

CIVILIZATION, TECHNOLOGY AND MONEY: THE CHALLENGE OF A HUMAN FIT

Michael C. Kalton

University of Washington, Tacoma (emeritus)

Home address: 8131 S. 14th St.

Tacoma, WA 98465

Abstract

Civilization in its science-enabled industrial form highlights and gives exponential growth to forms of agency and motivation so removed from the dynamics of eco-systemic mutual constraint that the troubled culture-nature interface has finally assumed the proportions of a sustainability crisis. With the emergence about 12,000 years ago of agriculture and the subsequent rise of the complex, settled societies we refer to as “civilization,” our models of ourselves and of the world transformed in ways that decisively separated the character of human agency and motivation from the behaviors by which other forms of life make a living. The science-enabled Industrial Revolution made central and self-aware the long-nurtured civilized thrust to control and shape the world to our purposes, refining that mindset into what Jacques Ellul has described as the “technological mind,” the probing search for an improved way of doing whatever we turn our minds to. With this mentality technology has moved to center stage both as our first resort in approaching any kind of problem and as our chief lever for economic growth. We have collapsed the constraints of space and time and the world of nature is quite outflanked by the speed and power with which thoughts and plans in the human mind can reshape and modify environments from the expectations structured into the way other species make a living.

This puts a new and critical weight on the thoughts, feelings, and motivation of the human mind-and-heart. All living beings are motivated to act in order to achieve and maintain well-being. But human motivation is far from the direct response to needs and dangers common to other forms of life. Our motivation as action is mediated by technology, and our technology loops back to shape our motivation. As a well-being guided response our motivation is mediated by money, which offers none of the inherent guidance of actual well-being. The “better” achievement of whatever that is the animating thrust of technology promises an open-ended more: more productivity, more speed, more convenience, more ease. And at the heart of money is another more, the profit motive that guides us to proud achievements and likewise to humiliating dysfunction. We market the promise of the technological “more” for profit, and the drive for more profit powerfully fuels the technological drive for all sorts of innovation. Thus the incremental thrusts embedded in technology and money work in synergy to bring us to the exponential burst of transformation in culture and the natural world. In the process guidance of real well-being becomes hit or miss, distorted by a thirst for and expectation of novelty stoked by endless advertising or overshadowed in the anxious pursuit of profit.

Seeing the deep structures that have brought civilization so rapidly to such an innovative and world-transforming peak reveals no easy answers: we cannot simply change ourselves without the difficult and uncertain process of reconfiguring elements structured into

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civilization that make us the kind of unpredictable and uncontrollable species we are at present. But it helps to know there are other ways available, perhaps even other ways of doing a civilization. If those alternatives are in any way open to our deliberate contrivance, that deliberation will have to include serious reflection on how the way we maintain our well-being has come to fit so ill with the well-being as pursued in the rest of the community of life. For humans, understanding is the guide to moving into a better future.

Keywords: civilization, technology, money, motivation, Neo-lithic Revolution, Industrial Revolution

Civilization: Settling Down

Evidences for early agriculture date back to about 12,000 years ago, but widespread adoption of the new way of making a living was a gradual process, a matter of thousands of years. It caught on first where conditions were optimal, in the well-named (at the time) Fertile Crescent, the arc of land surrounding and between the Tigris and Euphrates rivers and along the eastern coast of the Mediterranean Sea.

Every child learns in grade school that this area is also called The Cradle of Civilization. One of the most evident things about agriculture is that it finally let the nomadic human populations settle down and gradually agglomerate into larger and larger units. Civilization, from Latin, *civis*, a citizen of a city state, means the advent of urban human beings like us. The first urban civilization was Sumer, a confederation of city states that emerged in southern Mesopotamia about 7,500 years ago.

We tend to think in the scale of our own lifespan, so even a hundred years seems a long time. Greece and Rome already suffice for “ancient history,” and we naturally feel the dawn of civilization in Sumer is an era almost unimaginably distant. So much change has been crammed into the interval between Sumer and us that the feeling is understandable. But with a larger perspective we can see that civilization represents a still brand new mode of organization, a mode that has transformed the entire world while still so novel it might justifiably be regarded as an unproven recent experiment.

Our thoughts, motivations, and feelings are so steeped in the tacit assumptions and agreements of civilized culture that it is very hard to see the novelty of all this. But in what amounts to only the last 5.5% of the span of homo sapiens’ existence, we have become different from and distinct from anything in the “natural” world, and the world, in response to civilized humans, has in turn become fundamentally other than it was.

Imagine what it would mean to settle in one place, unconstrained by the mandate to live as if you might have to carry the accoutrements of your life on your back to a distant location in a few months or years. After almost 200 thousand years of a communal life of light living, the possibility of a lifestyle of weighty accumulation emerges. Ownership of goods, of residences, of land itself, first makes sense with settlements. Of course the community has to work out agreements about all this, for ownership means nothing unless it is publically recognized. And then there is the question of transfer of ownership, who can inherit what or trade what for what. From the easy egalitarian structure of small bands, we are on the way to structured social differences based on inequality of possessions. Acquisition becomes a major

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preoccupation, not just because one has to find lunch, but because acquiring goods is related to social status and political power. As society becomes thus differentiated, the nagging underlying question emerges: who gets to tell whom what to do, and why?

Wealth and military power certainly help, but that is a vulnerable basis for rule, since there is always the threat a superior power will take it away. The answer to establishing a more stable political order is to take it out of arbitrary human hands: the earliest city states in history were theocracies, ruled by a priestly or divinely sanctioned elite. Sumerian rulers even lived in the temple precincts. The ploy of ruling at the behest of, or in the name of, or with special guidance from divine sources has been replicated in one form or another throughout civilizations and down through history until the divine right monarchies of Europe finally gave way to secular governments in the 19th century.

Organized in a civilized way, humans have changed the face of the earth and the system by which that face is arranged. The external phenomenon of human cultures taking control and occupying the greater part of the earth is so obvious it needs no argument, though some description of the features of our exponentially accelerating takeover is called for. The deeper question, however, is what changed in the human mind-and-heart that has driven such a startling change.

Emergence of the Civilized Controlling Mind

We have already mentioned shifts that came when we settled down. Mainly these were the changes that came with a way of life that could accommodate accumulation as a good thing, adding it as a major motivation. From this we quickly get the familiar array of discrepancies of wealth, status, and power and the associated dynamics of complex social organization. But here we would like to probe a level deeper and investigate changes in the fundamental way humans conceive of themselves and the world. There is no universal that encompasses the entire human community, but we will be able to trace the emergence of new ways of thinking that become widespread and dominant even as they overlay rather than totally replace former modes of thought.

Religion offers a window on the deep assumptions that frame our understanding of ourselves and the world. Anthropological studies of indigenous peoples—our best access to the world of hunter-gatherers—often refer to their religious life as some form of animism. Animism has been broadly defined as the view that animals, plants, maybe even rocks and rivers possess a spiritual essence. That is, they are treated as we treat other humans, like people. We need not be distracted trying to imagine how you might think of a rock as a person. The more salient point is the non-differentiation: these peoples have not yet sorted themselves out as unique and different from all the other creatures that populate their ecosystem. They still regard themselves as equal members of the broad community of life, with life itself understood as a unifying spiritual power manifest in the earth's many forms and creatures. If one of life's necessities includes eating their fellow community members, it should be framed with rituals of permission, thanks, and appeasement. This was a community that understood the giving, taking, and consumption of life as a difficult and dangerous sacrament, not a simple act of mastery.

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As agricultural and pastoral modes of life finally replaced hunting and gathering, human attention shifted to the mystery of fertility. Fertility, mediated by a fertilizing sky god and receptive mother earth and a myriad associated forms, is similar to the animistic force of life insofar as it is another force running through the earth and all living bodies, including our own. Now it is the plowing of the earth and the planting of seeds that should be surrounded with the proper ritual, and human sexuality could ritually participate in and call forth the force that produces from the earth a new cycle of crops. The Hebrew Bible is full of passages that berate Israel's farmers for going off to alien fertility cults on the "high places," and remnants of fertility ritual remain in the icons and rituals of spring festivals such as maypoles or hiding Easter eggs in fields. And why should the ever so fertile rabbit become the spring Easter bunny bearing the baskets of eggs? Mother Earth still evokes a spontaneous reverence in anyone who ponders the phenomenon of the annual renewal of life and gives thanks for the harvest.

But beyond agriculture and fertility, organization into city states, with their politics and power and separation from the direct contact with the organic world of farm or forest, soon wrought a new transformation. The animating force of life, or its manifestation in fertility, are inner matters in which all creatures participate. But with urban civilization a new way of thinking emerges, and the forces that organize existence become externalized as divine beings that exercise command and give laws. Some traditions forbid representation of the ultimate power, but almost everywhere where there is representation, the divine now has two legs. Laws, commands, obedience, submission, fidelity, all the language and concepts that go with the new hierarchical political organization of human society, enter religious discourse. Even where kings are not considered literally divine as they were in Egypt or Rome, they are almost always the focal human interface with the divine, and human legislation is legitimated as a channel and reflection of the divine will. And for the divine overseer, the management of the world takes on a strongly human focus. That is, the worlds of culture and nature have now become quite distinct in human assumptions, with nature in such a subordinate position that it needs no particular divine attention except in those respects that affect humans, such as timely rains and bountiful crops.

I repeat, these forms of religious self-world understanding long overlay one another even as the dominance of one is supplanted by another. As humans organized into city states and empires, notions of a human-like intentional control and power became more appealing in our thinking about what makes and shapes the way things are. But for the better part of the next two thousand years the tendency was to project control and power to the divine and then borrow it back again, especially for political purposes. Then the Industrial Revolution brought science and technology to the forefront, and with it humans took control and power directly into their own hands, giving rise to the first secular societies. From then on, as Benjamin Franklin put it, "God helps those who help themselves."

The Industrial Revolution was a revolution in our ways and means of making a living, and it was likewise a revolution in our understanding of ourselves and the world. From the 18th century the revolution was embodied in the vision of Progress, the expectation that now the natural and the social world would be made steadily more amenable to human preferences by the advance of science and secular rationality. A western tradition which had formerly seen the world as a divinely sanctioned testing ground now shifted to a materialistic pragmatism:

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nature is there to be conquered, controlled, and rendered tame to our desires. With the emergence of civilization came the systemic division between human culture and nature. The two have always been uneasy bedfellows, and a number of civilizations have fallen due to environmental degradation. But with the science and technology of a new industrial culture at their disposal, the time seemed ripe for the human conquest of the natural world.

We are not yet done with this, but after 250 years of astonishing scientific and technological advance, the idea of progress has been largely abandoned. Most obviously, our societies have not become the happy rational secular communities of equality, liberty, and justice anticipated in the narratives that came out of the Enlightenment era. At first glance, the part of the vision that has more or less worked is the technological conquest of natural constraints on maximizing human well-being. The most fundamental natural constraint, that of space and time, has been largely conquered by our advances in transportation and communications technology. Health, comfort, convenience, and consumption are more in our control than ever before. If poverty, hunger, and disease prevail in less fortunate societies, it is nonetheless clear that we have the means to overcome them if we could just get our act together.

True as that might be, the optimistic vision that supported our crusade to conquer nature has dissipated. Just try doing an internet search on “conquest of nature,” or “war on nature.” When I was growing up in the 1950s those were acceptable terms, ways of introducing the question of how our progress was doing—much as we still check to see how we are doing in our war on cancer, war on drugs, war on teen pregnancy etc. Now when you search the many writings and images related to our war with or conquest of nature, they deal not with the forward human march, but with fundamental human mistakes and the question of whether and how we can rectify them.

The difference, of course, is the half-century of environmental awareness that has penetrated media, politics, and science. The fruits of our conquest became evident in toxic air and water, depleted soils, dead zones at river mouths, a warming climate, the Sixth Mass Extinction, and other dysfunctions too numerous and disheartening to list. As a bright, adaptive species, we have studied the mess and made great progress in understanding in each case both the cause of the problems and also the self-organized functionality of natural systems we so confidently reengineered or disrupted.

On one level, we have changed our minds-and-hearts, while on another we look with a certain helplessness at the prospect of reining in the vast commercialized mechanism we fabricated in the hopes it would deliver the maximal consumption we have come to identify with human well-being. This is a moment of great uneasiness in the human trajectory; we struggle like addicts with attractions that do not lose their power just because we see they may be our ruin.

Having been under the influence of a rather unreflective control mentality for about 250 years, we seem now to have turned a corner. But the control mentality has by no means disappeared: just keep an ear open for the term “engineering” to discover the contemporary frontiers of the campaign: “bio-engineering” and “genetic engineering” in particular are hot areas, magnets of graduate students and venture capitalists alike. But even as our engineering hand pries open the life sciences, we now greet an advance that would have been hailed with unalloyed self-congratulation in the 1950s with public misgiving, as

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reflected in the European restrictions on the import and sale of GMO foods, or the similar battles in the US over labelling them as such. Smart marketers have found it pays extra if they can affix prominent labels to their food products guaranteeing the absence of any GMO content. We no longer think it is progress when engineers drain wetlands to erect buildings or grow sugarcane. And we doubt whether it is for the benefit of humanity when corporations produce Roundup resistant seeds or salmon that grow twice the size in half the time.

In the good old days, the move to name our geological era the Anthropocene, the Human Age, would have been a boast, a sign of definitive victory in the conquest of nature. But now it is rather a reluctant and sad recognition of the stature we have assumed. What one finds in justification of this move is less our proud triumph over nature than the sorry recognition of humans as the controlling cause of global warming and the Sixth Mass Extinction.

Even though some kind of control remains our almost instinctive response to problems, chastened by the results of our attempt to simply take over and control the natural world, we seek a new approach. “Manage” is not too far removed from “control,” but it has room for a reappraisal of our mistaken readiness to rearrange the natural order of things to suit ourselves. Good management, be it of a factory or a wildlife refuge, involves sensitivity to the dynamics of the system. The aim, when possible, is to work with and optimize the functionality that is already there. Instead of reshaping the natural world to our purposes, we now recognize that we must tread softly and respect the dynamics inherent in self-organized ecosystems. If a problem is human-caused, such as the unnatural buildup of underbrush due to over-zealous suppression of small forest fires, then we must intervene to rectify the situation. But if big-horn goats are falling off cliffs because of an outbreak of “naturally occurring” eye disease, we best not fly in medical relief. The processes of natural selection may be at points painful, but our instinct to minimize pain wherever we see it, ill-fits the process that maintains the health and integrity of ecosystems. We know now that the intertwined relationships are more complex and subtle than we can grasp, so the best management is to simply keep our hands off.

If we could really just back off and let nature be nature, this would not be the Anthropocene. Even wise and informed eco-management exists only in the larger context of civilization, that is, of politics and power and contested control. Our global reach is such that if areas of wilderness continue to exist, it is because they are the product of human decisions that they will be preserved and protected. And if they contain anything of much value on the human market such as elephant tusks or rhinoceros horn, the decisions may be very difficult to enforce. Our crops and domestic animals already fill most of the earth. The total weight of all our domesticated animals are sevenfold the weight of all the larger wild animals left on earth.¹ The fish of the seas are ours to harvest; if those of any size remain, it is because we have decided, either by explicit management consideration or neglect (no market value) that they should remain. Rainforests, which have been called the lungs of the earth, exist only because of strong calls for their protection, and even then they are turning into pasture for cattle grazing and fields for soybeans.

¹ Harrari (2015), p. 350. The human population, in a similar comparison, would outweigh all wild creatures of size by about 3 times.

Actually rainforests are a paradigm of our situation. Although they are recognized as critical to the climate and also as comprising the densest life speciation on earth, we are still losing them at an estimated rate of about 80,000 acres *per day*.² Management of the world turns out to now be a struggle for human self-management.

Earth as a Human Managed System

It is useful to back off a little at this point to consider the broad dimensions of what is happening here. In the last 12 thousand years, and especially in the 250-300 years since the Industrial Revolution, we have moved from constructing a world of human society distinct from the eco-systemic world of nature, to a situation where the cultural world has overtaken and subsumed the natural world. The self-organization of life systems through natural selection is a fundamental life dynamic that cannot be supplanted, but the human imprint now looms so large among selective factors that we have become the constructive shapers of not only our society but of all macroscopic life on the earth. Fit with humans has become a critical selective pressure on every organism; in the short term, it is we who shape ourselves, and in so doing we determine what is to count as fit or misfit throughout the community of life.

To understand what this change portends it is useful to return to the basics: how does the natural world work? How does the human world work? What does it mean to overlay the former with the latter?

Organization in Nature

We think of evolution as an ongoing process continually probing an adjacent possible, constantly filling niches, potential ways of making a living, as niches emerge, transform, or disappear in changing environments. We admire the density and diversity of the life community with which it has filled the earth, feeling perhaps a special self-satisfaction that it has even come up with us.

But whence this power to come up with a mind-boggling array of ways of making a living and to organize them in a system of mutual functionality? Evolution is a continual tuning-tinkering process working selectively on the array of metabolic and behavioral functions by which the community of living organisms make their various livings. Its mechanism is the collection of gene-pools made up of the reproducing members of every species. Each works in terms of shaping an individual species, but the shaping takes place in terms of fit with environmental circumstances, including other species. Thus this seemingly species-specific process is inherently cross-referenced, so species do not just evolve, they co-evolve.

Co-evolving gene pools do their basic tuning negatively. What does not work for living long enough to reproduce just does not show up. Or what works poorly is more often pruned out while what works better slips through the meshes of mortality more often. The image of selection as a net of mortality is telling, since one can easily see that in easy times the meshes

² Measuring the Daily Destruction of the World's Rainforests, *Scientific American*, Nov. 19, 2009, <http://www.scientificamerican.com/article/earth-talks-daily-destruction/>, retrieved 2/11/2016.

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are large and most anything gets through, but when the going gets tough the meshes are fine and some real shaping takes place.

It is noteworthy that this process, in being only negative, is inherently as broad and forgiving as circumstances allow. It functions with a selectivity akin to going into a cluttered basement and throwing out all the easy stuff you know you don't want. That still leaves a lot of stuff. Contrast that with going into the basement and working with a firm resolve to keep only what you really want. This positive selective process will leave you with a much emptier basement. And almost inevitably a few weeks later something unforeseen develops and we end up saying, "Oh! I never should have thrown that out!" The power of evolution to adapt life to changing circumstances and fill new niches is critically related to its negative nature, which generously allows for enough diverse stuff of unidentified utility to remain around that there may be something there to adaptively fit unexpected circumstances.

It is somewhat counterintuitive, after all we hear about the rigors of having to fit and the disruptive potential of invasive species, to realize that the process that shapes and refines the community of life is about as permissive as possible. Given time, habitats, like basements, get crammed with about as much diversity as they can support as differences wedge into new ways of making a living in slightly different circumstances. How else would we get 400,000 species of beetles or 10,000 species of ants! Because it has been winnowed only for what does not work, the basket of life is full of unexplored potential for what lies ahead.

There is an irony here. Reproduction is above all a move that transcends the present to open up a future, and key to the whole project's success is adaptation not to a bygone world but the world as it will be. We think of the ability to adapt to a future before it arrives as the special mark of consciousness. And yet reproduction, the process that gives not individuals but whole species a future, shapes its product through the guidance of gene pools which are blind to the future. No anticipation, no forethought, no consciousness.

In fact, we can see that not having to anticipate the future is a strength, not a limitation, in eco-systemic self-organization. What a gene pool offers in its composition is in effect a perfect memory of what has been working in the parent's generation and how well. What it rolls forward in the reproductive process is not only the recipe that has worked, but any variations and other baggage that is around and has not proved much of a hindrance. Who knows what might turn out to be useful in the as yet undetermined future? Conscious anticipation is a more frail process. Creatures that learn from experience can turn the memory of past experiences into imagination or anticipation of what is about to occur or could occur, so experience can become a guide into the future. But sometimes the wrong memory is applied, the wrong lesson learned, or the future becomes too different and experience no longer applies.

In this respect gene pools are both a more copious and more accurate memory. It is a species-level form of learning from experience, but unencumbered with the selective attention or the potential misapplication that besets conscious learning and its imaginative application. Instead gene pools penetrate the future as the biological constitution of a new generation, guiding the metabolic function of all organisms and all such responsive behaviors as may be hard-wired.

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Human Organization

From this perspective the problem with the Anthropocene is the effective substitution of human conscious management for the organizing dynamic of gene-pools. When the narrow and frail selectivity of human consciousness becomes a determinative factor in the way the life system of the earth enters the future, even with the best of intentions the nature of the systemic management process is transformed. Gene pools, limited to experience and blind to the future, nonetheless turn out to be superb guides for adaptation. Humans, learning from but not constrained by experience and anxiously probing the future with imaginative foresight, concern themselves not only with adaptation but with reworking virtually anything into a *better* mode—better as construed primarily in terms of the well-being of a single species and subject to the limitations of our understanding, foresight, and concerns.

Having collapsed space and time, our reach extends anywhere we care to intervene. While gene pools systemically transcend the particularity of species by a cross-referenced constraint on the workability of the recipes they roll forward, human intervention is characteristically species-specific. That is, it reshapes the world to maximize the well-being of a single species. This brings troubles from two vectors. The first is simply the magnitude and speed of the kind of changes we introduce. Habitat loss, the disappearance of the ecosystem sources which are expected in the metabolisms and living-making recipes of a given species, mean the invalidation of that recipe, in other words, extinction. Agriculture and urbanization are twin vectors of massive habitat transformation. The second problem is that, unlike other species, the changes we introduce are not systemically constrained and shaped by the community of life that we impact, but by the socio-economic world of culture.

Culture critically shapes the motivation that guides human behavior. Motivation, and especially human motivation, is a complex and many-layered systemic function. But our culturally shaped motivation is systemically different from anything expected in the organizing dynamics of the natural world. Insofar as the guidance system shaped in human culture is now being superimposed on the natural world we find ourselves managing, the systemic discrepancies in the motivation of human conduct bear close examination.

Motivation

Life, Well-being as Motive Force

Every living organism is motivated. Being alive is itself a motivated condition, for life is a complex performance aimed at a non-random consequence, staying alive. This is the aim of metabolic function internally and the goal of interaction with the environment externally. Motivation is there all along, structured into all organic organization and behavior. Motivation becomes visible when cells evolve wiggling tails that could propel them through their environs. Having motion, the question becomes where do you want to go, that is, what is your motivation. For the single-celled swimmers, the answer is typically towards lunch or away from becoming lunch. The quest is for success in maintaining one's life in a flourishing condition and to avoid its degradation or termination, that is, failure. The maintenance and flourishing of life is thus the organic foundation of all motivation, the mainspring of all derivative forms. We term this condition in which a life is maintained and flourishes “well-being,” in distinction from the “ill” condition which arises when the dynamism of life fails.

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Another term for this kind of motivated dynamism is “interest.” Conscious or not, life is a dynamic process inherently interested in its on-going well-being. This brings us close to the commonplace notion that self-interest is the base of all motivation. That is a half-truth. It is true in the sense that if no units called “selves” had arisen as looping processes that maintained themselves, there would be no motivation at all, no well or ill, good or evil to be discerned.

Complexity of Levels of “Self” Interest

But self-interest does not remain a simple phenomenon, for “self” itself has proved a wonderfully dynamic kind of organizational center. If selves had remained packaged in rudimentary prokaryotic single-cell units, the common notion of self-interest would be almost accurate, except even then the phenomenon of reproduction would stretch the naïve atomism of unalloyed self-interest. But we progress thence to nucleated cells populated by those prokaryotic single-cell units. And then on to multicellular organisms, and further to communities, bands, herds, hives and nests, families, churches, corporations, governments, nations and more. In a nested structure of ascending complexity, each successive layer is a corporate self made up of what comprise whole self-units at a lower order.

The phenomenon of units, which in some respects are wholes in themselves, aggregating into larger units which in turn act as wholes at another level, produces a differentiated, multi-level kind of well-being. Cells in an organism do not get to maximize their lifespan, but must die off and be replaced roughly on schedule. The well-being of an ant colony is different from the individual well-being of any of the ants that make it up. The well-being of a human family, village or community is different from the well-being of its members, and the well-being of nations depends on citizens’ willingness to even die in its defense. These many layers of well-being may overlap and mutually reinforce, but they also may be in tension and competition with one another.

Cells in multicellular organisms and social insects can be hard-wired into an intricate organization of differentiated roles and even different body types in a way that maximally serves the well-being of the entire community. But humans are at the cutting edge of an evolutionary trajectory loading individuals with capacity to deal with situations by consciously mediated flexible responsiveness. And we have also evolved to become the most social of all such species: our inborn dispositions to take care of ourselves are complemented with dispositions to be sensitive to and responsive to the interests that arise as complex social organization advances. The result is that we act with a consciousness able to join in a collectivity of consciousnesses, yet with an individuality always primed to take care of its own well-being as well. This means that in our layers of complex nested organization, lower level interests will never be completely subordinated to and taken over by the next level. In fact, lower level interests need to remain active, for the well-being at each level is maintained by the dynamics appropriate to that level.

The more loaded up the unit level with flexible self-direction capacity, the more complex it’s interface with the other levels. For example, a corporation, while it seeks profits, may also contribute to national and local well-being and is concerned for the well-being of its workers. At least that is the common picture painted by management, and it gives due regard to the way interests of many levels intersect in any given level. But we are also all too familiar with

the way a given level's dynamic to pursue its own well-being gets distorted into an interest maximizing dynamic that distorts the complex balance of the nested system. Thus we easily find examples of profit-maximizing corporations that fight unions, exact tax breaks from communities, and simply move their business and jobs offshore when the profits look significantly better. The same goes for any level, from governments that steadily expand their authority, to charities that spend more on their organization than their causes, to committees that keep creating new work for themselves, to individuals ready to exploit anyone or anything for their personal enhancement. The stories of interest-maximizing dynamics skewing into dysfunction are commonplace.

Managing Interest-Maximizing Dynamics

The question of priorities and tradeoffs among these many levels of well-being and interest or motivation is always complex, shifting not only from situation to situation but from perspective to perspective as well. Gene pools rolling forward the latest adaptive models of whatever has been working currently manage the multi-level tradeoffs with the blind dynamic of mutual constraint. Although organization is complex, the trade-offs among species, herds, layered forests, groves, flocks etc. and all the individual organisms that comprise them, is constantly selected and shaped for how well its working in the context of all the others, the criterion for survival and reproduction.

It is easy to see the comparable magnitude of the challenge for human cultural systems. To some extent socio-economic systems are subject to the auto-organizing dynamics of mutual constraint evident in ecosystem formation. Such, in fact, is the theory of the free-market system, or the balance of power theories of government and international organization. Everybody on every level busily pursues their interest and is constrained by all others doing likewise. But the churn in human culture is incomparably more rapid, tumultuous, and complex than in ecosystems.

The critical difference is that the dynamic of mutual constraint in human systems is partially the product of minds that organize with strategic foresight. The same cognitive abilities that moved our strategizing beyond the systemic mutuality of constraining ecosystems also functions with regard to our own inter-human mutual constraints. Individuals and groups constantly chaff and work to strategically get around constraints perceived as not in the interest of their well-being. This inherent dynamic is the reason that any set of regulations we set in place for the financial world, for example, will need regular revision to take account of the ingenious workarounds that clever strategists will devise as they pursue faster more productive routes to more money.

If this sort of short term self-interest was all there is to human motivation, we would be too corrosively clever to sustain complex organization in the first place. But our evolution as a social species has selected also for forms of motivation attuned to communal well-being. This motivation, often phrased in moral terms of good and evil, does not simply supplant the more direct form of self-interest, but it buffers it and allows a kind of dialectic between what we regard dichotomously as good and evil, morality and immorality, or idealism and pragmatism.

This constant and necessary tension between the individual and the social, and among the graded levels of inclusivity in a complex nested system, makes the human calculus of well-

being a daunting matter. And this situation is rendered even more complex by the fact that the forms of well-being that guide the behavior of other forms of life are, in the human case, heavily mediated by both our technology and our financial system. When it comes to motivation, we live in a world constantly shaped and reshaped by our own construction.

Mediated Motivation

Every organism makes its living by interaction with its environment. The environment signifies sources of nutrition, safety, reproductive support and correlated dangers that go with the many ways these supports may fail. The pruning blade of natural selection keeps motivation adjusted to a tolerable fit with local environmental conditions that impinge on the organism in the course of its living and reproducing. For, as we have seen, being guided in ways that enable well-being is what motivation is all about in the first place.

Except for us. The systemic dynamics of the above statement are accurate enough, but for “the pruning blade of natural selection” we substitute “the pruning blade of cultural selection.” One has but to consider what it takes youngsters to survive in the conditions of gang-ridden inner city neighborhoods, or to prepare themselves for the world of competition in a global economy, to realize how our societies exercise a strong systemic selective force that shapes our responsive motivations and the ways we perceive and pursue well-being. That shaping force is now almost entirely a human creation, far-removed from the natural environment. The products of our own minds shape the human world, which in turn acts back to shape our minds. In particular, our technology mediates virtually all human interaction with the world, in the process shaping our perceptions and altering our pursuits. And, as we shall see, technology is in turn mediated by money, a symbolic stand in for real well-being in the commodified world of human interaction.

Technology

Physical, chemical, and biological flows shape and support life on earth. The biological layer, motivated by the organic thrust of a myriad kinds of organisms towards maintaining and refining their well-being, gets physics and chemistry to do things they would never do otherwise. Maintaining a reasonably constant body temperature in warm blooded creatures is a metabolic example. Blue-green algae photo-synthesizing the world into an oxygen-rich atmosphere (and a mega ice age to boot!) exemplifies an external effect. There is great non-calculated craft in this evolutionary process. But it is widely distributed through the multiple gene pools and relatively slow in its global consequences. The bluegreen algae’s Great Oxygenation Event, for example, radically changed the whole earth system, but it was an event that transpired over millions of years, not decades or centuries.³

The evolution of organisms with consciously mediated sensation to move with flexible strategy into their futures introduced into the system of life the faster kind of calculated craft. The craftiness of most of the creatures on this evolutionary trajectory has been quite modest, generally connected with basic needs such as getting food and constructing shelter. Chimps use shaped twigs or straws to go after termites, and pound hard nuts with rocks to get at the meat. Seagulls open clams by dropping them from a height upon rocks, using gravity instead of muscle power for the hammering effect. Big-brained killer whales have flexible and sophisticated hunting techniques, but they do not have hands, and even if they did, their

³ See, https://en.wikipedia.org/wiki/Great_Oxygenation_Event, retrieved 3/9/2016.

environment does not afford them the use of fire, which is the key to really opening up what a calculating mind can do with physics, chemistry and biology. We are the only big-brained species equipped to manipulate these physical, chemical, and biological components of the earth in a suitably flammable environment.

Living at the exponentially surging peak of technological development, it is hard for us to imagine how laid back our early ancestors were about this ability to come up with better and better (there is no technological “best”) methods for realizing our dreams. The earliest technology we know of, flaked stone hand axes, date from about 2.6 million years ago. They occur in many shapes, but the technology of their manufacture, the quality, and the use of the product underwent little change for the better part of the next 80 thousand years.⁴ Fire may have been tamed by humans as much as 400,000 years ago, and was certainly a common feature of human life by about 125,000 years ago. But for hundreds of thousands of years its use remained much the same: cooking food, providing warmth, perhaps sometimes as a hunting technique to flush game. If you have sharp stones to cut up meat and scrape hides, a fire to cook with and sit around, what else do you need? This is the hunter-gatherer life anthropologist Marshal Sahlins describes as that of “uneconomic man,” a human condition of limited wants and abundant means.⁵

After over 2 million years of uneconomic man, economic man, s(he) of “infinite wants and limited resources,”⁶ as described in classical economics, emerged with agriculture and the settled life of civilization. Once we settled in stable populated locales, accumulation became a way to differentiate a complex hierarchical organization of roles, classes, and power, all of which adds up to a new way of allocating well-being. And in the climate of the new thinking and motivation that went with this emergent civilized structure, technology took off. Fire turned clay into pottery, ore into metals, potters wheels became cart wheels, and within 8,000 short years we were riding and transporting not in carts but automobiles, trucks and airplanes, and we even perched ourselves in the nosecones of tall cylinders of metal to ride pillars of flame to the moon.

This spectacular burst of technological understanding and energy was not the product of any new brain power. Homo sapiens with pretty much the intelligence of our contemporaries had been around for about 190,000 years prior to the Neolithic Revolution. It was not the brain but the structure of human society that changed, and that change brought with it new ways of thinking and a transformation of our motivation. As ever motivation has remained on the deepest level a quest for well-being, but well-being in a civilized context starts to become more and more a human strategic achievement than a gift of nature, and with that everything changes.

Agriculture could be called the definitive control-revolution, for with the emergence of agriculture we took food, the essential item in our daily sustenance, under our own control. This was the wedge that opened on a new mentality, the notion that we produce our own

⁴ Mode 2 stone tools produced with improved techniques came in with the Acheulean, about 1.8 million years ago. See https://en.wikipedia.org/wiki/Acheulean#Acheulean_stone_tools, retrieved 3/10/2016.

⁵ Sahlins (1972).

⁶ The “basic economic problem,” as described in classical economics. See *Economic Problem*, https://en.wikipedia.org/wiki/Economic_problem, retrieved 3/16/16.

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well-being by means of our labor. The difference was really in who did the producing. Hunter-gatherers make their living literally free-loading (loading up for free) on what nature produces. Sure, they have to do *something* to make a living, but reaping what is freely offered by the environment is a far different matter from making it be there so you can reap it. Agriculture (and domestication of animals) is the epoch-changing step of making the food we eat a product mainly of our own labor, the harbinger of taking the world into our own hands.

Agriculture enabled humans to settle down in large communities with varied needs calling for new and specialized skills: architecture, builders, logistical planners, carpenters, all sorts of crafts (the Greeks called them *technē*—whence “technology”) and trades arose in the new city-states. In common with agriculture they shared the connection between making a living and doing some sort of labor, that is, producing one’s own well-being.

Well-being as the product of our own labor and cleverness rather than the free-gift of nature, became the hallmark of the human endeavor that eventually becomes technology. After 190,000 years of living in a manner strongly shaped by the constraints of what is offered by the natural world, homo sapiens turned attention to producing a world of human-making that will be increasingly livable for human beings. Civilized technology aims to enhance the livability of a human world, and livability in this context is understood as something achieved by transforming the natural world rather than just better fitting in with it. Technology and its products in this way tends to become a mediating layer that insulates the human world from the constraints of nature.

The full cognitive revolution launched with the introduction of agriculture-based civilization did not happen all at once. We who now view technology as the center of our civilization might be surprised to hear that the term in anything like its present meaning did not even exist until the mid-19th century. Up until the Industrial Revolution, the human world, for all its skills and techniques, still moved mostly within the limits of organic power. We had learned to harness the energy of wind and flowing waters, and our levers, gears and pulleys could raise great stones, our iron plows could cut deep furrows, but in the final analysis the energy making things happen was largely provided by the living muscle of humans and their domesticated animals. The Industrial Revolution came with the introduction of the steam engine, and then with the understanding of how to create electrical energy, and these opened never before imagined vistas of human control.

For thousands of years after humans began to think in terms of control, the tendency was still to project control to the gods or similar transcendent sources. But when Francis Bacon elaborated what came to be known as the scientific method, he spoke of it as a way in which mankind could subdue nature. Thereafter, as the new science bore fruit in steamships, locomotives, and the telegraph, we began to think of anything that constrained or inconvenienced us as a challenge of methodology: there must be a better (=faster, easier, more efficient) way to do it. This is what Jacques Ellul identified as the “technological mind,”⁷ the pervasive mindset that automatically looks for a technological fix, a better method, as the response to any problem.

⁷ Ellul (1964). Jacques Ellul was one of the earliest social thinkers to pinpoint and describe the problematic centrality of technology in the contemporary world.

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By the latter half of the 20th century talk of subduing or conquering nature pretty much disappeared. Perhaps, having conquered, we didn't like what we were seeing. Species disappearing, coral reefs bleaching, fertilizer runoff from industrial farms polluting rivers and creating dead zones at ocean deltas with fertilizer runoff, smog, acid rain, and then to top it all off, global warming. In 1982 Dupont finally dropped its famed "Better Things for Better Living Through Chemistry," slogan. What was a plausible selling point when it began in 1935 by the 1980s had become an ironic comment on naive over-reach. In 2009 it was estimated that a new chemical substance was invented every 2.6 seconds, 24/7.⁸ Coal mining in the Appalachians by MTR, Mountain Top Removal, (just put the mountaintop in the nearest valley!) has been a preferred technology (more efficient) since the 1970s, though now it may be slowed by the natural gas boom unleashed by our new fracking technology.

And so the story goes. In the Anthropocene, the technological mind reigns supreme in both our fears and our hopes. We know that our technologies, like medicines, come with side-effects, unwelcome baggage accompanying the improved well-being we were aiming at. The simple rule is that in a complex system you can never do just one thing, whether it is popping a pill to feel better or filling a valley with debris to more efficiently get at a seam of coal. When the side effects are too severe, we must discover a new, improved technique to intervene and remedy the situation.

As the shadows of the unintended consequences of our technological mastery have lengthened, we see more clearly the questionable nature of a strategy of simply outwitting the constraints natural systems impose upon us. But having built a globe encompassing market-consumer civilization on the basis of efficiency, speed, and convenience, we have also created ourselves as innovating, science informed, technology dependent beings. This genie does not go back in the bottle—and the old bottle is no longer there even if it did want to go back. We are situated with the citizens of California who want to restore the wilderness by reintroducing grizzly bears—but only equipped with GPS collars so they can be tracked and dissuaded from venturing too close to human habitat.⁹ Our encultured technology cannot but interpose even in our attempts to find again the original community of life.

Money

In the contemporary human world, most of the necessities for basic well-being, such as health care, food and water, housing, clothing, education and entertainment are delivered as commodities: they come to us for a price by way of a globe-encompassing system of production and consumption. As the most sociable primate species, even when we tell ourselves otherwise we instinctively work out our personal well-being in the context of a cooperatively worked out shared well-being. Even now, at the level of family and true face-to-face community, we divide labors and take care of one another in a non-monetary mode of exchange. But with agriculture and the emergence of city-states, the network of exchanges became both more complex and less personal. It was not long before Sumer, the first civilization, came up with clay tokens and then silver coins as symbolic media for various sorts of exchanges.

⁸ The estimate of Dr. Hideaki Chihara, Ph.D. chemist and former president of Japan Association for International Chemical Information, *Wired*, 9/09/9, <http://www.wired.com/2009/09/humans-have-made-found-or-used-over-50-million-unique-chemicals/>, retrieved 3/23/2016.

⁹ See Duane (2016).

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We are at the apex of a six-thousand year development of a seemingly inexorable process of networking the globe and permeating social life with a market system maintained by financial flows. But it was only in the 1850's that the word "job" assumed its present usage, as in "Get a job," or, "She has a really good job." To us, money has become the essential means for realizing all sorts of well-being, and having a job is the fundamental way to make money. We are now organized in a way that the association of well-being, money, and a job is taken as the self-evident reality of the way humans make a living. James Clifton, chairman and C.E.O. of the Gallup Poll organization, puts it this way:

The primary *will of the world* is no longer about peace or freedom or even democracy; it is not about having a family, and it is neither about God nor about owning a home or land. The will of the world is first and foremost to have a good job. Everything else comes after that.¹⁰

Money is an eminently useful abstract symbolic quantification of exchange value, mediating our consumption of all kinds of goods and services and the labor by which they are produced as well. Work "industriously" at a good job and you and your family can have a good life, i.e. abundant well-being. With money as medium, all sorts of productivity can be rewarded and encouraged, and as the variety and quantity of productivity grows, the variety and abundance of available human well-being increases. Where would we be without the stimulus of this incentive? And since money is a pure symbolic quantity, unlike the necessarily limited nature of actual, consumable well-being, it is a form of motivation that keeps on motivating: there is no inherent "enough" to shut down the draw by which clever millionaires keep working hard (and producing jobs!) to become billionaires.

Although money plays such a major role in human motivation, it is noteworthy that nothing remotely similar guides the conduct of any other form of life. It is easy to write this off to the fact that no other forms of life seem to have developed the symbolic sophistication to monetarize their needs. But our familiarity and ease with abstract symbolic representation should not blind us to the extraordinary systemic consequences of introducing this quantified, abstract symbol of exchange value as a motivating, guiding medium in the way we go about pursuing a life of well-being. Money as motivation injects a strange, unpredictable, and uncontrollable dimension into human affairs.

Strange

We surpass any other organism on earth in the scope and flexibility of our motivation. Motivation is a guidance system. All living beings, conscious or not, are motivated to pursue well-being. Conscious awareness injects a pleasure-pain, attraction-repulsion dimension into this guidance, which can be further modified by learning from experience: anticipation of a treat can train a dog to modify behavior it otherwise finds congenial. Humans, with the narrative power of symbolic language, open this up yet further by introducing creative stories

¹⁰From his 2011 book, provocatively titled "[The Coming Jobs War](http://www.nytimes.com/2016/03/24/opinion/dangerous-world-serious-leaders.html?_r=0)," as quoted in the *New York Times*, http://www.nytimes.com/2016/03/24/opinion/dangerous-world-serious-leaders.html?_r=0, retrieved 3/29/16.

they can use to probe and arrange for future pleasure (well-being). And the advertising industry refines this attraction-repulsion mechanism into a sophisticated manipulation technique to lead us to identify ever newer forms of well-being to anticipate and pursue—for a price.

Consumers soon learn to be wary of advertising and of the products of corporate enterprise promoted in the ads. We know that the vast economic system through which humans now create and support their well-being operates with a split motivation, producing well-being or its appearance not just out of the goodness of the socialized human heart, but in order to make money. We are rightly suspicious: somehow the motive power of money makes the system work, and at the same time is responsible for its most spectacular dysfunctions.

The strangeness of money as a motivation for a living organism is that it is a powerful motivation that offers no guidance. Well-being, at the heart of all motivation, guides activity in an inherently normative way. Though, especially for humans, it may have a myriad dimensions and complex paths of achievement or maintenance, there is a directionality involved, a norm that differentiates between well and ill in any of those dimensions. “Health,” be it physical, mental, social, economic, or whatever, is the term we use to reflect our awareness of this qualitative normativity and its content for guidance in living systems. In contrast, money, as an abstract unit of exchange value, motivates as a quantification of all sorts of well-being, but its guidance is purely quantitative, for it has none of the inherent qualitative content of the potential well-being from which it gets its motivation power.

The search for a money-mediated well-being gives a systemically unique cast to human organization and activity. We observed earlier the complexity and trade-offs among sorts of well-being that may apply at different systemic levels. Humans must negotiate such value tradeoffs constantly as they move into futures they shape with anticipative consciousness. Often money is the quantified medium for the calculus of tradeoffs, as when we work out budgets or make choices at the mall. But the twist is that money does not remain a simple quantifiable medium: it migrates in our value awareness to itself become one of the players among the value tradeoffs being made.

When money itself enters the field of consideration as a value being weighed against other values, the playing field is by no means equal. Any of the concrete items that constitute well-being are particular, as are the related abstract categories of well-being to which they belong such as health, food, security etc. But as a quantified abstraction of exchange value, money includes the whole range, and yet, as we consider trade-offs, it may be treated as another concrete value competing like any of the others. Careful thought reveals the familiar list of sorts of well-being “money can’t buy,” but even our need to invoke that commonplace reminder reflects our tendency to slip into simply identifying money and well-being. We can be “well-off” in respect to any of the constituents of well-being, but without a more particular context, being “well-off” means having a lot of money, the summary form of well-being.

This puts the conduct of human affairs in a category of its own. We are accustomed to attributing our uniqueness to the complexity of the decisions by which we navigate a path in life uniquely rich in options. We enjoy and create novelty as no other creatures, for the inner

voice of symbolic linguistic narrative allows us to entertain a relatively unconstrained range of possibilities as we enter the future. But equally or even more distinctive, money, the uniquely human motive offering nothing but quantitative guidance, regularly plays a major role in what we decide. For example, year after year, in the neighborhood of 30% of the graduating class of Harvard University heads off to Wall Street for careers in finance and consulting.¹¹ Why would the best (or most advantaged) and brightest, with the prospect before them of all the world needs and all it has to offer, choose to spend their lives this way? Maybe the prospect of \$90,000 plus starting salaries has something to do with it.

Being strongly motivated by a force that offers no inherent qualitative guidance weakens the learning feedback loop that characterizes complex adaptive systems. Not that we do not learn with an agility unmatched by any other creature, but our learning is no longer constrained to track closely with our well-being. If my back exercises do not help my lower back pain, I seek new ones. If my diet puts me at risk for diabetes, I am motivated to correct it. But feedback on cash flow has no corrective guidance relating activity and well-being. We may give up careers helping others because it does not pay enough. We may get coal by dumping mountain tops into valleys because it is most profitable.

If one probes the motivation forces that organize the natural world, well-being is the rosetta stone for making sense of every sort of organization and activity. When we hear of lemmings rushing into the sea, or of some species of female spiders that dine on their mates immediately after fertilization, we assume there must be some contribution to maintaining life and or procreation and try to understand what it may be. But when we observe humans and human organizations behaving in ways that appear to beget ill, we can make no such assumption: often enough one need look no further than the money it produces. If human society seems strange in how often and how far it can deviate from the logic of well-being, the guidance-free motivating power of money makes sense of a large part of the strangeness.

Unpredictable

As a quantified unit of exchange, money crystalizes two characteristic features of human civilization. The quality-free quantification of money serves the tendency of settled societies to prize accumulation, even as it removes the constraints on quantity inherent in the possession and consumption of concrete goods. And as both a unit of and an incitement to exchange, it enables the most social of big-brained creatures in enveloping the world in a freewheeling exchange of matter, energy, ideas, and labor in an interwoven and accelerating modification of the globe in line with human vision and interests.

But to say that we are engaged in a “modification of the globe in line with human vision and interests,” is perhaps an over-simplified generalization. For the notion of vision and interests suggests that humans, like all other living creatures, are in the final analysis motivated to seek their well-being. Even if this were the case, given the reach of our technological prowess, it would amount to a problematic shaping of the world by the limited consciousness of a single species, a human maximization that would challenge the adaptive capacities of the community of life. But in fact, the case is not that straightforward, for the tendency towards the shorthand equation of well-being with money muddies the water. As we observed above, qualitative well-being involves a normative, guiding content, whereas

¹¹ See Morris (2016).

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money does not. The vision and practice of what is truly in our interest is constantly put in question when there is a strong profit motive in the picture.

We have become used to living with misgivings about the profit motives of institutions and individuals, and we have routinized our awareness of this loose link in our motivation. The Romans already made the expression “caveat emptor (let the buyer beware)” a commonplace, and we often observe—without taking it too seriously—that “money is the root of all evil.” Indeed, it would be hard to say money is the unique source of our problems: human judgement in the complex pursuit of well-being is full of pitfalls. But money does introduce a systemic ambiguity and unpredictability throughout human conduct. The jobs which are our livelihood involve both the work described and the payment, and an eye on the money can easily subvert the integrity of the work performed. When money is tight, as in the Third World, buildings and bridges may crumble unexpectedly because someone was shorting the specs on cement or reinforcing rods. Where money is plentiful and organization more sophisticated, games just get more complex. Analogous to shorting cement and reinforcing rods, the richest financial institutions in the world marketed bundled subprime mortgages as triple-A securities, a critical shorting of the information on these products that in 2008 almost brought down the world’s financial structure.

The large corporate segment of our social organization dedicated to making money is not intentionally inimical to well-being: in general, providing goods and services for what we think of as our well-being is also the best way to make money. But even well-intentioned endeavors need continual course correction, and once we organize profit and jobs around something, it becomes especially resistant to corrections that cut into profit (politically protected as a matter of jobs). Such phenomena as mono-cropping industrial agriculture, the destruction of rainforests, the distortions of the pharmaceutical and medical industry, or the environmental recklessness of mining and fossil fuel industries, all richly illustrate the systemic organizational tension between providing for human and non-human well-being and the value-free motive to make (more) money.

Life systems originated and have subsisted as systems of mutual adaptive constraint. Our technologically enhanced strategic flexibility has rendered us eccentric to the immediate constraints of the natural life system, but in the final analysis, the mandate for adaptive fit is inescapable. Our ability to seemingly go our own way really means the rest of the life community is increasingly constrained to adapt to us. As always, the price of maladaptation in the life system is individual death and eventually species level extinction. Now few creatures of any size can adaptively match the moves we make as we pursue wealth and well-being. If other creatures cannot adaptively keep up with us, the systemic burden of adaptive behavior shifts proportionately to us.

Adaptation should be the predictable consequence of learning. We humans adapt by conscious adjustment as we move into an anticipated future. For creatures that learn from experience, missteps are occasions for improvement. As our predictive anticipation has become more accurate, we should be able to guide ourselves to a better adaptive fitness with our global environment and life community. We now understand our problematic impact on life and earth systems as never before. But now we find that our predictive anticipation of disaster routinely outstrips our ability for adaptive modification. Climate change is, of course,

the poster-predicament for our deer-in-the-headlights inability to match vision and action for well-being. It seems as if our very capacity to realize ongoing well-being by adaptive foresight is undercut when the question of what we are doing is complicated by bifurcation into future well-being and how much money we make by doing what we are doing.

Uncontrollable

In the natural world motivation is a mechanism of controlling guidance, a way in which creatures find and maintain well-being. As conscious processes took over more and more from hard wiring in more complex organisms, the basic attraction/repulsion features guiding behavior became more and packaged in the experience of pleasure and pain. Natural selection is sufficient to keep such proclivities on track: if your guidance system (and ability to learn to tailor it to circumstances) is messed up or no longer fits the environmental conditions, your recipe no longer makes it into the next generation.

The control that results from this relatively simple level of motivation is not only individual but also systemic. On one level it shapes behavior of an organism predictably towards well-being, and on a broader level it allows the behavior of other creatures to adaptively coevolve to fit with the expected behavior. This gives rise to interwoven strategies for well-being, such as the ongoing strategic arms race that interlocks the behaviors and abilities of predators and prey, or symbiotic strategies that bring mutual benefits to interacting species.

Controlled predictability also invites manipulation, and the world is full of evolved strategies whereby what motivates one becomes for another a means of entrapment. We humans, specialists in anticipatory living, are the masters at discovering and manipulating motives of both other creatures and of one another. Our ability to fill the world with domesticated animals (now more than twenty-five times the body mass of all wild mammals)¹² tokens our prowess in the community of life. The \$180 billion advertising industry evidences our attention to manipulating our own motivation. And both illustrate how money exacerbates the human meta-motivation problem, the motives with which we manipulate the functioning of motivation.

Animal husbandry, under the impact of the profit-maximizing industrial model, exploits economies of scale that radically distort expected life patterns of our major food animals. For cattle, pigs, and chickens the ordinary pleasure and pain guidance for a life of well-being is replaced with a human calculus of how to manipulate metabolic processes to maximize profitable productivity. In the case of advertising, the task is to ever enlarge and direct our imagination of pleasures to be had and pain to be avoided, but with scant attention to the well-being to which they once guided us. Rather, the manipulated feelings of attraction and repulsion which now guide our lives as consumers have become shaped for market profit, and in the process the allure of the promised well-being has become quite unreliable. Our evolved

¹² See Smil (2011). If all larger animals, not just mammals, are taken into account, the figure is still 7X the wild body mass.

appetite for fat, sweets, and salt profits of the fast food industry while contributing to an epidemic of obesity, diabetes, and heart disease. Our appreciation for ease, convenience, and speed has ratcheted into a world of hyper-productivity, hyper-connectivity, and hyper-tension, fueled in a positive feedback supply-demand loop with ever more potent mobile electronic devices, meds, fitness salons, and marketed distractions. Reproduction in any species is typically surrounded by imperious motive powers; for humans, sex becomes a tool for selling clothes, cars, and cell phones. Our needs, whims and fancies are immediately sucked into data banks and cycled back to us with tailored personal amplification.

The point here is not that all of this is necessarily ill. It is neither necessarily ill nor good: the for-profit meta-motivation of the system which delivers human well-being is so uncertainly linked with human well-being or the well-being of the world of life with which humans interdepend that the situation eludes a general valuation in terms of good or ill. In making money, the only inherent guidance is a preference dial set to “more.” But motivations operating on an open-ended “more” are sustainable only in situations that involve relevant constraints. We do our best, for example, to rein powerful appetites for food and sex. And though our success is imperfect, our effort is supported by strong feedback in terms of the well-being or ill that goes with our conduct. But there is no such feedback on money-making, except the ill that comes from lack of money; that is, the only feedback amounts to the message that more is better. And the absence of any inherent inner control in money is aggravated as the flow of money increases to become an organizing power that can shape and manipulate conditions to further maximize its flow.

Money, then, is a powerful motivation that operates not within but alongside the umbrella of well-being that encompasses and controls other forms of motivation. The profit motive may operate in synergistic concert with our many-layered thrust for well-being, or it may become a parallel force, uncontrolled and disorienting insofar as it is not subject to the normativity of the well-being it supposedly mediates. The “more” of profits has reshaped the lives and bodies of our domestic animals. And the same “more” plays upon our appetites for all sorts of consumption, with an eye to pumping up the appetite and minimizing restraints. The same “more” will conserve arrangements that are highly profitable and seek workarounds on regulatory restraints that reduce profitability. The same “more” finds its way into the notion of an economy comprised of the people with infinite wants and limited means, a biological impossibility systemically shored up by the advertising industry. The “more” also finds its way into the vision of necessary and open-ended economic growth, a formulation that puts perceived human well-being on a collision course with the ecological and environmental system of the earth.

I should also hasten to add that the same “more” also pushes entrepreneurs, researchers, and all sorts of businesses to search out and more effectively supply what the human community needs (and wants) for its well-being. If well-being were not still a major guide in human conduct, we would not have survived as long and as well as we have. But since well-being is so much the essence of what living is about, our monetary mediation of the flows necessary to our well-being is too easily construed as a benign facilitation that occasionally happens to get out of control. However there is nothing mysterious or incidental in our common experience that money can motivate in a way disconnected from or even negatively

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related to fairly evident questions of well-being. Money simply is not inherently under the control of our motivation towards well-being, even though we can often borrow that motivation to try to corral the anomy of the profit motive.

The commonplace failure to curtail financially motivated dysfunction brings us back to our earlier discussion of how particular forms of well-being do not compete on a level playing field with making money. Money and jobs to make money are such strong placeholders for holistic well-being that it frequently overbalances the weight of other considerations as we confront tradeoffs with the well-being of both human society and the natural world. When profits become the primary consideration, from the point of view of motivated guidance towards the realization of well-being, the situation is no longer in control.

Positive Feedback for More: Money and Technology

The “better” achievement of whatever, which is the animating thrust of technology, promises an open-ended more: more productivity, more speed, more convenience, more ease. This technological “more,” abstracted from any particular project, became the Enlightenment’s vision of progress: science and technology would surely move us continually towards a better, more abundant life. As our technological prowess has ramified, we have experienced the negative feedback from a world strained and reshaped to allocate our abundance, and as we have seen, the optimistic expectations have been chastened.

Yet even as we expect less of it, indeed even add it to our list of things to worry about, the “more” of technological innovation seems to accelerate. Socially, psychologically, in child-rearing, education, and employment, we strain to keep up with our surging flood of new devices enabling better ways of doing everything. This is made possible by a positive feedback built into cumulative knowledge: the more you know the more creative cross-connectivity increases to open up brand new avenues to learn and explore. But the motivating enthusiasm with which we push this project forward comes from something stronger than an innate love of knowledge. Technological innovation has become systematically joined at the hip with money. If it is no longer at the heart of a vision of growing progress, no matter, it has become the heart of a vision of growing profit.

Medieval theologians forbade lending money at interest: usury, they observed, is unnatural and therefore a sin, because money does not have the living nature to grow. Their reasoning was flawless, but too narrow. They missed the capitalist insight. Perhaps money may not grow by itself, but productivity, and especially technologically improving productivity, can grow, and more products turn into more money which can turn into more technologically improved productivity. If lending means we go into debt as individuals and nations, it is nonetheless virtuous debt because the money enables a yet more productive future, meaning there will be more money to spare to pay the interest and enable further investment.

More money is a powerfully attractive motivation as a symbolic placeholder for all sorts of well-being. But if that “more” is nothing more than a desire for a larger slice of the pie, it amounts to plain greed, a socially constrained motivation. But with profit-fueled technological innovation productivity grows and we have the magical pie that gets bigger the more we eat. Hence the provocative “Greed is good!” assertion that prods us to recognize the special nature of the capitalist pie. So ongoing technological innovation is the systemic

key that unlocks and transforms the only guidance inherent in money, that more is better, into the system-driving virtuous profit motive. Seeing the productivity of this system, it is all too easy to dismiss the equally systemic unpredictability and uncontrollability of this motivational package as just an occasional aberration.

Profit fuels innovation which fuels profit in a positive feedback loop that sustains the global market economy. In the 1990s it was possible to imagine an “end of history,” in which the dynamics inherent in civilization played out into a last act of triumphant liberal democracy and global free-market capitalism.¹³ As we now know too well, this was a far too simple reading of the dynamics structured into civilization. This paper has looked only at a portion of what was missed, but the looping relationship between technological innovation and the profit motive is proving far more destabilizing than was anticipated.

As I write this in the summer of 2016, this most potent of our system dynamics is implicated in a burst of pent up frustration and anger that has led to a vote by Britain to leave the European Union and to a US presidential campaign dominated by an unexpected wave of populist defiance. Upheavals in complex social systems are inevitably multi-causal, but a shared linkage in this summer of our discontent is what has been happening to jobs, the “first and foremost will of the world.”¹⁴

Good jobs, identified with well-being, have been disappearing, melted down in the churning pot of technological innovation. First technology simply changed and improved the productivity of human labor. Then, with automation, it began replacing human labor, freeing hands for other levels of productivity—provided the education was there. Then communications and transportation technology freed jobs from local labor markets to float to the global lowest bidders. And now robotics and artificial intelligence threaten further inroads of such proportions that the very notion we all need to have a job to earn money to support ourselves seems in jeopardy, though there seems little thought of systemic alternatives.

Smart money looks for the next big innovation, and right now that is robotics and artificial intelligence. Viewed in the framework of behavior guided and motivated by well-being, this is a perplexing vignette of a profit-driven process of technological innovation that has long been eroding the jobs we systemically expect be the human way of making a living. For a time, profit making drove the system to a sweet spot-- perhaps somewhat enhanced in angry and nostalgic memory-- but in any case now the system seems to be on a trajectory to consume itself. And even now that the erosion has become explosively clear, the process at its core continues to be a magnet for investors. The loop of technological innovation and profit is not inherently guided or controlled by the well-being it promises, and this summer of anger manifests its consequential unpredictability, both for human society and for human management if the natural world.

Conclusion

The emergence of agriculture allowed humans to settle in numbers and take the control and production of their well-being into their own hands. In the new urban context our language-

¹³ See Fukayama (1992).

¹⁴ Clifton (2011).

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enabled strategic prowess allowed us to accumulate not only possessions but knowledge and technologies to remake the earth in a manner we imagined better suited our purposes. This cumulative process has been exponential, with an especially dizzying acceleration since the Industrial Revolution. We are now in the Anthropocene, a world shaped by our technological muscle and the aims and desires of the human mind-and-heart. Those aims and desires are now strongly shaped by a global market system in which many real and imagined elements of our well-being are commodified, making money a major component in contemporary human motivation. Unlike well-being, money offers no intrinsic normative dimension, no guidance concerning the behaviors that will answer its powerful attraction. Thus it introduces a dimension of unpredictability and uncontrollability into the conduct of the species that at present is the primary organizing force in the biosphere.

This systemic analysis of how we have come to this predicament does not offer easy and obvious alternatives. But it does refocus the more common framing of the problem as a matter of shortsighted greediness. Like metabolic systems, “human nature,” the responsive patterns of our minds-and-hearts, cannot be understood apart from the environment in which they function. How were humans sustainable for some two-million pre-civilization years, even with the full skill set of homo sapiens on the scene for about 190 thousand of those years? What changed in the function of our minds-and-hearts with agriculture and settlement? Whence the riptide of technological change, and the march to a globe-encompassing market system which turns well-being into a quest for jobs and money? The notion of greedy, short-sighted human nature is fatalistic, paying little heed to the extent to which we are shaped by our environment. A systems view relocates the problem to the context of a more contingent historical evolution. It has not always been this way, need not be this way, and indeed we can say with some assurance, will not remain this way.

Not to suggest that we can simply stuff the toothpaste back in the tube. We rest atop a complex, dynamic, systemic development of civilization shaped over thousands of years. It may indeed collapse, but at present collapse is better viewed as the problem, not the solution. Indeed, the problem-solution view is too simple, suggesting there is some techno-tinkering fix available. But it helps to know there are other ways available, perhaps even other ways of doing a civilization. If those alternatives are in any way open to our deliberate contrivance, that deliberation will have to include serious reflection on how the way we maintain our well-being has come to fit so ill with the well-being as pursued in the rest of the community of life, and indeed, with our own well-being as well. For humans, understanding is the guide to moving into a better future.

The analysis here of the effects of the emergence of civilization, and particularly of the trajectories of technology and monetarization in industrialized societies, is intended to lay the framework for asking what may be useful questions as we search for a sustainable future. What structures might lead us to reframe our assumptions regarding control and of ourselves being the main producers of our own well-being? Is there a way to frame our technological endeavors in a way that reinforces an awareness that well-being is a co-production (social, environmental, now global)? What might move well-being more to the center of discourse? There was a time when all human labor was on the unpaid, role-related footing that now causes us to undervalue critical activities such as housework and child-raising. How could we readjust our focus to evaluate work in terms of its life-giving content

rather than its production of money? As we reach the apex of the exponential curve, how can we back off from the positive feedback between technological innovation, money, and the related systemic mandate of growth?

These are just a sample of a few of the questions that occur as one identifies why and how the human social system is presently working so problematically and so differently from any other life system on earth. Others will identify additional questions or see better, more refined ways to formulate these. Such questions have no easy answers and do not translate into immediate policy recommendations. But as we consider the constantly branching paths that lead into different futures, such questions and the awareness that gives rise to them can provide a sort of utility compass, a sense for options and directions that contribute usefully to the constant project of making a good living for ourselves, our species, and the earth community of life within which we find well-being.

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