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Liberalism Caused the Great Enrichment

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Executive Summary

Any innovation—mechanical, biological, institutional, scientific, artistic, personal—begins of course as a new idea in a liberated human mind. The point is obvious. But it has not been prominent in economics. The agent in economic models does not have agency. He merely accedes to a budget line or to a law or to a custom or to a habit of thought facing his already known utility function. He does not create, that is, but reacts, in requisite fashion. Human action, the liberated will, is absent. He is a vending machine, not an innovator, or not even an ordinarily choosy consumer exploring her tastes.

The unprecedented economic growth since 1800, a Great Enrichment of a fully 3,000 percent increase in real income per person, has been traced by economists not to "innovism," as one might call it. The Enrichment has been traced rather to various routine and intermediate and largely material causes—investment; exploitation; the rule of law. Some of these are necessary, but none sufficient to explain our enrichment. The creation of new ideas in human minds has been firmly set aside by economists. The non-economists who might save the ideational day, meanwhile, have seized on the wrong ideas, such as disenchantment or the Enlightenment or sheer modernity.

The economic trouble with the economist's non-ideational causes such as investment and institutions or exploitation is that they are merely allocative, and are, further, subject to sharply diminishing returns, or even zero sum. They are

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routine, not transformative. Small potatoes beside the 3,000 percent increase in human welfare of the Great Enrichment.

And the historical trouble is that most of them, and even most of the non-economist's ideational causes, are of very, very long standing— in ancient Rome good property rights, in ancient China long canals, in early modern Japan long peace, in modern Russia fierce pursuit of profit, in ancient Athens enlightenment. Yet no Great Enrichment ensued.

Early on, the cause of the Enrichment was said to be piling up physical capital, emphasized by Adam Smith, with the division of labor. Then it was indeed an ideational cause, put forward on the left or right of politics by anti-economists, such as the rise of "capitalism," or "possessive individualism," or "secularized asceticism," which have all been rejected in later research. Then it was the alleged routinization of innovation, such as Joseph Schumpeter came to believe, against his early belief in human creativity. Then it was human capital. Then it was institutions of various sorts, from legal to scientific.

But all of them depend of course upon ideas conceived in somebody's mind—and foundationally on her ideas about ideas, such as ethics, ideologies, political philosophies supporting the liberated imagination. The coming of a large and particular change of ideas in human minds seems a more promising hypothesis. The ideational change is called liberalism. The idea of a non-slave society has the oomph and the novelty to account for the 3,000 percent.

I propose here, mathematically and quantitatively, by historical comparison and by the paradoxical logic of creativity, to offer a fresh ideational explanation for why the modern world became so very rich—well, as "fresh" as can be a restatement of the old promise of human liberation.

The crux, I claim, was 18th-century liberalization at the level of ideas in Britain, in favor of a culture of free speech and an economy of enterprise. It was followed in the next century by actual liberalization—in the U.K the civil emancipation of Catholics, the abolition of Jamaican slavery, the free importation of wheat from Kansas and Ukraine, and then similar liberalizing measures in the U.S., Sweden, Italy, Japan, and the rest.

Adam Smith and Thomas Jefferson and Mary Wollstonecraft had put forward in the Anglophere the then-bizarre notion that no one should be a slave, that all people are created equal, and should be permitted liberated speaking and liberated voting and liberated buying and selling. The equality of permission in liberalism proceeded to erode the inequalities of hierarchies anciently stultifying. It made people bold to venture. As the British say in their sporting manner, ordinary people were permitted by liberalism for the first time, after 1776 or 1789 or 1848 or 1865, to "have a go." And go they did. Liberalism was gradually implemented in northwestern Europe, as lately in has been, at any rate in the economy, even in far China and India. And the Great Enrichment came.

Both economists and their enemies, in other words, need to understand the conditions for the flourishing of liberty and its fruits in novel ideas for enrichment, and to see that good laws and long railways and creative science and strong institutions and eager innovators are good but not themselves originating,

but depend on liberty and its ethical accompaniments, every time. Liberation in ethics and ideology yielded innovism, not a "capitalism" one can find in Mesopotamia in 2000 BCE or in England in 1066 CE or Mesoamerica in 1500 CE.

To use a mechanical image, the gearing in the historico-economic watch was, to be sure, investment and institutions, necessary for any economy anytime, from the caves of Lascaux to the caves of Wall Street, or for that matter on Crusoe's island. But liberal thinking was the new and largely sufficient spring imparting motion to the old gears. It happened in Britain, but not immediately in, say, France. It could have happened in Japan or the Ottoman Empire, but by happenstance it did not.

The implication for policy is straightforward. Ideas in human minds largely rule the world. The Ukrainians defend themselves for liberty, not for policies of left, right, or middle. Encouraging a loving and responsible liberty, with its mighty material and spiritual consequences, should be our chief aim. Coercive, illiberal nudges and taxes and regulations and fines and imprisonments, of which policymakers are so very fond, are not the path forward. The liberal path of an honest and competent but restrained state, under which ordinary people can have a go, has already led in much of the world to a stunning enrichment of the poorest. In the next couple of generations it can permit the rest of the wretched of the earth to raise themselves up.

The illiberal path of statism by contrast leads to the radical populisms of left and right, to Maduro and Putin. And even its middle path of regulation and redistribution leads adults back to a pathetic childhood to the masterful state. It turns back to the subordination that characterized agricultural societies until 1776, and to its poverty of body and mind and spirit. Liberalism worked to overcame such childishness and subordination.

It works yet.

The enrichment of humans has been recent and gigantic. It was caused, I argue here, by a sustained ideological change in northwestern Europe in the 18th and 19th centuries. It spread to the rest largely through the ideology of liberalism, that uniquely recent notion of equality of permission—much disdained in these latter days by the left and the right, by the Pikettys and Deneens, not to speak of the Muduros and Puutns.

During the millennia from the caves down to 1800 the average person on the planet earned and spent in today's prices some $2 or $3 a day, as now in the Central African Republic. By 1800 the average person in the richest countries, such as Holland and Britain and Britain's newly independent daughter in the New World, had attained perhaps $6 day, as now in Afghanistan. Still pitiful.[2]

[2] The historical figures in the passage are rough guesses based on Maddison's old figures, which have been confirmed pretty much by later research. All the recent figures ate World Bank or IMF, collected at

But in the 19th century, after a precarious beginning during the 18t,h century in Britain, a Great Enrichment transformed western European countries and their offshoots. Later, of course, enrichment spread to more and more of the planet—not by policy, I claim, but by ethics and ideology. In 1800 John Bull's Other Island, Ireland, had *not* shared in the recent comparative prosperity of Britain, even at the $6 level, and as late as 1970 it was still notably lagging. Yet Ireland today, after adopting liberal economic policies, is the fourth or fifth richest substantial country in the world. The Chinese, who not so long ago were thought to be trapped in an Asian Dilemma, adopted liberal economic policies after 1978, and therefore enriched radically. India, too, did so after 1991, and then enricged for the poorest by a factor of upwards of 10. The Chinese now, enriched by a factor of upwards of 20, earn roughly $45 or $50 a day per person. It is the level of Brazilians—which is roughly the World Bank's reckoning of the global average. The global average is a factor of 20 of enrichment over that $2 or $3 a day worldwide in 1800. The numbers are dizzying, and gratifying.

They make the recent obsession on the left with inequality with a country look strange. Seizing in Frabce the riches of all the people like the disgraceful Liliane Bettencourt, the ethics-less heiress to the L'Orćal cosmetics fortune, and giving it to the poor people of the country might do as much as double their incomes. Good. But instituting an attainable liberal equality of permission, as against the equalities of outcome or of opportunity unattainable in political practice, increases incomes by a factor of 20, or by much, much more. it has recently in Hong Kong or Botswana or Italy, and in France itself from the time of *les misćrables*.

There is little chance that the Great Enrichment will now stop, unless we try hard—as for instance we did beginning on July 28, 1914, ending on September 2, 1945, and by a longer count on November 9, 1989. A less violent way to stop the world's enrichment than the European Civil War 1914-1989 is to fall prey to imagined fears, finding every couple of years a new "headwind" requiring urgent tacking by the ship of state. The economist Robert Gordon in 2016, for example, pointed to such headwinds to justify extensions of statist policies. And the economist Tyler Cowen in 2011 and 2013 worried, too, about the headwinds, though with less enthusiasm for statist tacking.

Neither Gordon to Cowen note that internationally there is, covid 19 aside, no evidence of a slowdown in growth. The World Bank expects long-term growth in world income to be about 2% per year, indefinitely. Real incomes will double in one long generation. If we can avoid stopping growth with bloody war or panicked policy, a continued Great Enrichment bids fair in the next fifty or one hundred years, that is, to bring every human out of history's poverty.

Why did it happen? The timing, location, and magnitude of the Enrichment sets tight limits on possible scientific explanations.

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https://en.wikipedia.org/wiki/List_of_countries_by_GDP_(PPP)_per_capita#Lists_of_countries_and_dependencies

The deepest question is why it happened at all. Yet economists and economic historians tend to focus on asking why growth varies a little or a lot from place to place, as in the old debate over British as against American and German growth in the late 19th century, or in the recent econometrics of convergence, or in the history of the Great Divergence of the West from, say, a lagging China (Landes 1967; Durlauf 1996; Pomeranz 2000). Such turn are like the atheist's claim that a an account of what happened after the Big Bang serves to refute a theistic account of why there was anything to bang in the first place. The Divergers are looking in the wrong places for the answer to the question why the Enrichment happened at all. And the answer to this deeper question is what matters for understanding the one reason nations succeed, as against the myriad of ways they have found to fail. All happy families are alike; each unhappy family is unhappy in its own way.

Yet one needs to attend closely to the findings of economic history. It does not suffice to call on fairy tales from school or from the movies, or conveniently stylized though erroneous facts, as non-historians tend to do. For instance, that the economic big bang happened only after 1800 suggests strongly that, say, variations in geography or common law or savings rates were not ultimate causes. All of these, along with numerous other putative causes, were ancient and commonplace. Serbia, for example, developed a local common law underneath the enactments of the Ottoman sultan. Focusing on longstanding commonplaces would be like explaining a fire in the barn by stressing the existence of oxygen in the Earth's atmosphere.

That the Great Enrichment was located at first in Britain and its relatively liberal offshoots suggests likewise that science or Christianity or overseas empire, which were common to much of Europe, were not ultimate causes. The dry straw in the barn was where little Joe was smoking his first, stolen cigarette, dropping it and running when he heard his father approach. That was the cause.

That the Great Enrichment banged on to an astonishing factor of 20 or 30 or more suggests, too, that railways or banking or education were not ultimate causes. They are too small in effect, if measured in sober economic terms (as by Fogel 1964). The burning of the wooden cart standing inside the barn or of paper receipts from milk sales or of the school text lying there, after all, even if added up, do not reveal the *origin* of the fire, or, it turns out, very much about its astounding size.

Only the sharp ideological swerve originating in Holland and then England and especially Scotland during the 18th century called "liberalism" appears to survive scientific scrutiny. Slowly thereafter it affected to a greater or lesser extent all of Europe and its offshoots, inspiring from France to Ukraine great swathes of the populations. Little Joe's dropped cigarette eventually caught the whole barn on fire. The resulting inspiring of the masses to have a go has the quantitative oomph to explain a factor of 30. The non-liberal causes do not. The liberal fire once started caused the very timbers of the barn to explode into an innovative conflagration.

What made the modern world, then, was the gradual fall of ancient hierarchies, the shocking idea, new in the 18th century .that ordinary folk should be full adults,

without physically coercing masters. It grew in northwestern Europe at first only in the minds of a few theorists such as Locke and Voltaire and Montesquieu, and tentatively then in the policies of a few politicians, in Britain from the Younger Pitt to William Gladstone, and in the U.S. from Benjamin Franklin to President Cleveland. The liberalizing work of course goes on, against nowadays a looming threat from left and right of anti-liberal populisms and tyrannies. By now the threats to liberal democracy are beginning to look comparable to those of the 1920s.

Yet scientifically speaking we have a reply to the tyrants, which should assuage our recent anxieties: the first cause of modern economic growth and modern enlightenment was the shocking, liberal idea of democratic equality of *permission* to have a go at the ballot box and in the economy and in personal life. The idea is understandably popular with ordinary people protesting tyranny in the color revolutions of Eastern Europe and in the Arab Spring, in 1642 at the aPutney debates in England and in 1789 in the DDDD in France. When implemented, the liberal idea is enough to start and to sustain astounding growth, as in Britain, and then in Russia before Stalin and Hong Kong before Xi Jinping.

Modern liberal equality of permission, to put it another way, was the spring in the machine of growth. As Alexis de Tocqueville, a canny observer of the new spirit of equality of permission, wrote in 1835, "Looking at the turn given to the human spirit in England by political life; seeing the Englishman. . . inspired by the sense that he can do anything. . . I am in no hurry to inquire whether nature has scooped out ports for him, or given him coal or iron"(Tocqueville 1835, p. 116). Sweden had the charcoal rom wood and the iron ore in Dalarna to make iron, but lagged economically until its liberalization in the mid-19th century. The free states in the U.S. made iron also with charcoal, instead of the advanced technique from coal developed a century earlier in Britain. But they began liberalizing in their economies a half century before Sweden, with a corresponding big bang beginning. Liberalism was the spring, or, if you prefer a culinary image, the secret sauce. The usual economic explanations are the routine gears in the watch, or the spaghetti to hold the sauce—necessary for knowing the time or enjoying the meal, but nothing like sufficient even if the old necessary causes are present, as they commonly are.

Tocqueville later wrote, observing the spread of democracy (which is a liberalism of genuinely equal permission in a voting booth), that "the sentiments, the ideas, the mores [*moeurs*] . . . alone can lead to public prosperity and liberty" (Tocqueville 1853). He was linking prosperity to liberty in ideas—not merely to parliamentary statutes and administrative decisions. Five years later in far Illinois a rising star of the new Republican Party declared, "With public sentiment, nothing can fail; without it nothing can succeed. Consequently he who molds public sentiment goes deeper than he who enacts statutes or pronounces decisions. He makes statutes and decisions possible or impossible to be executed" (Lincoln 1858 [1894], p. 298). The liberal age of a democratic and republican sentiment made the Great Enrichment.

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In implied duration and character, it should be said, the old term "the Industrial Revolution" is not up to the scientific task. The popular understanding of it was spoofed in 1931 in Sellar and Yeatman's *1066 and All That*: *A Memorable History of England*: "Many remarkable discoveries and inventions were made [in the early 19th century]. Most remarkable among these was the discovery (made by all the rich men in England at once) that women and children could work for 25 hours a day . . . without many of them dying or becoming excessively deformed. This was known as the Industrial Revelation" (Sellar and Yeatman 1931 [1932], chap. 44, pp. 92–93).

The phrase "the Industrial Revolution" was introduced into English in *Lectures on the Industrial Revolution of the Eighteenth Century in England,* published in 1884, and delivered a year before his death at age thirty-one by a university lecturer and ardent enemy of commercially tested betterment, Arnold Toynbee (1852–1883; he was an uncle of the professional historian of that name).

The lectures depended on the sort of tale of tragedy and triumph put forward decades earlier in *The Communist Manifesto*. Toynbee declared for example that "as a matter of fact, in the early days of competition, the capitalists used all their power to oppress the laborers, and drove down wages to starvation point. This kind of competition has to be checked. . . . In England both remedies are in operation, the former through Trades Unions, the latter through factory legislation" (Toynbee1884 (1887, 2nd ed.).

Nothing in his account is factual. There were no "early days of competition"—competition, which consists of allowing consumers or laborers or capitalists to choose where and what and with whom they wish to buy or sell, is common in any society of even approximately free trade. Its enemies, such as the medieval guildsmen, sharply realized so, and did something about it (Ogilvie 2019), as at a broader political level the nation states of early modern Europe did, too. Competition in supplying a customer with bread or offering a worker a job baking the bread comes from competitive entry, which is human—or you might say biological, as Darwin realized—and is not especially modern. True, competitive entry is irritating to the vested interests. But it's good for the working class, not bad. Tough luck, one might say, for the high-hats earning rents from preventing competition.

And competition from entry, setting one entrepreneur against another for the benefit of *hoi polloi*, should be encouraged, not" checked." Supply and demand, not "[bargaining] power," is what determines wages, as economists have known since at the latest John Hicks' *The Theory of Wages*, and as can be seen in the ups and downs of real wages in response to population downs and ups during the age of Malthus. The workers in the "Industrial Revolution" did not find their real wages reduced, and did not starve, or become excessively deformed. That's why the workers moved eagerly to industrial cities, even though Manchester and Lille and New York were still death traps of waterborne disease. Wages were in fact rising, though not so sharply as they commenced rising after Marx and Engels and then Toynbee wrote, and after Europe began comprehensively to liberalize. Children were being taken out of English factories

by their parents before the legalization of trade unions, and before factory legislation began seriously to bite. In any case, children in countries still at $2 or at best $6 a day worked as hard in the old agricultural village or industrial quarry as they did in the new cotton mill. In neither place (I bring news from economic history) did they work 25 hours a day.

Yet about the Enrichment, Marx and Toynbee in earnest and *1066 and All That* in jest still motivate guilt. Non-historians credit such eloquent reactionaries as Thomas Carlyle or Charles Dickens or John Ruskin as scientific authorities about how very lovely was the world we have lost, and how very terrible the conditions were in the first era of the dismal science. Terrible they were, but routine since the caves, and then radically improving.

The guilt has reechoed in the recent academic and journalistic and political fascination about allegedly rising inequality, overlooking the profound equality of real comfort coming from the rise of the average, bringing humans out of $2 or $3 a day to $50 or $100 or higher. As was shown for a popular audience by the Swedish professor of public health, the late Hans Rosling, building on decisive scientific evidence, we've never had it so good (Rosling and others 2018**;** and Bailey and Tupy 2020). In recent decades even the poor countries have been catching up to the West. In 1960, 4 out of the 5 billion people on the planet lived at the ancient wretchedness of $2 a day. Now it is 1 out of over 7 billion, and falling sharply. The world we have gained since 1800 or 1960 *is* the end of history, as the political scientist Francis Fukuyama once declared. The last two centuries have been, as teachers of literature might put it, a comedy, not a tragedy (Fukuyama 1968, 1992; McCloskey 2020).

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The historical sociologist Jack Goldstone noted twenty years ago that the Industrial Revolution 1750-1850, unlike the Great Enrichment that followed it, was not in fact unprecedented. It was merely the last of many "efflorescences," desirable if temporary increases, sometimes a doubling of average incomes, such as it may be the Quattrocento in northern Italy—but nothing like the 3,000 percent which followed the last one. As the economic historian Joel Mokyr put it, what was bizarre about the past two centuries was that growth did *not* peter out after this last efflorescence. It did not revert to the human fate of $2 pr $3 a day determined by Malthusian forces, as had all earlier cases, such as the innovation of the wheat-oil- -wine economy during the early 1st millennium BCE in the eastern Mediterranean, or the numerous commercial innovations of the Song Dynasty in China 960-1279 CE.

During the vaunted Industrial Revolution in Britain 1750-1850 real income per person increased by 60 percent—very welcome to be sure, yielding as early as 1800 that world-beating, if still-not-very-good, $6 a day per person (Broadberry and others 2015, pp. 241, 244). But what was bizarre, going far beyond efflorescence, is that British real incomes per person then proceeded in the late 19th century and beyond to double and to double again and to redouble, up to well over $100 a day in Britain now, and likewise in Switzerland, Sweden, Finland, Japan, and other formerly wretched places, it is

expressed (as well as one can over such a stretch of time) in those sane prices of the $6 or $2 past. The U.S., from roughly the same base as Britain in 1800, has risen to $170 a day per person. Switzerland, once exporting its young men to die as mercenaries, is now at $200 a day. The Enrichment, in short, was assuredly Great, and wholly unprecedented.

The factor of many-tens-of-times more goods and services, admittedly, is hard to feel on one's pulse. Yet think of open heart surgery versus bleeding therapy, 95 percent literacy versus 5 percent, jet airplanes versus sailing ships, McDonalds versus potato lazy beds, skyscrapers surfaced with glass versus two-storey thatched cottages with bottle-blown windowpanes, if any.

Recently a major Swedish capitalist (Sweden, of course, *is* thoroughly capitalist) invited to breakfast a professor of economic history, on the strength it seems of her alleged expertise in how commercially tested betterment works. He wanted historico-economic tips from the professor on how to *stop* improving, the better to lead a quiet life. The professor replied, "I'm sorry, sir, but you are our servant. Like the Red Queen's advice to Alice, you need to run faster and faster to stay in the same place." The capitalist was depressed by the news from economic history, though not entirely surprised, and went back to innovating.

By the time in 1901 that the redoubling of modern incomes over each generation in liberal countries was coming to be expected, the American economist John Bates Clark predicted that "the typical laborer will increase his wages from one dollar a day to two, from two to four and from four to eight." It was an accurate prediction in real terms down to the present, though its magnitude does not entirely allow for the radical improvement in the quality of goods and services, such as in the cleanliness of food and the efficacy of medicine. "Such gains," Clark continued, "will mean infinitely more to him than any possible increase of capital can mean to the rich. . . . This very change will bring with it a continual approach to equality of genuine comfort" (Clark 1901 (1949). There came to pass an equality of enrichment instead of an equality of misery.

Liliiane Bettencourt had diamonds and yachts aplenty out of her $40 billion of wealth. Yet the poor man in France has ample food and some education and a decent home, all denied to his ancestors. And the French rich and poor both have access to anti-depressants and cell phones denied even to a billionaire as late as1960 (Boudreaux 2001, 2013, 2014). The big story of the modern world is not inequality, which has declined even in purely financial terms since the days of dukes with 800-year-old names. The story is Clark's "equality of genuine comfort." The diamond bracelet in the bottom of Mme. Bettencourt's jewelry box was to be sure a vulgar, blameworthy waste. For Lord's sake, you *imbécile égoïste*, give the money to the Fantines of *Les Misérables*! But for genuine comfort, what matters is the 3,000 percent improvement in the average Fantine since 1830.

Real income per person grew in the United States 1800 to the present at a little below 2 percent per year, mostly from technological and organizational innovations such as selective breeding of cotton plants in the slave South, not by capital

accumulation or by slavery's horrors (Olmstead and Brode 2018). Two percent doesn't sound like much. But at such rates, I have noted, the ability to buy goods and services doubled in one long generation. Later enrichers such as Japan and Finland and Hong Kong, and now China and India, grew three to four times faster, as they caught up to American ways of hard driving their blast furnaces or French ways of organizing their department stores or Swedish ways of running their local governments or Norwegian or Greek ways of owning and operating their ships.

Recent studies by a magnificent Maddison Project have detected a bit of growth in Europe and elsewhere in the centuries before 1800. But it was an order of magnitude smaller than what happened after 1800 (Bolt and van Zanden 2014). The growth rate 1272-1800 in England was about one fifth of 1 percent per year, 0.2 percent, which is to say that real income doubled every three-and-a-half centuries (Broadberry and others 2015, pp. 237,242). Good show, at any rate compared with zero. But it was a doubling every twenty generations instead of every one or two.

The aerodynamic metaphor of "take-off" that W. W. Rostow long ago introduced into the literature implies a long runway, centuries long it would seem. The "roots" of growth, to use another popular metaphor, are also said to be deep. But aerodynamic or arboreal metaphors do not provide an actual explanation of the Great Enrichment. The metaphors do sharpen the question of why so many poor people have become in the past two centuries so very rich. But they do not provide an answer.

Likewise, attaching the Great Enrichment to various particular causes many centuries earlier in Europe, such he Black Death of 1348-50, is questionable. After all, the Black Death originated in Mongolia, with similar levels of deaths in Han China, and the same temporary rise in real wages, until Malthus got to work again. And yet China did not experience presently (that is, four and a half centuries later) a Great Enrichment. Questionable, too, is the Eurocentric belief, prominent in conservative circles, of an ancient superiority of melanin-challenged *Volk* back in the Black Forest. And to mention one of the alleged English particularities, all European countries in the Middle Ages had at some level a common law, judge-or-chirftan-found-and-made, not legislated or much codified in the center. Christianity, too, existed far beyond the northwestern corner of Europe in which he Great Enrichment began (McCloskey 2022b). And it is also questionable, though popular, to claim that recent Europeans are more individualistic than other peoples, or than earlier Europeans. Consult Japanese bourgeois short stories, or the *Mahabharata*, or European fairy tales. Jack climbing the beanstalk to steal from the ogre does not look like a docile member of a closed corporate community.

The Great Enrichment was qualitatively different from what came before, which tells against the metaphors of airplanes or trees or running up to bowl, or the elevation to causal prominence of factors that were common in other times and places, such as property rights and national debts and fractional reserve banking—the old timbers of the now burning barn. And relative to the 3,000 percent they were anyway small in economic oomph.

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The Great Enrichment is the second most important secular event in human history, second only to the domestication of plants and animals causing cities and literacy. The very Great Enrichment, though, is news to most educated people, and to some few economists, and even to a (very) few economic historians. Hans Rosling emphasized how little most people know about the overwhelmingly good news, 1800 to the present, or even 1960 to the present—such as that places like Bangladesh have seen recently a falling infant death rate, falling birth rates, rising literacy, rising real income (Rosling and other 2018.). Rosling surveyed people to the number of 20,000 in his various live audiences concerning how much of the news they knew. They were embarrassingly less accurate than, literally, a gorilla would be throwing darts at the survey.

Even the economic or historical experts among his audiences were strongly biased, as ordinary citizens were, in favor of the pessimistic, anti-modern, Marx-Toynbee-*1066* story. The historical sociologist Immanuel Wallerstein, an eminent man of the left, declared boldly in 1983 that "it is simply not true that capitalism as a historical system has represented progress over the various previous historical systems that it destroyed or transformed" (Wallerstein 1983 [1995], p. 98). Even considering the less developed state of the quantitative scholarship in 1983, such an opinion was untenable.

Likewise the distinguished historians Kenneth Pomeranz, and Steven C. Topik in *The World That Trade Created* (2006) tell many interesting and accurate stories about the destructiive side of "creative destruction" (a phrase coined by the Marxist economic and social historian Werner Soimbart a century ago, and made famous by the un-Marxist Joseph Schumpeter). Pomeranz and Topik are not mistaken to note the exploitation of workers when, say, increased demand for twine to bale the straw of American wheat led to Mayan and Yaqui first nations being physically coerced in the Yucatán to harvest cactus to make the twine (Pomeranz and Topik 2006**)**. They are mistaken, though, when they assign the exploitation to the innovation itself— in this case the prolific mechanical bailers of wheat—rather than to the pre-liberal structures of power that allowed tyrants to exploit in evil ways the opportunity to trade in twine or coffee or cotton or sugar or rubber or bananas. Such pre-existing evils—exploited of course in other evil ways before the alternative evil-yielding opportunity appeared in a new market—were often eroded in such places by the liberalism and its markets that Pomeranz and Topik detest. And liberalism produced the rising tide of world real incomes per person since 1800, and the political power that it often brought to ordinary people, and at the least the new opportunities for exit from the poor places to the relatively rich. Measuring the destruction without including the creation gets the history of the past two centuries radically wrong.

It was the British liberal and evangelical bourgeoisie, after all, which supported, early and uniquely, the ending in 1807 of the slave trade and in 1833 the ending of slavery itself in the British Empire. It was their advocacy of abolition that so irritated the hierarchical tastes of Carlyle against the "dismal" liberals such as his friend Mill. The liberal political economists were adjudged dismal because they didn't support slavery at the time and did not look back with favor upon medieval serfdom, in both of which

lovely masters ruled grateful subordinates (Persky1990; Levy and Peart 2001).

It was the American gentry and bourgeoisie in 1789 which supported the new liberal protections for free speech and religion, as in the First Amendment to the Constitution. (Admittedly the fine words about free speech were dead letters in practice until other bourgeois such as Holmes and Brandeis started to take them seriously a century and a half later (Robert McCloskey 1961). And it was the French bourgeoisie which supported the various comprehensive liberties that overturned the *ancien régime* in that other dawn.

Nowhere in their book do Pomeranz and Topik emphasize the gigantic betterments for ordinary people arising from liberalism and its Great Enrichment. The oversight is typical of the literature on inequality and divergence. Pomeranz' best known book, *The Great Divergence*, documenting the failure of the Qing Dynasty to keep up, was seized on by inequality-minded scholars to emphasize, speaking statistically, the routine *variance* of income over time and within a country. But the variance is rather invariant. The brilliant leftish economist Samuel Bowles discovered in 2016 that the Gini or Pareto coefficients were similar in all sorts of human societies. Yet the astounding explosion of the *average*, by that factor of 30, has been set aside by the left. The implicit sentiment, if seldom explicit considering the overwhelming evidence to the contrary, is that it is simply not true that capitalism as a historical system has represented progress over the various previous historical systems that it destroyed or transformed.

The question, further, why nations fail (as Daron Acemoglu and James Robinson put it in 2012) is not the fundamental scientific question, though perhaps useful to ask in fending off the grosser stupidities of states. A typical piece of advice to a failing state would be, Don't shoot everyone wearing eyeglasses—as did the Pol Pot régime in Cambodia; or, Don't expel all the oil drilling and refining engineers—as did the Chavez/Maduro régime in Venezuela. But the fundamental question, I have noted, is why there was for the first time after 1800 a prospect for any nation that equipped itself with a liberal ideology to *succeed*.

§

The explanation of the Great Enrichment must lie of course in people. It is people with particular cultures, ethics, ideologies—not classes or institutions or for that matter nations—who discover innovations and buy them. The fact is admitted in so-called endogenous growth theory, but then its theorists turn immediately to materialist explanations, such as urbanization or education, said to drop mysteriously onto England in the 18th century, and not onto, say, China, (Romer 1990). The same is true of neo-institutionalism, as for example in Acemoglu and Robinson's book of 2019. They do recognize occasionally that people matter, but then hurriedly revert to materialism (McCloskey 2021). China a thousand years ago had the materialisms of peace, science, education, and enormous cities at a time when Europeans were huddled in small groups behind protective walls, or in isolated villas similarly militarized. Yet Chinese education and economies of scale were not productive of a Great Enrichment.

On the contrary, it was the ideas people began to entertain seriously after 1776 that mattered to the Great Enrichment. From the inspiring master idea of liberalism—the startling idea of equal permissions to have a go—people became mightily creative. The ideas that people consequently discovered for commercially tested betterments, such as railroads and interchangeable parts and better cotton plants, exploded (Fogel 1964; Rosenberg 1972; again Olmstead and Rhode 2018).

Only such widespread permissions have the explanatory force to explain a factor of 30. Humans had of course always innovated, from the lovely but pointlessly polished stone tools of the Neolithic era to the clanking but businesslike steam engines of the modern era. But until 1800 humans innovated slowly by recent standards. They were even forgetful of their inventions. The proto-aborigines in Australia forgot the use of the bow and arrow when they came across from New Guinea. The proto-English people forgot the use of coal and the potter's wheel when the Roman legions left and the Anglo-Saxons came. Humans before 1800 innovated so slowly that Malthusian pressures overwhelmed the promise of each fresh efflorescence, windmills in Persia or acupuncture in China or place-value for number systems in India and Central America.

After 1800, however, innovation in liberal countries commenced propagating in what Matt Ridley calls "ideas having sex" (Ridley 2010). The production for the masses of metal goods had sex with elegance of design provided earlier only for the elite (Berg 1998, 2004). The steam engine had sex with rails used earlier only for underground mines. Then the babies of those innovations had sex with each other, and the grandbabies, in the unique and ramifying innovations of the Great Enrichment. Consider a mere two score of them out of literally millions: AC electricity, cardboard boxes, the little black dress, The Pill, cheap food, literacy, asphalt, antibiotics, airplanes, screw-making machines, research universities, cheap steel, sewers, tooth fillings, plate glass, forward markets, zippers, universal literacy, running water, science, reinforced concrete, secret voting, bicycles, automobiles, window screens, ball bearings, limited access highways, free speech, artificial rubber, washing machines, detergents, air conditioning, plastics, containerization, jet engine, free trade, radar, computers, the cloud, smart phones. And all these were embodied designs pleasing to the senses, like polished stone tools but immensely more common, the curve of plastic boxes, the elegance of faux-oriental rugs, the ear-candy of music in the age of mechanical reproduction.

The Great Enrichment was expressed also in less famous but nonetheless crucial multitudes of free lunches prepared by the alert worker and the liberated shopkeeper rushing about inspired by the sense that they can do anything, each with her own little project for profit and pleasure. Sometimes, unpredictably, the little ventures became big, such as John Mackey's single Whole Foods store in Austin, Texas resulting in 479 stores in the U.S. and the U.K., or Jim Walton's single little Walmart in Bentonville, Arkansas resulting in 11,718 stores worldwide, revolutionizing retailing (Carden and Courtemanche 2016).

Such unexpected if hoped-for free lunches and fresh designs are what modern growth has been about. It has not been about the normal investments earning routine, predictable returns, which characterize the economy of ancient Mesopotamia as much that of modern Manhattan. The routines are necessary to keep what we already have, repairing our roofs or making our cars or darning our sicks. But as necessary as such routines are, growth has been about discovery, not about optimal reshuffling in full view of opportunity cost.

The ingenious economists Dale Jorgenson and Zvi Griliches were quite wrong in 1967: contrary to what they claimed, productivity change is *not* reducible to an investment rewarding at routine rates its opportunity cost, as for example they claimed about hybrid corn rewarding U.S. investment in land-grant research centers in agronomy and genetics. Creativity—not "capitalism"—is the point, being involved in, say, the Nobelist Barbara McClintock watching lovingly her little corn plants growing (Keller 1983).

The liberation of such creativity is what economists and economic historians should be studying. A hired manager, noted the University of Iowa economist Frank Knight in 1921, can carry out optimal shuffling or maintaining or copying, a routine job for a routine reward. As put in 1976 by the economist and rabbi Israel Kirzner (who cannot be accused of not understanding opportunity cost), "the incentive is to try to get something for nothing, if only one can see what it is that can be done" (Kirzner 1976, p. 84, compare Spender 1989, 2014; and Diamond 2019).

Before liberalism, the getting of something for nothing by creative thinking was routinely obstructed. Until the 19th century the very word "innovation" signified religious changes dangerous to the soul. The new permission in liberalism for people to implement their ideas for betterment was the crux.

Observe that no one has seriously thought otherwise about *non*-commercial activities, such as music or painting or science or friendship or language. No one doubts that obstruction or regulation or central planning of these—of jazz, sculpture, architecture, biology, novels, poetry, movies, dance, rock music, friendships, hobbies, exercise, knitting, whatever—would yield anything but dreck. Think of Fascist Italian literature or Soviet Russian biology.

Yes, *self*-imposed rules of form item-by-item, such the haiku, or the Petrarchan sonnet, or the jazz standard, or the Palladian rules for neo-classical buildings, or conventional experimental controls in science, can of course be creative constraints. Or not. One can't say for sure. It's not mechanical. There's no routine and predictably fruitful Method of art or of science (Kuhn 1962, Feyerabend 1975, Mulkay 1985, Collins 1985). But what is clear is that when someone outside the conversations of art or science or business presumes to *plan* art or science or business, as in socialist realism or Marxist-Leninist biology or industrial planning or illiberal populism denying vaccination or global warming, disaster regularly strikes (Polanyi 1951; Kealey 1996; McCloskey and Mingardi 2020; Collins and McCloskey forthcoming).

In the economy of Britain after 1800 and then the rest, I am saying, what caused enrichment was massive creativity coming from the ideology of liberalism—Adam Smith's "obvious and simple system of natural liberty," "the liberal plan of [social] equality, [economic] liberty, and [legal] justice"(Smith 1776, 4.2.9, p. 456.; and, 4.9, p. 664). The extension of equality from the individual soul to the secular citizen arrived suddenly in the 18th century, without much in the way of anticipation within a decidedly non-liberal Europe. The *Oxford English Dictionary on Historical Principles* speaks of liberty, sense 3a**:**"Freedom to do a specified thing; *permission*, leave" (italics supplied). In the opinion of radical liberals in the late 18th century such as Thomas Paine or Mary Wollstonecraft, the hierarchies of lord and servant, priest and parishioner, husband and wife, which had seemed natural to an agricultural society, were to be overturned, as never before. Equal permissions for the generality were to be laid on in all directions.

In medieval English the plural "liberties" meant *in*equality of permissions. Thus sense 6a in the *OED's* entry on "liberty'' is "chiefly in plural. A privilege, immunity, or right enjoyed by prescription or grant. . . . Now chiefly historical." Thus the English *Magna Carta* of *Liberatum* (genitive "of liberties") affirming in 1215 baronial privileges against the king. Compare the southern Dutch *Groot Privilegie* in 1477 affirming local privileges against Burgundian centralization. In the plural sense a particular person or a particular city was to have certain named and limited privileges, to run a market with a specified frequency or to be exempted from specified taxes. Not the generality. General, as against one-by-one special liberties for enclosing open fields and forming a limited liability corporation, date from the liberal 19th century (Wallis 2022; Shilts 2004).

The liberal turn among theorists in the 18th century was so to speak from "liberties" to "liberty," from unequal privileges for some few to equal privileges for all (though in fact at first in politics the liberty applied only to the few libertated males having substantial property). Such a liberalism promised an equality, note once again, of permissions.

It is not, as the middle of the conventional political spectrum says without thinking about it very much, an equality of initial "opportunity" (equality at the starting line). Nor is it, as the left says without thinking about it very much, equality of final outcome (equality at the finish). (The right says, "To hell with any equality! Stay where you are born, you natural slaves!")

Equal opportunity is impossible to implement, because equal *money* incomes do not suffice to achieve it. Full equality of opportunity would require defacing handsome people and taking good parents away from lucky children and putting weights on fast runners, like racehorses. Just such a dystopia of equal opportunity is spoofed in a short story by Kurt Vonnegut, Jr., in 1961:

> The year was 2081, and everybody was finally equal. They weren't only equal before God and the law. They were equal every which way. Nobody was smarter than anybody else. Nobody was better looking than anybody else. Nobody was stronger or quicker than anybody else. All this equality was due to the 211th, 212th, and 213th Amendments to the Constitution, and to the unceasing

> vigilance of agents of the United States Handicapper General. . . . . The television program was suddenly interrupted for a news bulletin. It wasn't clear at first as to what the bulletin was about, since the announcer, like all announcers, had a serious speech impediment.
>
> Vonnegut 1961 (1978).

And equality of final outcome is paying brain surgeons the same as someone whose output is much less valuable to others, or paying someone equally who chooses not to be valuable to anyone. It islike Melville's Bartleby intoning "I would prefer not to" work, it violates St. Paul's declaration to the Thessalonians (3:10) that he who does not work should not eat. Equality of final outcome, as John Rawls conceded to the economic liberal, shrinks the expanding social pie that saved the poor.

When implemented—if fitfully—the liberalism of equal *permission* encouraged, honored, permitted an ideology of innovism. "Capitalism," Max Weber noted a century ago, is ancient. "Capitalism appeared in China, India, Babylon, the ancient world, and Middle Ages" (Weber1904–1905 [1920, 1958], p. p. 53). "Innovism" by contrast describes what is actually economically and scenically and artistically modern about modernity. The C-word makes the erroneous suggestion that the modern world was initiated by and keeps growing by piling brick upon brick, bachelor's degree upon bachelor's degree—and that such a "capitalism" did not exist when *Homo erectus* accumulated Acheulean hand axes by the hundreds or when *Homo sapiens* traded over hundreds of miles for shell ornaments or when the Chinese and Romans organized massive divisions of labor to make silk and fish sauce, not to speak of the Grand Canal and the Appian Way. Capital accumulation is fine for sustaining the routine, I have noted, keeping the rooves from leaking, fixing the roadways, growing the usual crops. Rice cultivators in east and south Asia invested gigantic sums in terraced and irrigated fields. Medieval European peasants saved perforce upwards of a quarter of their grain crop for seed, because the yields per unit of seed for wheat or barley (unlike for rice) were pathetically low. The ancients, that is, engaged in big-time "capitalism." The noble project of permitting the wretched to raise themselves up, by contrast, requires entirely new ideas to be found for the use of labor, capital, and land. Such progress would be recommended by an all-wise central planner as it is by a roughly wise market. It is progress in technology and organization saving the poor, whether state-planned or market-spontaneous, not "capitalism," that entails the destruction in creative destruction.

Piling up physical or human capital without a new and profitable idea will face rapidly diminishing returns. The Dutch learned it in their enormously expensive project after 1927 of damming and then draining their Zuider Zee ("inner sea") in order to make more agricultural land ("God made the sea, but the Dutch made the land"). By the late 20th century the project had not come close to justifying its expense, because by then the Netherlands was no longer chiefly agricultural. The Chinese will soon learn a similar lesson about their enormously expensive if politically exciting high-speed rail system and their Belt and Road Imitative. The Nobelist W. A. Lewis declared in 1954 that "the central fact of economic development is rapid capital accumulation." But in

the same decade this apparently obvious truth was shown by Robert Solow and Moses Abramowitz to be false (Solow 1957; Abramowitz 1956).

Innovism is the piling up not of capital but of ideas, which then justify the particular accumulation of capital, the reallocation of labor, the use of the legal system, the exploitation of natural resources. As the economist Julian Simon put it, human creativity is the "ultimate" resource—not the natural resources that non-economist believe to be so important. In Latin America they say, mistakenly, "The land is rich [in resources]; but we are poor" (that is, someone is stealing it). Natural resources are only made valuable by human ideas, Simon pointed out (Simon 1981 [1996]). Leakages of Pennsylvanian oil from the gerund were merely irritating obstacles to agriculture until people with a little chemistry thought to make them into kerosene. Rare earths were just elemental dirt until ideas made them inputs into computers.

The claim here, that liberalism led to innovism and thence to the Great Enrichment, is highly testable. For example, it can be tested by comparing places with liberal encouragements to innovation with places with oppressive hierarchies, England after 1800 compared with, say, England before 1700. Test cases would be China, Japan, Moghul India, and the Ottoman Empire in 1492, when all of them were more promising than the miserable and quarrelsome nations of the extreme northwestern corner of the Eurasian continent. All those non-European places had more peace and craftsmen and scientists, and better enforced property rights and often better tax systems, than Holland as late as 1600, or England, Scotland, and some of the English colonies as late as 1700. Yet they did not enrich. They lacked liberalism, and liberalism alone.

Or one could follow innovators in biographies in Victorian England, say, comparing each innovator with a matched individual in non-liberal regimes, such as Elizabethan England. Did blacksmiths or the sons of blacksmiths in the late 16th century become makers of marine chronometers or of magnetic-electric coils? Did the son of a glover become a playwright flattering the Queen—good stuff, to be sure, and after all Shakespeare was an innovative manager of playhouses, too— or did a descendant three centuries later turn instead to making better soap or bicycles, and his grandchildren then able to turn like Hanno in Thomas Mann's *Buddenbrooks* to high art, too.

The historical materialist in all of us after Marx nonetheless demurs. Surely, she exclaims, innovism cannot come out of mere *ideas*! The psychologist Steven Pinker, for example, though wisely emphasizing recent human progress, announces as an historiographic dogma that "the most satisfying explanation of a historical change is one that identifies an exogenous trigger"(Pinker 2018, Preface)—by which he means a materialist one, not a social psychological, or rhetorical-ideological, one. Well, why so? Are we doing historical science or historical materialism?

§

The enriching liberal idea itself came out of the accidents of European reformations, revolts, and revolutions 1517 to 1789, in a Europe of hundreds of independent political units, such as the Dutch cities in their Golden Age, or the *Kleinstaaterei* of the German lands. Ordinary people were made bold by the success of

the accidents of reformation, revolt, and revolution—accelerated in public opinion by the technology of printing, as the internet does now (though by the way the printing press had centuries earlier been invented and used massively in China, without such revolutionary results; liberal ideology is the spring, the secret sauce).

The liberal outcome did not arrive necessarily and logically, but contingently and factually, justifying the word "accidents." Similar or even the very same accidents sometimes instead made the illiberal rulers of Europe bold, too, and resulted in the top-down ideology of the new nation states, inspiring the divine right of kings and the elevation of urban protectionism to national policy, and finally to central planning, the rule of the Party, and world wars. Such illiberalism could have killed innovism. It tried.

The turmoil in Europe eventuating in 18th-century liberalism, in other words, could easily have broken bad. The Radical Reformation, as against the Magisterial one of Lutherans and Anglicans, was that of the Anabaptists, Mennonites, Congregationalists, and latterly the Quakers and Methodists. The leveling radicalism in church governance could have been crushed by a more successful Counter-Reformation or by stricter enforcement of the laws against a non-conformity to the rites of the magisters. But the precarious success of the radicals let ordinary people for the first time take charge of their religious lives—and by analogy their economic lives. Witness the Massachusetts Puritans. And back in the home country the tiny group of English Quakers made Lloyd's insurance, Barclay bank, Cadbury and Rowntree chocolate. The economically significant force in the religious case was not, as Max Weber eloquently but erroneously claimed, the doctrines of Calvinism (which would not describe Quakers or Methodists), but a flattened church governance. No bishops. Choosing your own minister mattered for inspiriting people to have a go, and to take "responsibility"(a new word in the modern sense emerging in the late the 18th century [Haskell 1999]). Less hierarchy. Quakers do not even have an assigned minister.

The Dutch Revolt 1568–1648 likewise re-enforced a leveling idea of civic autonomy against the imperial hegemon of the time, Spain—and by analogy against other hegemons, international and local. Contrast the success of the Tokugawa in bringing the daimyo to heel in Japan. But the Dutch Revolt could have failed. Its success, after 80 years of attempts by the Spaniards to re-occupy the northern Low Countries, was a close call, an accident. Had for example the Spanish Armada of 1588 succeeded in landing the best army in Europe on the south coast of England, crushing the pathetic English army gathered in Tilbury Field to hear Elizabeth promising "a famous victory over these enemies of my God, of my kingdom, and of my people," it would have made England again Roman Catholic, and would have left the Dutch even more exposed. Such an accident would have turned out badly for liberalism.

Likewise, during the English Civil War 1642-1651 the successes of the Parliamentary armies suggested to some ordinary people that they could begin the world over again—though the gentry-general responsible for the successes, Oliver Cromwell, argued against their ideas at NNN and developed as Lord Protector into a tyrant. By accident, he died of malaria, and his experiment in crushing even a

republican liberty was sidelined, to be reborn a century and a quarter later in British North America.

And so forth. By such accidents the idea of a society without naturalized subordination prospered in northwestern Europe, and especially in a formerly highly illiberal England. The core idea was expressed by one of the Levelers in the Civil War, Richard Rumbold, from his scaffold in 1685: "There was no man born marked of God above another, for none comes into this world with a saddle on his back, neither any booted and spurred to ride him" (Rumbold 1685). Rumbold's claim was laughable in a hierarchical society possessed of an ancient and contrary ideology of the Great Chain of Being. In 1685 many in the crowd gathered in Edinburgh for the public entertainment of seeing him hanged would have snickered. By 1785 such equality of permission, a daring thought of certain intellectuals, was being put into practice only in the Swiss and American confederations, and highly unevenly even in those places. By 1885 in liberal Western Europe and its offshoots Rumbold's claim was a solemn cliché. And by1985 worldwide it was appropriated by régimes without the slightest intention of carrying it out.

The more predictable and less creative result was what has been called Smithian growth (Boettke 2020). People were permitted to reallocate their labor or capital to where they knew from existing routines it would be the most productive, yielding the routine increases of efficiency we talk about in most economics. It was Adam Smith's chief analytic contribution to point out such arbitrage, for both capital and labor. People recently built apartment blocks in gentrifying neighborhoods on Capitol Hill in Washington, D.C. because they knew that demand was brisk and the annual returns to the building would be normal or even a little above normal. People went to North Dakota during the oil boom there 2006-2015, because wages were high and known. People moved in the 1890s from Sweden to the U.S. because wages in Minnesota were high and known.

A classic example in U.S. history is supposed to be the Kuznets Effect, the alleged doubling of income achieved merely by moving from agriculture to industry (Kuznets 1957). It is dubiously sensible in its magnitude net of transaction and transport costs, because such an enormous, $300 bill sitting unused on the sidewalk in 1880 is hard to believe as an equilibrium. Why didn't everyone move to Chicago? They did not: in 1900 a third of U.S. families remained down on the farm. But if true, it is a spectacular example of the gain from routine reallocation internal to the U.S. The external Smithian cause of growth was the re-peopling of the New World by Europeans, Africans, and Asians. It has been plausibly calculated by economists that allowing people to move freely worldwide would increase world income per head in Smithian fashion by a startling 50 percent (Clemens 2011). Thus the Blessed Smith,

Yet we are seeking not an explanation for 50 percent or even 100 percent, but 3,000 percent. The 5 to 50 to 100 percent yield of efficiency from Smithian growth in liberal markets is a fine thing. It is what we teach in economics for a couple of weeks at the beginning of the term, devoting the rest of the term to devising lovely models, if never tested against facts, of dozens and dozens of "imperfections" in the market—

monopoly, informational asymmetry, inadequate aggregate demand, consumer ignorance, and on and on. (Most academic economists leave to the political scientists in the other building the teaching of the imperfections in the coercive state the economists assign to offset the so-obvious economic imperfections in voluntary markets.) Such teaching gives the false impression to the students that their teachers must have collected voluminous quantitative evidence that the imperfections bulk large in the economy, accounting for how very wretchedly it performs (McCloskey 2018a). Meanwhile, outside the university precincts, the wretchedly imperfect market economy produced a Great Enrichment of 3,000 percent. It enriched not by reallocations but by innovations, which in turn justified the reallocations. In Yiddish syntax, with such "imperfections" who needs perfections?

Economists and economic historians have known for a long time that efficiency gains from reallocation are small on the scale of modern economic growth. This is so even if one considers their allegedly dynamic if mechanical secondary effects, such as re-investment of the proceeds, or economies of scale. In the jargon of economics, Smithian efficiency yields only "Harberger triangles" (Harberger 1954; Hnes 1999). In 1964 the economic historian and Nobelist Robert Fogel established the fact for U.S. railroads. Many others have used the argument after Harberger invented it for monopoly and Fogel applied it to social savings from innovations. To put Fogel's application in a three-line proof:

> 1.) Take the share of an industry such as railroads in national income,
>
> 2.) multiply the share by the percentage fall in costs in the industry, such as falls in transport costs along rail routes,
>
> 3.) and then multiply by the share of the new part in the industry, such as the half or so of transport accounted for by railroads.
>
> The product will be the national percentage gain in national income. QED

Thus value added on railroads in the U.S. in 1890 was about 10% of GDP, the fall in cost was abut 50% on rail lines (compared with old rates on such routes by water and wagon), and the share of revenues from railroads in all transport was by 1890 about 50%. That is, (10%) x (50%) x (50%) = 2.5%, the percentage increase the GDP per head from the invention of the railroads alone, which was Fogel's finding. (Fogel, it must be admitted, did not approve of my simplification when I proposed it to him in the Solarium of the Quadrangle Club at the University of Chicago in the early 1970s; he insisted on laboriously calculating counterfactual canals.) The modest rise in GDP was a Smithian, Harberger triangle of efficiency gained, about a year's worth of U.S. growth.

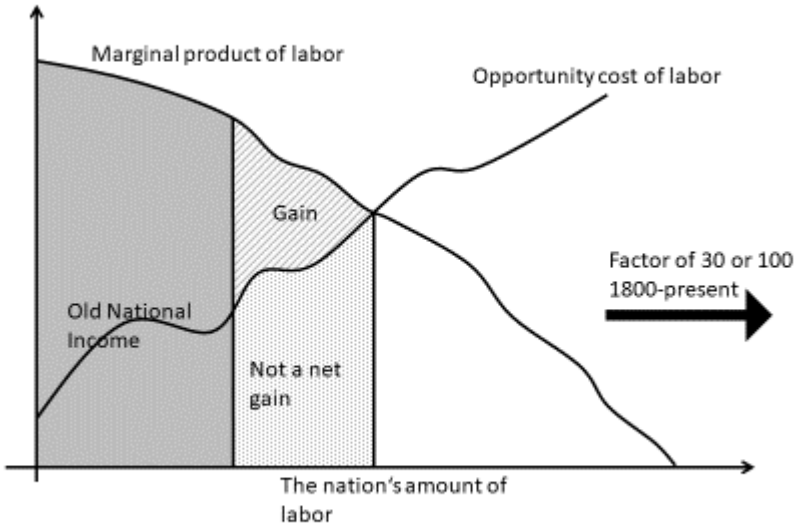
If you believe Fogel's number has to be larger because land rents along the routes of railroads would also rise, you have not understood the double counting involved. It was the very fall in transport costs that raised the land rents in, say, Iowa, which has few navigable rivers except along its east and west borders. Adding up such rises in rents by themselves, the economic logic implies, arrives at roughly the same low estimate of the impact of the railroad on national income (Ransom 1970).

If you believe, because you have taken a microeconomics course in which imperfections are over-studied, that externalities and economies of scale would make the result much bigger, you need to show it empirically (Fogel 1979). Furthermore, you need to explain why externalities and economies of scale in, say, hypothetically expanded transport by canal or road would not in the counterfactual world have had their own positive externalities and economics of scale.

If you believe that the rise of Chicago—"Hog butcher for the world, Tool maker, stacker of wheat, Player with railroads and the nation's freight handler" sang the poet Carl Sandberg, son of a railway worker—was a net gain to the nation attributable to railroads, you need to understand that shuffling resources from St. Louis and Memphis to Chicago is not "net."

If you believe that the romance of the Iron Horse proves that it was important, you need to consider unromantic cost and benefit.

Here is the economic problem with Smithian growth as an explanation of the Great Enrichment:[3]



Gains of efficiency are dwarfed by the Great Enrichment 1800-present

Note the arrow in the diagram of "Factor of 30 or 100, 1800-present." That's where the world-historical, Schumpeterian, Bourgeois-Era action is. The Harberger triangle to be had from better allocation is merely the triangle Gain. If applied to pre-existing sources of imperfection, such as taxation, it is a trapezoid instead; but it is still trivial compared

[3] Pardon the error, which I blame on someone else, of at one place a *downward* slope in the opportunity cost. I do know better: McCloskey 1985, Chp. 10.

with the factor or 30 or 100. The triangle/trapzoid is dwarfed by the outward/upward explosion of the marginal product of labor.

The railroad age accustomed us to think in terms of capital/output ratios as the way to wealth. Students of development economics were taught so in the 1960s. Consult Arthur Lewis or W.W. Rostow. Yet the yield on sheer capital accumulation is small *in the absence of commercially tested betterment,* those innovations that do account for the Great Enrichment. As Keynes said in 1936, diminishing returns to investment are sharp: "a properly run community equipped with modern technical resources. . . ought to be able to bring down the marginal efficiency of capital in equilibrium approximately to zero within a single generation" (Keynes 1936, Chp. 16). To repeat, physical capital accumulation, contrary to most economists from Adam Smith to even a good many now, was not the spring in the mechanical watch**.**

Nor was the secret sauce the accumulation of *human* capital. The doyen of the economic history of education in Britain, David Mitch, notes that in the early 19th century elementary education in England (if not in Calvinist Scotland) was poor by comparison with, say, Sweden's or Prussia's (Mitch 1992, 2003). And the cross-section yield of human capital implies at most a 50% gain from getting a university degree compared with a high-school degree. To say it yet again: we are seeking 3,000%.

The word "capitalism," as I have noted, is a scientific problem. Immanuel Wallerstein can again be quoted as a useful locus of erroneous assertions about economics and economic history. He wrote in 1983 that "the word capitalism is derived from capital. It would be legitimate therefore to presume that capital is a key element in capitalism" (Wallerstein 1983, p. 13). No, it would not. Even though the first part of the word "astrology" is derived from the Latin for "star," we would not be wise to presume that stars are a key element in human fate. What we say about the world does not by virtue of the saying become true. That we insist on ruminating on something called "capital" does not imply that its accumulation was in fact unique to modernity. It does not make true the Master's words: "Accumulate, accumulate! That is Moses and the prophets" (Marx 1867, chap. 24, sect. 3). Marx was noting that such was the opinion of the classical economists whom he was criticizing, but he heartily agreed with them on the centrality of capital and its accumulation "endlessly" (a characterization going back to Aristotle, and figuring in Weber).

The word "capitalism" emerged in the late 19th century on the left of European politics, and eventually—in a turn the Dutch call a *geuzennaam* (literally, a "beggar name," assigned by your enemies, such as "Quaker" or "Tory" or "Whig," but then adopted proudly by you—was adopted proudly by the liberals and especially the conservatives. The American business magazine calls itself *Forbes: Capitalist Tool*. Once the lineup of the politics has been settled, people on the left and on the right reckon that they already know the merely corroborative detail about the actual economic history backing the politics. "Capitalism," as educated people have been believing erroneously since 1848, emerged in the 16th century. Accumulation proceeded until it yielded the Industrial ~~Revelation~~ Revolution of the 18th century and early 19th century. It corrupted

all who touched it, said the left. It automatically enriched people through the sheer accumulation of physical and human capital, said the right. Left-wing scholars to this day believe that Marx and Engels in 1848, long before the full professionalization of history, had somehow discerned the story pretty much correctly. Right-wing scholars have joined them in the same erroneous stylized facts—much less troublesome than actual facts—such as the non-fact that enclosure drove workers into the arms of the mill owners. Both left and right are enchanted by the just-so story that the Industrial Revolution was a "take off" and that sheer physical accumulation, not the unique liberal ideology of the age, was its jet fuel.

Once a liberal economy has created new productive forces, tyrants can take advantage of its innovations, making by coercion for example a considerable amount steel, as Stalin did in the 1930s. It is orthodoxy in historical materialism to praise bourgeois society for producing the ripe fruit of monopolized and rationalized industry that the dictatorship of the proletariat can then pluck. Lenin wrote in 1917 of making "the whole of society . . .a single office and a single factory, with equality of labor and pay" (Lenin 1917 [2014], p.141; note that the industrial engineer and the sweeper are to be paid the same, equal in God's eyes, yes, but not in the economy's' if it is to work for the enrichment of us all, even approximately). But the cause of enrichment is not the Gosplan but the ideas for typewriters in offices and for assembly lines in factories and for stock trading in Wall Street that enable latter-day constructivists like Lenin to have something to imagine they can so easily construct, as moving a piece on a chess board.

Nations will vary in their uptake. A political tyranny like British Hong King or independent Singapore or China in the care of the Communist Party can copy liberals in its economy, and then maybe even start innovating a little beyond the technological frontier—at any rate if within its state bureaucracy there is liberty for the engineer, say, to have a go. But letting people have a go in the economy or within the enterprise or even within a government office is the original secret sauce. There is reason to believe that without political or personal liberties, the liberty to have a go also in the wider economy will wither. It happened in sad Russia again and again. In Taiwan and South Korea, by contrast, the shift from tyranny to liberty led on to still grater economic gains.

But such variation, I repeat, can mislead as to how it all began. The barn burned because of little Joe's carelessness. Not much is to be learned about the cause from variations in the rate at which different parts of the barn then burned. And the fire, once lit, can easily spread to other buildings on the farm, from the British building to the Russian building. Or not. A forest fire is the same story. We wish to know why a fire in California started close to Pacific Gas and Electric Company transmission lines. Once the fire started, though, nothing is to be learned *about that original cause,* and no much about how to stop such fires from happening in future, by knowing that far away from the power lines the fire moves faster when the wind is blowing hard against a wooded slope with plenty of drought-dried ground cover. True, one can learn about the later causes of spread, just as one can learn that shooting people with eyeglasses will lead a nation to fail. But to learn the spring, the secret sauce, the jet fuel, the great alteration in *moeurs* that led to the modern world, one needs to attend to little Joe and his cigarette.

Many economists and economic historians therefore have slowly, with difficulty, come to question the notions that thrifty saving or predictable reallocations or the ""peace, easy taxes and the tolerable administration of justice" of the Smithian sort are ways to explain "more massive and more colossal productive forces than have all preceding" (Smith 1755; Marx and Engels 1848, Chp. 1). In 1960, when Solow and Abramowitz and Edward Denison were questioning it (an economic historian, G. T. Jones, a student of Marshall, had already done so in 1933), Fredrick Hayek also questioned "our habit of regarding economic progress chiefly as an accumulation of ever greater quantities of goods and equipment" (Hayek 1960, p. 42; Jones 1933). In 2010 the economic historian Alexander Field reinforced the original insights of the 1960s with his calculations of productivity change in the United States during the 1930s, showing that technology was the ticket, not private capital accumulation—which at the time was small to vanishing (Field 2002, 2011). In 2006 the economist Peter Howitt had arrived at a similar conclusion even from somewhat beside-the-point cross-country studies (Howitt 2005, p. 7).

And the Great Enrichment did not start in Britain through improved property rights, either. Common law is commonplace, I've noted, and an improvement in it didn't happen. English common law, with other common laws elsewhere, as in northern France, or in Iceland with the annual law reading, or in Israel under the Judges, is ancient ("before the time of Edward I," the year 1272; Pollock and Maitland 1895). The Glorious Revolution emphasized by Douglass North and Barry Weingast on the occasion of its 300th anniversary did not significantly change English property rights or contract law. It shifted the supervision of the Old Corruption partly from the Crown to Parliament. The big legal changes came a century and a half later.

And improved law, too, is subject to Harberger's Law. In the early 1970s, tutored by the Chinese economist Steven Cheung (as Doug North later was), I tried to show that legal change caused the Great Enrichment. I discovered the im-greatness of the effects of the change in property rights, and its endogeneity, in a study of the English enclosure movement.[4] Legal historians had come to similar conclusions about other items in England's legal history. The project of the neo-institutionalism that North (Nobel 1993) and Oliver Williamson (Nobel 2009) initiated is problematic, because lacking serious attention to shifting ethics and ideology, not to speak of the project's notable lack of quantitative oomph. (I invite you to examine the full treatment of these points in

[4] McCloskey 1972. Both North and I were heavily influenced to study property rights by the great Chinese economist, S. N. S. Cheung, who was my office mate when arrived in Chicago in 1968. He moved a couple of years later to the University of Washington in Seattle as a colleague of North. Cheung was in turn the star student of Armen Alchian at UCLA, one the chief inventors of property-rights economics; another was Harold Demsetz, with whom I ate lunch at the university of Chicago nearly every weekday for twelve years.

numerous chapters of McCloskey 2010 and 2016), and more recently in McCloskey 2021.)

Nor was the secret sauce natural resources, to repeat Julian Simon's point, such as coal. Among the many frailties of the claim, China used coal anciently, as did the Romans. Decades into the Age of Coal, the U.S. and Sweden, I noted, continued to use wood to make their iron, run their steam boats, and heat their homes. By then London had for centuries used "sea [shipped] coal" from Northumberland for heating homes and making glass: Coal was not new.

Nor was the secret sauce transport. See Fogel. Nor trade, despite persistent theories depending on it as an engine of growth. Nor exploitation, imperialism, slavery—the new King Cotton School of U.S. history notwithstanding (Olmstead and Rhode 2018). Nor racial difference: the Great Enrichment is happening now in China and India—highly non-European places—and it is starting to happen in sub-Saharan Africa, from where, speaking of the human race, all of us came.

Nor is it an obstacle of "culture" at last overcome, unless one is speaking of the culture of agricultural hierarchy itself, the overcoming of which is indeed the liberal spring in the watch, the sufficient secret sauce. In the usual meaning of the word "culture," however, the public and private culture of the individuals changed not at all when Chinese people moved from Canton to San Francisco or when Jewish people moved from Lithuania to New York. They kept on cooking without milk products or keeping milk and meat separate. Yet when they found that the move had put them in a liberal economic environment, both responded mightily.

And the specifically economic parts of culture can change fast, contrary to what economists often assert without evidence, the better to avoid having to learn about culture in ideological and ethical detail. Even the pioneering liberal economist Peter Bauer, a rare bird after World War II in resisting the statism of the age, doubted that culture could change much. An example is the pessimism about amoral familism in Southern Italy in the political scientist Edward Banfield's old book (Banfield 1958). And yet Southern Italy grew, and southern Italians moving to the U.S. or to Latin America prospered mightily, too, like the overseas Chinese and the immigrant Jews, for the same reason. The Italian culture of pasta, Catholicism, and emphatic hand gestures was unchanged, echoing down the generations.

Nor was the obstacle a path dependence, to speak of another allegedly cultural dragging of feet, except in the short run. The charming myth of the inferiority of the QWERTY arrangement of typewriter keys, for example, is belied by its persistence in typing-intensive companies, which in the age of computers can easily shift to the Dvorak keyboard—if typing pn it is in fact much quicker (the fact is asserted by economists on the basis of experiments run by . . . August Dvorak). Musicians can move between clarinet and saxophone, as they did in the Era of Charlie "Bird" Parker. You yourself, without a lot of fuss, can move from Swedish to French to English keyboards.

And certainly the secret sauce was not the "entrepreneurial state" recently re-asserted after Keynes by Mariana Mazzucato, or the internal improvements of the Age

of Jackson, or the Anglo-French Concorde airplane, or the space program, or whatever glorious project of state coercion one can instance (McCloskey and Mingardi 2020). The correct way to test the argument of Mazzucato and other statists enthusiastic about industrial policy would make a fine Ph.D. dissertation in economics or economic history. Take a literally random sample of twenty or, if especially ambitious, fifty industries out of all production of goods and services, 5-digit industries, say. In the U.S. classification, for example, two industries might be 11115 Wheat Farming; and 32412 Asphalt Paving, Roofing, and Saturated Materials Manufacturing. Then look into the role of the state or of science or of liberal permissions in each industry's historical supply chain of betterment, at each stage measuring the change in total factor productivity expressed in falling output prices relative to input prices, taking account of the substitutes for the alleged ultimate causes in supply and demand along the way. Consider the mechanical reaper, for example, wholly private and unscientific, in the history of wheat farming. Or as a recent example, consider for large urban projects in China the platting of property and the building of roads and the digging of sewerage provided by local government, compared with similar large projects in India. In India a private provision is often necessary, because the local government is incompetent. Both countries are corrupt, but at least the Chinese officials appear to know what they are doing, and stay bought. It is an instance of substitution in supply. State action is sometimes the cheapest route. Yet sometimes it is the dearest, considering the bribes to a monopolists of coercion. But private substitutes are often possible. Canals in Britain were wholly private.

And the same sampling of historical supply chains would probably conclude that the Great Enrichment was until recently not much caused by Science. The portmanteau word "scienceandtechnology" is heard frequently, giving credit to High Science for ingenious tinkering with, say, windmills for drainage. Joel Mokyr has argued learnedly for Science, but there are faults in his story. Very many economically important innovations—containerization again, for example; limited access highways—had nothing to do with High Science. Canning of food by sterilization was invented many decades before its High Science justification in the germ theory. Of the forty innovations in the earlier list, 18 had an element of Science such as AC electricity, though their implementation involved also mases of technology by tinkering, in AC with making wire and glass for transmission. But the rest (zippers, window screens) had essentially no Science in them, and came from people emoblened by liberalism.

Furthermore, the Scientific Revolution was Europe-wide, yet the Great Enrichment was initiated and for a long time pursued chiefly in Europe's relatively liberal parts. The United States contributed little to Science until around 1900, yet meanwhile, even when it had a small population relative to the European powers in Science such as France, it contributed mightily to new machinery, such as the sewing machine and the making of guns with assembly lines and with interchangeable parts, themselves having little or no input from Science. The greatest flourishing of Science in the U.S. depended on immigrants fleeing the illiberal regimes on the Continent during the 1930s. And in the long term in theU.S the flourishing of high and low science and

engineering depended on letting ordinary Americans ambitious to contribute to chemistry or medicine or agronomy or for that matter economics to have a go, under the gradual extension of the obvious and simple system of natural liberty. In the 20th century such liberation for Science started to happen even for Jews, women, and Blacks. The Black laboratory supervisor Vivien Thomas (1910-1985) at Vanderbilt and Johns Hopkins (honorary Hopkins PhD 1976) was central to curing by surgical intervention the blue-baby syndrome—though he was a Black man without a college degree. Permission to innovate was granted by the new liberalism, if highly unevenly.

Nor was the Great Enrichment out of innovism to be accounted as the summed effect of even a substantial pile of these intermediate causes. In view of Harberger's Law and the 3,000 percent, something was making for a widening permission to have a go, and making for the stunningly widespread ingenuity after 1800. A Birmingham in Warwickshire or a Hartford in Connecticut were proverbial hives of innovation by liberated craftspeople and their bosses. The permission and ingenuity in turn were encouraged by a gradually widening of liberty, which alone among the proffered causes has the oomph to explain ingenuity in one sector after another liberated to have a go—from Wedgwood's blue-painted china in the 18th century to Liberty Ships in the 20th.

§

Innovism, that is, is a matter of creativity, which depends on liberty. No one thinks that slaves are good at novelties, aside from an occasional Epictetus. The quantitative importance of creativity is one reason to identify liberalism as the *primum mobile.* The conditions encouraging creativity can be studied and measured. Chief among them is a liberal society, especially in its economic culture.

But of course the moment of creativity is unpredictable. A prepared mind such as G. H. Hardy's can make surprising advances in number theory, and yet an unprepared mind such as Srinivasa Ramanujan sometimes can, too, coming at the subject from the outside. The linear B script of Cretan Greek was deciphered by an architect. The decipherment of Central American glyphs was begun by a Soviet linguist outside the domain of the chief Mayanist, an Englishman at Harvard, who long blocked creative progress.

The word "creative" means *not* caused by a routine, write-downable formula. That is what is misleading about the ambition now of the London Institute for Mathematical Sciences to "characterize innovation in a mathematical way, so that we can predict it and influence it through interventions" (quoted in the *Times of London* June 12, 2021).We speak of God, the *primum mobile primorum mobilium* "creating" the universe. August Kekulé discovered the carbon ring of benzine in 1865 from a daydream about snakes devouring each other's tails.

"Routine, predictable creativity" is a contradiction in terms.

On the contrary, as I noted briefly above, Joseph Schumpeter famously claimed in 1942, "it is much easier now than it has been in the past to do things that lie outside familiar routine—innovation itself is being reduced to routine. Technological progress

is increasingly becoming the business of teams of trained specialists who turn out what is required and make it work in predictable ways" (Schumpeter 1942, p. 132). Or: "Since capitalist enterprise, by its very achievements, tends to automatize progress, we conclude that it tends to make itself superfluous," this being one part of his theme of the self-destruction of "capitalism" (Schumpeter 1942, p. 134). If he meant that the society had come to admire and protect progress and "teams of trained specialists," he was of course correct, though the society's state often enough intervened to protect the old and to prevent the new. Witness again the Lysenko Affair in the Soviet Union, or the tragicomedy of President Trump vs. Dr. Anthony Fauci. And the bad intervention can come from a dogmatic public opinion, too, as it did in journalists scorning certain reasonable doubts that Dr. Fauci had every single thing exactly right.

In any case, Schumpeter's claim of predictable and easily managed betterment is erroneous (Langlois 2002). If we were so smart as to find easy gold at the hand of fay or elf, we would all be rich beyond limit. We aren't. Robert Frost says in "Mowing," after denying the easy free lunch of fay or elf: "Anything more than the truth would have seemed too weak / To the earnest love that laid the swale in rows. . . . / The fact is the sweetest dream that labor knows." (Frost is the most economistic of poets). Our riches of matter or spirit come from creativity, wherever it is permitted, and then selected by commercial or social test. And then the innovation is copied even by régimes that do not have the equality of permission defining of liberalism.

Schumpeter, who by the 1940s had begun to doubt with many others that liberalism was still possible, was Austrian by national origin but cannot be called "Austrian" in the sense of the school of Menger (b. 1840)-Mises-Hayek-Lachmann-Rothbard-Kirzner-Lavoie-Boettke (b. 1960). Kirzner (b. 1930), a British-born American yet Austrian economist, argues that real innovation—especially what Mokyr calls "macro inventions," but many parts of his micro inventions, too—must come, to use the chess metaphor, *en passant*, in passing, casually, so to speak, or else they are routine, not innovative. Routine, plannable, predictable, laboratory-generated investments earn routine returns, and did so in the Roman Empire as much as in Victorian Britain or in the recent U.S. They do precisely because they are predictable and therefore subject to swift imitation if profitable in money or honor. And anyway the plannable and routine is subject to diminishing returns, driving the return quickly down to normal, because everyone knows how.

You do not earn massive returns by mastering double-entry bookkeeping or learning to touch type or studying textbooks on finance. By now such personal betterments, which in their origin as macro innovations did indeed contribute to the average enrichment of the nation, have settled down to the normal return to education at the margin. Having a job in a team of trained specialists may provide a good environment for innovation. Or, if creativity in the team is discouraged, as at Harvard once in the study of Mayan glyphs or in Cuba now in the study of economics, it may not. A university without free speech, for example, is a reproducer of dogma, not the maker of innovation envisaged by Wilhelm von Humboldt in founding the University

of Berlin in 1810. Teams of specialists and chairs for professors, which may liberate people to create, or may enslave them to dogma, do not make creativity a routine.

Much of economic thinking confuses in Schumpeter's way some necessary conditions with the sufficient conditions, and intermediate causes with ultimate causes, and confuses helpful normal science with inspiring revolutions.

For example, the idea overused in Samuelsonian economics of the "production function" (which I myself overused for decades, after over-learning it in graduate school), says that a book of alternative recipes for products is necessary. Such a book is certainly helpful, whether literally written down or not. You can put together in England in 1860. I hate already noted, such and such a tonnage of iron ore, limestone, and coke (from coal) into a blast furnace with such and such specifications run by a certain number of laborers with such and such skills, according to page 106 or the book of recipes, and you get in Britain a ton of pig iron. If you instead the recipe from page 26, which entails much more labor, and is charged instead with charcoal (from wood, instead of coke), and you get in Sweden at the same time a ton of pig iron, but with differing opportunity cost of the inputs used. Good to know.

But to stop at the recipe book as the "cause" of the pig iron is to confuse the book with the human actions sufficient and inspiring that yielded the very book in the first place, such as engineering educations and craft traditions, and a liberal society encouraging ordinary people to have a go in exercising them and bragging about them. And most basically it ignores the human creativity that suffices for education and craft and betterment, when the society permits. The racist society of Tennessee and Maryland tried not to permit Vivien Thomas. His creativity overcame it, in a partially liberal society which in the end was ashamed of its racism.

True, French cuisine still depends to some degree on *Le Guide Cuisinaire* (1903; also called *L'art culinaire*) by Auguste Escoffier, as for example in lessons for its five "mother sauces": béchamel, espagnole, velouté, hollandaise, and tomate. Escoffier's *Guide* is a necessary input if you know nothing, and at least a helpful one even if you do know a good deal, for a purpose of *Mastering the Art of French Cooking*, and for Julie Powell's 365 days of dinners cooking from it (as related in the charming 2009 movie, *Julie and Julia,*).

But the sufficient and inspiring causes of French cuisine as it exists are not such items in the present supply chain of a dinner. They are the social and intellectual arrangements in French kitchens and restaurants that made for the cuisine and its books and chefs in the first place, from Guillaume Tirel in the 14th century and Catherine de Medici in the 16th century down to untold thousands of wives, and then husbands, too, inventing crème caramel and bouillabaisse, with the millions of French eaters insisting on getting a good meal, "Slow Food," and willing to discuss it at tiresome length.

The "causes" in a sense relevant to serious scientific description, and relevant to proposals for policies to encourage haute cuisine, were not recipes but the *ideas* for the recipes, the human creativity along with the conditions such as *liberté*, and then practice, practice. (How do you get to Guy Savoy, Monnaie de Paris, 11? Practice, practice.) The

causes were not production functions—not the routine, bookable recipes helpfully teaching the unskilled how to combine ingredients and how to practice, practice knife skills by chopping potatoes. The sufficient cause, given some broadly available necessary conditions such as the existence of labor and sunlight and the French nation, was human creativity liberated.

Confusing necessary with sufficient conditions—confusing modestly helpful pedagogy, or the merely necessary accumulations of physical and human capital, with the powerfully inspiring conditions for creation, as does for example the economist's "growth theory"—leads away from a proper understanding of economic growth, among lesser topics in economic and historical science. Establishing property rights under a rule of law, to instance a conservative neo-institutionalist's favorite cause, is necessary and helpful, of course, or the life of humans is solitary, poor, nasty, brutish, and short. Anthropologically speaking in any case, a place of human habitation wholly without investment or property rights or the rule of law is not a society but a war of all against all, the Donbas in the Ukrainian War. You can therefore explain why nations *fail*, and can discern the origins of poverty in a bombed-out city, by noting the nasty incentives that have led most nations for millennia quite far away from secure and alienable property rights, and towards the rest of the evils that hobble an economy after an efflorescence (again, Acemoglu and Robinson 2006, 2012). You can see it in the nationwide discouragement of Black inventors and entrepreneurs in the U.S. after the Tulsa race riot o 1921, or the worldwide discouragement of female inventors, entrepreneurs, painters, musicians, poets, and novelists after Eden.

But you can only explain why nations *succeed,* and then discern in a proper economic science the origins of our startling modern prosperity, and the comparative liberation of Blacks and women, by noting with Francis Hutcheson of Belfast and Glasgow the sufficient cooperativeness, and noting with his student Adam Smith of Glasgow and Edinburgh the inspiring liberties, jointly sufficient, that led a few nations such as Holland and Britain early and the U.S. and Sweden and Japan late, towards enterprise and betterment. If *Le Guide Cuisinaire,* or *The Foundations of Economic Analysis*, had been bad books, as they were not, you could explain, too, some outcomes in bad cooking or bad economics. But in any case the excellent cooking and excellent economics comes from human creativity liberated—such as exhibited by the admirable Escoffier and the admirable Samuelson. For example, a liberal move after World War II to let a certain number of especially brilliant Jews take academic posts in the U.S. caused Samuelson and Arrow and therefore modern orthodox economics. We should seek to know the sufficient conditions for such creativity, like knowing the sufficient conditions for the sun's burning or the sufficient conditions for the mountains rising. It's economic and historical science.

Elevating a necessary condition such as investment or a labor force or property rights, or elevating a helpful condition such as banking or education or canals, to the cause of modern growth would be like elevating the existence of the tomato in Europe after the Columbian Exchange to the cause of *sauce tomate.* It was necessary, obviously, but not sufficient, equally obviously. The British and the Dutch and the Germans had

the necessary tomatoes, too, and even shared much of the alleged geographical advantages of France in crops. But they did not have the sufficiencies that made for the glorious Italian and then French use of tomatoes. French genius applied to tomatoes, textbooks, labor, and capital in France made for French cuisine; in Germany, German. (I could rest my case.)

To return then from tomatoes to the role of property rights—the necessary conditions featured in growth theory and neo-institutionalism such as property rights are in fact commonplace and given, with no present opportunity cost, like sunlight or the rule of law. Therefore they are not to be priced in a proper theory of marginal productivity assuring efficiency in the use of inputs that do have an opportunity cost. That's the economics. If you believe with, say, Mazzucato (2018) that everything which "contributes" to output is to be given present payment you are positing an average-product, labor theory of distribution, without opportunity cost acknowledged. Efficacy, as in the old USSR, goes by the boards. Nothing is priced in a way that reflects its opportunity cost, and the life of humans is poor and political, and often enough brutish, too.

The historical truth is that since the beginning of human societies, investment, property rights, and civil peace have been more or less universal, with or without the permission of an effective sovereign, if there was one. Investment, property rights, and civil peace were especially intermittent by world standards for centuries in what became the home of innovism, northwestern Europe. The scientific question is the "more or less" in the "universal," not yes/no or present/absent. Little bands of hunter-gatherers, with no fixed sovereign, or much of any leader at all, had a vivid sense of ownership, as in a lesser and non-alienable form do many species down to butterflies. The coiner of the word "humanomics" for an economics scientifically supplemented by the humanities, Bart Wilson, sees in a 2020 book the origins of the uniquely human practice of alienable property in the mental and ethical habits of making compound human tools, such as spears. Prisoners and gold miners without kings devise rules of property (Umbeck 1977; Radford 1945; Bell 2018; Skarbeck 2020). To speak of larger societies, Israel under the Judges had fully enforced private property (though the evidence from the Bible is mixed as to its exact character) well before the Israelites unwisely demanded that God give them a king, "like other nations"—eventually a king who compromised their property rights, exactly as God through Samuel had warned them he would (1 Samuel 8).

Observe: such universally law-abiding societies did not yield a Great Enrichment, until in 18th-century Britain and its North American colonies the ancient routine of reasonably good laws was mixed for the first time in agricultural societies with an entirely new idea, an ideology of egalitarian liberalism of economic permission. It was explored first in Italian and then in Dutch cities and theorized later in French salons and then applied throughout the Anglosphere. (Well. . . like ancient Athenian "democracy," excepting those pesky slaves and women.)

The liberal releasing of human creativity has *sufficed* for growth, when the routine and widespread necessary and helpful conditions have obtained—the existing recipe books, as they routinely do exist, such as property rights, the rule of law, capital markets, liquid water, oxygen in the air, the absence of an active civil war, the arrow of time, the existence of the universe. Northern Italy, the Ottoman Empire, Northern India, Japan, and China had for centuries all such necessary conditions, as did the Assyrian, Persian, Roman, Incan, Aztec, Zimbabwean, and Mongol empires before. Yet they did not achieve the Great Enrichment, which instead emerged from a Dutch-influenced and liberalizing England around 1700, spreading after 1800 slowly to the world.

Therefore I say to my beloved colleagues in economics and economic history: please stop putting forward as an explanation for the startling betterment since 1800 still another necessary or helpful (or sometimes on examination in fact obstructive and unhelpful) condition—coal, war, national debt, canals, patents, banking, internal improvements, industrial policy, this or that expanding sector, the rule of law (on that last, consider the Fugitive Slave Act). If you are politically on the right, my dear friends, I suppose you put the rule of law forward because you imagine that the bad and unruly little children called citizens should be controlled from above. If you are on the left, my equally dear friends, you put forward industrial policy because you imagine that the sad and stupid little children called citizens should be controlled from above. Either way, controlled from above. Realize, my dear friends, that the great virtues of innovism come mostly from adult human action independent of state action. State action can wreck human action, and often does, with eminent domain and industrial policy and ill-designed taxes, not to speak of war and corruption. When the state does permit creative human action—with honest courts and short patents—the rarity is cause for breaking out the champagne. Botswana versus Zimbabwe.

Look instead for the sufficient and inspiring conditions for the creativity of liberated adults. They are not usually to be found in a non-destructive form in the law and the state and the church and patriarchy, which are mostly devoted to enforcing obedience and suppressing any disturbing creativity. The Dutch proverb against innovation is "Do the normal thing: you are already crazy enough." The first Irish cardinal, Paul Cullen (1803-1878), imposed the "devotional revolution" on Ireland, infantilizing the population in deference to priestly fathers and holy sisters (Larkin 1972). Only in the diaspora, and in Ireland itself only in the past half-century, did Catholic Irishry wax innovative in the economy.

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One can look at all this more formally. Yet consider the possibility that formal production functions, known utility functions, estimated input-out tables, realized supply chains, structures in place, relations of production, and the rest of the apparatus of most economics left or right might be ill-suited to describing an economy of commercially tested betterment by innovism out of liberalism. Creativity from innovism is the economy we actually have. Every year in U.S. grocery stores many tens of thousands of new "consumer packaged goods" (as the marketing jargon has it) are

introduced, to be tested commercially, and to succeed or, mostly, to fail. That's the ticket to enrichment.

The function for national product could be:

$Q = \mathrm{I}(D, B, R) \bullet \mathrm{F}(K, sL)$

in which I(.) is the innovation function (Solow's *A* in his classic of 1957), depending on *D*, the dignity accorded innovators, and on *B*, the li*B*erty of innovators (the letter *L* is need for Labor), and depending too on *R*, the rent or pRofit or pRestige accruing to innovation. The innovation function multiplies a conventional neoclassical production function, F(.), depending on ordinary, price-able inputs—that is, ones having a present opportunity cost—physical capital and land, *K,* and raw labor, *L*, multiplied by an education-and-skill multiplier, *s*. If you wanted you could get into details of biased *K* and *L* saving, but in view of the massive social saving implied by the factor of 30, such worries seem lacking in much scientific point. Some economists have tried to endogenize innovation as a function of ordinary factor scarcities, giving they imagine a slight twist to the marginal product of labor, say, as it zooms out 3,000 percent. Slight twists do not result in 3,000 percents, or else they would have done so in 1800 BCE instead of 1800 CE. This empirical problem is in addition to the shocking economic illogic, as Samuelson pointed out long ago, of treating only one input, usually labor, as "scarce." A dollar saved in land rent or capital acquisition is the same as a dollar saved in labor, and has likewise a present opportunity cost necessitating pricing for efficiency, whatever era or place one is talking about.

There is of course nothing profoundly mathematical about the equation. The "mathematics" is merely a metaphorical language in which economists are trained (and it may be, I notd, over-trained), and which allows one to chat with them without excessive confusion about the economic and social ideas involved. The reason to separate out the I(.) function is to stress, as I do after decades of denying it in favor of static equilibrium analysis, and messing about with the ill-named growth theory, that economic growth depends mainly on early Schumpeterian/ late Austrian/ present-day "humanomical" innovation, and not, as some economists and historians still believe, on Classical / Marxist/ Samuelsonian accumulation of capital.

Once upon a time, as I have noted, economists thought that growth depended especially on physical capital (here *K*), and now some think that it depends on various versions of human capital (*sL*). Aside from the historical and contemporary evidence against what William Easterly calls "capital fundamentalism," Peter Howitt concludes that "more than 60 percent of the cross-country variation of per-worker GDP is attributable to productivity rather than to the accumulation of physical and human capital," and over 90 percent of its growth rate. "Thus it seems," he concludes, "that almost everything to be explained by the theory lies in the Solow residual," here the I(.) function. "This is part of the evidence," Howitt continues, "that inclines me towards innovation-based growth theory." His cross-country regressions are slightly off point, I have noted, for explaining the original Big Bang, but anyway his seems a sensible conclusion. It was anticipated by Smith, whose *Theory of Moral Sentiments* (1759 [1790])

treats the *D* variable of dignity, and whose *Wealth of Nations* treats the *B* variable of liberty (amongst a good deal also about F(.), not all of it seen by later economists to be sound). Smith believed that liberty (*B,* but linked with *D*) was necessary and sufficient for the (admittedly modest) growth he had in mind: the Scottish Highlands becoming as productive as Holland, say.

Even with so vague a specification as the unspecified functional form, Q = I(*B, D, R*)•F(.) some qualitative points emerge—though without actual measurement our knowledge is meager and unsatisfactory. In the innovation function, I(.), the term *R* is what economists call rent, and other people call profit or prestige. It represents in part the routine incentive to innovate, picking up $300 bills. Whether routine or not, it has two aspects, depending on when you are looking at it—whether before or after innovation, "ex ante" or "ex post," as economists after Gunnar Myrdal say, "from the before" or "from the after." *R* is sometimes "*R*outine" (a helpful mnemonic to keep in mind the contrast with the non-economic and non-routine variables for *D*ignity and li*B*erty). But to the extent that it depends on alertness and the ability to form a hopeful image of the future, it is decidedly not routine. Ex ante it is precisely "the possible lives they imagine for themselves and their children" (as the Nobelist Robert Lucas put it in 2001, his essay springing to life after many tedious pages of routine mathematical ruminations about capital accumulation), expressed in money (that is, expressed in profane terms, and not mentioning sacred matters, the animal spirits, such as the spiritual value of caring for one's children and grandchildren—acknowledged in feminist humanomics but not by orthodox Samuelsonians).

Such an *R* viewed ex ante is in part the routine gain hovering before the eyes of an entrepreneur in Chennai imagining how very rich he could become if he could introduce air conditioning to the standard of Atlanta. But it is also the highly non-routine gain of Kirzner's formulation, such as what John Ericsson imagined would be gained from introducing screw propellers into motor ships. What innovations are imaginable depends on the new devices or institutions in the offing. (The "offing" is one of the numerous beautiful metaphors from sailing ships used in English, mesning the place beyond the horizon on a curved earth, at which even topmasts cannot be seen—yet can be imagined.) The novelties floating in the offing are sometimes said to depend on those relative factor prices, I just noted, but the argument is not sound, as I also noted. On the other hand, when steam engines with separate condensers became common, it eventually occurred to many people that they might be made more compact for the same power at high steam pressures, and would not need Watt's fiercely protected sperate condenser, either (Selgin and Turner 2011). What slowed their introduction until Trevithick was therefore not Watt's patent but the danger that such engines would be subject to terrible explosions. So they were, when applied for example to railroads such as the wreck of the Old 97, and to steam vessels such as killed Mark Twain's brother on a paddle wheeler in New Orleans.

The private *R* of the entrepreneur's ex ante imaginings, however, dissipates ex post by competition into a social *R,* imparting an actual, non-speculative, ex post height, a multiplicand applied to the I(.) function. If *R* dissipates too soon—if it is too easily

imitated, or is unpatentable knowledge that nonetheless becomes known—then the incentive to innovate is attenuated. As has long been realized in economic thinking, however, there's no blackboard formula yielding institutions or parameters that optimize *R*. Once laboriously discovered, the opportunity cost of another person learning, say, the calculus is zero: Newton and Leibniz (they disagreed on which of them) should have gotten money credit, the economist at first says, to evoke the optimal amount of mathematical innovation (the example shows again, by the way, why macro-inventions are perhaps not best analyzed as routine matters of monetary cost and benefit: prestige and non-monetary glory matter). But once the job of invention is done (the economist then says, switching sides), the optimal price for copying should be zero—and so the society should promptly stop the checks just issued to Newton or Leibniz. It's a paradox, with no general resolution. It depends.[5]

The other arguments in I(*B, D, R*), *D* for Dignity and *B* for liBerty, are also unpaid inputs, given by the society without opportunity cost at present—and therefore they should not enter into the efficiency-logic of payment by marginal productivity as in F(.). It is tempting to call them externalities. But that would suggest, according to the Samuelsonian (but not Coaean) understanding, that they *should* be paid, to achieve efficiency of allocation, which is not the case. It is the characteristic mistake of economists who do not understand the economics after the Margins Revolution (for example Mazzucato 2018; and criticizing her on the point McCloskey and Mingardi 2020; or for example Piketty 2014; and criticizing him on the point McCloskey 2014).

R is unpaid, too, *after* its private rewards have been dissipated. But before that time it is paid in supernormal profits earned in excess of the opportunity cost of the routine inputs *K* and *sL*. When being paid, the rent, *R*, disturbs the marginal-productivity rules for distribution, which depend solely on the routineness of the F(.) function. The manager knows how much to pay the workers or the investors if she knows what hiring one more unit of them will produce. Just look at the production function, the book of recipes, how things have always been done. But her knowledge is disturbed if an *R* out-of-equilibrium is hanging about. The disturbance provides one way to measure *R,* by seeing what financial return is *not* explained by routine marginal productivities of *K* and *sL*. It was the essential insight of the creativity of Jones, Solow, Abramowitz, Denison.

The ex post return of *R* sloshes around the social classes, in other words, unsettling the routine distribution of payment for static efficiency in allocating by marginal product the inputs with current opportunity costs. Early on it goes to Carnegie. Later, bythe competition of steel companies at home and abroad, it goes to *hoi polloi*. If there was no dissipation, and no ultimate gain to *hoi polloi,* innovation would not have a justification on egalitarian grounds—as in the historical event it surely does.

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[5] Yet the *National* Bureau of *Economic* Research charges a substantial positive price for email access to its papers, on the non-economic grounds (I have been told by members of the board) that average cost pricing pays for—what?—the paper one supposes, since it can hardly pay the professors' salaries. The NBER is immune to economic reasoning on the point. For shame.

It is the poor who mainly benefited from innovism.

That is why ex post rent from land has been since Ricardo under persistent ethical attack even by economists. It is the economic puzzle central to Anthony Trollope's first successful novel, *The Warden* (1855): how to "fairly" distribute between the Warden and his twelve pauper charges the 400-year gain from rising land rent. The sociology is that large rents from mere possession of land—the half of national income in the Middle Ages that went to the dignified classes—tend to create an aristocratic or priestly society. (The Warden in the novel was a Church of England priest.) Large and eventually dissipated rents from innovation, by contrast, tend to create a bourgeois society that in fact enriches *hoi polloi*. Over the long run, of course, honor follows money, and money honor.

The paid/unpaid distinction, I repeat in case you missed it, is why I(.) and F(.) are to be treated separately, and it justifies, at least in mere logic, talk of the Great Enrichment as being the result of massive free lunches. Free, because not priced. The F(.) function is routine, and you can tell whether an economist acknowledges the role of the *non*-routine in economic life by how she treats *R*. The Austrian economists treat *R* as unintended discovery; the Samuelsonians/ Chicagoans want to bring *R* back into a routine of marginal benefit and marginal cost, that is, to force it back into the economics of a routine F(.). (All three schools, incidentally, are "neoclassical," the one out of Menger and the others out of Walras and Jevons, and then Wicksell, Marshall, Clark, and at last Samuelson/ Friedman /Becker, which is why "neoclassical" is a poor title for the conventional Samuelsonians.) Howitt, referring to Mokyr's pioneering historical work on the matter, notes that "nations that experience the most rapid growth are not necessarily those in which people have the strongest incentives to develop new technologies [in my terms, high Samuelsonian *R*s] but those which have developed the greatest tolerance for, and capacity to adjust to, the many negative side-effects of economic growth [namely, the high *D* and *B* that accompany a signing on to the Bourgeois Deal: "Leave me alone and I'll make *you* rich'"] (Howitt 2005, p. 10; and Mokyr 1990, p. 179; and McCloskey and Carden 2020). "Those negative side-effects," Howitt continues, "are almost always the result of . . . the destructive side of creative destruction." The high *D* and *B* in the Netherlands (before the *regenten* in the 18th century became a virtual aristocracy and undertook to close off innovation) and Britain and the new United States made for less reaction, such as Continental anti-Semitism or French dirigisme protecting this or that industry of concern to *l'État.* By 1859 the liberal ideology was as Mill put the point in *On Liberty* that "Society admits no right, either legal or moral, in the disappointed competitors, to immunity from this kind of suffering; and feels called on to interfere, only when means of success have been employed which it is contrary to the general interest to permit—namely, fraud or treachery, and force"(Mill 1859 [2001], pp. 86–87).

The variables of dignity, *D,* and of liberty, *B,* have their own dynamics. When expressed as a virtuous behavior towards others, dignity draws on the elemental

virtues of faith and justice—who you are and whom you should respect. Liberty by contrast draws on the virtues of hope and courage—towards oneself, that is, the courage to be (as the theologian Paul Tillich put it) and the hope to venture. The rent in prospect or in achievement, *R,* draws on temperance (savings for investment) and prudence (rationality picking up the $300 bills in plain sight). The greatest of the so-called theological virtues, love of people or of the transcendent (science, God, the family), affects the other variables—in a way often unacknowledged, yet (properly) unpaid, but not therefore unimportant. The Swede John Ericsson's great love for the iron-shaper Cornelius H. DeLamater was important for the inventor's life and work.

Virtues unbalanced, though, are vices. Dignity, for example, tends to corruption—causing it to become sometimes a negative rather than a positive influence on the height of I(.). The corruption happens if merchants develop into a proud little aristocracy, as they did at Florence, for example, and as the left believes the power elite of the United States has, and as indeed many people nowadays think the left itself has. Liberty, too, including verbal action, can be dangerous. Liberty for example can be turned into a negative influence, a politically expressed envy for example, if it seems plausible to poor people now equipped with voices and votes that stealing from the rich is, after all, the most direct way to mend their poverty. A *New Yorker* cartoon back in the 1960s showed a bank truck pulled up to the curb with the guards handing money out of bags to the people on the street, one of whom exclaims, "Well, at last the War on Poverty has gotten under way!"

Over time the I(.) variables of *D, B,* and *R* are entangled (just as *K* and *L* are entangled in the conventional F(.) function, as in substitutability, complementarity, specific human capital, diminishing returns). A society, like routine production, hangs together. For example, dignity for innovation in 1900 depended on earlier liberties and earlier rents from innovation. $D_t = g(B_{t-1}, R_{t-1})$. Liberated people tend after a while to get accorded dignity, especially if their liberty results in high incomes for themselves or, as the acknowledged benefactors of the world, for the rest of us. The Roman poet Horace was the son of a freedman. The reverse causation can happen, too, from dignity to liberty after a while, or (less pleasantly) from dignity to high rents, as when British aristicrats became the honorable if unproductive chairmen of the boards of railroads and banks.

Likewise the variables in the innovation function, I(.), can have influences over time on the routine variables in the production function, F(.). One conventional way to think about it is to imagine the demand curves (the marginal revenue product curves) derived from the entire expression $Q = I(.) \bullet F(.)$. The I(.) function in such a derivation would be a multiplicative term raising the marginal product of capital and of more-or-less educated labor. The point made earlier about the non-initiating character of capital can be expressed here by saying that *K* and *sL* are elastically supplied in the long run. Accumulation, whether in physical or human capital, will therefore depend on the I(.)-altered valuation of its fruits. As I(.) rises in the Age of Liberalism, savings were found to make the appropriate investments, because the higher productivity made a high *R* n prospect evident and routine. Likewise, education in technical subjects responded

elastically in the long run to the demand for them—though what is "technical" varies with the times, being fluency in Latin in the 17th century (the better to serve, say, as a diplomat, as Milton did as Cromwell's Latin secretary), or fluency with differential equations in the 20th century, or fluency with computer simulation in the 21st.

The international context in which innovation takes place matters. From the point of view of a stagnant economy such as Russia's in 1850, the imaginable *R* becomes larger and larger as the 19th century proceeds, finally overcoming in some countries, such as Russia, their low values for *D* and *B*—this is a point made long ago by the economic historians Alexander Gerschenkron and Sidney Pollard (Gerschenkron 1957; Pollard 1981). A place with low Dignity for the bourgeoisie, such as prerevolutionary France, can compensate with high LiBerty for the despised class, a high level of *B* (though in fact it did not, and French-imagined betterments were therefore notably aristocratic or military in origin and market). And anyway the country slowly gets dragged into the modern world if it is in the neighborhood of first a militarily and economically successful Holland and then a militarily and economically successful Britain, or a militarily and economically successful Japan, which makes obvious even to stupidly traditional English or French or Chinese or Russians the great magnitude of ex-ante *R*. Russia was awakened in a good way by its embarrassing defeat by Japan in 1905, and then in a bad way by its defeat by Germany is 1917. In the embarrassment of the War of the Spanish Succession, 1701–1714, tiny Holland teamed up with emergent Britain (and aristocratic Austria on the southern front) to humble the great and mighty Louis XIV. It taught France some of what it needed. Some.

The advantage of algebra, though, is that one can get beyond such qualitative, existence-theorem, merely philosophical claims and counterclaims, which after all can justify any pattern of alleged facts whatever, as in evidence-free "analytic narratives" popular nowadays among some economic historians, and ever popular among economists. One can get a little quantitative, and focus on the relative importance of this or that effect, its oomph. For example, suppose the I(.) and F(.) functions were Cobb-Douglas, that is, having constant exponents on each . You ask why: because it is mathematically (very) convenient, and because starting with constants is a wise first step if you have no a priori knowledge of how they would vary, and have no particular reason to suppose that they vary endogenously. Then taking rates of change of each variable (using an asterisk, *, to mean "rate of change of the variable preceding the *") and using corresponding Greek letters to mean "elasticities—that is, exponential coefficients—of the variable following"), yields obviously:

$$Q^* = [\ \delta D^* + \beta B^* + \rho R^*] + [\kappa K^* + \lambda s^* + \lambda L^*]$$

If you like to think in logarithms, you can make the same expression into a log-linear one. In either case it holds without interaction terms only for small changes in the variables, but can be easily (if lengthily) rewritten with the interaction terms present. It should be so rewritten if you have an interest in a particular interaction, for example between K^* and D^*—percentage changes in physical capital accumulation and the

dignity of Mr. Moneybags.

The equation can be expressed in per-person form by subtracting L* from both sides:

$$(Q/L)^* = [\ \delta D^* + \beta B^* + \rho R^*] + [\kappa K^* + \lambda s^* + (\lambda - 1)L^*]$$

One can make all sorts of foxy points with the equation. If the skill variable is measured as years of education, for example, the slope of the human capital coefficient *s* relative to years of education would be quite small, as I said, relative to the massive change of $(Q/L)^*$ to be explained in the Great Enrichment. A college graduate is not ten times better in contributions to *Q* than is a high-school graduate—an insulting hypothesis anyway on its face, and silly if you have actually known any non-college graduates. It might work out if college is accurately selecting for a tiny elite of geniuses. But such screening cannot in fact be done with accuracy, as the history of Britain's Eleven-Plus Examination showed, or as Einstein's inability at first to get an academic job showed. So the equation makes explicit why one might doubt the force of education.

On the other hand, the innovation variables *D* and *B* and even *R* might themselves be improved by education. You can see reasons for it, a higher skill level, *s*, resulting in higher dignity, *D*, because of admiration for a skilled bourgeois/-e, or because of a better grasp of technical matters necessary for innovation. Or indeed it might work because instruction in economics might lead people to admire liberty in economic matters, and achieve thereby higher *B*. That last actually happened in early 19th-century Britain. But the high-*s*-effect can be and often has been perverse, corrupting the good bourgeois boys by educating them to believe that the bourgeoisie have no dignity at all, or corrupting the good bourgeois girls to become state bureaucrats devoted to stamping out bourgeois liberty in favor of planning in Stockholm or Whitehall. Marx took a Ph.D. degree in philosophy at Jena in 1841. The leader of the Shining Path Marxists in Peru was a professor of philosophy. A high percentage of the officers in Hitler's SS had advanced degrees in the humanities. German engineers built the gas chambers. Excellent computer engineers enforce the Chinese censorship of the internet.

Likewise, unless one has assumed, or in fact measured, economies of scale, which would make the elasticity κ in *K* large, even a large percentage change in *K* cannot explain what is to be explained in the rise of income per person. The economies of scale could explain the modern world if they actually were there in other times and places, too, but were activated for some reason in England. But apparently they weren't present in other times and places, which makes one wonder, as I have said, why not, if they are supposed to arrive suddenly in England in 1700, a *deus ex machina* a lot less plausible than the perfectly evident arrival of liberalism from the happy accidents of northwestern Europe 1517-1789. And as actually measured (away from the blackboard of existence theorems), economies of scale prove to be modest, raising the sum of coefficients in the F(.) variables from the 1.0 of Cobb-Douglas to perhaps 1.1. For reasons of competition and the marginal productivity theory of distribution, the share of capital in rewards to factors of production is the elasticity in question, here κ (strictly

in the absence of economies of scale: and if the economies are small, approximately so). The elasticity is small in modern economies (on the order of .10 or .20), though larger when land bulked large.

Speaking of land bulking large: when it does *not*, and the share of *L* is therefore high, the term $\lambda - 1$ (which is of course negative and captures simple diminishing returns to labor applied to fixed land) is small, because λ gets close to 1.0. (Indeed, economies of scale can tip $\lambda - 1$ into modestly positive territory, meaning that we are enriched a bit by having more of us, even without regard to economies of scale in the other, I(.) function arising, say, from the competition that a wider market provides). In a modern economy in which human-capital-enhanced labor gets much of national income for itself, the impact of Malthusian diminishing returns is greatly weakened by the effect. The mathematics reflects the point that human resources become more important than natural resources—land is subsumed here in *K*, but causes diminishing returns only to the extent that $\lambda - 1$ is large. The term was large in the Middle Ages, with as I mentioned only half of national income accruing to workers of any sort, including entrepreneurs, and the rest accruing to the inelastically supplied services of land. The move to modern times reduced $\lambda - 1$, and therefore the threat from diminishing returns, from 0.5 to 0.1. Radical environmentalists should listen up.

There is no reason in the facts for the coefficients in the other, I(.) function to add up to 1.0. On the contrary, a doubling of dignity might result in a far more than doubling of output, by encouraging massive innovations. You will doubt that "dignity" can be measured. But it can rather easily be measured, by public opinion polls such as the Values Survey, or from the prevalence of merchant-innovator heroes in lowbrow literature (which, by the way, the Horatio Alger novels are *not* examples; read them and see), or in the percentage in some textual sample of favorable mentions of innovation. A Mr. Strahan, reports Boswell, put Dr. Samuel Johnson in mind of a remark which Johnson himself had made to Strahan;:"There are few ways in which a man can be more innocently employed than in getting money. . . .The more one thinks of this, [said Strahan,] the juster it will appear" (Boswell's Life, 27 March 1775, aetat. 66, Everyman ed., I: 532.). Nimish Adhia measured the rising *D* of businesspeople in India during the License Raj and in the decade before it collapsed by measuring the plots of Bollywood movies and editorials in the *Times of India* (Adhia 2013).

Liberty, *B*, is easier to measure, and has been, in the surveys of days-to-open-a-business or ease-of-dismissing-workers now conventional. It, too, being a (correctly) unpaid factor at the margin, need not have a coefficient constrained by constant returns to scale. The β coefficient may by itself be well above 1.0, which is to say that a 50 percent increase in liberty measured as uncensored book pages per person, say, could easily result in well over 50 percent increases in national income per person. Say, 3,000 percent.

For such revolutionary effects, the press had to be adequately free. Before the printing press, what the few readers could read had not much attracted the attention of the authorities. Even afterwards there was not much for the European states to worry about if printing was in Latin. But with publication in German and English and French

and the rest, the state sprung to attention—though unable by international standards to dam the flood. Censorship in the Chinese Empire was routine and thorough, such as in the 18th century executing a man and enslaving his entire family for the terrible crime of printing the character for the emperor's name. So late as 1834 a Japanese writer who issued a pamphlet recommending the opening of the country was arrested and forced to commit suicide (Fairbank, Reischauer, and Craig 1989, pp. 234, 486). For the Ottomans, as Metin Coşgel, Thomas Miceli, and Jared Rubin have noted, there was a nearly three-century delay after Gutenberg, until 1727, in allowing books to be printed in Turkish (in the Arabic alphabet), and a century later until printing was permitted in Arabic itself. Yet the Ottomans adopted gunpowder with lightning speed (Coşgel, Miceli, and Rubin 2012). That is, it was not sheer, stupid conservatism but successful state control that kept the presses shuttered. Revealingly, non-Turkish and non-Arabic groups in the Ottoman Empire were free to publish. The Empire allowed Salonika to become a center for publishing in Hebrew, Aramaic, and Ladino a mere fifty years after Gutenberg. What did it matter, the Ottoman elite probably reflected, so long as the mass of Turkish- and Arabic-speaking subjects did not have access to novel ideas of governance, or of business? And remained poor.

Economists believe such sociological/political matters as those summarized in I(.) as relatively constant (or anyway exogenous to economic matters), and so they focus on F(.). They have no evidence for their belief. The formalization and measurement of F(.) is nice. But I(.) was the maker of the modern world. F(.) was the coastline, I(.) was the tide. And anyway it is economically obvious that what matters to the Great Enrichment is discovery, "alertness," as Kirzner put it, a free lunch, not routine.

And not even High Science does the trick, unless one starts with a liberalizing society permitting people to have a go in it. Take again containerization, invented in 1956 by Malcom McLean in North Carolina. It was entirely organizational, involving no new physical principle, no Science, a box made from cheap, corrugated steel. Or take again the modern research university, invented in Berlin 1810, with Arabic ancestors a millennium ago, yet depending on a liberalism of inquiry contrary to Prussian habits in other matters at the time, or Moslem habits in the later Middle Ages. Take sewerage, invented anciently by the Chinese and Romans, but not pursued seriously in Europe until very recent centuries. It was organizational, and based on an unscientific theory of disease, yet worked to reduce disease, bringing European cities closer to East-Asian standards of urban cleanliness.

Crucial to modern building was reinforced concrete, invented in the 1840s by Jean-Louis Lambot on his family's estate (another non-bourgeois French inventor), making water troughs and boats out of it, using pieces of iron and then chicken wire (invented by a bourgeois in England in 1844). Take, too, as an admitted case of early High Science, the electric motor, invented by Faraday (the son of a blacksmith, though permitted in a somewhat liberal scientific community to mess about with magnets) and many others, which came into its own 80 years later with systems of generation, especially alternating current à la Tesla (the son of a Serbian priest, though permitted a secular higher education). What made Western doctors and hospitals non-lethal was

penicillin—to be sure, invented in High Science proverbially by Fleming, though its mass production in the 1940s was an engineering achievement, not Science. But washing hands in obstetrical wards was invented in 1847 by Herr Dr. Semmelweis without High Science, and when finally adopted generally (overcoming the resistance by high-*D,* male doctors clinging firmly to their own erroneous High Science) saved millions of female lives (not, alas, my great grandmother and my great-great grandmother, both of whom died in childbirth). And anyway quite a few "Western" medical inventions were re-inventions, such as anesthesia for surgery (Chinese) or aspirin (anciently from willow bark). The transistor and the printed circuit, surely, were spectacularly Scientific, at which point I agree with Mokyr—that a higher and higher share of GDP comes nowadays from High Science. The question is when it becomes *really* big, economically. I reckon after the Great War. The question is quantitatively testable.

The remaining question, though, is how much of Science depended on liberalism. A lot. Accepting Mokyr's argument, with adjustment for its date and its liberal sources, undermines the gloomster predictions such as Robert Gordon's of declining innovation—even aside from the worldwide enrichment to be expected for the next half century, yielding many millions of new engineers and entrepreneurs ready to have a go, if their societies accord them sufficient *D* and *B*. To answer the question of the importance of Science, or for that matter the importance of innovation generally, in other words, it's not enough to stop with naming off the betterments and then standing amazed, or for that matter depressed. One has to measure their oomph.

§

That is, bettering ideas were massively encouraged by a liberal society. It is a matter of unpredictable dynamics, not predictable statics—but dynamics from new ideas, not from mechanical feedbacks (though those happened, too). Look at the cartoon from the long-running series "Han Ola and Han Per" during the 1910s and 1920s in *Decorah Posten*, the bilingual newspaper published in Iowa for the Norwegian immigrant community. The dialogue is translated into both languages in an edition from the University of Iowa Press:

270. *Formeget og forlidet skjæmmer ud* Too Much and Too Little Are Equally Bad / May 6, 1927

1. "But what in the world kind of patent have you made now, Per?" "Oh, it's just an electric fan for driving the windmill. When you turn that pointer you can change the speed. There are three speeds: 'light wind,' 'strong wind,' and 'hurricane.'"

2. "I've set the pointer at 'light wind.'" "It won't run. Try 'strong wind.'"

3. "Does it turn around now, Per?" "Yes, now it runs lickety-split!"

4. "Now I've set the pointer on 'hurricane,' Per."

One of the running jokes in the strip, as here, is Han Per's obsessive inventiveness when transplanted from traditional Norway to a high *B* place. Sometimes his inventions are riffs off the latest New Thing, such as the auto, sometimes it re-uses in a crazy way an older technology, such as the windmill for pumping a well (Edgerton 2007). During the life of the strip, as the editor of the collection of the cartoons notes, Per tries out with disastrous effect fully *sixty* new machines "invented (or bought) by Per." The cartoonist, suggestively named Rosendahl (a rare enserfing barony in Norway, a few miles from my great grandfather's shockingly poor if beautiful farm), "presents him as the undying optimist, trying in every way possible to mechanize not only the outdoor work of the farmer but also the indoor work of his wife." It was high *D* and *B* in the upper Midwest.

What matters, then, is human creativity liberated by liberalism. Innovism, not tricky proposals for utilitarian nudging and planning by the state, or endless theoretical attempts to endogenize *I* by noting this or that feedback from materialism, should be the focus of economics. Economics should become "humanomics," that is, an economics with the philosophy, history, literature left in. No one would deny, I've noted, that having a free artistic or scientific community is good for us. Yet then many people will deny the same in the economy. They think, as we Ivy League economists did in the 1960s, that "fine tuning" is what the economy needed, and that we expert economists from Harvard, Yale, and Princeton could provide it.

No Swede forgets the modern expression of the nation as a home, *folkhemmet*, the *mysigt* ideal expressed in a famous speech in the Riksdag by Per Albin Hansson on 18 January 1928. In a passage in the speech he declared that, like the good nation, "the good home knows no privileged or misfortuned, no favorites or undesired. There no one looks down on the other. There none try to gain benefits on the others expense, the strong do not oppress and plunder the weak. In the good home reigns equality, kindness, cooperation, helpfulness." Lovely an loving and good in a literal home.

Yet the home is not an appropriate model for the nation. Yes, it is literally the instructress. What you learn at your mother's knee matters mightily to a good society, to *D* and *B*˛ for example. Institutions of a liberal society, or for that matter of a conservative or socialist society, are dead letters or worse without ethics. The three Soviet constitutions were lovely, liberal documents, guaranteeing liberty from state violence in all directions. The pity is that their implementers from Lenin to the end, and now Putin beyond the end, were ethically defective thugs—no doubt because of their mothers.

One can see the dangers of modeling by *folkhemmet*. You have to plan your own life, of course. And when you were a child, Mum and Dad planned it for you. Good. The life of an individual or a family without planning aimed intentionally at a single end, such as putting dinner on the table, would be dangerous chaos. True, any adult knows that such plans do not always work out in the family. But at the level of family life, some plan is better than no plan, to get the kids off to school, to clean the house, to do your job, and at the level of the nation to get people vaccinated. One can see the dangers of modeling by *folkhemmet*. You have to plan your own life, of course. And when you were a child, Mum and Dad planned it for you. Good. The life of an individual or a family without planning aimed intentionally at a single end, such as putting dinner on the table, would be dangerous chaos. True, any adult knows that such plans do not always work out in the family. But at the level of family life, some plan is better than no plan, to get the kids off to school, to clean the house, to do your job, and at the level of the nation to get people vaccinated.

People will say that a big modern economy needs big modern regulation and planning. But it's the other way around. The bigger and more complicated an economy s, the less it can be planned. You plan today to pick up a sandwich at the little place at the corner on your way home from work. But does it seem plausible that a bureaucrat in Washington or London or Stockholm or Moscow can anticipate your plan in The Plan, or design what Regulations make sense? You know what shop has the best sandwiches. You went to school with the owner. She doesn't want to poison you. Washington doesn't know, or short of bureaucratic sainthood doesn't much care.

A big economy works best, the evidence agrees, bottom-up, not top-down. Yet what is "best" here? The liberal points out that in a varied society the definition of the best is as varied as 330,000,000 loves and abilities and projects. Since 1776 we have believed it, if not always followed it, and sometimes we fall again into the traditional collective, unified, one-goal national enthusiasm for Harry, England, and St. George. The liberal historian Lord Acton observed in an essay on nationality in 1862: "Whenever a single definite object is made the supreme end of the State, be it the advantage of a class, the safety or the power of the country, the greatest happiness of the greatest number, or the support of any speculative idea, the State becomes for the time

inevitably absolute" (Acton 1862). Mum and Dad in a home *should* be absolute. Eva and Gunnar in a nation should not.

Liberalism has worked. China and India ran for decades on the analogy of state as an authoritarian home, what the Indians bitterly called, I have noted, the License Raj. They both sat at $2 a day per person for decades after 1947. Then China in 1978 and India in 1991 began loosening the planning and regulation, letting people start businesses more easily and go to where the work was and carry out their little personal projects without Mamma Gandhi or Pappa Mao. Income in China is now equal to that of Brazil. India is catching up.

The danger in statism is a contempt for the difficulty of creativity in business, or for that matter in family life, Papa Gunnar and Mother Eva taking over both from their offices in Stockholm. It's Max *U*, they say, easy, slam bang. Fix those so evident, though quantitatively undocumented, imperfections. Tell people how much tooth paste to put on their brush. Encourage them to revert to being sad or bad children. The monopoly of Max *U* in Samuelsonian economics focusing on F(*K, sL*) top down has not been good for the inquiry into the nature and causes of the wealth of nations, not for policies.

We need to honor I(.) scientifically, in our hypotheses and in our scientific practice, and ultimately in our politics, in the liberal world of human creation for good.

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