

Let's get real about the prospects for the American lifestyle

### ***Two overwhelming realities***

Put baldly, the lifestyle of the vast majority of Americans is sliding downward slowly and apparently inexorably; Asian and even African lifestyles are rising, some slowly, some fast; Latin America is a mixed bag. The political discourse in America centers, in the large, on identifying a small flock of scapegoats – variously on different sides of the political spectrum, these include immigrants, trade pacts unfavorable to American workers, corporate greed, welfare statism, and the like. Some are near the mark, most are far off target. Apart from the diverse rhetoric, there are two fundamental realities to be faced. First, America no longer has the claim on world's physical resources that it had some decades ago, whether these are minerals that we use in manufacturing jet engines, smartphones, and much more. The hard figures are shocking. Second, America no longer has an oligopolic claim, along with Western Europe and a few other nations, on the world's intellectual resources that it had those same decades ago, be these engineering know-how, financial know-how, or other powers that structure the modern world. Resources both physical and intellectual are spread out now, with no legitimate way to gather them back to the US, if there ever was such a way. The world's wealth is leveling out, the US falling and much of the rest of the world rising. This is so, at least, on the scale of nations and their sovereign wealth, though not so equably on the scale of the individual citizens of rising nations who are often under oligarchic (e.g., China, Russia) or even despotic rule (Saudi Arabia, Iran – however much ameliorated with selective freedoms).

### ***Progress is not guaranteed***

Before I elaborate some about the loss of control of the US on world resources, I must note that progress in global wealth is not inevitable over the next decades. Economists are unduly optimistic; it's an occupational disease. There is certainly lots of material progress to cite, in manufactured goods, while much more dubiously in services, particularly financial services. There are, nonetheless, real diversions and traps in the way. Take emerging diseases- Zika, ebola, dengue, chikungunya, West Nile, Japanese equine encephalitis, SARS, MERS, multidrug resistant malaria, tuberculosis, and staph among humans, Uganda 99, rice blast, and XXX for crops. Bright spots such as the elimination of smallpox and the near-elimination of polio are outnumbered by the emerging diseases. Also, take the exhaustion of resources built into the core of economic systems, local to global, that are substantially based on capitalism. Capitalism, which is only about 400 years old as the latest economic system replacing mercantilism, has a requirement for ever-expanding resource use. It's in a broad sense a massive Amway scheme or Ponzi scheme. It takes negligible mathematical ability to see that this doesn't work on a finite planet. Resource exhaustion has already hit the US – even if not as absolute depletion but often as extraction becoming uneconomical on remaining lower-grade resources. Resource substitution is often cited by economists as an escape – fiber optics for copper lines for communications, for example – but it can't be done indefinitely. Over and above resource depletion are a number of collateral damages such as pollution of air, soil, and water, to which China is the poster child (remember that when you drink fruit juice, much of it blended with apple juice, 60% of which comes to the US from China).

Not a damage from resource use but a vulnerability is the instability of key industrial systems, with the electric grid being a sobering (I hope) example. The US and Canada have an electric grid composed of six individual grids. The whole grid has to maintain both voltage and frequency within tight limits or else cascading outages occur, such as the 1988 East Coast outage triggered by a solar storm disabling the

Quebec Hydro grid (power lines act as giant radio antennas, with solar storm particles hitting them generating huge overvoltages). The grid is susceptible to such solar storms as well as to physical disruption (bullets into the San Jose substation), cyberattacks (we are unprepared), and simple age (the average age of major transformers is 40 years, also near the expected lifetime – replacement of a major transformer can require two years, and a city without power become uninhabitable). Taken together, disruptions from any source can generate rippling instability in any complex system, the electric grid included. The grid must be viewed as the very largest machine ever built, with 5500 massive generators all rotating in unison, equivalent mechanically to XXX. Should – or when – the grid fails, we must realize that lack of electrical power on a large area translates to lack of lights, communication, goods transport, financial transaction processing, water pumping, and sewage pumping and treatment, or, simply, uninhabitability. Preparations?

One collateral damage of resource use that overwhelms all others in its scale in space and time is climate change.

Ag adapted to current conditions

Climate migrants

Indonesia ICTZ (we all heard of submerging nations)

### ***Loss of the US claim on physical resources***

I return to the loss of control or claim of the US on the globe's physical resources. The US started a remarkable trajectory as the major world power around the time of the US Civil War with its rapid industrialization, supported by geographically and volumetrically vast resources of the common materials and flows of industry in that era – timber, water power, iron ore, then shortly, oil and ores of alloying minerals. One reality of the modern era is that we used up much of those resources, certainly relative to modern rates of demand. That's how we ended up importing such a great fraction of our demand on oil (temporarily alleviated by the expansion of fracking now). A second reality is that the modern world's economy doesn't run on the resources we have left. Just in minerals alone, we import over 90% of 22 non-fuel minerals, ranging from aluminum ores to rare earth metals (think motors and smartphones) to niobium for jet engine alloys. We import 50% or more of our demands for 21 more minerals, ranging from potash (glassmaking, fertilizers, etc.) to tin to chromium to diamond (gemstone and industrial).

In the past, the US exerted corporate and political control, sometimes very heavy-handed, to exert control on resources. Recall the era of gunboat diplomacy, and the more recent era of overthrowing Latin American governments, to give us cheap fruit or minerals. The US has invaded Latin American nations 33 times. The US and European nations controlled oil in the Middle East, diverse mineral resources in Africa and Oceania by force for decades, but it became untenable economically, legally, and morally, resulting in nations becoming independent in the 1960s and thereafter. Corporate control can be just as strong, using international trade policies written by the most powerful nations, the US included. More recently, trade pacts have disfavored the average American citizen to favor, instead, corporations. The major corporations are now overwhelmingly multinational, having no allegiance to any nation. They will negotiate their individual agreements or the multinational trade pacts to their advantage. If you have allegiance not extending outside your organization, why not site a factory and hire workers where the wages are lowest and the ability to externalize costs of pollution and social disruption are the lowest? To the question of what can be done about the adverse effects, the answer has many ramifications, of which I can touch only a few.

### ***Global redistribution of intellectual resources***

I return to the changes in the allocation of the world's intellectual resources. Making cars, making jet engines, designing massive hydropower dams, designing and installing the Internet, designing and producing new drugs – all these take very high levels of knowledge. The US and Western Europe long had a near monopoly on the great universities and great industrial research labs (Bell Labs, the Rutherford lab...). Knowledge, however, escapes any geographic boundaries and multiplies. The cat is out of the bag on how to make a nuclear weapon, as we all know; just the fact that one weapon could be made enabled physicists all over the world to put together all the concepts for any nation to make one. It's also out of the bag about how to make a high-quality automobile suspension, or a smartphone, or a jet engine. To be sure, the US and Western Europe still dominate in the number of intellectual wellsprings. However, citizens of other nations are welcomed to study in these institutions and to take the intellectual power home. There are many reasons why this reverse brain drain is tolerated and even encouraged. One reason is that there are too few intellectually prepared native citizens to do all the research and development. America, for one, has always thrived on the brains as well as brawn of immigrants. Think of the time during and immediately after World War II, when we received the great European scientists and engineers – von Neumann, von Braun, Ulam, and many more. Think also of the state of American primary and secondary education, generating a steady stream of young citizens whose average ability in science, technology, engineering, and math is mediocre at best and whose intellectual work ethic is similarly mediocre. I speak from decades of experience here, seeing both American students viewing these fields as too demanding as a self-fulfilling prophecy and Asian, Latin American, and African students eager and willing to take the challenges. It's rare now to see a scientific research paper in a top international journal without a Chinese co-author, for one.

### ***Where does it go from here?***

In summary, irreversible forces have and are redistributing the resources available to the US as a whole. Can the US maintain what is mostly an unearned privilege, its citizens having been born in the right place or having moved here? This is a “whole ‘nother story,” in which I may mention a few threads.