
Introduction

THE GREAT EXPERIMENT

Our everyday life is much stranger than we imagine, and rests on fragile foundations. This is the startling message of the evolutionary history of humankind. Our teeming, industrialized, networked existence is not some gradual and inevitable outcome of human development over millions of years. Instead we owe it to an extraordinary experiment launched a mere ten thousand years ago.* No one could have predicted this experiment from observing the course of our previous evolution, but it would forever change the character of life on our planet. For around that time, after the end of the last ice age, one of the most aggressive and elusive bandit species in the entire animal kingdom began to settle down. It was one of the great apes—a close cousin of chimpanzees and bonobos, and a lucky survivor of the extinctions that had wiped out several other promising branches of the chimpanzee family.¹ Like the chimpanzee it was violent, mobile, intensely suspicious of strangers, and used to hunting and fighting in bands of close relatives. Yet now, instead of ranging in search of food, it began to keep herds and grow crops, storing them in settlements that limited the ape's mobility and exposed it to the attentions of the very strangers it had hitherto fought or fled. Within a few hundred generations—barely a pause for breath in evolutionary time—it had formed social organizations of startling complexity. Not just village settlements but cities, armies, empires, corporations, nation states, political movements, humanitarian organizations, even internet communities. The same shy, murderous ape that had avoided strangers throughout its evolutionary history was now living, working, and moving among complete strangers in their millions.

Homo sapiens sapiens is the only animal that engages in elaborate task-sharing—the division of labor as it is sometimes known—between genetically unrelated members of the same species.² It is a phenomenon as remarkable and uniquely human as language itself. Most human beings now obtain a large share of the provision for their daily lives from others to whom they are not related by blood or marriage. Even in poor

* This is equivalent to about two and a half minutes ago on a twenty-four-hour clock that began ticking when our evolution diverged from the rest of the animal kingdom.

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rural societies people depend significantly on nonrelatives for food, clothing, medicine, protection, and shelter. In cities, most of these nonrelatives crucial to our survival are complete strangers. Nature knows no other examples of such complex mutual dependence among strangers. A division of labor occurs, it is true, in some other species, such as the social insects, but only among close relatives (the workers in a beehive or an ant colony are sisters).³ Modern biology has provided a convincing account of the evolutionary mechanisms by which such cooperation between close relatives must have evolved: it is known as the theory of kin selection.⁴ This theory has shown that cooperation through a division of labor between close genetic relatives is likely to be favored by natural selection, since close relatives share a high proportion of genes, including mutant genes, both good and bad.⁵ But for a cooperative division of labor to evolve among genetically unrelated individuals would be very surprising indeed, since individuals with mutant genes favoring dispositions to cooperate would help others who had no such dispositions and offered nothing in return. And sure enough, cooperation through a division of labor has never evolved in any species other than man.

Some species, it is true, practice a small degree of cooperation between unrelated individuals on very precise tasks. It has been seen among sticklebacks, vampire bats, and lions, for example—albeit only in very small groups.⁶ But these rudiments bear as much relation to the elaborate human division of labor between relatives, nonrelatives, and complete strangers as do the hunting calls of chimpanzees to the highly structured human languages spoken all over the globe. Nature is also full of examples of mutual dependence between *different* species—such as that between sharks and cleaner fish (this is known as symbiosis).⁷ But members of the same species occupy the same environment, eat the same food, and—especially—pursue the same sexual opportunities; they are rivals for all of these things in a much more intense way than are members of different species. Nowhere else in nature do unrelated members of the same species—genetic rivals incited by instinct and history to fight one another—cooperate on projects of such complexity and requiring such a high degree of mutual trust as human beings do.

No solution to this puzzle can be found in evolutionary biology alone. Ten thousand years is too short a time for the genetic makeup of *Homo sapiens sapiens* to have adapted to his new social surroundings. If it were somehow possible to assemble together all your direct same-sex ancestors—your father and your father's father and so on if you're male, your mother and your mother's mother and so on if you're female; one for each generation right back to the dawn of agriculture—you and all of these individuals could fit comfortably in a medium-sized

lecture hall.⁸ Only half of you would have known the wheel, and only 1 percent of you the motor car. But you would be far more similar to each other—genetically, physically, and instinctually—than any group of modern men or women who might have assembled there by chance. Apart from a small number of genes that have been subject to unusually strong selective pressures over the last ten millennia (such as the gene for lactose tolerance—the ability to digest milk—in adults)⁹ and the effects of improved nutrition and other environmental developments over the centuries, the biological differences between you and your furthest ancestor would be very hard to distinguish from random variation within the group. If you are reading this book in a train or an airplane, this means your most distant ancestor from Neolithic times was almost certainly more like you, biologically, than the stranger sitting in the seat next to you now.

Yet evolutionary biology has something important to tell us all the same. For the division of labor among human beings has had to piggyback on a physiology and a psychology that evolved to meet a far different set of ecological problems. These were problems faced by hunter-gatherers, mainly on the African woodland savannah, over the six or seven million years that separate us from our last common ancestor with chimpanzees and bonobos. Some time in the last two hundred thousand years or so—less than one-thirtieth of that total span—a series of changes, minuscule to geneticists, vast in the space of cultural potential, occurred to make human beings capable of abstract, symbolic thought and communication.¹⁰ The changes themselves must have occurred before the last common ancestor of the human beings alive today. This implies that they occurred at least 140,000 years ago.¹¹ But the first evidence of the new cultural capabilities to which they gave rise is found in the cave paintings, grave goods, and other symbolic artifacts left by hunter-gatherer communities of anatomically modern man (Cro-Magnon man, as he is sometimes known), which are no older than sixty or seventy thousand years—and most are much younger.¹² These capabilities seem to have made a move toward agriculture and settlement possible once the environmental conditions became favorable, after the end of the last ice age. Indeed, the fact that agriculture was independently invented at least seven times, at close intervals, in different parts of the world suggests it was more than possible; it may even have been in some way inevitable.¹³ These capabilities also enabled human beings to construct the social rules and habits that would constrain their own violent and unreliable instincts enough to make society possible on a larger, more formal scale. And they laid the foundation for the accumulation of knowledge that would provide humanity as a whole with a reservoir of shared skills vastly greater than the skills available to any

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single person. But these cultural capabilities did not evolve *because* of their value in making the modern division of labor possible. Quite the contrary: modern society is an opportunistic experiment, founded on a human psychology that had already evolved before human beings ever had to deal with strangers in any systematic way. It is like a journey to the open sea by people who have never yet had to adapt to any environment but the land.

THE ARGUMENT OF THIS BOOK

The chapters that follow explore what made this remarkable experiment possible and why, against all the odds, it did not collapse. They also explore why it could collapse in the future, and what might be done to prevent that from happening. Part 1 shows why the division of labor is such a challenge for us to explain. It looks at the way in which even some of the simplest activities of modern society depend upon intricate webs of international cooperation that function without anyone's being in overall charge. On the contrary, they work through eliciting a single-mindedness from their participants—a tunnel vision—that is hardly compatible with a clear and nonpartisan vision of the priorities of society as a whole. It seems hard to believe that something as complex as a modern industrial society could possibly work at all without an overall guiding intelligence, but since the work of the economist Adam Smith in the eighteenth century, we have come to realize that this is exactly how things are. Like medical students studying the human body, therefore, we have to understand and marvel at the degree of spontaneous coordination displayed in human societies before we can even begin to investigate its pathologies. This coordination comes about simply because of a willingness of individuals to cooperate with strangers in a multitude of small but collectively very significant ways.

Part 2 looks at what makes such cooperation possible, given the psychology we have inherited from our hunter-gatherer ancestors. The answer consists of institutions—sets of rules for social behavior, some formal, many informal—that build on the instincts of the shy, murderous ape in ways that make life among strangers not only survivable but attractive, potentially even luxurious. These rules of behavior have made it possible for us to deal with strangers by persuading us, in effect, to treat them as honorary friends. Some of the institutions that make this possible have been consciously and coherently designed, but many have grown by experiment or as the by-product of attempts to achieve something quite different. Nobody can claim they are the “best” institutions that human beings could ever devise. They are simply the ones

that happen to have been tried, and that, given the psychology and physiology of the creatures that tried them, happen to have survived and spread.¹⁴

The explanation begins by showing how the division of labor can create great benefits for those societies that can make it work. These benefits come mainly from specialization, the sharing of risk, and the accumulation of knowledge. But advantages to society as a whole cannot explain why a division of labor evolved. We also need to understand why individuals have an interest in participating. A division of labor needs to be robust against opportunism—the behavior of those who seek to benefit from the efforts of others without contributing anything themselves. In other words, participants need to be able to trust each other—especially those they do not know. Social cooperation depends on institutions that have exactly such a property of robustness. Given the facts of human psychology, they ensure that cooperation not only happens but is reliable enough for others to be willing to take its presence for granted, at least most of the time. One such robust human institution will be described in detail: it is the institution of money. Another is the banking system. We shall look at the foundations of trust in financial institutions, and examine the delicate balance between the natural incentives of individuals to signal their trustworthiness to others and the need for outside supervision to enforce trust. Effective institutions rely on a minimum of outside supervision, knowing that a little outside supervision can make natural incentives go a long way.

The rest of part 2 completes the task of explaining how human cooperation is possible by addressing the paradox of tunnel vision. Not only does widespread social trust arise in spite of the limitations of people's individual perspectives, but it even *requires* tunnel vision in order to persist. This is because the most effective mechanisms for ensuring trust rely not just on incentives but on people's internalization of values through education and training. This process entrenches commitment to professional values and at the same makes them resistant to change. Codes of professional ethics can therefore make individual acts of local cooperation more reliable, while generating a degree of systematic blindness to the more distant consequences of our actions. Such blindness—tunnel vision—has dangers that are a natural by-product of its inherent virtues.

Part 2 has therefore argued that we can understand why human beings have proved capable of cooperating with strangers, thanks to institutions that build on their already evolved hunter-gatherer psychology. Part 3 goes on to look at global consequences—at what happens when human beings equipped with this psychology, and responding to the presence of these institutions, come together in the mass. Our mutual

interdependence has produced effects that utterly surpass what any of the participants can have intended or sometimes even imagined. The growth of cities, the despoliation of the environment, the sophisticated functioning of markets, the growth of large corporations, and the development of stocks of collective knowledge in the form of science and technology: all are part of the landscape of human interaction even though nobody has planned them to look the way they do, and all have contributed to the dramatic historical improvement in the prosperity of mankind. But since nobody has planned them, we should not be surprised that while some of them look encouraging, others look very troubling indeed. For instance, the growth of cities—the result of countless uncoordinated individual decisions about where to live and work—has led to some of history’s most creative and innovative environments. It has also produced pollution and disease on an unprecedentedly concentrated scale. Cities themselves have often been able to organize collective action to overcome these by-products of their affluence, but only by living off a hinterland whose resources they exploit and to which they export their waste. But the world as a whole cannot do as cities have done, for it has no hinterland. The example of water, which we shall look at in detail, shows us that problems of global pollution and resource depletion will prove extremely dangerous unless we can find ways of calculating and accounting for the cost of the resources we use and the pollution we cause. For this we need to draw on one of the other great unintended characteristics of modern society: the capacity of markets to calculate prices that summarize the information necessary for allocating resources in a world of scarcity. Markets, when they work well, have a remarkable ability to allow their participants—who may never even physically meet—to pool information about the scarcity of the goods and services they are exchanging. It is precisely this kind of information that we need in order to treat our limited environmental resources wisely.

Nevertheless, there are other aspects of the division of labor that markets on their own cannot effectively coordinate. Many kinds of productive activity take place inside firms, which represent islands of planning and coordination—often also between strangers—in the sea of unplanned market transactions around them. What makes some activities suitable for large firms, whose members are more anonymous to each other, while others are suitable for small firms? The answer is that successful firms adapt to their economic environment by channeling information between people in a way that market transactions cannot do. Information, and the spectacular accumulation of knowledge across the centuries, is another of the remarkable by-products of modern society: how has it happened, what are its benefits, and what are its dangers?

Finally, the last chapter in part 3 explores the paradox that a society whose members are interconnected as never before can nevertheless exclude some of its most vulnerable members—the unemployed, the poor, the sick.

So, although part 3 will give us many reasons to be impressed by the achievements of modern society, it will also show us urgent reasons for concern. The persistence of desperate poverty in a world of plenty, the destruction of the world's environmental assets, and the spread of weapons of large- and small-scale destruction (resulting from the diffusion of information into the hands of those who would use it for aggressive ends) all call for conscious reflection on solutions, using that same capacity for abstract reasoning that has created so many of the problems in the first place. So part 4 looks at the institutions of collective action—states, communities, and other political entities—and considers their virtues and their weaknesses in the face of the need to design collective solutions to the common problems of our species. At first, it may look as though we have abundant reasons to be optimistic. For while part 3 indicated the daunting scale of these common problems, part 2 has already shown us that the emotional and cognitive capacities for cooperation, and for rational reflection on the proper uses to make of that cooperation, have a solid foundation in human evolution.

Unfortunately, however, the human capacity for cooperation is double-edged. It is not only the foundation of social trust and peaceful living but also what makes for the most successful acts of aggression between one group and another. Like chimpanzees, though with more deadly refinement, human beings are distinguished by their ability to harness the virtues of altruism and solidarity, and the skills of rational reflection, to the end of making brutal and efficient warfare against rival groups. What modern society needs, therefore, is not more cooperation but better-directed forms of cooperation. The book concludes by asking just how optimistic we can reasonably be, knowing that some of the very qualities that have made the great experiment of modern life possible are also those that now threaten its very existence. Just how fragile is the great experiment on which our species set out ten thousand years ago? And what can we do to make it less fragile now?

Understanding the delicacy of our social institutions and their roots in our evolutionary past helps us to think constructively about the pressing problems of the world today. Take globalization—one of those rare abstract nouns that can bring people out marching in the streets in their hundreds of thousands. The anxieties provoked by globalization are not new but have been with us for ten thousand years— anxieties about powerful individuals and groups of whom we know little but who may intend to do us harm or who may undermine our security and

our prosperity even if they have no intentions toward us of any kind. Terrorism, too, is a modern name for a phenomenon that provokes in us an age-old fear: that among our enemies are numbered not only those who bear us personal grudges but also those who do not know us or even care about us as individuals at all. Living with these fears requires us to deploy abstract reasoning in the service of institution-building, today as throughout the last ten thousand years. As our world has grown more complex, we now have to do more than create the simple local marketplaces where the first strangers could meet in enough security to justify the risk of dealing with each other. We have to create a marketplace where tribes, corporations, and whole nations can meet in relative security and do the deals that underpin their collective prosperity. But though the scale of the challenges has grown, they retain much of their old character. And the last ten millennia have shown repeatedly how those who have not learned from their history may never notice their deficiency until, fatally, they are pitted against adversaries who have.

The argument of this book rests, therefore, on four pillars:

First, the unplanned but sophisticated coordination of modern industrial societies is a remarkable fact that needs an explanation. Nothing in our species' biological evolution has shown us to have any talent or taste for dealing with strangers.

Second, this explanation is to be found in the presence of institutions that make human beings willing to treat strangers as honorary friends.

Third, when human beings come together in the mass, the unintended consequences are sometimes startlingly impressive, sometimes very troubling.

Fourth, the very talents for cooperation and rational reflection that could provide solutions to our most urgent problems are also the source of our species' terrifying capacity for organized violence between groups. Trust between groups needs as much human ingenuity as trust between individuals.

This book draws together a large range of findings by scholars working in history, biology, anthropology, and, especially, economics and economic history. The outline of the story told here is not new and in many respects has been part of the shared understanding of economists since the work of Adam Smith in the eighteenth century. But the growing specialization of disciplines has meant that many people outside the mysterious world of professional economics have not realized how directly our subject speaks to the past and the future of our human species. We are believed to deal only in the rational skeleton of human life and to avoid addressing the flesh and blood it bears. At the same time, some scholars working within economics are surprised to discover how

starkly and expressively the writings of other disciplines illustrate the dilemmas that we have been in the habit of studying in our often somewhat bloodless way.

To help bridge this gap I have chosen to discuss economic arguments using as little economic terminology as possible and citing evidence drawn mainly from outside economics—from history, biology, and other sources, including literary ones. The endnotes are designed not just to support the claims made in the text but also to give sources and suggestions for further reading. While the book's individual chapters are designed to be read as self-contained essays, the prologues to parts 2, 3, and 4 situates the chapters to come within a structured argument. Epilogues at the end of these parts link the themes that have been discussed to the more formal literature of economics. They offer suggestions for further reading to those who would like to see the economic arguments made more explicit, to see the logical skeleton under the flesh.