Catechism: A Global Economic History of the "Long Twentieth Century", 1870-2016

I. Introduction: My Grand Narrative

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What does DeLong see as the proper temporal boundaries of the "Long 20th Century"?
The Long 20th Century began around 1870, when the triple emergence of globalization, the industrial research lab, and the modern corporation in the context of the market economy set the world on the path that pulled it out of the dire poverty that was humanity's lot in all centuries before; and when America took the steps that made it the place where much of the action was—"the furnace where the future is forged", to quote Russian Revolutionary Leon Trotsky. The Long Twentieth Century ended in 2016, with failure of the anemic economic recovery from the Great Recession that started in 2008 to bring a restoration of the post-1870 normal pace of productivity growth; and with the election of Donald Trump, an American president hostile to global leadership, to global cooperation, and to the very ideas that America was open to immigrants.

Why is the Long 20th Century especially worthy of study?
It was the most consequential single century humanity has had. Before it began, humanity was still in the Malthusian poverty trap—albeit rattling the cage. After it ended, humanity had the path to a truly human world open to it—if we can grasp the opportunity.

Why was humanity desperately poor before 1870?
In a nutshell, because over and over again technology lost its race with fecundity, and so trapped itself in a Malthusian cage.

Why focus on the economic history of the Long 20th Century?
Because economic changes and transformations were, for the first time, clearly dominant in all the changes and events that make up history.

What were the limits of human opportunities before 1870?
Before 1870, most people most of the time could not be confident that in a year they and their families would have their 2000 calories, plus essential nutrients, plus a roof over their heads.

What was the focus of human entrepreneurship before 1870?
Before 1870, most entrepreneurial activity was extractive: those successfully on the make had to do so overwhelmingly by focusing on how to take from others and then keep what they had while maintaining order

What is the focus of human entrepreneurship today?
Primarily, it is to figure out how to make more for everyone, and then take a slice of the newly-generated surplus

But didn't the real change come with the Industrial Revolution that started around 1730, and managed to make itself felt in aggregates around 1770? Wasn't the real change in the possibilities for human destiny already accomplished by 1870?
Perhaps. Perhaps not. Certainty the ice was breaking before 1870. Between 1770 and 1870 technology and organization accelerated, and had gained a step or two or three on fecundity in their race. But only a step or two or three. Any post-1870 slackening of the pace of technological or organizational progress, or any major redivision of society's dividends devoting less to the sinews or peace and more to the sinews of war, and the "nasty, brutish, and short" of previous ages would have reasserted itself.

How did John Stuart Mill judge human possibilities as of 1870?
Depending on the advance and diffusion of birth-control technologies and on the implementation of a rigid system of demographic control via child licenses—not on any further acceleration of the pace of technological progress. (And not on a voluntary fall in fertility from a demographic transition.) As late as the 1870s he was claiming that "it is questionable if all the mechanical inventions yet made have lightened the day's toil of any human being…" Rather, they had merely "enabled a greater population to live the same life of drudgery and imprisonment…"

What is the global level of poverty today?
Today less than 9% of humanity lives at or below the roughly $2-a-day living standard we think of as "extreme poverty". And even those 9% have access to public-health and mobile communications technologies of vast worth and power.

What was the global level of poverty back in 1870?
70% or so of humanity lived at or below the roughly $2-a-day living standard we think of as "extreme poverty" back in 1870

How has the prosperity of the globe's rich economies changed since 1870?
The economies of the world lucky enough to be rich stand at levels of per-capita prosperity at least twenty (and possibly much more) times those of 1870 and at least

twenty-five (and possibly much more) times those of 1770—with every expectation of further doublings in the centuries to come.

How has the prosperity of the globe's not-rich economies changed since 1870?
Today the center-of-gravity of those economies unlucky and in the "Global South" is not at the $2-3 a day living standard of those economies in 1800 or 1870, but $15 a day (and more).

How would our predecessors of the years before 1870 have viewed us?
Tell any of those in previous centuries about the wealth, productivity, technology level, and sophisticated productive organizations of the world today, and they would say that with such power and wealth in our collective hands we must have built a utopia of abundance.

How has the wealth created in the Long 20th Century failed to deliver its societal promise?
Simply take a brief look at the political economy of the 2010s: the stepping-back of the United States from its role of good-guy world leader and of Britain from its role as a key piece of Europe, the rise in politics in North America and Europe of movements that rejects democratic representative consensus normal politics in favor of allegiance to leader whose principal qualifications are their desires to strike at external foes and at internal fifth columns who are not proper full members of the ethno-nationalist community—movements Madeleine Albright calls "fascist" (and who am I to tell her she is wrong?)

How has the economy been managed by governments in the Long 20th Century?
Not conspicuously well. Simply look at the conspicuous failure over the decade before 2016 of the stewards of the global economy to either maintain or to rapidly return to full employment.

What are the biggest achievements of the Long 20th Century?
Over 1870-2016, technology and organization repeatedly lapped fecundity. The psychology of a newly richer humanity in which girls learned to read and acquired social power permanently scotched Malthusian forces from their role as the fetters of humanity.

What are the biggest failures of the Long 20th Century?
Material prosperity is grossly unevenly—criminally—distributed around the globe. And material wealth does not make people happy—at least not in a world where politicians and others prosper mightily from finding new ways to make and keep people unhappy.

But these failures will be repaired in the next century, right?
Even a continuation of the slouch is not guaranteed. This book will appear ludicrously stupid if the next century sees a major thermonuclear war. This book will appear ludicrously short-sighted if uncertainty about the effects of global warming—no, I am not going to call it "climate change"—turns out to really be not-our-friend, and over the next

200 years we cook our planet.

Is telling the history of the Long 20th Century as a Grand Narrative a good thing to do?
No: pounding history into a Procrustean Bed of a Grand Narrative is fuzzy thought that leads to bad judgments.

So why is DeLong telling the history of the Long 20th Century as a Grand Narrative?
Because we have to do it, since we are individually and collectively bears of very little brain. We have to tell Grand Narratives if we are to think at all. We think in narratives: stories are how we make sense, and how we remember. And our thought is fuzzy. Grand Narratives are, in Ludwig Wittgenstein's words, "nonsense"—as is all human thought. But our fuzzy thoughts are the only ways we can think—the only ways we have to climb up. Then if we are lucky one can, as Wittgenstein says, "recognize… them as nonsensical, when [one] has used them—as steps—to climb beyond them… [and then] throw[n] away the ladder after [one] has climbed…. Transcend these propositions, and then… see the world aright". We are story-telling animals.

How does DeLong "heroically" construct his index of the stock of valuable human knowledge about technology and organization?
Assuming that each 1% increase in typical human standards of living worldwide at a constant global population tells us that the value of the useful ideas stock has risen by 1%. Assuming that each 1% increase in the human population at a constant typical living standard tells us that the value of the useful ideas stock has risen by ½%—for such an increase is necessary to hold living standards constant in the face of the smaller average farm sizes and other Malthusian *per capita* resource scarcities that emerge from a higher population. And setting that index of the quantitive index of the global value of useful human knowledge equal to a value of 1 back in the year -8000, ten millennia ago.

Where does the ½ come from in the calculation of DeLong's index?
The ⅓ is a heroic guess: a judgment that natural resources are, in the average and over time, roughly half as important as human brains, eyes, hands, and muscles in boosting production.

What conclusions do we then reach from examining this heroic index?
We reach three conclusions: (1) humans have always been inventive, and over the millennia technological progress has added up; (2) before 1870, back in the pre-industrial Agrarian-Age, technological progress led to little visible change over one or even several lifetimes; and (3) technological progress led to little if any growth in typical living standards even over centuries or millennia.

What are the values of this constructed index of the stock of useful knowledge about technology and organization back in the agrarian age?
0.2 70 millennia ago; 1 ten millennia ago, in the year -8000, back at the beginning of the Agrarian Age; 6.18 in the year 1, 10.6 in the year 1500. Because of more knowledge

about how to use nature and organize humans, a team of workers in the year 1500 could, *if they had had access to the same natural resources,* produce things of the value it would have taken 10.6 as large a team of typical workers of 8000 BC to produce.

What was the level of *per capita* and per worker production in 1500, relative to the level back in -8000, ten millennia ago at the start of the agrarian age?
Production *per capita* and per worker was probably only about ¾ as large. The presence of 500 million rather than 2.5 million people on the globe meant that natural resources were much scarcer. Better technology made up for much of that hundred-fold decline in potential resources per capita, but not all of it.

How should we think about technology in 1500 relative to technology in -8000?
The gap is enormous. Back in -8000 people were possibly able to make felt, but not to spin or weave, and probably were not yet reliably able to turn barley porridge into beer. In 1500 humanity had Ming pottery, Portuguese caravels, and wet-cultivation multiple-cropping rice seedlings.

How should we think about the pace of growth of technology in the agrarian age?
The pace of technological progress was abysmally slow: 0.035% per year for the entire span years from 1 to 1500—that is only 0.875% over an average 25-year lifetime of that age. And the human population grew at an average rate of 0.07% per year from 1 to 1500, soaking up essentially all of that progress. While while the elite lived far better in 1500, typical human peasants and craftsmen lived little or no better than their predecessors.

How certain are we that agrarian age societies were typically desperately poor?
Consider this: Back in the agrarian age, an average 2.03 children per mother survived to reproduce. A typical woman (who was not in the 1/7 who died in childbirth or the additional ⅕ who died before her children were grown) spent perhaps 20 years eating for two: nine pregnancies, six live births, three children surviving to age five, and the life expectancy at birth of her children under and perhaps well under 30. Keeping your children from dying is the first and highest goal of every parent. Humanity in the Agrarian Age could not do so. That is an index of how much pressure from material want humanity found itself under.

What happened to the level of *per capita* and per worker production and the level of technology from 1500 to 1870?
The ice started to break. The pace of invention and innovation sped up. We call the century before 1870 the "Industrial Revolution" for a reason. By 1870 our heroic-assumptions index of the value of knowledge stood at 25, nearly 2.5 times its value of 1500. But there were then 1.3 billion people alive, and so farm sizes were only ⅖ as large as they had been in 1500. The bulk of the human population was still in or on the edge of the extreme poverty—living on $2 a day or less—that the United Nations Millennium Development Project hoped to banish from the world, even though average per capita and per worker production probably stood some 40% higher than it had in 1500. The surplus was concentrated at the top.

What happened to the level of *per capita* and per worker production and the level of technology over the Long 20th Century, from 1870 to 2016?
Our 7.6 billion people today have a global value of knowledge index of 544 other than 25. The value of knowledge about technology and organization grew at an average rate of 2.06% per year. And output per capita and per worker today stands perhaps 8 times higher than it did in 1870.

What difference has this explosion of material wealth made?
At the most basic level, today the typical human family no longer faces as its most urgent and important problem how to acquire for the next year—or the next week—enough food that they were not desperately hungry, enough shelter that they were not wet, and enough clothing (in climates far from the equator at least) that they were not cold.

What are the quantitative dimensions of this surge in wealth?
In 1870 the daily wages of an unskilled male worker in London, the city then at the forefront of world economic growth and development, would buy him and his family about 5,000 calories worth of bread each. That was progress: in 1800 the daily wages would have bought him and his family perhaps 4000 calories, and in 1600 some 3000 calories. Today the daily wages of an unskilled male worker in London would buy him 2,400,000 wheat calories: nearly 500 times as much.

How has greatly increased life expectancy and the resulting decline in required fertility changed the world?
From the biological-social angle, the wealth creation process of 1870-2016 drove it to be *the* century in which it ceased to be the case that the typical woman spent twenty years eating for two—pregnant or breastfeeding. Today, it is more like four years. And it was the century in which we stopped watching more than half our babies die in miscarriages, stillbirths, and infant mortality—and stopped watching more than a tenth of mothers die in childbed.

What were the roots of this explosion of material wealth?
From the technological-sociological angle, growth over 1870-2016 was primarily the age of the industrial research lab, the associated communities of engineering practice that supercharged economic growth, and the increasing size and competence of the bureaucratic corporations that deployed the fruits of invention—plus globalization.

What difference has globalization made over the Long 20th Century?
Cheap ocean and rail transport that destroyed distance as a cost factor,. The human desire and ability to cross oceans led enormous numbers to do so to seek better lives. The submarine and land telegraph and later other communications links allowed us to talk across the world in real time.

What country's economy spearheaded the economic growth miracle of the Long 20th Century?
From the international political-economic angle, that wealth creation and distribution

process made 1870-2016 the century in which the United States of America was a superpower, a hyperpower, a *hegemon.* And the way the U.S. exercised its hegemonic role helped make a world primarily of nations rather than of empires.

What kind of economy did the Long 20th Century create?
From the industrial organization angle, that wealth creation and distribution process made 1870-2016 the century in which the made an economy with a center of gravity consisting of large oligopolistic firms ringmastering value chains, rather than of either small atomistic perfect competition or direct state control.

What kind of polity went along with the Long GCentury?
From the political, that wealth creation and distribution process played a role in making 1870-2016 the century in which political orders would be primarily legitimated, at least notionally, by elections with universal suffrage—rather than the claims of plutocracy, tradition, "fitness", leadership charisma (usually in the service of the exaltation of a particular largely-fictitious *ethnos*), or knowledge of a secret key to historical destiny. And the advance of democracy as at least a notional legitimating principal powerfully helped make a world primarily of nations rather than of empires.

How different was life in the global north at the 1870 cusp of the coming of modern economic growth from life earlier, in the Agrarian Age?
1770-1870 did see, for the first time, productive capability begin to outrun population growth and natural resource scarcity. By the last quarter of the nineteenth century, the average inhabitant of a leading economies—a Briton, a Belgian, a Dutchman, an American, a Canadian, or an Australian—had perhaps twice the material wealth and standard of living of the typical inhabitant of a pre-industrial economy.

How did British economist, moral philosopher, intellectual, and bureaucrat characterize the world at the 1870 start of the Long 20th Century?
His book gave due attention and place to the 1730-1870 era of the British Industrial Revolution. But he looked out on what he saw around him, and saw the world still poor and miserable. "Hitherto", he wrote, "it is questionable if all the mechanical inventions yet made have lightened the day's toil of any human being. They have enabled a greater population to live the same life of drudgery and imprisonment, and an increased number of manufacturers and others to make fortunes. They have increased the comforts of the middle classes…" Denser populations, more and richer plutocrats, a larger middle class—those were the fruits Mill saw of the 1720-1870 Industrial Revolution. Humans in 1870 were still under the harrow of Malthus. Whatever possibilities for a better world had existed in the womb of better technology over 1720-1870 had been stillborn.

How did John Stuart Mill see the state of human liberty in 1870?
In the John Stuart Mill quote "all the mechanical inventions yet made have… [but] enabled a greater population to live the same life of drudgery and imprisonment", one word stands out : *imprisonment.* The world Mill saw as of 1870 was not just a world of drudgery, poverty, and illiteracy. The world Mill saw was a world in which humanity was *imprisoned:* not free, in a dungeon, chained and fettered.

What did John Stuart Mill, in 1870, think needed to be done in order for humanity to become free?
Mill focused not on accelerating technological advance but rather on the government's control of human fecundity: requiring child licenses, and prohibiting those who could not properly support and educate their children from reproducing. Only then—or was he thinking "if"?—would mechanical inventions wreak the "great changes in human destiny, which it is in their nature and in their futurity to accomplish".

Was Mill's pessimism about the prospects for better technology leading us to utopia shared?
It was broadly shared. But it was not universal. Karl Marx and Friedrich Engels, for example, had already back in 1848 seen science and technology as Promethean forces that would allow humanity to overthrow its (mythical) old gods and give humanity itself the power of a god. Science, technology, and the profit-seeking entrepreneurial business class that deployed it had already, as of 1848: "during its rule of scarce one hundred years, has created more massive and more colossal productive forces than have all preceding generations together. Subjection of Nature's forces to man, machinery, application of chemistry to industry and agriculture, steam-navigation, railways, electric telegraphs, clearing of whole continents for cultivation, canalisation of rivers, whole populations conjured out of the ground—what earlier century had even a presentiment that such productive forces slumbered in the lap of social labour?…"

Did other economists of the mid-1800s see the possibilities for utopian wealth that technological revolutions would bring?
By and large, no. William Jevons, for example, was greatly worded that exhaust of coal deposits would lead to a substantial economic regress. Friedrich Engels snarked that in their systematic overlooking of the power of science, technology, and engineering mere economists (like Mill) had demonstrated that they were simply the paid hacks of the rich: "Land, capital and labour are for him the conditions of wealth, and he requires nothing else. Science is no concern of his.What does it matter to him that he has received its gifts through Berthollet, Davy, Liebig, Watt, Cartwright, etc.–gifts which have benefited him and his production immeasurably? He does not know how to calculate such things; the advances of science go beyond his figures. But in a rational order… the mental element certainly belongs among the elements of production and will find its place, too…"

What were Marx and Engels's views about what was required for utopian transformation?
They saw the technological foundations either as already built, or their building as unproblematic—the natural course of the capitalist market economy would produce them. But what was needed was a great socialist revolution, which would have consequences that would be literally miraculous: divine and heavenly. Marx's few and thin descriptions in works like his *Critique of the Gotha Program* of life after the socialist revolution he foresaw as inevitable and then the drive to a "higher phase of communist society" echo—deliberately, but with what authorial intent?—the descriptions of how people who have attained the Kingdom of Heaven behave: each will contribute "according to his ability" (*Acts of the Apostles*: 11:29) and each will draw on the common, abundant store "according to his needs" (*Acts of the Apostles* 4:35).

How are our occupations different from what they were 150 years ago?
Hunting, gathering, farming, herding, spinning and weaving, cleaning, digging, smelting metal and shaping wood, assembling structures by hand—those are now the occupations of a small and dwindling proportion of humans. And where we do have farmers, herdsmen, manufacturing workers, construction workers, and miners, they are overwhelmingly controllers of machines and increasingly programmers of robots. They are no longer people who make or shape things—*facture*—with their hands—*manu*. What do modern people do instead? Increasingly, we push forward the body of technological and scientific knowledge. We educate each other. We doctor and nurse each other. We care for our young and the old. We entertain each other. We provide other services for each other to take advantage of the benefits of specialization. And we engage in complicated symbolic interactions that have the emergent effect of distributing status and power and coordinating the 7.4-billion person division of labor of today's economy. We have crossed a great divide between what we used to do in all previous human history, and what we do now.

What shape has our greatly increased productivity relative to 150 years ago taken?
We today are not just better at making the goods of a century ago. We today also have the new and powerful technological capability to make an enormously expanded range of goods and services: from streaming entertainment services—the audio and videocassettes, CDs, and DVDs which wowed us less than one generation ago are now obsolete—and antibiotics to airplane flights and plastic bottles. We today would feel—we would be—enormously impoverished if by some mischance our money incomes and the prices of commodities remained the same, but if we were at the same time forbidden to use any commodity not produced in 1870. This expansion in the range of what we can produce is an enormous additional multiplier of material well-being.

What was Edward Bellamy's aim in writing *Looking Backward, 2000-1887*?
Bellamy,s a populist and—although he rejected the name—a socialist, dreamed of a utopia created by government ownership of industry, the elimination of destructive competition, and the altruistic mobilization of human energies in a way analogous to his vision of the North's collective effort to end slavery in the Civil War. He therefore wrote a "literary fantasy, a fairy tale of social felicity" as a "hanging in mid-air, far out of reach of the sordid and material world of the present… cloud-palace for an ideal humanity" to show how technologic, mobilization, and organization could generate a society of abundance..

In Edward Bellamy's *Looking Backward, 2000-1887*, what is the technological innovation of the 20th century that carries humanity to the "limit of human felicity"?
When the narrator-protagonist hears the question, "Would you like to hear some music?" Then his hostess does not then sit down at the pianoforte to amuse him and exhibit her ladylike domestic accomplishments. Instead, Bellamy's narrator-protagonist is stupefied to find his hostess dials up an orchestra on the speakerphone, and immediately the room was "filled with music; filled, not flooded, for, by some means, the volume of melody had been perfectly graduated to the size of the apartment. 'Grand!' I cried. 'Bach must be at the keys of that organ; but where is the organ?'" On learning what is going on, his reaction: "If we [in the nineteenth century] could have devised an arrangement for providing everybody with music in their homes, perfect in quality, unlimited in quantity,

suited to every mood, and beginning and ceasing at will, we should have considered the limit of human felicity already attained…"

Do we today understand how rich we are in the context of previous centuries—how they would regard us?
Not really. We today—even the richest of us—rarely see ourselves as so extraordinarily lucky and fortunate and happy even though *for the first time in human history there is enough*. There are enough calories that it is not necessary that anybody need be hungry. There is enough shelter that it is not necessary that anybody need be wet. There is enough clothing that it is not necessary that anybody need be cold. And enough stuff to aid daily life that nobody need feel under the pressure of lack of something necessary. We are no longer in anything that we could call "the realm of necessity". So one would think we humans ought to be in "the realm of freedom": something that is and that we recognize as a Utopia. But we aren't there.