

II

THE GREAT EXPERIMENT

SOMEONE FOND OF logical absurdities once defined specialists as "people who know more and more about less and less, until they know all about nothing." Many animals are highly specialized, their bodies adapted to specific ecological niches and ways of life. Specialization brings short-term rewards but can lead, in the long run, to an evolutionary dead end. When the prey of the sabretoothed cat died out, so did the cat.

The modern human animal — our physical being — is a generalist. We have no fangs, claws, or venom built into our bodies. Instead we've devised tools and weapons — knives, spearheads, poisoned arrows. Elementary inventions such as warm clothing and simple watercraft allowed us to overrun the whole planet before the end of the last ice age.¹ Our specialization is the brain. The flexibility of the brain's interactions with nature, through culture, has been the key to our success.

Cultures can adapt far more quickly than genes to new threats and needs.

But as I suggested in the previous chapter, there is still a risk. As cultures grow more elaborate, and technologies more powerful, they themselves may become ponderous specializations — vulnerable and, in extreme cases, deadly. The atomic bomb, a logical progression from the arrow and the bullet, became the first technology to threaten our whole species with extinction. It is what I call a “progress trap.” But much simpler technologies have also seduced and ruined societies in the past, even back in the Stone Age.

In the previous chapter, I raised three questions asked by Paul Gauguin in his great 1897 painting, entitled, *Where Do We Come From? What Are We? Where Are We Going?* At a practical level, anthropology has answered the first two: we now know that we are the remote descendants of apes who lived in Africa about 5 million years ago. Modern apes, which are also descended from the same original stock, are kin, not ancestors. Our main difference from chimps and gorillas is that over the last 3 million years or so, we have been shaped less and less by nature, and more and more by culture. We have become experimental creatures of our own making.

This experiment has never been tried before. And we, its unwitting authors, have never controlled it. The experiment is now moving very quickly and on a colossal scale. Since the early 1900s, the world’s population has multiplied by four and its economy — a rough measure of the human load on nature — by more than forty. We have

reached a stage where we must bring the experiment under rational control, and guard against present and potential dangers. It’s entirely up to us. If we fail — if we blow up or degrade the biosphere so it can no longer sustain us — nature will merely shrug and conclude that letting apes run the laboratory was fun for a while but in the end a bad idea.

We have already caused so many extinctions that our dominion over the earth will appear in the fossil record like the impact of an asteroid. So far, we are only a small asteroid compared with the one that clobbered the dinosaurs.² But if the extinctions continue much longer, or if we unleash weapons of mass destruction — I mean the real ones kept in huge stockpiles by the great powers — then the next layer of fossils will indeed show a major hiatus in this planet’s life.

I suggested in the previous chapter that prehistory, like history, tells us that the nice folk didn’t win, that we are at best the heirs of many ruthless victories and at worst the heirs of genocide. We may well be descended from humans who repeatedly exterminated rival humans — culminating in the suspicious death of our Neanderthal cousins some 30,000 years ago. Whatever the truth of that event, it marks the beginning of the Upper Palaeolithic period — the last and briefest of three divisions in the Old Stone Age, about one-hundredth of the whole.

In this chapter I want to see what we can deduce from the first progress trap — the perfection of hunting, which ended the Old Stone Age — and how our escape from

that trap by the invention of farming led to our greatest experiment: worldwide civilization. We then have to ask ourselves this urgent question: Could civilization itself be another and much greater trap?

The Old Stone Age began nearly 3 million years ago, with the first rough tools made by the first rough beasts slouching towards humanity, and ended only 12,000 years ago, when the great ice sheets withdrew for the last time to the poles and ranges where they await further climate change. Geologically speaking, 3 million years is only a wink, one minute of earth's day. But in human terms, the Old Stone Age is a deep abyss of time — more than 99.5 per cent of our existence — from which we crawled into the soft beds of civilization only yesterday.

Even our modern subspecies, *Homo sapiens sapiens*, is between ten and twenty times older than the oldest civilization. But measured as subjective human experience — as a sum of individual lives — more people have lived a civilized life than any other.³ Civilization does not run deep in time, but it runs wide, for it is both the cause and the effect of a population boom that has yet to level off.

I should make it clear that I'm defining "civilization" and "culture" in a technical, anthropological way. By culture I mean the whole of any society's knowledge, beliefs, and practices. Culture is everything: from veganism to cannibalism; Beethoven, Botticelli, and body piercing; what you do in the bedroom, the bathroom, and the church of your choice (if your culture allows a choice); and all of technology from the split stone to the split

atom. Civilizations are a specific kind of culture: large, complex societies based on the domestication of plants, animals, and human beings.⁴ Civilizations vary in their makeup but typically have towns, cities, governments, social classes, and specialized professions. All civilizations are cultures, or conglomerates of cultures, but not all cultures are civilizations.

Archaeologists generally agree that the first civilizations were those of Sumer — in southern Mesopotamia, or what is now Iraq — and Egypt, both emerging about 3000 B.C. By 1000 B.C., civilization ringed the world, notably in India, China, Mexico, Peru, and parts of Europe.

From ancient times until today, civilized people have believed they behave better, and *are* better, than so-called savages. But the moral values attached to civilization are specious: too often used to justify attacking and dominating other, less powerful, societies. In their imperial heyday, the French had their "civilizing mission" and the British their "white man's burden" — the bearing of which was eased by automatic weapons. As Hilaire Belloc wrote in 1898: "Whatever happens, we have got / The Maxim gun, and they have not." Nowadays, Washington claims to lead and safeguard "the civilized world," a tradition in American rhetoric that began with the uprooting and exterminating of that country's first inhabitants.⁵

The Roman circus, the Aztec sacrifices, the Inquisition bonfires, the Nazi death camps — all have been the work of highly civilized societies.⁶ In the twentieth century alone, at least 100 million people, mostly civilians, died in

wars.⁷ Savages have done no worse. At the gates of the Colosseum and the concentration camp, we have no choice but to abandon hope that civilization is, in itself, a guarantor of moral progress.

When Mahatma Gandhi came to England in the 1930s for talks on Indian self-rule, a reporter asked him what he thought of Western civilization. Gandhi, who had just visited the London slums, replied: "I think it would be a very good idea."⁸ If I sound at times rather hard on civilization, this is because, like Gandhi, I would like it to fulfill its promise and succeed. I would rather live in a house than in a rock-shelter. I like great buildings and good books. I like knowing that I am an ape, that the world is round, that the sun is a star and the stars are suns — taken-for-granted knowledge that took thousands of years to wrest from "chaos and old night."⁹ For all its cruelties, civilization is precious, an experiment worth continuing. It is also precarious: as we climbed the ladder of progress, we kicked out the rungs below. There is no going back without catastrophe. Those who don't like civilization, and can't wait for it to fall on its arrogant face, should keep in mind that there is no other way to support humanity in anything like our present numbers or estate.¹⁰

The Old Stone Age now seems so remote that we seldom give it a thought, except perhaps to chuckle at a "Farside" cartoon. Yet it ended so recently — only six times further back than the birth of Christ and the Roman Empire —

that the big changes since we left the cave have all been cultural, not physical. A long-lived species like ours can't evolve significantly over so short an interval. This means that while culture and technology are cumulative, innate intelligence is not.¹¹

Like the butt of Dr. Johnson's joke that much may be made of a Scotsman if he be caught young, a late-Palaeolithic child snatched from a campfire and raised among us now would have an even chance at earning a degree in astrophysics or computer science. To use a computer analogy, we are running twenty-first-century software on hardware last upgraded 50,000 years ago or more. This may explain quite a lot of what we see in the news.

Culture itself has created this uniquely human problem: partly because cultural growth runs far ahead of evolution, and because for a long time now the accreting mass of culture has forestalled natural selection and put destiny into our hands.

"I will tell you what a man is," wrote William Golding in his 1956 novel, *Pincher Martin*, which though set during the Second World War continues the meditation on humanity that he began in his Stone Age novel, *The Inheritors*: "He is a freak, an ejected foetus robbed of his natural development, thrown out in the world with a naked covering of parchment, with too little room for his teeth and a soft bulging skull like a bubble. But nature stirs a pudding there. . . ."¹²

In Golding's pudding seethe many ingredients: genius and madness, logic and belief, instinct and hallucination,

compassion and cruelty, love, hate, sex, art, greed — all the drives towards life and death. In the individual, the sum of these is personality; in society, it is the collective personality called culture. In the long run, the pudding of culture has always grown in size. And there have been several yeasty times when it rose quite suddenly and spilled across the kitchen.

The first of these was the taming of fire by *Homo erectus*, which tipped the balance of survival strongly in our favour. The next, half a million years later, was the perfection of hunting by Cro-Magnons soon after they displaced the Neanderthals. New weapons were produced: lighter, sharper, longer-ranged, more elegant and deadly.¹³ Bead adornment, bone carvings, musical instruments, and elaborate burials became common. Magnificent paintings appeared on cave walls and rock faces, in a vigorous naturalism that would not be seen again until the Renaissance.

Many of these things had already been done on a small scale by Neanderthals and earlier Cro-Magnons,¹⁴ so this spurt of art and technology cannot (as some claim) be evidence that we suddenly evolved into a new species with brand-new cognitive powers. But it is evidence of a familiar cultural pattern: leisure born of a food surplus. The hunters and gatherers were producing more than mere subsistence, giving themselves time to paint the walls, make beads and effigies, play music, indulge in religious rituals. For the first time, people were rich.

To draw a rough analogy between two unconnected eras of very different length and complexity, there are certain

resemblances between this end-time of the Old Stone Age and the past half millennium of Western “discovery” and conquest. Since A.D. 1492, one kind of civilization — the European — has largely destroyed and displaced all others, fattening and remaking itself into an industrial force in the process (a point I shall return to in a later chapter). During the Upper Palaeolithic, one kind of human — the Cro-Magnon, or *Homo sapiens*¹⁵ — multiplied and fanned out around the world, killing, displacing, or absorbing all other variants of man, then entering new worlds that had never felt a human foot.

By 15,000 years ago at the very latest — long before the ice withdraws — humankind is established on every continent except Antarctica. Like the worldwide expansion of Europe, this prehistoric wave of discovery and migration had profound ecological consequences. Soon after man shows up in new lands, the big game starts to go missing. Mammoths and woolly rhinos retreat north, then vanish from Europe and Asia. A giant wombat, other marsupials, and a tortoise as big as a Volkswagen disappear from Australia. Camels, mammoth, giant bison, giant sloth, and the horse die out across the Americas.¹⁶ A bad smell of extinction follows *Homo sapiens* around the world.

Not all experts agree that our ancestors were solely to blame. Our defenders point out that we hunted in Africa, Asia, and Europe for a million years or more without killing everything off; that many of these extinctions coincide with climatic upheavals; that the end of the Ice Age may have come so swiftly that big animals couldn't adapt

or migrate. These are good objections, and it would be unwise to rule them out entirely. Yet the evidence against our ancestors is, I think, overwhelming. Undoubtedly, animals were stressed by the melting of the ice, but they had made it through many similar warmings before. It is also true that earlier people — *Homo erectus*, Neanderthals, and early *Homo sapiens* — had hunted big game without hunting it out. But Upper Palaeolithic people were far better equipped and more numerous than their forerunners, and they killed on a much grander scale.¹⁷ Some of their slaughter sites were almost industrial in size: a thousand mammoths at one; more than 100,000 horses at another.¹⁸ “The Neanderthals were surely able and valiant in the chase,” wrote the anthropologist William Howells in 1960, “but they left no such massive bone yards as this.”¹⁹ And the ecological moral is underlined more recently by Ian Tattersall. “Like us,” he says, “the Cro-Magnons must have had a darker side.”²⁰

In steep terrain, these relentless hunters drove entire herds over cliffs, leaving piles of animals to rot, a practice that continued into historic times at places such as Head-Smashed-In Buffalo Jump, Alberta. Luckily for bison, cliffs are rare on the great plains. But there would be no limit to the white man’s guns that reduced both buffalo and Indian to near extinction in a few decades of the nineteenth century. “The humped herds of buffalo,” wrote Herman Melville, “not forty years ago, overspread by tens of thousands the prairies of Illinois and Missouri . . . where now the polite broker sells you land at a dollar an inch.”²¹ Land at a dollar an inch: now *that* is civilization.

Modern hunter-gatherers — Amazonians, Australian Aboriginals, Inuit, Kalahari “bushmen” — are wise stewards of their ecologies, limiting their own numbers, treading lightly on the land.²² It is often assumed that ancient hunters would have been equally wise. But archaeological evidence does not support this view. Palaeolithic hunting was the mainstream livelihood, done in the richest environments on a seemingly boundless earth. Done, we have to infer from the profligate remains, with the stock-trader’s optimism that there would always be another big killing just over the next hill. In the last and best-documented mass extinctions — the loss of flightless birds and other animals from New Zealand and Madagascar — there is no room for doubt that people were to blame.²³ The Australian biologist Tim Flannery has called human beings the “future-eaters.” Each extermination is a death of possibility.²⁴

So among the things we need to know about ourselves is that the Upper Palaeolithic period, which may well have begun in genocide, ended with an all-you-can-kill wildlife barbecue. The *perfection* of hunting spelled the *end* of hunting as a way of life. Easy meat meant more babies. More babies meant more hunters. More hunters, sooner or later, meant less game. Most of the great human migrations across the world at this time must have been driven by want, as we bankrupted the land with our moveable feasts.

The archaeology of western Europe during the final millennia of the Palaeolithic shows the grand lifestyle of the Cro-Magnons falling away. Their cave painting falters

and stops. Sculptures and carvings become rare. The flint blades grow smaller, and smaller. Instead of killing mammoth they are shooting rabbits.

In a 1930s essay called "In Praise of Clumsy People," the waggish Czech writer Karel Čapek observed: "Man ceased to be a mere hunter when individuals were born who were very bad hunters." As someone once said of Wagner's music, Čapek's remark is better than it sounds. The hunters at the end of the Old Stone Age were certainly not clumsy, but they were bad because they broke rule one for any prudent parasite: *Don't kill off your host*. As they drove species after species to extinction, they walked into the first progress trap.

Some of their descendants — the hunter-gatherer societies that have survived into recent times — would learn in the school of hard knocks to restrain themselves. But the rest of us found a new way to raise the stakes: that great change known to hindsight as the Farming or Neolithic "Revolution."

Among hunters there had always been a large number of non-hunters: the gatherers — mainly women and children, we suppose, responsible for the wild fruits and vegetables in the diet of a well-run cave. Their contribution to the food supply became more and more important as the game died out.

The people of that short, sharp period known as the Mesolithic, or Middle Stone Age, tried everything: living in estuaries and bogs; beachcombing; grubbing up roots; and reaping wild grasses for the tiny seeds, a practice

with enormous implications. So rich were some of these grasses, and so labour-intensive their exploitation, that settled villages appear in key areas *before* farming.²⁵ Gatherers began to notice that seeds accidentally scattered or passed in droppings would spring up the following year. They began to influence the outcome by tending and enlarging wild stands, sowing the most easily reaped and plumpest seeds.

Such experiments would eventually lead to full agriculture and almost total dependence on a few monotonous staples, but that was several thousand years away; at this early time, the plant-tenders were still mainly gatherers, exploiting a great variety of flora, as well as any wild game and fish they could find. At Monte Verde in Chile, for example, a permanent village of rectangular wooden huts was in place by 13,000 years ago, sustained by hunting camelids, small game, and soon-to-be-extinct mastodon; but the remains include many wild vegetables, not least potato peelings.²⁶ Although Monte Verde is one of the earliest human sites anywhere in the Americas, it shows a mature and intimate knowledge of local plants, several of which would eventually become the founding crops of Andean civilization.

Like the accumulation of small changes that separated us from the other great apes, the Farming Revolution was an unconscious experiment, too gradual for its initiators to be aware of it, let alone to foresee where it would lead. But compared with all earlier developments, it happened at breakneck speed.

Highly important, for what it tells us about ourselves, is that there was not one revolution but many. On every continent except Australia, farming experiments began soon after the regime of the ice released its grip.²⁷ Older books (and some recent ones²⁸) emphasize the importance of the Middle East, or the Fertile Crescent, which in those days stretched from the Mediterranean shore to the Anatolian plateau and the alluvial plains of Iraq. All the bread-based civilizations derive their staples from this area, which gave us wheat, barley, sheep, and goats.

It is now clear that the Middle East was only one of at least four major regions of the world where agriculture developed independently at about the same time. The others are the Far East, where rice and millet became the main staples; Mesoamerica (Mexico and neighbouring parts of Central America), whose civilizations were based on maize, beans, squash, amaranth, and tomatoes; and the Andean region of South America, which developed many kinds of potato, other tubers, squash, cotton, peanuts, and high-protein grains such as quinoa.²⁹ In all these heartlands, crop domestication appears between 8,000 and 10,000 years ago.³⁰ Besides these Big Four, there are about a dozen lesser founding areas around the world, including tropical Southeast Asia, Ethiopia, the Amazon, and eastern North America, which gave us, respectively, the banana, coffee, manioc, and the sunflower.³¹ Unconnected peoples sometimes developed the same plants: cotton and peanuts are each of two kinds, developed simultaneously in the New World and the Old.

Animal domestication is harder to document, but at about the same time people were developing crops, they learned that certain herbivores and birds could be followed, corralled, and killed at a sustainable rate. Over generations these animals grew tame enough, and dim-witted enough, not to mind the two-legged serial killer who followed them around. Hunting became herding, just as gathering grew into gardening.

Sheep and goats were the first true domesticates in the Middle East, starting about 8000 B.C. Domestic camelids — early forms of the llama and alpaca, used for pack trains and wool, as well as for meat — appear in Peru during the sixth millennium B.C., about the same time as cattle in Eurasia, though neither camelids nor early cattle were milked. Donkeys and horses were tamed by about 4000 B.C. Craftier creatures such as dogs, pigs, and cats had long been willing to hang around human settlements in return for scraps, slops, and the mouse boom spurred by granaries. Dogs, which may have been tamed for hunting back in the Palaeolithic, are found with human groups throughout the world. In cold weather, they were sometimes used as bedwarmers. In places such as Korea and Mexico, special breeds were kept for meat. The chicken began its sad march towards the maw of Colonel Sanders as a gorgeously feathered Asian jungle fowl, while Mexico domesticated the turkey. Along with the llama and alpaca, Peruvians kept muscovy ducks and the lowly but prolific guinea pig — which even made a cameo appearance on the menu of Christ's Last Supper in a colonial painting.³²

As the eating of guinea pigs and chihuahuas suggests, the Americas were less well-endowed with domesticable animals than the Old World. But the New World compensated by developing a wider and more productive range of plants. Peru alone had nearly forty major species.³³ Such plants eventually supported huge native cities in the Americas, and several of them would transform the Old World's nutrition and economics when they were introduced there — a matter I shall discuss in the final chapter.

The more predictable the food supply, the bigger the population. Unlike mobile foragers, sedentary people had little reason to limit the number of children, who were useful for field and household tasks. The reproductive rate of women tended to rise, owing to higher levels of body fat and earlier weaning with animal milk and cereal baby food. Farmers soon outnumbered hunter-gatherers — absorbing, killing, or driving them into the surrounding “wilderness.”

At the beginning of the Upper Palaeolithic, when our modern subspecies emerged by fair means or foul as the earth's inheritors, we numbered perhaps a third of a million all told.³⁴ By 10,000 years ago, on the eve of agriculture and after settling all habitable continents, we had increased to about 3 million; and by 5,000 years ago, when farming was established in all the founding regions and full civilization had begun in Sumer and Egypt, we may have reached between 15 and 20 million worldwide.

Such figures are merely educated guesswork, and everything else I have just said is, of course, an oversimplification. The change to full-time farming took

millennia, and early results were not always promising, even in a core zone such as the Middle East. Neolithic Jericho was tiny, a mere four acres³⁵ in 8000 B.C., and it took another 1,500 years to reach ten acres.³⁶ The Turkish site of Çatal Hüyük, the largest settlement in the Fertile Crescent between 7000 and 5500 B.C., covered only one twentieth of a square mile (or thirty-two acres),³⁷ and its inhabitants depended on wild game for much of their protein. As any rural Canadian knows, hunting continues among farmers wherever it's fun or worthwhile, and this was especially true in the Americas and parts of Asia where domestic animals were scarce. Nevertheless, the pace of growth accelerated. By about 5,000 years ago, the majority of human beings had made the transition from wild food to tame.

In the magnitude of its consequences, no other invention rivals farming (except, since 1940, the invention of weapons that can kill us all). The human career divides in two: everything before the Neolithic Revolution and everything after it. Although the three Stone Ages — Old, Middle, and New — may seem to belong in a set, they do not. The New Stone Age has much more in common with later ages than with the millions of years of stone toolery that went before it. The Farming Revolution produced an entirely new mode of subsistence, which remains the basis of the world economy to this day. The food technology of the late Stone Age is the one technology we can't live without. The crops of about a dozen ancient peoples feed the 6 billion on earth today. Despite more than two

centuries of scientific crop-breeding, the so-called green revolution of the 1960s, and the genetic engineering of the 1990s, not one new staple has been added to our repertoire of crops since prehistoric times.

Although the New Stone Age eventually gave rise to metalworking in several parts of the world, and to the Industrial Revolution in Europe, these were elaborations on the same theme, not a fundamental shift in subsistence. A Neolithic village was much like a Bronze or Iron Age village — or a modern Third World village, for that matter.

The Victorian archaeological scheme of classifying stages of human development by tool materials becomes unhelpful from the Neolithic onward. It may have some merit in Europe, where technology was often linked to social change, but is little help for understanding what happened in places where a lack of the things our technocentric culture regards as basic — metal, ploughs, wheels, etc. — was ingeniously circumvented, or where, conversely, their presence was inconsequential.³⁸ For example, Mesopotamia invented the wheel about 4000 B.C., but its close neighbour Egypt made no use of wheels for another 2,000 years. The Classic Period Maya, a literate civilization rivalling classical Europe in mathematics and astronomy, made so little use of metals that they were technically in the Stone Age.³⁹ By contrast, sub-Saharan Africa mastered ironworking by 500 B.C. (as early as China did), yet never developed a full-blown civilization.⁴⁰ The Incas of Peru, where metalworking had begun about 1500 B.C., created one of the world's largest and

most closely administered empires, yet may have done so without writing as we know it (though evidence is growing that their quipu system was indeed a form of script).⁴¹ Japan made pottery long before anyone else — more than 12,000 years ago — but rice farming and full civilization did not appear there for another 10,000 years, adopted wholesale from China and Korea. The Japanese didn't begin to work bronze until 500 B.C., but became famous for steel swords by the sixteenth century. At that time they acquired European firearms, then abandoned them for 300 years.

We should therefore be wary of technological determinism, for it tends to underestimate cultural factors and reduce complex questions of human adaptation to a simplistic "We're the winners of history, so why didn't others do what we did?" We call agriculture and civilization "inventions" or "experiments" because that is how they look to hindsight. But they began accidentally, a series of seductive steps down a path leading, for most people, to lives of monotony and toil. Farming achieved quantity at the expense of quality: more food and more people, but seldom better nourishment or better lives. People gave up a broad array of wild foods for a handful of starchy roots and grasses — wheat, barley, rice, potatoes, maize. As we domesticated plants, the plants domesticated us. Without us, they die; and without them, so do we. There is no escape from agriculture except into mass starvation, and it has often led there anyway, with drought and blight. Most people, throughout most of time, have lived on the edge of hunger — and much of the world still does.⁴²

In hunter-gatherer societies (barring a few special cases) the social structure was more or less egalitarian, with only slight differences in wealth and power between greatest and least. Leadership was either diffuse, a matter of consensus, or something earned by merit and example. The successful hunter did not sit down beside his kill and stuff himself on the spot; he shared the meat and thereby gained prestige. If a leader became overbearing, or a minority disliked a majority decision, people could leave. In an uncrowded world without fixed borders or belongings, it was easy to vote with one's feet.

The early towns and villages that sprang up in a dozen farming heartlands around the world after the last ice age seem to have continued these free-and-easy ways for a while. Most of them were small peasant communities in which everyone worked at similar tasks and had a comparable standard of living.⁴³ Land was either communally owned or thought of as having no owner but the gods. Farmers whose effort and skill made them wealthier had an obligation to share with the needy, to whom they were bound by kinship.

Gradually, however, differences in wealth and power became entrenched. Freedom and social opportunity declined as populations rose and boundaries hardened between groups. This pattern first appears in the Neolithic villages of the Middle East, and it has recurred all over the world. The first farmers along the Danube, for example, left only tools in their remains; later settlements are heavily fortified and strewn with weapons. Here, said the great Australian archaeologist Gordon Childe, "we

almost see the state of war of all against all arising as . . . land became scarce."⁴⁴ Writing those words in 1942, during Hitler's expansionist policy of *Lebensraum*,⁴⁵ Childe did not need to underline how little the world had changed from Stone Age times to his.

Patriotism may indeed be, as Dr. Johnson said, "the last refuge of a scoundrel," but it's also the tyrant's first resort. People afraid of outsiders are easily manipulated. The warrior caste, supposedly society's protectors, often become protection racketeers. In times of war or crisis, power is easily stolen from the many by the few on a promise of security. The more elusive or imaginary the foe, the better for manufacturing consent. The Inquisition did a roaring trade against the Devil.⁴⁶ And the twentieth century's struggle between capitalism and communism had all the hallmarks of the old religious wars. Was defending either system *really* worth the risk of blowing up the world?

Now we are losing hard-won freedoms on the pretext of a worldwide "war on terror," as if terrorism were something new. (Those who think it is should read *The Secret Agent*, a novel in which anarchist suicide bombers prowl London wearing explosives; it was written by Joseph Conrad a hundred years ago.⁴⁷) The Muslim fanatic is proving a worthy replacement for the heretic, the anarchist, and especially the Red Menace so helpful to military budgets throughout the Cold War.

The Neolithic Revolution seems to have been inevitable, or nearly so, wherever the makings for it were found. If

the discovery of farming had been sparked by a freak combination of circumstances, we would expect to see it happen only in one particular place and spread outward from there; or to see it happen very rarely and at widely differing times. Until the Upper Palaeolithic (or shortly before⁴⁸), nature had kept all the meddlesome apes in one big laboratory, the Old World. But once the apes got out and made their way to the New World, there were two laboratories, each stocked with different raw materials and largely cut off from the other when sea levels rose with the melting of the ice.⁴⁹ Given that the plants, animals, environments, and technologies in each lab were so different, the astonishing thing is what similar paths were taken on each side of the earth — and how alike the results turned out to be.

When the Spaniards reached the American mainland in the early sixteenth century, the peoples of the western and eastern hemispheres had not met since their ancestors parted as Ice Age hunters running out of game. It is true that there had been a few pre-Columbian contacts — with Polynesians, Vikings, and possibly Asians — but these were too fleeting and too late to affect native flora and fauna or the rise of civilization. Not even such able seamen as the Norway rat and the cockroach had reached America before Columbus. Neither had the Old World's terrible plagues, such as smallpox.⁵⁰

What took place in the early 1500s was truly exceptional, something that had never happened before and never will again. Two cultural experiments, running in isolation for 15,000 years or more, at last came face to face.

Amazingly, after all that time, each could recognize the other's institutions. When Cortés landed in Mexico he found roads, canals, cities, palaces, schools, law courts, markets, irrigation works, kings, priests, temples, peasants, artisans, armies, astronomers, merchants, sports, theatre, art, music, and books. High civilization, differing in detail but alike in essentials, had evolved independently on both sides of the earth.

The test case of America suggests that we are predictable creatures, driven everywhere by similar needs, lusts, hopes, and follies. Smaller experiments running independently elsewhere had not reached the same level of complexity, but many showed the same trends. Even on remote Polynesian islands, settled by people descended from a boatload or two of intrepid seafarers, mini-civilizations sprang up complete with social rank, intensive farming, and stone monuments.

Faced not only with the similarity but also the synchronicity of these discrete developments, we have to ask: Why were no crops domesticated anywhere *before* the end of the last ice age? The people of 20,000 years ago were just as smart as those of 10,000 years ago; not all of them were gluttons with game, and the ice did not hold sway in lower latitudes.

One possible answer to this question is a worry to us now. By studying ancient ice cores, which, like tree rings, leave a yearly record, climatologists have been able to track the average global temperature over a quarter million years. These studies show that the world's climate

has been unusually stable for the past 10,000 years — exactly the lifetime of agriculture and civilization. It seems we couldn't have developed farming earlier, even if we'd tried. The studies also show that the earth's climate has sometimes fluctuated wildly, breaking from an ice age — or plunging into one — not over centuries but in *decades*.⁵¹

The natural triggers of such events are not well understood. Some sort of chain reaction may provoke the rapid upsets — perhaps a sudden reversal of oceanic currents, or a release of methane from thawing permafrost. In his book on the glacial core studies, Richard Alley points out what should be obvious: "humans have built a civilization adapted to the climate we have. Increasingly, humanity is using everything this climate provides . . . [and] the climate of the last few thousand years is about as good as it gets."⁵²

Change is not in our interest. Our only rational policy is not to risk provoking it. Yet we face abundant evidence that civilization itself, through fossil-fuel emissions and other disturbances, is upsetting the long calm in which it grew. Ice sheets at both poles are breaking up. Glaciers in the Andes and Himalayas are thawing; some have disappeared in only twenty-five years.⁵³ Droughts and unusually hot weather have already caused world grain output to fall or stagnate for eight years in a row. During the same eight years, the number of mouths to feed went up by 600 million.

Steady warming will be bad enough, but the worst outcome would be a sudden overturning of earth's

climatic balance — back to its old regime of sweats and chills. If that happens, crops will fail everywhere and the great experiment of civilization will come to a catastrophic end. In the matter of our food, we have grown as specialized, and therefore as vulnerable, as a sabre-toothed cat.