need to gain control of the evolutionary path we have stumbled onto if we are to survive the coming centuries. As individuals we can clearly see the consequences of climate change, the loss of the natural world, and the other existential threats we face. But even though the ultrasocial system we live under acts *as if* it is an individual organism, it is not a sentient being. It cannot see the long-term consequences of its immediate behavior.



Even though the market superorganism is the result of natural evolutionary forces, that does not mean it is good for humans. "Natural" does not mean "good." In advanced ultrasocial systems such as those of ants and termites, individuals are expendable, like cells in a body. Moreover, natural selection cannot see ahead to avoid distant dangers that do not affect current fitness. An immediate and practical implication is that we cannot rely on a product of amoral natural selection, the global market superorganism, to save us from the destabilizing effects of environmental disruption and material inequality. In fact, to survive and flourish in the coming decades we must come to a radically new understanding of economic life. If we are to save ourselves from a bleak future, we can no longer accept horrific inequality or the rapacious exploitation of nature. To avoid ecological and social disaster we must get control of the superorganism that has evolved into the

global market economy. Minimal first steps include global controls on carbon emissions, enforceable protection of the earth's remaining biodiversity, and insuring an equitable access to the world economy's material output. Is such intentional change possible? Do we have the collective ability to change? Democratic socialist economies, most notably in the Scandinavian countries, have been successful in modifying the excessive inequality generated by capitalism. We can modify the existing system to make the world a better place – such a “minimal bioeconomic program” is suggested in Chapter 8. But this is not enough. Without addressing the structure and evolution of our current expansionary system we cannot achieve a stable economic order or the stability of nonhuman world. We cannot change overnight but we can start down a new evolutionary path compatible with basic human needs and our place in nature.

Evolutionary theory has been used successfully to modify individual behavior, and to shape decision-making in small groups. But the task is to change our global collective behavior. How can nations with widely varying material needs, and very different social and environmental values, agree to common rules that limit national sovereignty? And how can we fundamentally change economic structure while we humanely establish these binding global rules? We have entered the realm of what has been called “post-normal science” – characterized by extreme uncertainty and the possibility of catastrophic consequences of inaction.³³

Human society has taken on many of the characteristics of an insect superorganism. The dynamics of ant, termite, and human ultrasocial systems show strikingly similar commonalities. The convergent evolution of agricultural societies in widely dissimilar species is the result of natural selection acting on groups. As the group becomes the focus of natural selection, the components of the group – individual humans, ants, and termites – become expendable for the good of the superorganism. What is good for the group may no longer be good for the individuals that comprise it. The question raised by human ultrasociality is whether our fate as a species will be left to blind evolutionary forces or whether we can use ethics, science, and reason to collectively change our present trajectory. Can we alter the path of social evolution? Can our global civilization return to the sustainable and egalitarian world of our hunter-gatherer ancestors based on collective responsibility for the well-being of every individual?

The vision of the market economy as a highly integrated, self-organizing system is not new. In fact, it is widely accepted. The crucial difference in the vision presented here is that this system operates as if it is a sentient entity advancing and protecting its own narrow interests. Individuals within the ultrasocial system are mere tools – pawns to be used to further the “goals” of the superorganism. Recognizing the inherent conflict between individual well-being and the workings of the global market is a critical first step if we are to move toward an equitable and environmentally sustainable human presence on planet earth. Understanding the evolutionary origins of this conflict is crucial.