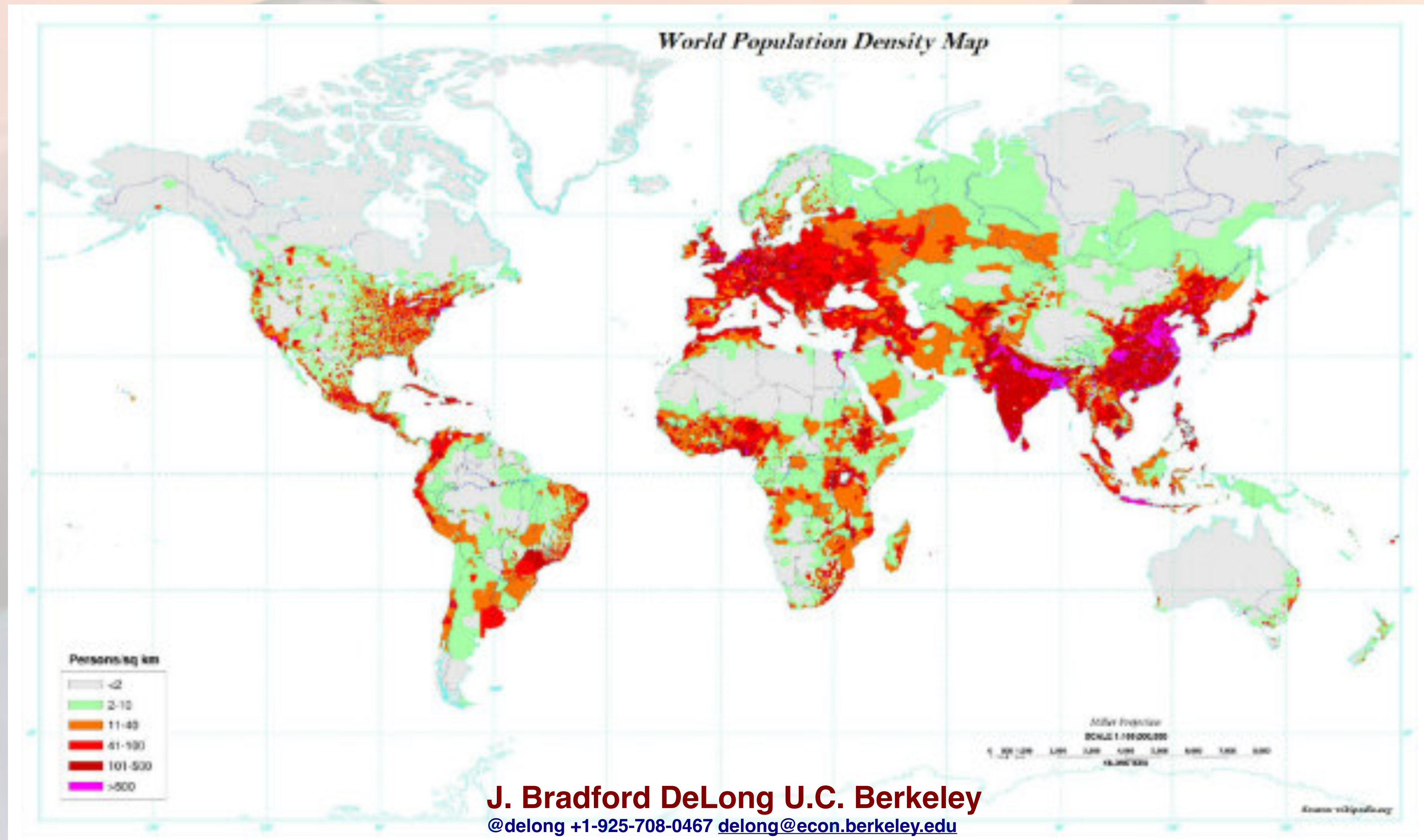


The 20th Century



Quantitative

Guesses

Guesses at Human Population

Date	Population P (millions)
-73000	0.005
-68000	0.1
-48000	0.2
-8000	2
-6000	5
-3000	15
-1000	50
150	200
800	240
1500	500
1770	750
1870	1300
2010	6900
2100	9000
2200	9000

The English-Wage Hockey Stick



English construction workers

- Lots of priests and monks in England hiring construction workers, and then writing everything down, and then saving it
- English construction workers on average earned the same real wages in 1000, in 1450, and in 1850
- In John Stuart Mill's old age—1870—they were only 20% above what they had been 400 years before.
- Yet today they stand sixteen times as high as in 1800—and maybe much more

Rick: Steckel: Heights...

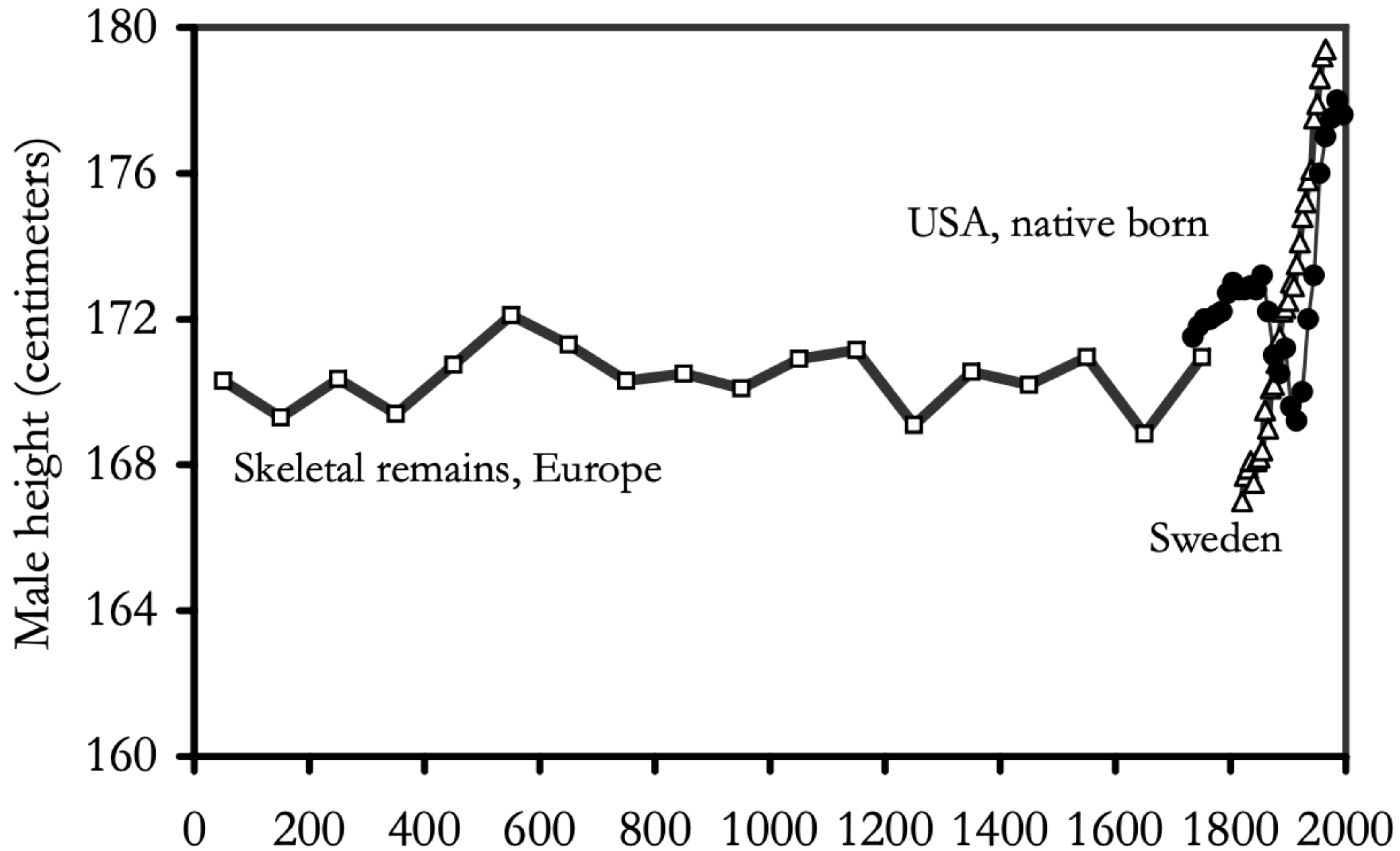


Figure 3.6 Male heights from skeletons in Europe, AD 1–2000. Data from Steckel, 2001, figures 3 and 4, and Koepke and Baten, 2005.

- What diet stunts your adult height by 8 cm?
- Upper classes 5 cm or so higher than lower classes...
- What would Alameda County child and protective services say about this?
- What constraints are parents under for this to happen?

Guesses at Human Population & at Average World Income

Date	Real Income/ Capita y	Popula- tion P (millions)	Total Income Y (billions)
-73000	\$1,200	0.005	
-68000	\$1,200	0.1	\$0.12
-48000	\$1,200	0.2	\$0.24
-8000	\$1,200	2	\$2.4
-6000	\$900	5	\$4.5
-3000	\$900	15	\$14
-1000	\$900	50	\$45
150	\$900	200	\$180
800	\$900	240	\$216
1500	\$900	500	\$450
1770	\$1,100	750	\$825
1870	\$1,300	1300	\$1,690
2010	\$11,600	6900	\$80,040
2100	\$53,802	9000	\$484,214
2200	\$397,543	9000	\$3,577,883

For the World as a Whole:

- \$13,000/year & 8B; 2020
- \$11,600/year & 6.9B: 2010 estimates
- \$1,300/year & 1.3B: backward projections at crudely-estimated growth rates; 1870
- 750, 500, 240M: well-informed guesses
- 200, 50, 15M: guesses
- 5, 2, 0.2, 0.1, 0.005M: barely-even guesses
- \$1,200/year: inference based on relatively healthy gatherer-hunter skeletons
- \$900/year inference based on not-so-healthy typical agrarian-age skeletons
- \$1100/year: interpolation

Heroic Assumptions

Date	Real Income/ Capita y	Popula- tion P (millions)	Ideas Growth Rate h	Ideas Stock Level H
150	\$900	200	0.060%	0.272
800	\$900	240	0.014%	0.297
1500	\$900	500	0.052%	0.429
1770	\$1,100	750	0.149%	0.643
1870	\$1,300	1300	0.442%	1.000
2010	\$11,600	6900	2.159%	20.557
2100	\$53,802	9000	2.000%	108.893
2200	\$397,543	9000	2.000%	804.618
2500	\$160,380,	9000	2.000%	324606.13

$$H = \left(\frac{n + g + \dots}{s} \right) y\sqrt{L}$$

- Assume constancy of capital intensity...
- Assume constancy of labor-force share...
- Assume $\alpha = 2$
- Normalize...

$$H_{1870} = 1$$

$$H = y\sqrt{P}$$

Adding Economic Theory...

Longest-Run Global Economic Growth

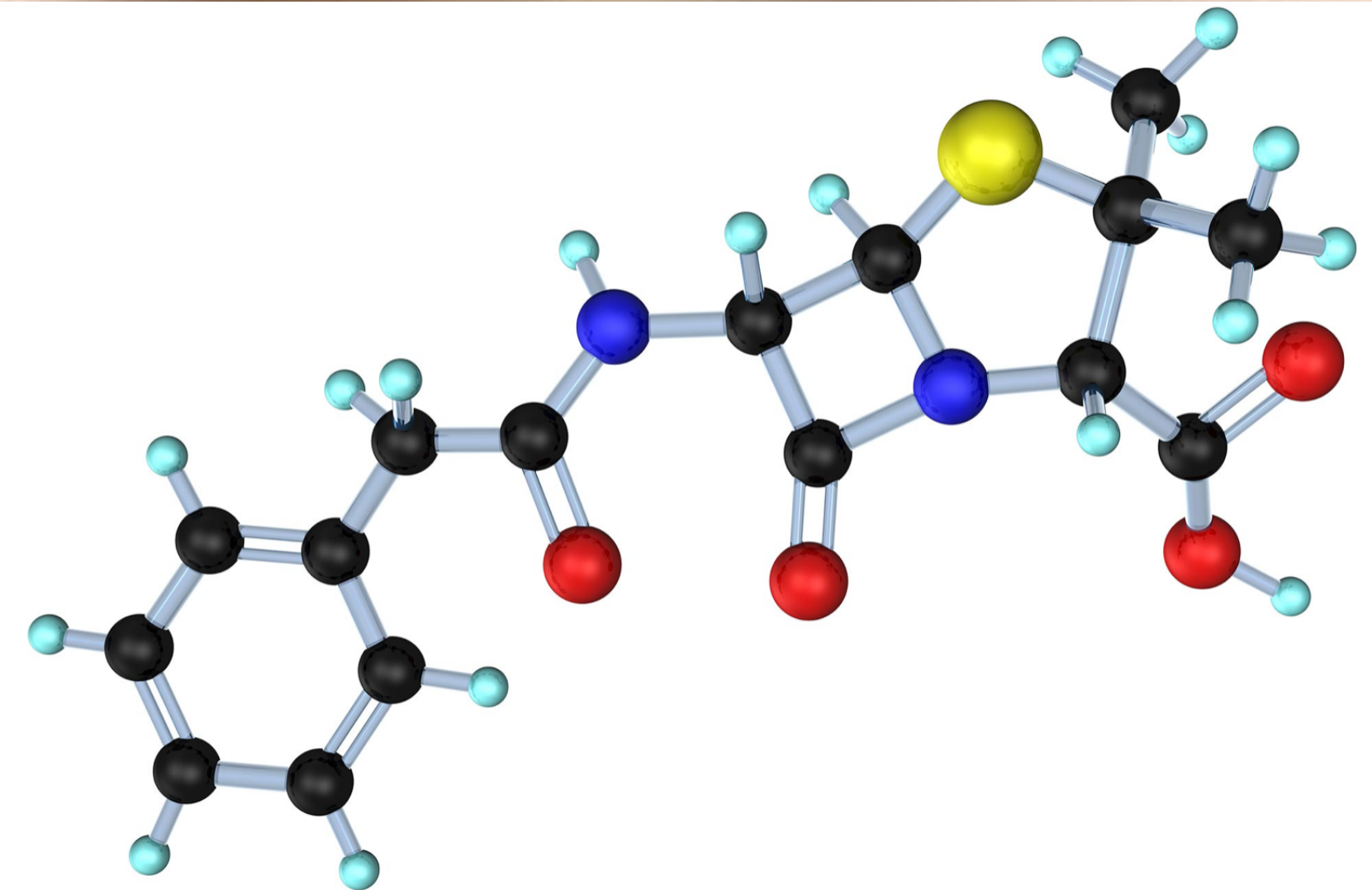
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-68000	\$1,200	0.1	\$0.12
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2010	\$11,600	6900	\$80,040
2100	\$53,802	9000	\$484,214
2200	\$397,543	9000	\$3,577,883
2500	\$160,380	9000	\$1,443,420

An Economic Model...

- $y = E$
- $= s / (n + g + \delta)$
- $E = H (R/L)^{1/2}$

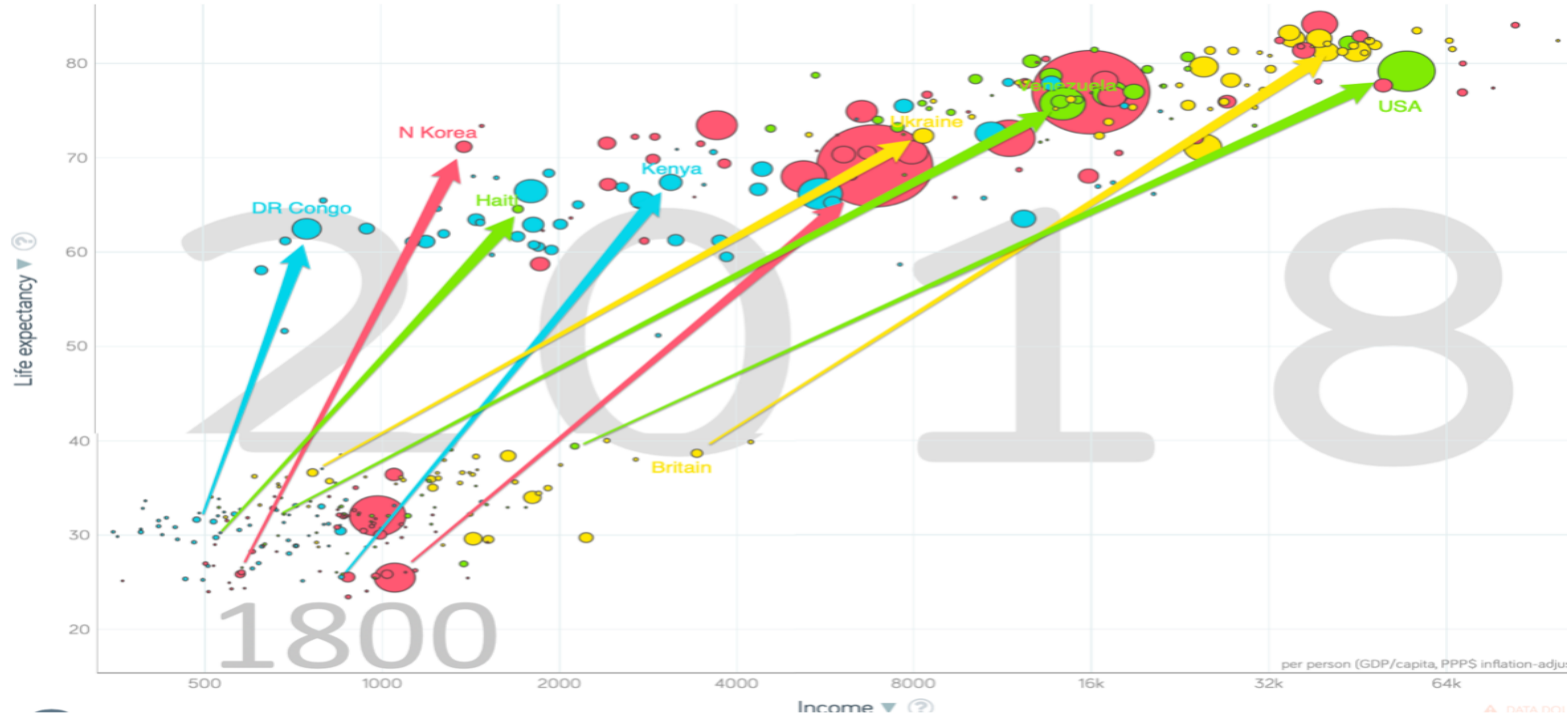
- y , income per worker
- k , capital-intensity
- α , salience of capital vs. efficiency in production
- E , labor efficiency
- s , savings-investment share of spending
- n , labor-force growth rate
- g , labor-efficiency growth rate
- δ , capital depreciation rate
- R , natural resources
- L , labor force (assumed constant share of population)
- β , salience of ideas vs, resources in efficiency
- H , value of the stock of useful “technological” ideas about manipulating nature and organizing humans discovered, developed, deployed, and diffused throughout the global economy
- Is this?
 - A powerful intuition pump?
 - A filing system?
 - A pointless and exclusionary ritual exercise?

Are These Estimates of the Right Thing?



Global Inequality

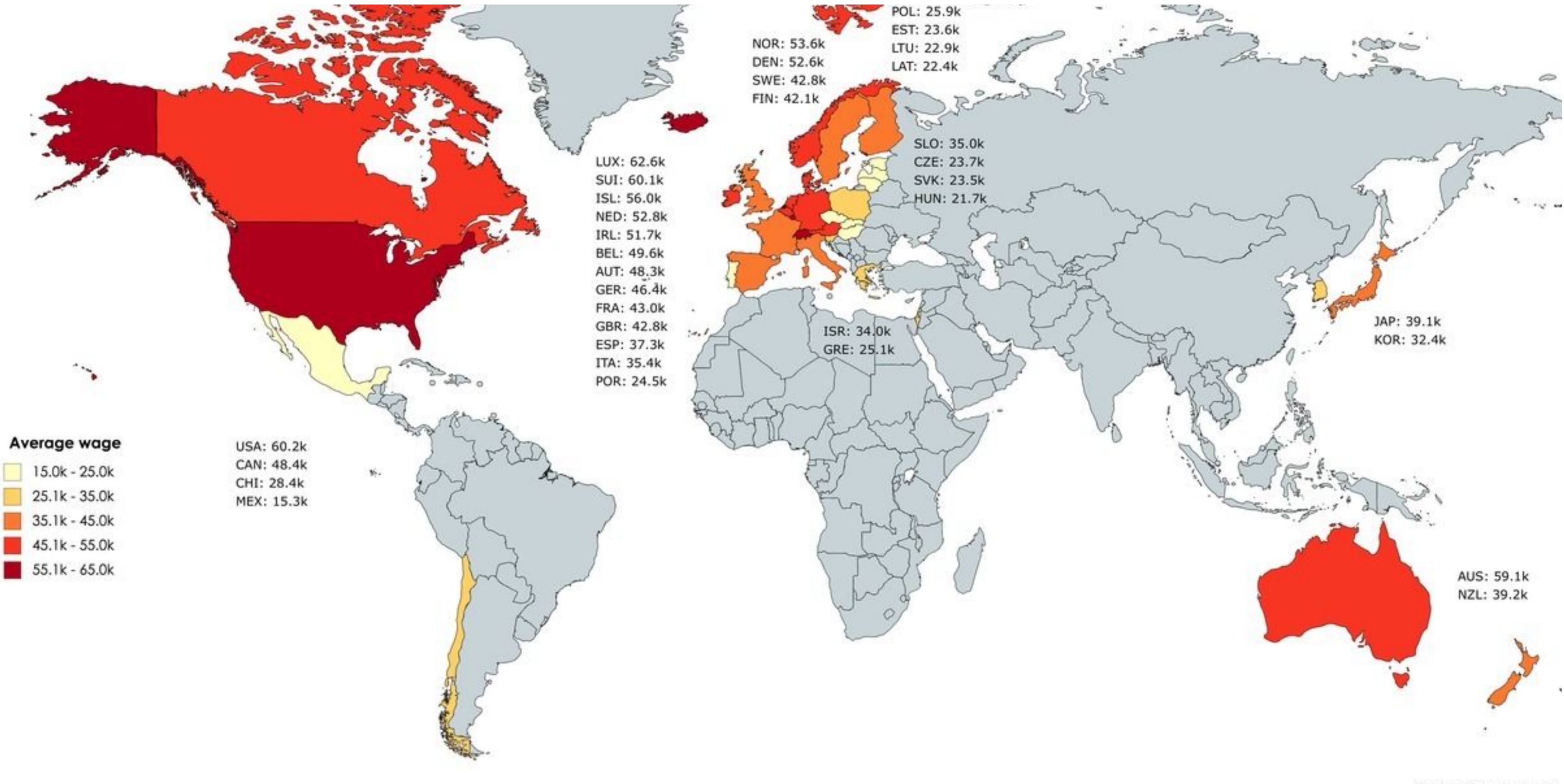
And Global Inequality...



The Dover Circle—and Its Spread

Conquest, Settlement, Emulation...

- Plus resource engrossment: imperialism & neoimperialism
- 2.5% of the world's population in 800, 5% in 1500, 15% in 1870, 11% of the world's population today
- Leading edge vs. world as a whole: 1-1 in 1500, 1.1-1 in 1770, 2.1-1 in 1870, 4.5-1 today



The World...

Date	Ideas Growth Rate h	Ideas Stock Level H (1870 = 1)	Real Income/ Capita y	Population P (millions)
-48000	0.002%	0.011	\$1,200	0.2
-8000	0.005%	0.057	\$1,200	5
-6000	0.003%	0.061	\$900	10.00
-3000	0.007%	0.074	\$900	15
-1000	0.030%	0.136	\$900	50
150	0.060%	0.272	\$900	200
800	0.007%	0.285	\$900	220
1500	0.062%	0.467	\$1,000	480
1770	0.146%	0.694	\$1,100	875
1870	0.365%	1.000	\$1,300	1300
2020	2.282%	27.000	\$12,000	7800

World

Date	Ideas Growth Rate h	Ideas Stock Level H (1870 = 1)	Real Income/ Capita y	Population P (millions)
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-8000		0.05	\$1,200	0.1
-6000	0.003%	0.05	\$900	0.3
-3000	0.007%	0.06	\$900	0.4
-1000	0.030%	0.11	\$900	1.4
150	0.071%	0.24	\$900	6.9
800	0.007%	0.26	\$900	7.5
1500	0.086%	0.47	\$900	25
1770	0.243%	0.9	\$1,400	75
1870	0.799%	2.0	\$2,800	175
2020	2.808%	135	\$60,000	800

Dover Circle

Date	Ideas Growth Rate h	Ideas Stock Level H (1870 = 1)	Real Income/ Capita y	Population P (millions)
-48000				
-8000		0.058	1200	5
-6000	0.003%	0.061	900	10
-3000	0.007%	0.075	900	15
-1000	0.030%	0.137	900	49
150	0.060%	0.272	900	193
800	0.007%	0.286	900	212
1500	0.070%	0.467	1005	455
1770	0.136%	0.675	1072	800
1870	0.224%	0.844	1067	1125
2020	1.903%	14.657	6514	7000

Elsewhere

The “Dover Circle”

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		Elsewhere		

The Pre-1870

World

Aristotle & the Four Branches of the Science of Acquisition



The Arming of Akhilleus



Why 1870 Is the Hinge of History

- 1870 as the hinge of history...
- Before 1870 humanity desperately poor: ensorcelled by the Devil of Malthus...
- Before 1870, governance a force-and-fraud game by thugs-with-spears (and their tame accountants, bureaucrats, and propagandists)...
- Only an élite and their families can have *enough*...
- After 1870, constant technological revolution and the demographic transition...
- Thus everyone can have *enough*—“exceed the limits of human felicity”...

Toward the 20th Century: Feudal to Commercial-Imperial

- Feudal-era forces- and relations-of-production taught:
 - society is static, hierarchical
 - who you is chosen for you by the role ascribed to you
 - production is small-scale, handicraft, and individually autonomous
 - those who work owe rent to those who protect them and tithes to those who guide them to salvation. Hence Agrarian-Age forces-of-production requires that we write something like feudal-society software to run on top of it.
- Commercial-imperial gunpowder-empire forces- and relations-of-production taught:
 - society is mobile, contractual
 - who you are is chosen by you—if you can make a contractual-network place for yourself;
 - production is middle-scale, aided by tools and finance, and interdependent
 - in a peaceful world we can make and fulfill the bargains and contracts our interdependence requires
 - the bourgeois virtues.
- Steampower & after society?



The 20th Century

How have we handled the opportunities and dangers that opened up around 1870?

In the 20th Century: Commercial-Imperial to Steampower

- After 1870, it is clear that soon, very soon, governance no longer has to be a force-and-fraud scheme...
- Freddie from Barmen: The requirements of organizing production in Steampower & Machinery Society will teach us:
 - to recognize our interdependence...
 - to recognize our collective power...
 - to recognize our individual equality...
 - that it is fair that we rotate through administrative jobs...
 - that we really want to all wear identical blue overalls...
 - that we really want to all call one another “comrade!” ...
- The problems of slicing and tasting the sufficiently large economic pie are second-order...



**No, “Steampower &
Machine Society” not the
end of history either...**

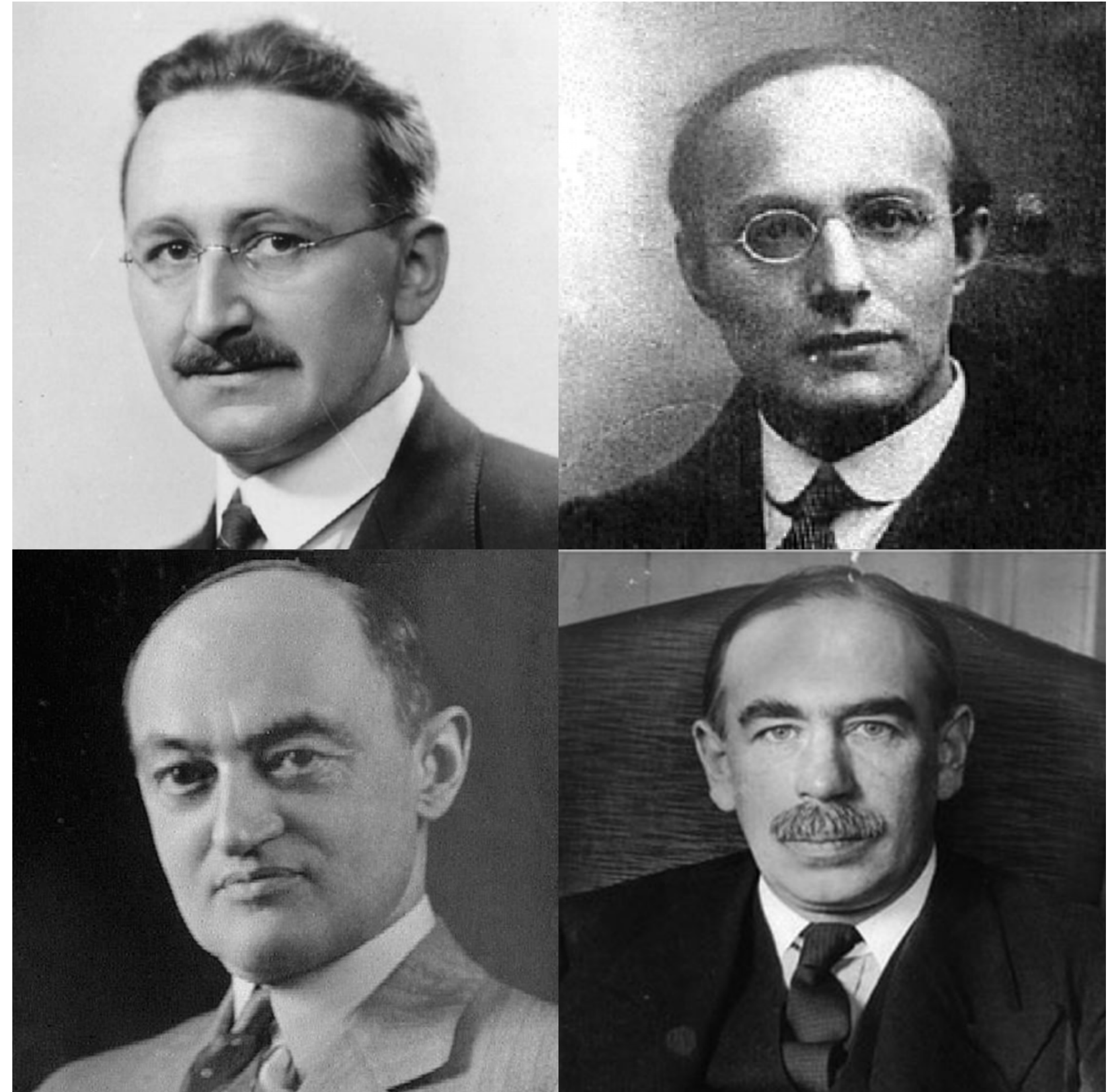
After Steampower...

- What possibilities were unleashed by the coming of the:
 - Applied Science?
 - Mass Production?
 - Global Value Chain?
 - Info-Biotech?
- Different:
 - Externalities
 - Distributions
 - Psychological Lessons

Date	Ideas Growth Rate h	Ideas Stock Level H	Real Income/ Capita y	Human Population P (millions)
-6000		0.06	\$900	10
800	0.023%	0.28	\$900	220
1500	0.071%	0.47	\$1,000	480
1770	0.146%	0.69	\$1,100	875
1870	0.365%	1.00	\$1,300	1300
1930	1.831%	3.00	\$3,000	2100
1975	2.441%	9.00	\$6,000	4000
2020	2.441%	27.00	\$12,000	7800
2050	1.250%	40.00	\$16,000	9500

Hayek, Polanyi (Karl), Schumpeter, Keynes

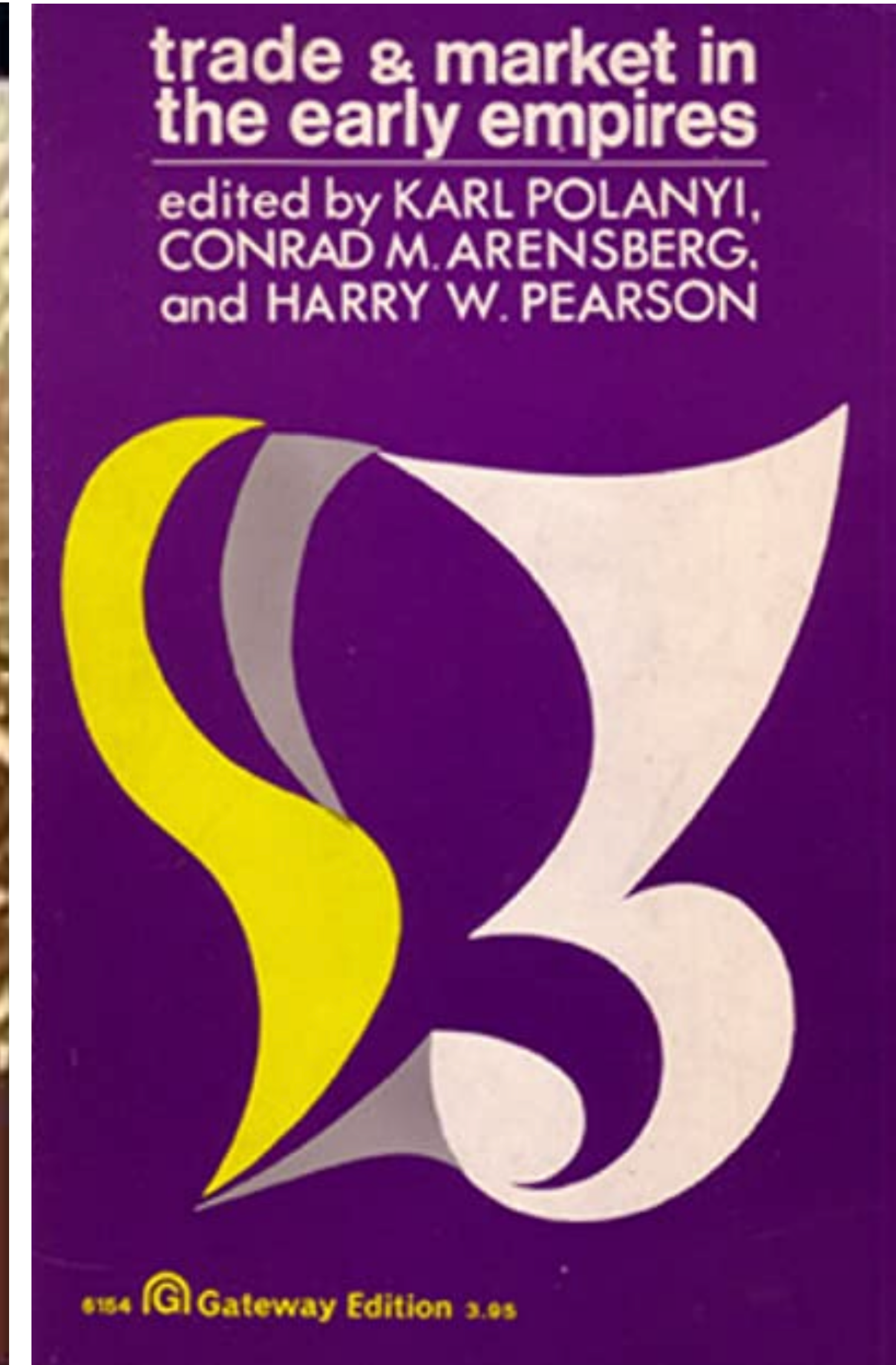
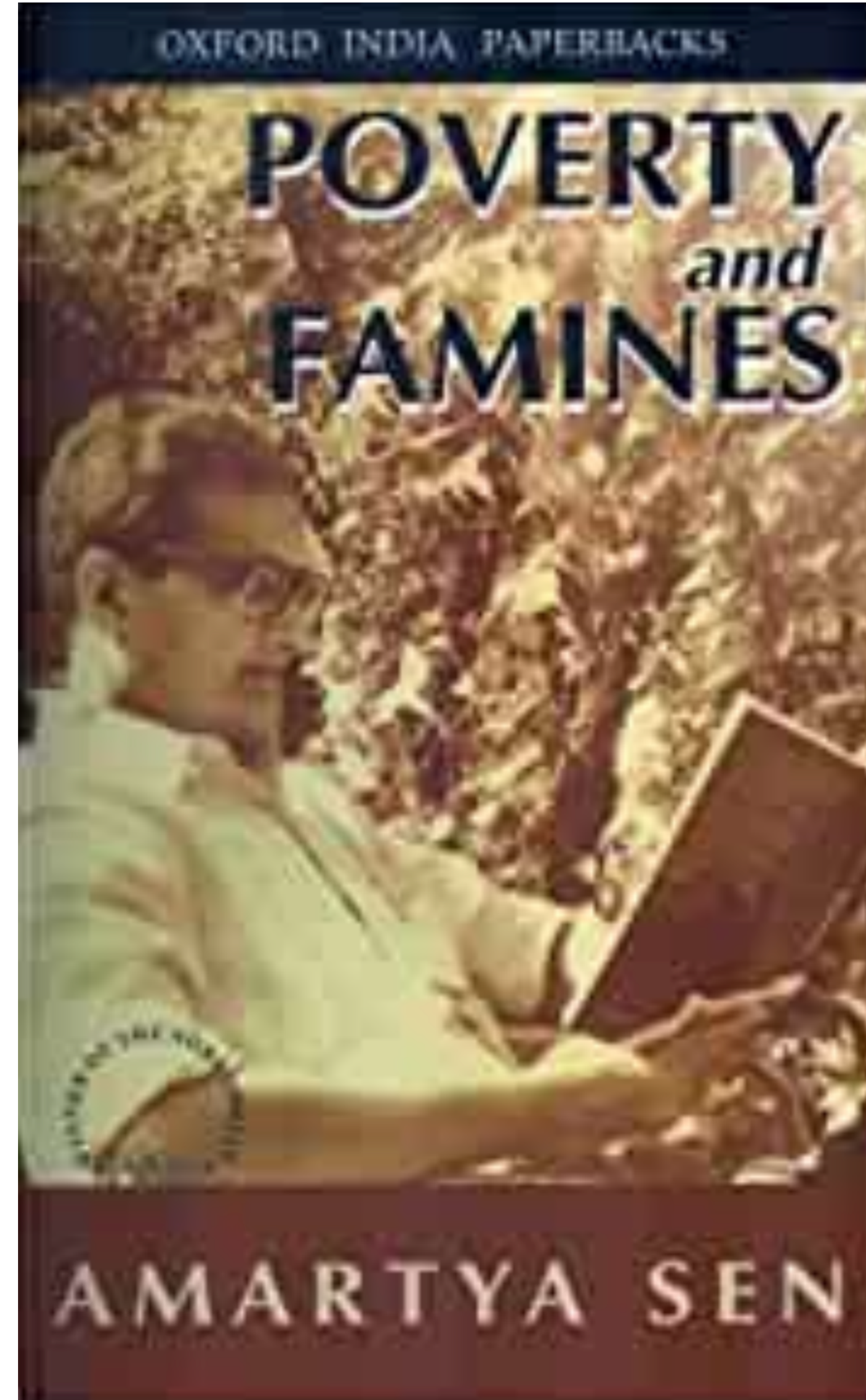
- Schumpeterian creative-destruction revolutionizing the economy every generation...
- Schumpeterian creative-destruction creating immense wealth...
- Schumpeterian creative-destruction destroying firms, jobs, occupations, livelihoods, communities...
- We need the market economy to crowdsource the problems of managing our immensely complex division of labor...
- But the only rights the market vindicates are property rights...
- That stark utopia is not fit for humans...
- How to cobble together rewritten software code for society on the fly so that it does not crash as the underlying forces-of-production hardware changes?...



**Why have we been
so flummoxed?**

**We need help in figuring out
how to rewrite society's
software code, yet again...**

Amartya Sen



Franklin Delano Roosevelt

The Four Freedoms



**Freedom
of Speech**

**Freedom
of Worship**

**Freedom
from Want**

**Freedom
from Fear**

Utopias



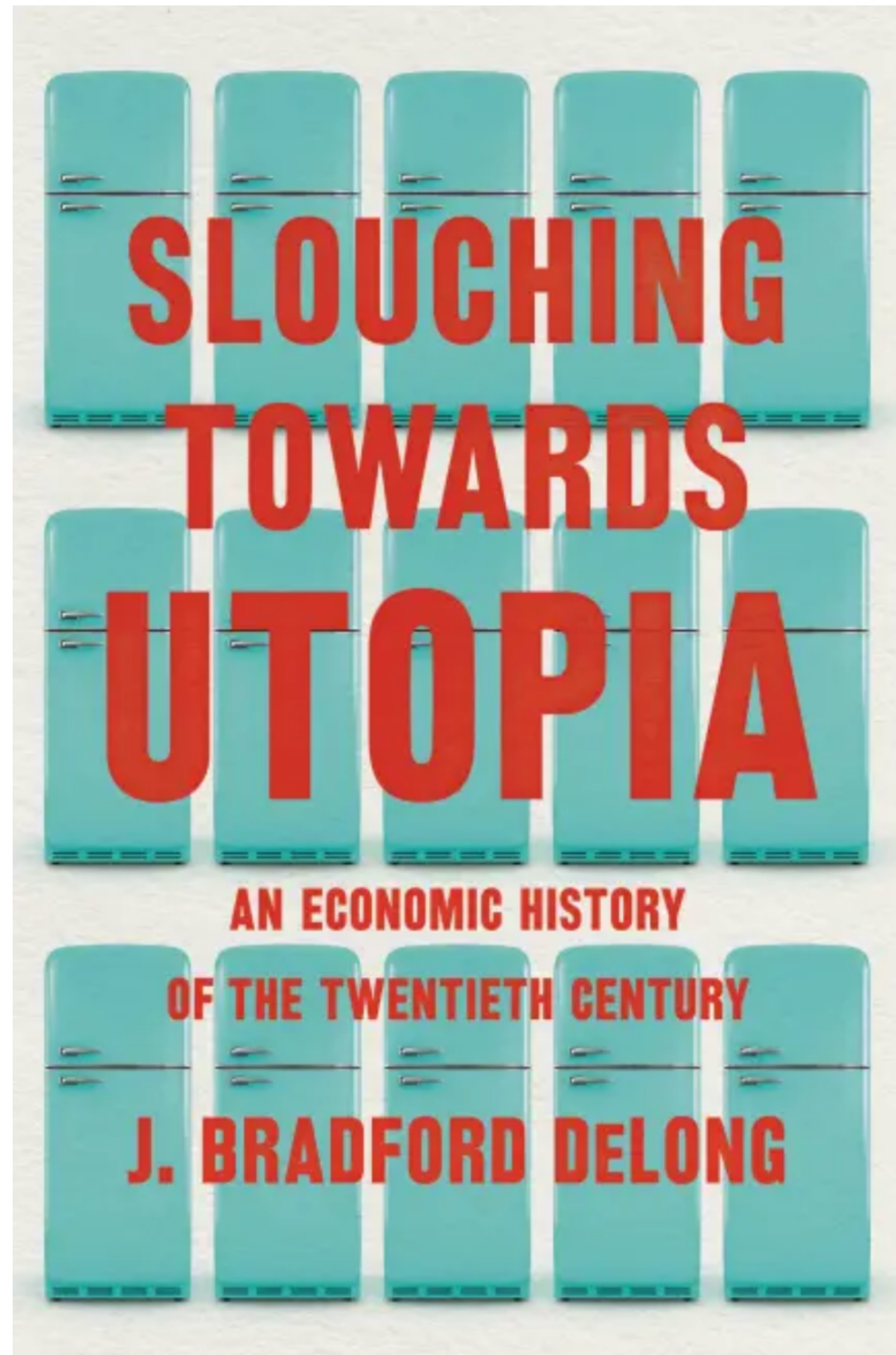
Catch Our Breath

Let's reflect on what we have just heard & seen...

1. Comments
2. Questions
3. Readings



Slouching Towards Utopia



Slouching Towards Utopia

An Economic History of the Twentieth Century

by J. Bradford DeLong

<https://bit.ly/3pP3Krk>

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