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WHAT IS AT STAKE?

Just how bad is it likely to get?

ALL OF US depend on the biosphere for our survival: for the air we breathe, the water we drink, the soil in which we grow food and the complex, ever-evolving community of microorganisms that inhabit our bodies and account for several pounds of our body weight. Disruptions to the biosphere pose multiple mortal dangers to us: global warming spreads tropical diseases further and further north; rising ocean levels are predicted to drown the coastal cities where nearly half of us live; disappearing mountain glaciers are turning arable land into deserts, threatening starvation.

Most of us also depend on the technosphere for our survival. If the lights went out, the public water supply failed, transportation fuels became unavailable and so on, most of us would lose access to food, medicine, heat and air conditioning, and would starve, suffer from dehydration and either hypothermia or heatstroke, fall sick and die. Without communications and transportation networks we would find ourselves stranded and unable to communicate.

It is also by now quite clear that the technosphere dominates, disrupts and kills off the biosphere in a myriad interrelated ways— too many to enumerate. To mention a shocking few:

- The oceans are becoming quite literally trashed. There is the plastics plague which has inundated the oceans with tiny, long-lived bits of material which, as they decay, release toxins into the marine environment. There are the increasing ocean acidity and water temperatures, which are imperiling shellfish and coral. Now add all the chemical toxins, such as the 1.84 million gallons of Corexit oil dispersant that BP used after the Deepwater Horizon disaster and the fertilizer runoff from farms and lawns, which has caused anoxic dead zones to appear and spread. All of this is forcing the oceans to revert to a primordial state dominated by bacteria and jellyfish. How will coastal and island populations survive if deprived of the sea as a source of food?

- There is the nuclear contamination issue: all of the long-lived radioactive materials from both nuclear weapons production and nuclear power will remain dangerous for far longer than the maximum lifetime of any conceivable civilization, longer even than the maximum expected lifetime of the human species. As facilities that house nuclear material are abandoned and fall into disrepair, plumes of radioactive contamination will spread across various areas of the planet. How could post-industrial societies be expected to be able to track and map the nuclear contamination as it is gradually spread by winds and currents, migrating bird species, smoke from forest fires, storm runoff and so on?

- The level of climate disruption due to the burning of fossil fuels may have already resulted in unstoppable positive feedback that will put the Earth's climate in a state that will nullify all our efforts at agriculture. Humans developed agriculture roughly 10,000 years ago and started the chain of events in which civilizations rose and fell, culminating in the present global industrial civilization. According to the climate record deduced from ice cores, fossilized tree rings and other sources of evidence, these last 10,000 years were also a period of unusual climatic stability. This was not a coincidence: without this stability there would have been too many failed harvests to maintain a stock of seed grain, and agriculture in

its most common form—the tilled monoculture of annual plants—would not have been possible. And now that we have entered a geological epoch that some are calling the Anthropocene—because it is so significantly impacted by human activity—agriculture is once again likely to become a losing proposition. How are human populations going to survive if the usual methods for growing staple foods can no longer be relied on?

- Infectious disease control has prevented many deaths and resulted in a very large population, but antibiotics have been overused by doctors and livestock farmers alike. Now bacteria are evolving antibiotic resistance faster than new antibiotics can be invented, tested and made available. Some medical experts predict that antibiotics will become useless in as little as a decade, leaving a large population of both humans and domesticated animals that, through the use of antibiotics, has inadvertently been bred to be defenseless against infectious disease. How will human communities and families be able to cope with the large, sudden increase in morbidity and mortality that will occur when industrial medicine fails and disease loads rise?

- Last, but by no means least, the advance of technology has produced a human population that is far more helpless and dependent than any human population before, one that is unable to survive when exposed to the elements, or travel long distances on foot, make its own tools, construct its own shelter, clothe and feed itself without outside assistance, treat diseases with substances available from the environment, or teach its children to survive on their own … How will these people, who have been conditioned since birth to expect to be taken care of by a vast industrial machine, respond to suddenly being forced to rely on their own wits and physical strength to survive? How many of them will not even try and simply await a rescue that will never come?

It follows that if the biosphere wins the struggle and the technosphere fails and disappears, *many* of us will die, but if the

technosphere wins and kills off what's left of the biosphere, then *all* of us will die. That is the difference: destroying the technosphere is a suicidal move for *most* of us; letting it go on is a suicidal move for *all* of us.

Does it have to be this way? I certainly hope not! But what is the choice? Do we really have to choose between genocide and extinction, or is there the possibility of a third choice? I want to believe that there is. The task, as I see it, is not to destroy the technosphere, nor to allow it to grow uncontrollably and then, just as uncontrollably, fail. The task is to *shrink* it down to a few well-chosen essentials. This means depriving ourselves of many of our habits, luxuries and comforts. But that's just what's on one pan of the scale. What's on the other?

The bad effects of the technosphere are by no means limited to the environment: its effects on us are just as bad, if not worse. As we shrink it, we will gain everything that it has taken away from us: autonomy in decision-making; unstructured, unscheduled time; a relatively stress-free existence; the ability to live close to nature, to spend time with those we care about rather than with strangers and to make the things we need instead of shopping for things we don't … and, last but not least, to have hope for our future.

Remembering who we are

LET US PUT ourselves into the broader context of our history as a species. The current industrial civilization is a mere blip in our long history, which started with *Homo habilis,* the first tool-maker, some 2.8 million years ago. On this time scale, the entire episode of civilization, during which we developed agriculture and cities, accounts for 0.3 percent of it, while the two centuries since the start of industrialization make up a vanishingly small 0.01 percent. If we look at the entire existence of humans as a single day, then we invented agriculture around 10 p.m., and industrialized around 11:57 p.m. If we take the present moment as the dawn of the new

day, then it's quite likely that the industrial episode will be over in less than a minute.

It is useful, therefore, to recall who we really are, the last three minutes of our history notwithstanding. Let us abandon the science-fiction idea that the last few seconds of these three minutes are our lift-off phase and that we are off to colonize other galaxies; we are not. So far all we have managed to do is blast a few widgets into the cold darkness of space, and we might launch a few more of those, but then that is going to be the end of our "space-faring" and "star-steading." Let us instead consider a future in which the current industrial blip looks like a momentary bout of planet-wide insanity, swiftly terminated by nonrenewable natural resource depletion and environmental devastation. Let us concede that it will most likely be followed by an equally quick reversion to norm—a well-equipped, intelligent, enlightened, long-lasting one if our efforts at shrinking the technosphere succeed, or a chaotic, calamitous and short-lived one should we fail.

What should we consider normal?

WHAT COULD WE say about ourselves that would be close to universally true, outside of the current industrialized context? Below I will list some generic properties of humans which should be uncontroversial but of course will be, because for many of us our perceptions of what is normal have been warped by life within the technosphere. The values inculcated in us are the ones the technosphere chose for us, to foster dependency and to make us easier to control. It wants us to be atomized, lone individuals because individuals cannot stand up for themselves nearly as well as tight-knit groups. It wants us to be dependent on it in as many ways as possible because dependent people are subservient people. It wants to take away our decision-making abilities, our judgment and our discretion and to put them in the hands of experts or, better yet, robots and algorithms running on internet servers.

Let us, then, start with what should be the least controversial: all humans are very closely related. There are now no hominid subspecies; we are all just *Homo sapiens.* Biologically speaking, we are all pretty much cousins. To ascribe a significant genetic component to constructs such as race and ethnicity is to ignore a mountain of evidence that these constructs are social concoctions with no basis in biological reality. But something akin to breeds does exist if natural selection and natural variability are allowed to exert themselves. Put humans in a hot, sunny place, and some 10,000 years later they will have dark skin; put them some place where it's too cold year-round to go naked, and some 10,000 years later they will have again lost their skin pigmentation. Make them chase down game in the savanna, and they grow tall and lanky; make them row kayaks amid ice floes and sit out polar winters in igloos, and they become thickset and squat. But if they all breed together, then rather quickly you get back to a medium-beige, medium-height typical human, just as, if you allow dogs to breed however they wish, they quickly revert to the typical pointy-nosed, curly-tailed medium-sized "yellow dog."

The second least controversial observation worth making is that it is normal for humans to develop a tremendous diversity of cultures. Each unique type of natural environment requires its own set of unique cultural adaptations, but, beyond that, every little band and tribe tries to be different from all the others just because it wants to—because being different reinforces group identity and loyalty and makes it difficult to switch groups. There is generally a very low tolerance for strangers, and human bands and tribes tend to deal with outsiders as groups, not as individuals. Individuality is generally only allowed to express itself within the group; outside of it, what is important is the ability to present a unified front.

Thus, it can be said that humans are naturally separatist and try to spread out across the landscape to avoid members of other tribes. But since bands and tribes need to interbreed in order to avoid inbreeding, there are some common techniques for selectively

breaching intertribal barriers. One is bride-snatching: the oldest form of marriage is "marriage by abduction," and it still persists in a surprisingly large number of cultures, although it has mostly devolved into "mock abduction." This ritual requires the bride to protest, but not too loudly, or the bridegroom and his friends run the risk of a non-mock beating. There are a couple of other methods as well. One is to exchange children. This allows the two children to grow up as bilinguals, who are valuable if the bands or tribes ever need to trade, form an alliance or otherwise work together. Another is by taking captives. Slaves aren't all that useful outside of industry or agriculture, but they can be used as breeding stock or as translators.

Next, with some notable exceptions, humans tend to have crisply defined gender roles. Children are often allowed to do whatever they like, but the boys usually emulate their fathers, and girls their mothers. This makes for efficient parenting, because the amount of practical knowledge children must informally absorb from their elders is too large for everyone to be taught everything. There is usually a rite of passage that separates childhood from adulthood, and after this rite of passage the gender roles tend to become rather strictly defined. The old cliché that men hunt while women gather is absolute nonsense because both do both (generally true of trapping and gathering, while less so of hunting). Nevertheless, gender roles tend to be distinct. Notably, both genders exercise leadership: the men overtly through authoritarian actions and commands; the women covertly through persuasion, conspiracy, passive resistance and guile. But the actual locus of power is usually the family hearth, ruled by a woman, and few men are stupid enough to issue orders they know will be resisted.

There are other fairly uncontroversial near-universals as well. Humans tend to be monogamous: like otters, beavers, turtle doves, gibbons, swans, wolves, bald eagles, prairie voles and barn owls, they breed for life. They tend to be intensely private about their sex lives and start insisting on some modicum of privacy from a young

age. They tend to develop a few close friendships outside of their families that persist over their entire lives.

Somewhat more controversially, humans tend to be territorial and, even if they are nomadic or migratory and wander over a large territory, their sense of self is deeply rooted within the natural landscape. Certain of its features are often considered sacred—a particular rock, a grove or a spring. They regulate their interactions with nature and with each other using a set of taboos and unwritten rules. And they maintain an oral history, a cosmography and a mythology, which are passed down from generation to generation as epic poems, songs and stories, some of which persist for thousands of years.

More controversially yet, like plenty of other animals, humans kill their own kind—for all kinds of reasons. Some are even cannibalistic. Warfare offers a straightforward, natural way to decrease population pressure on the environment because crowding instinctively increases many animals' propensity for violence, humans included. Warfare can be used for all sorts of purposes—defending territory, enforcing a relationship based on tribute, even wholesale genocide of groups whose customs are considered disagreeable. When two tribes fight over territory, it is not unusual for the winners to dispatch all the males on the losing side and to take the females for themselves. Raiding one's neighbors is also an old favorite, and back-and-forth raiding is sometimes used to alleviate various kinds of accidental inequality. Although fratricide is generally taboo and so is patricide, it is not entirely uncommon to passively let old people starve in times of famine.

Lastly, and perhaps most controversially so far, humans generally have a very low tolerance for abnormality, and it is an unfortunate but indisputable fact that compassionate treatment of those who are viewed as abnormal is very far from a human cultural universal. Infanticide is a common way of getting rid of infants with birth defects. Physical perfection is usually very highly prized, and deviations from it are treated quite harshly. The weak and the infirm, those with chronic ailments, aberrant personality

traits or perverse sexual tendencies all tend to be treated quite differently from the rest—not as full members. Unless they have great special talents, they are not valued, and they can easily be abandoned or neglected and, in the harsher societies, banished or even killed. Those who are considered "freaks" are often mocked and abused. Far from being arbitrarily uncharitable, such attitudes towards the abnormal and the handicapped are of practical survival value. The act of survival is so arduous and demanding, both physically and mentally, that the typical human band or tribe must resemble, for lack of a better metaphor, a sports team, and nature does not organize any sort of Special Olympics for us.

And now comes the most controversial observation of all. All of our vaunted civilizational values—including human rights, representative democracy, the rights of minorities be they racial, ethnic or sexual, the rights of the handicapped—have no place in nature. They are part of a culture—one single very special culture that has had an exorbitant amount of influence over the entire planet because it is optimal for the technosphere. No matter how much we treasure liberalism, humanism, gender equality, human rights, democratic principles, minority rights, rights of the handicapped, "responsibility to protect"[1]—no matter how much in love we are with all of that, when the technosphere fails, so will this culture.

Some of us have grown up thinking, along with Thomas Jefferson, that there are certain "truths" that are "self-evident," which include the "unalienable right" to "life, liberty and the pursuit of happiness," and we need to take a step back and reflect. To start with, nothing is "self-evident." That's just a pompous but empty phrase, because an established fact can be used as evidence in support of *another fact that is yet to be established,* but it cannot be evidence of itself—that's called a tautology, and it doesn't advance

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1   "Responsibility to protect" (R2P) is a dubious political principle according to which when Tribe A is busy slaughtering Tribe B to a man, Tribe Q from across the world has the right to intervene to save Tribe B from extinction, in spite of Tribe Q having no standing in the matter of said slaughter.

an argument. As for the rest of it, see for yourself: do you see any examples where any of these rights seem very much "alienable"? Are there any murdered or imprisoned or miserable people in the world? Well, what about their rights, then? Don't you have a "responsibility to protect" them? Leap into action forthwith, then, and right these wrongs!

Perhaps before leaping into action you should look around first, to see what you might encounter. Do you see any men who claim to have an unalienable right to cut out a man's heart, eat it in front of a video camera and post the result on the internet? And do you see your national leaders doing much of anything to stop them? Perhaps the best you can do is not be part of the same tribe as these men and not let them anywhere near your own tribe. And before you can even do that, you will need to figure out who is in your tribe and who isn't.

In the end, all these vaunted principles and values, which so often go under the label of "Western," will turn out to be the shibboleths of a culture that is tethered to the technosphere and will die with it. If you like them, feel free to keep them, but be warned that they may not prove to be conducive to your survival.

A problem of shared values

IT IS TO be expected that most readers will look at the above sketch of the ways of our common, historical humanity and consider many of them backward, non-progressive and incompatible with modern ways of living. And they would be right, of course. Nevertheless, the discussion is worth considering, not because old traits must be emulated or readopted, but because they allow us to get at something else. You see, what if it turns out that your values, which you consider enlightened, progressive and above all yours, actually turn out to be the technosphere's values and are completely in line with the technosphere's own needs and motivations rather than with your own? And if you and the technosphere turn out to share the same set of values, then how on earth can you ever even hope

to stand up in opposition to it? Stand up and do what—surrender?

Let's go down the list and give you ample opportunity to examine your own feelings.

Do you think that it's a good idea for people to generally live wherever their ancestors came from, to make good use of various physiological adaptations that they have developed over time, such as dark skin, or a stocky build and a generous layer of subcutaneous fat, or the ability to handle a certain endemic disease load? Perhaps you feel that this arrangement is too confining and limiting of individual freedom of movement and that people should instead be allowed to range over the entire planet as they do now. After all, if they spend most of their lives within a germ-free air-conditioned environment, what difference could their physiological adaptations possibly make? Well, they won't matter, until the technosphere goes away and takes the artificial environment with it. Then you would have stocky pale northerners stuck in the tropics, dying of heat exhaustion and sunburn, and lanky, dark-skinned people adapted to the southern deserts dying of frostbite and hypothermia in the snowy north.

On the other hand, cultural and ethnic diversity does seem like a winner—so liberal and progressive-sounding!—until you realize what it means to people who claim that it is their right to only deal with their own kind, except perhaps for a bit of trade, bride-snatching and the odd raiding party. Would you grant them that right, or would you rather perish in the futile attempt to force all of them to live harmoniously in a single "multicultural" society and send their children to school with the children of strangers whose cultures are incompatible with theirs and so on? If a certain tribe only wants to spend time with its own kind and is unwelcoming toward all outsiders, would you insist on starting a war with them, or would you consider just letting them be?

From the point of view of the technosphere, tribal behavior is decidedly suboptimal. The technosphere wants to deal with individuals because individual humans are weak and easy to manipulate and dominate. But once they combine in tight-knit,

cohesive groups they become very strong and willful. A hundred or so people who hold down a patch of ground, have their own agenda and are ready to die for each other are certainly a force to be reckoned with and not at all copacetic with the technosphere's objective of complete domination and control over all living things.

But now consider what happens when the technosphere goes away, taking the police, the courts, the jails and all the rest with it. Would you prefer to be surrounded by strangers, any one of whom could at any time turn on you, a lone individual in a frightening and unfamiliar world, or would you rather be surrounded by people who are most like you, whose character is transparent to you, whom you know and trust and possibly even love, and who are willing to die for you, and you for them? The choice seems obvious.

Moving down the list… do you like traditional, strict gender roles and a clear separation of concerns between biological sexes, or do you believe in gender equality, equal rights, fluid gender roles, shared responsibilities for everything, complete acceptance of homosexuals and transgender individuals and so on? Again, the latter sound progressive, liberal, in some countries even patriotic, while the former sound decidedly old-fashioned and obsolete. You probably like the latter more than the former.

But what does the technosphere like better? Does it like it more when men behave like men and cultivate unquestioned, rock-solid male solidarity, while women are women and form a similar rock-solid tribal sisterhood, or would it prefer us to be maximally alienated from each other? Would it prefer the way men and women treat each other to be governed by a long-standing, inviolable tradition in which all are bound by the same unwritten, sometimes even unspoken code of conduct, or would it prefer that we weaken ourselves and our families with endless gender battles?

Perhaps the technosphere would prefer it if everyone were vaguely androgynous and sexually ambiguous, with meek, effete, ladylike men and women who are essentially emasculated men? After all, all today's men and women are ever required to do is push buttons and follow written instructions (until such time when

they are duly replaced by algorithms and robots), and they can do these things well enough even if they are entirely unsexed. On the other hand why not indulge their sexual fantasies, no matter how perverse and bizarre? Why not make it socially acceptable to practice gay bestiality assisted by transsexual midgets? The more the merrier! The wider the spectrum of acceptable behavior, then the less people know what to expect of each other, the less likely it becomes for their interests and tastes to coincide, the more useless they are to each other and, consequently, the easier they are to manipulate and control.

And would the technosphere prefer it if boys and girls had powerful role models in their fathers and mothers, respectively, and could learn all of the requisite survival skills simply by following their parents around and assisting them in any way they could? Well, no, because this would make children strong-willed and independent-minded and that would get in the way of making them submit unquestioningly to being indoctrinated by licensed, credentialed educators and forced to memorize large amounts of useless trivia for the sake of passing standardized tests. (Such tests are poor educational tools, but they do establish a performance standard for both students and teachers and so offer a wonderful way of controlling everyone.) No, it is much better from the technosphere's point of view for the parents to be confused or indifferent, generally passive, but eager to cooperate with educators for the sake of their children's educational success. After all, the technosphere wants your children to belong to it, not to you.

Next, let's consider the institution of marriage. Is the marriage ceremony a celebration of romantic love and a way of granting sexual relationships a bit of dignity? Is it acceptable for people to divorce and search for new, temporary love interests as soon as romantic love fades? Or should marriage be regarded as a lifelong contract that is based on feelings of duty to past and future generations of your tribe, entered into with complete surrender of your individual interest for the sake of sustaining a greater whole?

Clearly, it is in the interest of the technosphere to make personal relationships as shallow, superficial and temporary as possible, so that the individual has no larger social entity to rely on. Strong extended families give individuals the ability to cultivate some amount of autonomy and freedom in group decision-making, and this is anathema to the technosphere, which wants to control everything through bureaucratic, technocratic management and supervision at the level of the individual. Weak families are also helpful in breaking the bond between generations, making the children more easily dominated by educators, more malleable and easier to control.

To this end, the extended family, with several generations living under one roof and with a single household budget—the bedrock of humanity since time immemorial—has been all but demolished, replaced by the nuclear family. And now it is the nuclear family that is being dismantled. According to the CDC, in the US in 2013 the percentage of out-of-wedlock births was 29.3 for whites, 54.2 for Hispanics and 71.4 for African Americans. Fathers have been made largely superfluous, and now it is the mothers' turn to be made redundant: because of the requirement to work, which makes no economic sense and is only made possible by subsidized daycare, children are brought up by low-paid strangers.

You may be justified in thinking that the modern social arrangement maximizes your personal freedom of choice and chances of finding sexual satisfaction. But what do you think will happen to nonexistent or weak nuclear families upon the disappearance of all the technosphere-provided services on which they depend? Chances are they will not last, because there is little substance to them beyond a living arrangement. When that living arrangement unravels, what is there to fall back on? At the other extreme, multi-generational extended families that see it as their sacred, inviolable duty to do everything possible to help their members even unto death should be able to do much better.

When it comes to freedom of movement, the modern arrangement attempts to break with the age-old human tendency to live

out our days pretty much where we were born. The aspiration is to be mobile: to grow up in one place, be schooled in another and settle down in a third. Many people think nothing of switching houses, neighborhoods, towns, even countries as a side-effect of switching jobs. This arrangement is most useful from the point of view of the technosphere: labor flows to wherever it is needed. Nobody has any particular connection to a native piece of turf, and when it becomes trashed by economic development and turns into a barren, unsightly asphalt-and-concrete jungle they can simply move to someplace else that still needs more economic development. Since nobody has any particular connection to the people with whom they are temporarily thrown together, they have no opportunity to develop strong personal relationships that foster self-sufficiency and autonomy, making them easy to dominate and control.

But when the technosphere falls apart, this geographically mobile, rootless arrangement translates to being stranded among strangers. A population with a strong sense of rootedness—of being bound to a certain piece of terrain by ancestral lineages—will spontaneously form popular insurgencies to defend it against outside threats. Members of a rootless population bereft of a profound sense of place will only stand up for themselves and perhaps for a few others, based on personal sympathies, and will be unable to spontaneously coalesce into a guerrilla fighting force.

Now we come to an even tougher subject: murder. The commandment "Thou shalt not kill" is a quirky one, given the quite tremendous amount of officially condoned murder that happens all the time. The all-time record in officially sanctioned murders was set in 2015, with China, Saudi Arabia and Pakistan at the top of the list and the US not far behind. Perhaps the commandment should be modified to "Thou shalt not kill unless so ordered by your superiors." That is, you aren't allowed to kill (unless it's in self-defense, or in some jurisdictions a crime of passion), but the technosphere is certainly allowed to kill, and you are allowed to kill on its behalf. Now, one odd thing about murder is that it tends to

be extremely rare in places where there is little or no official law enforcement. This is because in such places a murder automatically leads to a blood feud, and relatives of the victim are more or less required to avenge it (unless the matter is resolved by paying blood money). But the technosphere certainly doesn't want you to take justice (or anything else, for that matter) into your own hands. What benefits the technosphere most is a high murder rate, to make people feel unsafe and clamor for more police protection because this makes them easier to control.

Lastly, we come to the matter of how we treat those with physical and mental abnormalities and those who, in politically correct language, are now to be referred to as "differently-abled." Of course, the enlightened, modern way is to deny that there is such a thing as "normal": all of us are on some sort of spectrum for all sorts of things—autism, obsessive-compulsive disorder, anxiety, depression, phobias, addiction, eating disorders, etc…. The goal is to allow all the various sufferers and the handicapped, regardless of the severity of handicap, to lead full, happy lives, with technology, both high and low, brought in to make this possible, from low-tech wheelchair ramps to high-tech suck-and-puff controlled wheelchairs and speech synthesizers.

A poster boy for this trend is Prof. Stephen Hawking, who held Sir Isaac Newton's chair at Oxford until his retirement in 2009. Hawking is almost completely paralyzed (and somewhat uncomfortable to look at) but is able to communicate profound cosmological thoughts through a speech synthesizer by moving his eyeballs about and twitching one of the few muscles, in his cheek, that is still wired up to his brain. Hawking recently said that we should take it easy on trashing the biosphere because we will still need it for a couple more centuries while we figure out how to get off this planet and colonize others. I suppose he hasn't heard that industrial civilization is almost over, but then he wouldn't be the only one.

It seems somewhat incongruous that Hawking long held Sir Isaac Newton's chair at Oxford—that same Newton one of whose

notebooks was written in Greek—classical Greek—that same classical Greece that idolized physical beauty and looked upon every sort of deformity as an abomination. In classical Greece Hawking would have been hidden away from the public, at the very least, or carried to a forest and left to die, for fear of offending the gods with his presence. But without classical Greek science both Newton and Hawking would have been professors of perfectly nothing, because the entire modern scientific tradition got its start in that one place and time.

It also seems somewhat incongruous that Hawking talks up the idea of colonizing space, while Greek science would have had nothing to do with anything so applied. It was a pure intellectual pursuit in search of divine perfection. Sure, it was OK for Archimedes to do a magic trick with mirrors to burn down the Roman fleet in defense of his native Syracuse, but in a time of peace anything so applied would have been considered undignified. Thus, to the classical Greeks, the technosphere would have been an impossibility, while Hawking is its spokesman. From the classical Greek point of view, Hawking is not just an abomination but also an embarrassment to science. But to us he is a hero because he has persevered in spite of having a debilitating disease.

To many people today, our supportive treatment of those who have problems—be it obesity or addiction or a little of each—is a manifestation of our humanity. It is also legally required of us. Fewer and fewer occupations, principally the police, firefighters, paramedics and the military, require a fitness test; in all others the handicapped have to be considered alongside able-bodied applicants. It is a difficult subject because what is at issue is how much of our compassion we are willing to sacrifice for the sake of our safety and security.

But what does the technosphere want? It wants *all* of us to be patients within the medical system. It has no standard of health—just statistical measures of relative sickness. If all of us are considered sick and in need of constant medical supervision, this increases the amount of control it can exercise over us. If we are

weak, then this makes us more dependent on it and less able to get by without it. Just one family member who is in constant need of medical supervision is enough to make sure that the entire family can never risk losing access to medical treatments and will do whatever it takes to maintain that access.

But what will they do when the technosphere falls away, taking the medical system with it? Here, we have to put our compassion and part of our humanity aside. Anybody who isn't physically and mentally fit would automatically become a tremendous burden. Physically, anyone who can't walk and is too heavy to be carried by another person becomes a hindrance to movement. Mentally, anybody who suffers a nervous breakdown when the situation rapidly shifts for the worse can ruin the chances for everyone around them. As we work to shrink the technosphere, our ability to support those who cannot support themselves and are abjectly dependent on it will of necessity shrink too. It is an uncomfortable situation, but nobody has repealed natural selection and survival of the fittest. If we want to survive, we have to be fit and surround ourselves with those who are also fit.

If we value the exact same things that the technosphere finds useful for its own purposes, then our efforts to free ourselves from the technosphere's stranglehold are likely to fail. We should expect that many people will find themselves unwilling, unable or both, to change their values, even if they are capable of appreciating on an intellectual level that the values the technosphere has inculcated in them are maladaptive and will endanger their survival. On the other hand, there is no reason to think that all of the traditional, tribal human values are strictly necessary for survival; after all, human culture is extremely variable. Perhaps a community that embraces gender equality, is LGBT-friendly and is tolerant of handicaps and various human frailties and failings would be less efficient than a more traditional model, but this is just a guess, and what if it can find effective ways to compensate for this inefficiency? Ours is not to pre-judge; ours is to observe and to decide for ourselves. Perhaps modeling our society after Sparta would give us the best

chances of surviving, but then how many of us would want to live like the Spartans?

How much do we need to compromise in deciding on how best to equip ourselves for the arduous tasks that lie ahead? Choosing tools and other bits of technology is relatively easy. There is a lot to learn, but all it takes is time and practice. It is much harder to choose the people with whom to surround ourselves, to support and to draw support from. There are plenty of things that can be compromised on relatively safely: physical beauty, youth, fashion sense, intellectual brilliance and an enlightened, progressive world-view and are, if you think about them hard enough, nonessential. But if you compromise on health, loyalty, common sense, adapt-ability, the ability to get along and that scarce but precious quality of rootedness—a strong sense of belonging to a place and a group of people—then the entire project is sure to be imperiled.

This choice is made even more difficult by the fact that virtually all of the people you can choose from are in one sense or another damaged or incomplete. Some have been too sheltered in their lives, while others not enough and have been traumatized. Some have been through various cycles of addiction, have hit bottom and recovered, while others have an unblemished history, but only because they were pampered by favorable circumstances and will instantly fall apart when stressed. How you choose may in the end say more about you than about those you choose. But choose you must, because the lone, supposedly rugged but in reality incredibly vulnerable individual does not stand a chance against the techno-sphere—for it could be said that humans are its second favorite food, after crude oil—and you will only be able to stand up to it as a group.

Why act now?

BUT WHAT, YOU may ask, is the urgency? After all, environmental degradation has been happening for a long time and will continue getting worse for centuries. Yes, the technosphere is becoming more and more invasive and oppressive all the time, but that's not

a new development either. Yes, nonrenewable resources are depleting, but they have been depleting ever since they were first tapped, and pouring ever more money and energy into the extractive industries seems to compensate for resource depletion for the time being. Why is now—starting with when you finish reading this book—the time for you to concentrate all of your efforts on trying to shrink it?

Well, here is the reason: the technosphere is terminally ill. As it gets sicker and sicker, if we continue to depend on it, it will sicken us as well. You see, the only reason it was able to continue to grow is by chewing its way through larger and larger quantities of non-renewable natural resources: oil, gas and coal, metal ores, fresh water and arable land, phosphate for fertilizer and much else. And now, it turns out, this trend is becoming impossible to sustain. A thorough evaluation of the remaining supplies of nonrenewable natural resources was conducted by Christopher Clugston and detailed in his book *Scarcity: Humanity's Final Chapter*.[2] It is a convincing and compelling work, and it makes technophiles want to shoot the messenger, because what it implies is that technological civilization is a suicide pact. And that is not a fact that technophiles are able to take on board safely, because doing so would give them serious psychiatric problems.

Clugston examined statistics on nonrenewable natural resources (NNRS) from USGS, EIA, BEA, BLS, the Federal Reserve, CBO, FBI, IEA, the UN and the World Bank and concluded that "absent some combination of immediate and drastic reductions in our global NNR utilization levels … we will experience escalating international and intranational conflicts during the coming decades over increasingly scarce NNRS, which will devolve into global societal collapse, almost certainly by the year 2050." For example, there remains only an eight-year supply of lithium—so don't pin too many hopes on electric cars or portable computing

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2   http://www.amazon.com/dp/1621412504

devices that use lithium-ion batteries. And there are only 15 years left of iron ore, the main ingredient in making steel. Most other resources are not far behind, with bauxite, used to make aluminum, one of the most plentiful, with a 40-year supply buffer.

Note that these supply problems are not something that is predicted to arrive in some remote, possibly fictional future; they are here today. Look at the roller-coaster ride of commodity prices so far this century, and a picture emerges of constant, permanent crisis. Commodity prices are, most of the time, either too high for the consumers to be able to afford the manufactured products or too low to allow the producers to extract the resources. As a result of this constant market whipsawing, strategic production planning becomes impaired, and losses mount for both producers and consumers and for the economy as a whole.

If this isn't the narrative you are used to hearing, then it's because there is a good reason for that. You see, whenever failing societies are forced to recognize that their problems are unsolvable, they tend to suffer something like a society-wide psychotic break and do all they can to persist in their conviction that everything is going to be all right. For example, when the train of the Soviet economy stopped moving and it became clear that only a rather different economy—one that did not have a role for the Soviet leadership—would make it possible to move forward, the leadership preferred to, figuratively speaking, draw the curtains, break out the vodka and the caviar, and pay flunkies to rock the train to pretend that it was still moving.

This is quite similar to what we are witnessing today: the inescapable reality of nonrenewable natural resource depletion has caused economic growth to slow and, in the more developed countries, to stall. In response, the monetary authorities have unleashed wave after wave of "stimulus": quantitative easing, zero interest rate policy (ZIRP) and now negative interest policy (NIRP). This has prevented the financial house of cards from collapsing outright, but monetary policy is unable to create super-giant oil fields full of

light sweet crude or geologic strata of anthracite coal or high-grade hematite iron ore. Monetary policy isn't even able to prevent a market panic; all it can do is postpone it by some indeterminable but probably rather short period of time.

What this is, then, is the technosphere thrashing in its death agony. One moment the price of oil is too low, crushing the oil business; another moment it is too high, crushing the rest of the economy. When the supply and demand lines diverge and the price most oil consumers are able to pay without going bankrupt becomes lower than the price most oil producers have to charge to stay in business, it's effectively game over. In the meantime, we see fiscal austerity, increasing levels of financial instability, a continuously dropping labor participation rate, a shrinking middle class and more and more countries becoming failed states.

The urgency, then, comes from the need to avoid any of the following deadly eventualities:

The greatest danger, for most of us, is of **dying of withdrawal symptoms** as we lose access to technosphere's many products and services and can't come up with any way to compensate for their loss. For some people, such as those kept alive by industrial medicine, this is unavoidable. Others, especially if they are reasonably healthy and have access to some land, could shift to fishing, hunting, gathering and eventually growing their own food.

Next is the danger of **being stuck in the wrong place at the wrong time** and being crushed by the technosphere as it thrashes about or by being trapped underneath its lifeless, decaying hulk once it finally stops moving. The major population centers can be expected to be the most vulnerable. Deeply divided, internally conflicted societies held together by the overt threat of official violence euphemistically referred to as "law and order" are likely to suffer a great deal of looting, mayhem, rape and murder. And if the violence doesn't get you, high-density, built-up environments are not particularly survivable without functioning utilities and transportation networks.

At the other extreme, deeply rooted traditional societies that live largely off the land, do much of their own internal policing and are quick to take the law into their own hands in case of outside incursions should be able to do fine, but making peace with them and earning their respect and trust, which are essential if you wish to live alongside them, takes time, effort, some special talents and plenty of luck. It requires time—ten years or so on average—before the locals will accept you as one of their own. It also requires that you show a great deal of flexibility among people who are rather inflexible, and do so without losing face before them. In all, it is often easier to remain migratory or nomadic and be a welcome guest in several places than a permanent, unwelcome guest in just one.

The next-greatest risk is **getting poisoned or irradiated** by the various toxic and radioactive "gifts" of the technosphere—which will keep on giving long after it is gone. With regard to radiation, a good number to remember is the half-life of Plutonium-239, the isotope used to make nuclear weapons, which is over 24,000 years. Over 1,300 metric tons of it have been produced. In 24,000 years there will be only half as many tons of it left; in 48,000 years only a quarter as much. A few milligrams of it is a lethal dose. There are one billion milligrams in a metric ton, and the population of the Earth is just over seven billion. This means that there is much more than enough Plutonium-239 to kill all of us—perhaps as much as two grams per person—but only if each of us finds a way to receive a concentrated dose of it.

Plutonium-239 is but one example; there is also the problem of the much more plentiful spent nuclear fuel rods which are stored in pools of water at hundreds of nuclear power plants. The rods remain hot for a long time, and if cooling water isn't circulated and replenished using electric circulator pumps, it boils out, the rods catch on fire, cause hydrogen explosions, and plumes of radioactive dust enter the biosphere. (This exact scenario unfolded during the nuclear disaster at Fukushima Daiichi nuclear power plant in Japan in March of 2011.)

If some substantial part of the nuclear stockpile gradually becomes evenly dispersed throughout the biosphere—the oceans, the Earth's crust—as it most certainly will after a few tens of thousands of years of neglect, then, should any humans still be around, few of them will live long enough to reproduce because of high rates of cancer, and those that do will give birth to many children who will be nonviable because of birth defects. We have already started seeing signs of this in places that were bombed by the US or by NATO using depleted uranium ordnance—Serbia/Kosovo, Basra and Fallujah in Iraq, and elsewhere. High rates of cancer and birth defects do not necessarily spell extinction, at least not immediately, provided enough of the women have lots of children starting at a young age.

But there is no reason to think that toxic and radioactive materials will be evenly dispersed, at least in the near future, and so the task of survival requires identifying those locations which are particularly unsafe, the better to avoid an encounter with a lethal dose. Since radiation cannot be perceived by our senses, without a Geiger counter you would be driving blindfolded, and it takes a good deal of scientific knowledge and engineering know-how to make one from scratch using artisanal methods. The situation is only slightly better with regard to toxic chemicals, because here our senses, if we are well-attuned to our environment, do serve as a rough guide: water that has healthy-looking plants and animals in it obviously isn't killing them while a body of water that is perfectly clear and transparent may be poisoned; an oily film on the water may indicate proximity to a hydrofractured oil and gas well that was hastily capped but has since started leaking toxic, possibly radioactive substances and is likely to continue doing so for decades. Fruits, berries and mushrooms that have an unusual, metallic taste should be avoided. There will be much to learn—not necessarily through science, but by collecting anecdotal evidence and by evolving a system of taboos—the way we hominids have managed to survive for millions of years.

Admittedly, none of these survival scenarios sounds all that happy. But we have foolishly allowed the technosphere to make our bed, and now we will have to sleep in it. Yes, the changes we need to make are, at the very least, uncomfortable: we have to break habits, we have to learn to do without luxuries and deprive ourselves of comforts; we have to change our location, acquire new skills, make new friends and adopt a different culture and a different outlook—ones predicated not on achieving success within a successful society but on survival on the edges of a failed one.