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Book Reviews

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Sixteen Worldviews:
A Summation of Recent Reviews

Where is humanity headed? What are the major problems that must be addressed, and what should be done?

Recent Book of the Month (BOM) selections for Global Foresight Books, especially for 2013, have focused on these important questions. Now is the time for a brief summary and preliminary analysis—a rough mapping−of their similarities and differences. Reviews of virtually all of the books summarized here have appeared in recent issues of *CADMUS, Eruditio,* and *Op-Ed.* However, to readily see them all together, it is best to go to www. GlobalForesightBooks.org and click on Book of the Month. Better still, open up the *GFB Update* Newsletter (3:5/6, 2013), which repeats this essay, along with linkages to all books cited.

1. General Perspectives

The latest selection (see long review, above) provides an excellent starting point: **Now for the Long Term: The Report of the Oxford Martin Commission for Future Generations** (University of Oxford, Oxford Martin School, Oct 2013, 85p; BOM 11/13). This impressive, broad-ranging, and amply documented report identifies key "megatrend" drivers of change, areas where action is imperative (boosting youth employment through "youth guarantee programs," reducing inequality, tackling climate change, risk prevention for better health, targeting corruption, more transparency on taxes, etc.), elements to overcome impediments to action, problems of growing complexity and public trust, the need for "creative coalitions," more innovative institutions, revaluing the future, "more global conversations," and an agreed global ethic.

A somewhat similar overview is provided by former Vice President Al Gore in **The Future: Six Drivers of Global Change** (Random House, Feb 2013, 558p; BOM 4/13), describing a "future now emerging that will be extremely different from anything we have known." The six "revolutionary" drivers are a deeply interconnected global economy, a planet-wide communications grid, a new balance of political/economic/military power, unsustainable growth in population and resource consumption, emergence of a new set of powerful technologies (biological, biochemical, genetic, materials), and human civilization colliding with the natural world and causing grave harm (notably due to climate change). Gore's prescriptions include stabilizing human population growth, following principles of sustainability, a full and accurate measurement of value and externalities, re-evaluating reliance on the GDP measure of progress, fully recognizing the value of public goods, and

restoring our ability to communicate "clearly and candidly" with one another in a broadly accessible forum.

Another framework for appreciating global problems and possibilities is offered by the Millennium Project (Jerome C. Glenn, Director), which assesses 15 Global Challenges in its annual **State of the Future** reports, begun in 1997. See the long review of **2010 SOF** (July 2010, 88p; BOM 9/10) and a shorter review of **2011 SOF.** The Global Challenges deal with familiar topics such as sustainable development and climate change, clean water, energy, population growth, promoting democracy, new and re-emerging diseases, and the status of women. Less familiar but important topics include transnational organized crime, new security strategies, improving decision-making capacity, more global long-term perspectives, ethical market economies, ethics in global decisions, and promoting collective intelligence about accelerating science and technology and other matters. The MP, with 49 "Nodes" around the world, now offers ongoing updates of the individual challenges (https://themp.org/#). The 2013-2014 edition of **State of the Future** is available on http://www.millennium-project. org/millennium/publications.html.

A considerable amount of fresh thinking around the broad topic of "security" is provided in **The Quest for Security: Protection Without Protectionism and the Challenge of Global Governance,** edited by Joseph E. Stiglitz and Mary Kaldor (Columbia University Press, April 2013, 412p; BOM 8/13), with essays on economic security without ruinous nation-state protectionism, Scandinavian equality, the need for global security cooperation, restructuring global security with "human security" as the organizing framework, trends in global criminal industries, sharing the burden of adjusting to climate change, designing the post-Kyoto climate regime, how cities have taken the lead in facing global governance challenges, urban security challenges, cities and climate governance, a five-point agenda for improving global governance structures, expanding the G20, global financial governance, and the "vast" waste of resources in military spending.

22 Ideas to Fix the World: Conversations with the World's Foremost Thinkers (New York University Press, Aug 2013, 466p; BOM 9/13), edited by Piotr Dutkiewicz and Richard Sakwa, is a joint publication of the Social Science Research Council, Russia's World Public Forum, and NYU Press. The title is striking but overstated; still, many of the inter-views deserve consideration. Topics include Muhammad Yunus on rethinking the nature of humanity so we can design a new system that allows people to take care of themselves, Will Kymlicka on how society can benefit from rights granted to minority groups, Joseph Stiglitz on the defective standard paradigm of economics (notably as regards sustainability and inequality), Ha-Joon Chang on the failure of free-market economics, Jose Antonio Ocampo on the need for a different international monetary system, Paul Watson on "Planet Ocean" and the dying of the seas, Mike Davis on the need to become a planet of gardeners, Immanuel Wallerstein on the hegemonic decline of the US in recent decades, Zygmunt Bauman on our new world of "liquid modernity" where change is the only constant, Bob Deacon on the ILO's quest for international standards for workers and a global social protection floor, Peter Katzenstein on the diffusion of power that makes governance more challenging, Ivan Krastev on the paradox of much more interconnection in our globalizing world—yet more

fragmentation, Manuel F. Montes on the need for more stringent regulation of the financial sector, Kemal Dervis on the underappreciated European model of social democracy, and more.

In **Futurevision: Scenarios for the World in 2040** (Scribe, Nov 2012, 330p; BOM 6/13), futurists Richard Watson and Oliver Freeman seek "to prevent people from getting the future seriously wrong" and to emphasize that the world offers more promise than ever before, but also more threats to our existence. The scenarios serve to introduce the subsequent Worldviews described here under the headings of SUSTAINABLE DEVELOPMENT (Watson/Freeman's "world of temperance" where less is more and people are happier), TECHNO-OPTIMISM (Watson/Freeman's "world of intelligence" where science and technology restore order to the natural world and life is generally good under free-market capitalism), and GREEN PESSIMISM (Watson/Freeman's narcissistic "world of greed" and rudderless "world of fear" scenarios where things go downhill).

2. Sustainable Development

Resilient People, Resilient Planet: A Future Worth Choosing (United Nations, Jan 2012, 94p; www.un.org/gsp; BOM 6/12) is the Report of the United Nations Secretary-General's High-Level Panel on Global Sustainability, featuring 56 proposals to empower people, promote a sustainable economy, and strengthen governance. This reaffirmation of **Our Common Future,** the 1987 "Brundtland Report" by the World Commission on Environment and Development, calls for genuine global action to integrate the economic, social, and environmental dimensions of development, eradicate poverty, reduce inequality, make production and consumption more sustainable, combat climate change, and respect a range of other planetary boundaries. Proposals include a Global Fund for Education, promotion of green jobs and decent work policies, an "ever-green revolution" to at least double productivity while drastically reducing resource use, basic safety nets for all citizens, price signals that value sustainability, a Sustainable Development Index by 2014, a set of universal sustainable development goals, and sustainable energy for all.

An overlapping and equally ambitious report is offered by another UN High-Level Panel: **A New Global Partnership: Eradicate Poverty and Transform Economies Through Sustainable Development** (United Nations, July 2013, 69p; www.un.org/sg/management/pdf/HLP_P2015_Report.pdf ; BOM 7/13). This report, from the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda, goes beyond the UN's limited Millennium Development Goals for 2015, urging "a new paradigm" and "a universal agenda" driven by five transformative shifts: 1) leave no one behind by ending extreme poverty in all its forms; 2) put sustainable development at the core, in halting the pace of climate change and environmental degradation; 3) transform economies for jobs and inclusive growth to improve livelihoods in every country; 4) build peace and effective institutions for all with a transparency revolution; 5) forge a new global partnership based on a common understanding of our shared humanity underpinning mutual respect and mutual benefit. These five changes, which must be a universal endeavor, are "the right, smart, and necessary thing to do."

Similar to the paired UN high-level Panels, the Worldwatch Institute provides a visionary pair of their signature "State of the World" reports, published since 1984 and now distributed

in 18 languages. **State of the World 2012: Moving Toward Sustainable Prosperity** (Island Press, April 2012, 241p) offers essays on making the green economy work for everybody, "degrowth" in overdeveloped countries to create a steady-state economy, inclusive urban development, sustainable transport, technologies for livable and equitable cities, principles of corporate redesign, a new global architecture for sustainability, nine population strategies to stop short of nine billion people, sustainable buildings, sustainable consumption, sustainable agriculture, food security, protecting biodiversity, valuing natural capital and ecosystem services, and local democracy as critical to sustainable development.

State of the World 2013: Is Sustainability Still Possible? (Island Press, April 2013, 441p; www.sustainabilitypossible.org; BOM 10/13) presents 34 essays on such topics as nine endangered planetary boundaries, metrics for a "new economic dashboard" beyond the inadequate GDP measure, humanity's ecological footprint, sustaining freshwater, sustainable fisheries and seas, net energy analysis, conserving nonrenewable resources, re-engineering cultures for a sustainable civilization, the Genuine Progress Indicator compared with the GDP measure, political strategies for sustainability, corporate reporting, calculating all costs to end the fossil fuel era, assessing energy alternatives, healthy food for all, valuing indigenous peoples, new university courses in "Big History," moving toward a global moral consensus, more effective environmental studies programs, governance in the long emergency, building a deeper environmentalism, pros and cons of geoengineering, the impact of four years of drought in Syria, cultivating resilience, and the warning that it is not too late if we do everything right starting now and continuing for several decades.

The Climate Bonus: Co-benefits of Climate Policy (Earthscan/Routledge, Jan 2013, 408p; BOM 5/13) by Alison Smith, a UK policy consultant and lead author for the IPCC, provides a detailed, systematic overview of the many environmental, social, and economic benefits of a green economy, which "can provide a much stronger motivation" for supporting the move to a low-carbon society and a cleaner, safer, and healthier world. Some 37 overlapping and reinforcing co-benefits are discussed in six major categories: cleaner air by cutting pollution, greener land for forests and farming, safe and secure energy by cutting consumption and waste and shifting to low-carbon sources, less waste in a resource-efficient economy, long-term economic stability and prosperity with more jobs, and improved health and fitness. To reap the full benefits of the Climate Bonus, however, we must look at the big picture and take all co-benefits into account, which outweigh the total costs of a strong and coordinated climate policy. This message needs to be refined and widely publicized. Too many people—including Joseph Stiglitz in **The Quest for Security,** above—look only at the costs and not at the offsetting benefits.

3. Techno-optimists

The alternative to sustainable, low-carbon societies that aim to reduce poverty and inequality is essentially "business as usual" powered by the panoply of new technologies, with "trickle-down" benefits to all implicitly assumed. This is expressed subtly, or not so subtly.

Global Trends 2030: Alternative Worlds from America's National Intelligence Council (NIC, Dec 2012, 137p; www.dni.gov/nic/globaltrends; BOM 2/13) acknowledges that the world of 2030 "will be radically transformed" and presents a framework of four megatrends, six "game-changers," potential "black swans" or wild cards, and four "alternative worlds" scenarios that bear little resemblance to any of the sustainable development visions presented above. The tip-off to the NIC's bias is their selection of "Individual Empowerment" as the most important megatrend, which will "accelerate substantially during the next 15-20 years owing to poverty reduction and a huge growth of the global middle class, greater educational attainment, and better health care." The potential for greater individual initiative due to widespread use of new communications and manufacturing technologies is thus seen as "key to solving the mounting global challenges over the next 15-20 years." Perhaps so, but this upbeat assumption should be categorized as a scenario and not a megatrend. Conversely, the NIC's "Gini Out-of-the-Bottle" scenario of greater inequality as measured by the Gini Coefficient should be seen as a megatrend, not a possible scenario. For further critiques of the NIC report, see the 13 essays in **The NIC's Global Trends 2030 Report: A Collective Critique,** *World Future Review* Special Issue, 5:4, Winter 2013 (published by World Future Society/Sage Publications).

The bias of *The Economist,* a widely-respected weekly magazine with outstanding global coverage, is not as subtle. **Megachange: The World in 2050** (London: The Economist and Profile Books, 2012, 304p; BOM 6/13), edited by Executive Editor Daniel Franklin, provides 20 chapters on the "great trends that are transforming the world": population growth to "over 9 billion" by 2050, "stunning" advances in health care, more opportunities for women in most countries, collective intelligence as commonplace by 2050, continued dominance of the English language as many other languages die off, atheism and agnosticism expected to decline (!), global emissions unlikely to fall for decades (the best we can hope for is a plateauing in the 2030s, followed perhaps by a modest decline), problems of failing states and jihadist terrorism will remain, the problematic spread of the rule of law, the rising social burden of an aging society, the prospering of today's "upstart economies," scenarios of globalization, a "far narrower" gap between rich and poor countries, disruptive innovation, the accelerating growth of information (information overload is a very real problem, but "tools to help us handle it are improving") and mobile technology bringing the excluded closer to the mainstream and making markets more efficient. Editor Franklin concludes that "there is every chance that the world in 2050 will be richer, healthier, more connected, more sustainable, more productive, more innovative, better educated, (and) with less inequality… and with more opportunity for billions of people." A concluding essay by Matt Ridley, author of **The Rational Optimist** (2010), states that "planetary pessimism is usually wrong; the field of futurology is littered with cataclysmic prognostications that failed." He does not compare with the many optimistic prognostications that failed in the mythical "field of futurology," a simplistic construct used as a straw man by one-eyed optimists.

"Sustainability" is not mentioned by *The Economist,* other than the passing reference, cited above. The overview of scores of trends is quite good, and many problems are discussed, albeit too briefly in most instances (e.g., infoglut). The general expectation is that R&D and

rising levels of education "will offset barriers to growth such as unemployment, corruption, environmental degradation, and social tensions arising from income inequalities."

In contrast to this sophisticated defense of free-market capitalism and globalization driven by high technology, **Abundance: The Future Is Better Than You Think** (Free Press, Feb 2012, 386p; www.AbundanceTheBook.com; BOM 8/12), by Peter H. Diamandis and Steven Kotler, presents the uninhibited techno-enthusiasm of Silicon Valley's Singularity University, founded by Diamandis and prodigious inventor and putative "futurist" Ray Kurzweil. Eight exponentially growing fields are at the core of SU's curriculum: biotechnology and bioinformatics, computational systems, networks and sensors, artificial intelligence, robotics, digital manufacturing, medicine, and nanomaterials and nanotechnology. "Each of these has the potential to affect billions of people, solve grand challenges, and reinvent industries." The back-cover blurb by Kurzweil announces that "This brilliant must-read book provides the key to the coming era of abundance replacing eons of scarcity; (it) is a powerful antidote to today's malaise and pessimism." The authors go on to forecast that "within a generation, we will be able to provide goods and services, once reserved for the wealthy few, to any and all who need them. Or desire them. Abundance for all is actually within our grasp."

4. Green Pessimists

Whereas techno-optimists ignore or downplay environmental issues, or brag that new technologies will "solve" them, green pessimists characteristically ignore or downplay the panoply of new and emerging technologies while focusing on population/resource/ environment issues, especially climate change. And, if one looks, there is much to be pessimistic about.

Bankrupting Nature: Denying Our Planetary Boundaries (Earthscan/Routledge, Nov 2012, 206p; BOM 1/13), a Report to the Club of Rome by Anders Wijkman (Co-President, Club of Rome) and Johan Rockstrom (Stockholm Resilience Center), expands the concern about climate change to the broader concept of "planetary boundaries" involving nine biophysical processes as regards climate, ozone levels, ocean acidification, biogeochemical loading (nitrogen and phosphorus cycles), biodiversity loss, degradation of land, overexploitation of freshwater, toxic chemical pollution, and atmospheric aerosol loading. They argue that since WWII, the evidence is clear that "pressures on key ecosystems have increased exponentially" and that "we are very close to a saturation point, where the biosphere cannot handle additional stress." Major indicators are higher levels of CO_2 in the atmosphere, large dead zones in coastal areas, melting sea ice and permafrost, rising sea levels, land use changes, etc. The authors discuss the necessary energy transition to renewable sources and greatly-reduced consumption, the possibility that the Arctic region may have entered a "death spiral," the need to stop using GDP growth as a measure of well-being and to place a value on natural capital and ecosystem services, financial sector reform to promote sustainability, and the need to curb population growth and reform agriculture. A brief version of the "planetary boundaries" concept also appears in the Worldwatch Institute's **State of the World 2013** report, written by Carl Folke of the Stockholm Resilience Centre. This well-documented concept of planetary pessimism, first published in 2009 in *Nature and in Ecology and Society,* has yet to be widely noticed.

Another recent Report to the Club of Rome, **2052: A Global Forecast for the Next Forty Years** (Chelsea Green, June 2012, 392p; BOM 7/12) was written by Jorgen Randers, one of the four original authors of the first report to the CoR in 1972, **The Limits to Growth.** Commemorating the 40th anniversary of this much-discussed and debated report, Randers looks 40 years ahead at "the most likely global roadmap," based on the premise that "humanity remains in solid overshoot…and we can discern the early signs of the coming gradual destruction of the ecosystem." The negative impacts of climate change will be significant but not disastrous by 2052, with more droughts, floods, sea-level rise, and self-reinforcing climate change largely due to methane emissions from melting tundra as "worry number one." Slow and insufficient response to our challenges will dominate, but lack of space and cheap resources will force solutions with a lower ecological footprint, and a decline of world GDP just after 2052. Emerging problems will mean increased investment, forced or voluntary, lowering the share of GDP available for consumption, which will begin to fall around 2050. In sum, "the story of the 2052 forecast is one of overshoot caused by delayed societal response to greenhouse gas emissions being allowed to increase beyond sustainable levels for generations." This forecast is not entirely bleak: whereas Randers and colleagues warned of "exponential" population growth in the original LtoG report, **2052** envisions global population reaching a maximum of 8.1 billion in the early 2040s (the U.N. low projection), thereafter declining to 7 billion by 2075.

A far more pessimistic view coupled with an idealized global vision is provided by Ross Jackson's **Occupy World Street: A Global Roadmap for Radical Economic and Political Reform** (Chelsea Green, March 2012, 315p; www.occupyworldstreet.org; BOM 9/12), which views our civilization in the midst of a painful global collapse by overloading the ecosystem. Chapters describe the assault on nature, the coming peak in global oil production, overpopulation, "grossly overstated" hopes for biotechnology, how the Genuine Progress Indicator that adjusts GDP for negative factors shows deterioration of well-being in the past 30 years, inadequate economic beliefs that make a collapse inevitable, the corporatocracy, and recurrent financial crises ("the financial mafia is simply too powerful"). Calling for a new worldview to promote sustainability, Jackson advocates Gaia theory as foundation, steady-state economics, and effective global governance in a Gaian world to ensure survival (with detailed discussion of eight institutions to be founded by a Gaian League of small nations).

5. The Long Road Ahead to Shared Vision

The Oxford Martin Commission for Future Generations advocates more global conversations, more international cooperation, creative coalitions, an agreed global ethic, and a "common global vision" and "platform of understanding" to create global belonging among citizens, especially the justifiably angry and alienated young. But this is more easily said than done, and considerable learning about alternative views is needed.

The good news is that something of this sort is emerging, centered around WAAS discussions of a "new paradigm," promoting a "universal agenda" for sustainable development along with a "new paradigm" (2013 UN High-Level Panel), paying more attention to the long term and future generations (Oxford Martin Commission), rethinking obsolete economic concepts (Al Gore and Worldwatch Institute), addressing 15 Global Challenges

(Millennium Project), human security and global security cooperation (Stiglitz and Kaldor), ideas to fix the world (Dutkiewicz and Sakwa), halting population growth and promoting a "green economy" that works for everyone (State of the World 2012), and considering the many co-benefits of a strong and coordinated climate policy (The Climate Bonus).

The bad news is the "herding cats" problem of identifying the hundreds of individuals and organizations that are continuously generating promising ideas and actions—far more than the sixteen worldviews described here – and arriving at some common language and a common global vision. Efforts should certainly be made at more conversations and more coalitions, but there will invariably be conflicts between big and small organizations, and between idealists and pragmatists, or "fundis" and "realos" as long identified among German greens. Practical disputes are inevitable as to which issues should be addressed and prioritized, and who gets credited. The ongoing problem of forging a global climate policy may seem simple in comparison.

Even if some sort of common global vision does begin to emerge, a still greater task will be to promote it in the nations of the world, especially in the still-powerful but information-glutted United States, where "sustainability" is not on the national political agenda; there are few "green" champions in national policy discourse and fewer still in public office, and any universal global agenda would be viewed with suspicion at a time when "big government" is under assault and fiscally challenged. On the other hand, as noted in several chapters in **The Quest for Security,** large cities and some businesses in the US and elsewhere are taking the lead in pursuing important elements of sustainable development.

Both tasks — forging a common vision and making it widely visible and accepted – are not impossible and should be undertaken. But a long and difficult road ahead seems more likely than not. Conversations can be undertaken among most cosmopolitans and greens, and possibly with muted techno-optimists such as the National Intelligence Council, which professes openness to dialogue. Productive conversations seem less likely with *The Economist* and other institutions wedded to free-market capitalism and conventional economic thinking, and seem virtually impossible with those who hear the siren call of technology innovation and easy "solutions" to our numerous global problems, especially because some new technologies may prove to be helpful.

Meanwhile, estimates of world population growth in 2050 continue to creep upwards every year, according to the annual **World Population Data Sheet** of the Washington-based Population Reference Bureau. In 2003, the projected population in 2050 was 9.198 billion. In the 2008 Data Sheet, world population rose to 9.352 billion. In the 2013 Data Sheet, the projection was expected to be 9.727 billion. This "estimate creep" is probably due to better health care and declining mortality rates. One might reasonably expect a projection of 10 billion people by 2050 to be made in the next three or four years—quite contrary to the 9 billion now assumed by *The Economist* (and many others) and the 8 billion or so assumed by Jorgen Randers. This "most likely" informed forecast for 2050 is not yet in anyone's worldview, but it ought to be cause for further concern. Some 10% more population by 2050 than commonly assumed increases the urgency of forging and pursuing a shared vision for sustainability.

Now for the Long Term:
The Report of the Oxford Martin Commission for Future Generations

Oxford Martin Commission. Oxford UK: University of Oxford,
Oxford Martin School, Oct 2013, 85p. (download for free at www.oxfordmartin.ox.ac.uk).

1. Background

James Martin (1933-2013) was the respected author or co-author of more than a hundred books, including **The Computerized Society** (Prentice-Hall, 1970), **The Wired Society** (Prentice-Hall, 1977), and **The Meaning of the 21st Century: A Vital Blueprint for Ensuring Our Future** (Riverhead/Penguin, 2006). In 2005, he founded the James Martin 21st Century School at the University of Oxford, re-named in 2010 as the Oxford Martin School, which currently supports over 30 research teams and over 300 scholars across the University, addressing "some of the biggest questions that concern our future." Martin was elected as a Fellow of the World Academy of Art and Science in 2007.

The Oxford Martin Commission, chaired by Pascal Lamy (former WTO Director-General), has 18 other members: Michelle Bachelet (former President of Chile), Lionel Barber (Editor, *The Financial Times*), Roland Berger, Ian Goldin (Director, Oxford Martin School), Arianna Huffington (*Huffington Post)*, Mo Ibrahim (Mo Ibrahim Foundation), Luiz Felipe Lampreia (Brazil), Liu He (China), Kishore Mahbubani (Dean, National University of Singapore), Trevor Manuel (South Africa), Julia Marton-Lefevre (Director-General, IUCN), Nandan Nilekani (former CEO, Infosys), Chris Patten (Chancellor, University of Oxford), Peter Piot, Martin Rees (former President, The Royal Society), Amartya Sen (Harvard University), Nicholas Stern (President, The British Academy), and Jean-Claude Trichet (former President, European Central Bank).

The Commission focuses on "the increasing short-termism of modern politics and our collective inability to break the gridlock which undermines attempts to address the biggest challenges that will shape our future" (p.6). The case for action is built in three parts: ***Possible Futures,*** identifying key "megatrend" drivers of change and how to address five categories of resultant challenges; ***Responsible Futures,*** on historical drivers of transformative change, previous examples of where impediments to action have been overcome, and lessons from where progress has been stalled; ***Practical Futures,*** on five principles for action that advance the interests of future generations and "how we can build a sustainable, inclusive, and resilient future for all." The Report is backed up by a whopping 551 references, including recent reports from WTO, OECD, IEA, IPCC, IUCN, ILO, NIC, WHO, World Bank, Transparency International, and McKinsey Global Institute. According to the Oxford Martin School website, the "Future Generations" report was downloaded >500,000 times in >130 countries by the end of November 2013!

2. Introduction

Our world has experienced a sustained period of positive change such that "Now is the best time in history to be alive." However, while the future is full of opportunity from the

advances of recent decades, it is also highly uncertain and characterized by growing systemic risks, in many cases the consequences of our success. Given the scale of the challenges—such as plundering of our planet's natural capital, growing inequality, and potentially devastating results of accidental or deliberate use of new technologies—we need more attention to the future and a more far-sighted attitude. *"In an increasingly integrated and hyper-connected world, our individual future depends more than ever on our collective future and our capacity to work together to deepen our understanding of the critical challenges.* We need to ensure that we have the skills, tools, institutions and social fabric necessary to navigate safely through the hazardous fog of the future" (p.9; emphasis added).

Governing requires a dual vision: a commitment to address current needs, and to build the foundations for vibrant generations in the decades ahead. This responsibility relates to future generations and "a broader societal ideal of trusteeship that requires us to leave the world better than we find it" (p.9). Given advances in knowledge, we are more aware than ever of the implications of our actions on future generations. "And we could arguably be amongst the last generations able to do anything to stop the long-term devastation of our planet. Soon it may be too late… Changing course towards the longer term requires society to devote sustained attention to the transformational changes which will characterize our lifetimes" (p.10).

3. Part A: Possible Futures

Megatrends are grouped under seven highly interactive headings, all underpinned by globalization:

1. *Demographics:* continued world population growth, aging nations;

2. *Mobility:* migration and urbanization, rise of the middle class in the next 40 years along with more consumption, more empowerment through education;

3. *Society:* a steady decline in poverty rates but rising inequality, generational and gender divides (one-third of the world labor force is poor or unemployed);

4. *Geopolitics:* rise of developing countries, more networks that transcend state boundaries, a global marketplace with world merchandise trade at $18.2 trillion in 2011, nearly four times as many states as in 1945, growing influence of international law, decline of violence although potentially devastating tensions still simmer, growing concern about cyber or biological warfare;

5. *Sustainability:* an emerging "perfect storm" associated with water/food/energy and climate change as a risk enhancer, 2 of every 3 countries to be water-stressed by 2025, extreme weather events expected to increase with great regional variation;

6. *Health:* the growing threat of NCDs (non-communicable diseases such as diabetes and cancer), new and re-emerging infectious diseases as up to 2 billion people will live in slums by 2030, increasing levels of dementia and mental illness;

7. *Technology:* the information revolution creating a faster and smarter world, the Internet as key driver of global connectivity but exacerbating inequality, our carbon-based

energy and transport system as evidence of "technological lock-in," the pace of technology change as "an accelerating race into the unknown," technology as double-edged sword.

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"Crisis is often a stimulant for action ."
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These megatrends present extraordinary opportunities, but also generate acute risks and challenges. Five areas where action is imperative:

1. *Society:* boosting youth employment, empowering women, reducing inequality;

2. *Resources:* tackling climate change, improved climate modeling, generating green growth and resource security, valuing biodiversity and ecosystem services, reducing excessive consumption, a global carbon price, a "Manhattan Project" for new energy;

3. *Health:* risk prevention for NCDs such as obesity is highly cost-effective but no single action is sufficient, providing better access to cheaper drugs, new and reinvigorated avenues of cooperation to stem the burden of disease, incentives to encourage new innovations, measurable targets for reducing NCDs;

4. *Geopolitics:* more international cooperation due to rise of unconventional security threats, the US-China relationship should not be seen as a threat (they should work together to set a safer and more sustainable course); *"More global conversations, less anachronistic policies, and an agreed global ethic are essential for a one-world theory to emerge triumphant"* (p.31, emphasis added), long-overdue reform of 20th century global governance institutions, modernizing trade by cutting customs' red tape, completing the Doha package to renew global trade, continued development of rules for cybercrime and cyberwar;

5. *Governance:* improving transparency in extractive industries, targeting corruption as an impediment to good governance, more transparency on tax evasion and tax havens, "systemic reform of the current capitalist growth model," upgrading agreement on a common legal and rights language, improving baseline governance indicators, making information available in as many formats and institutions as possible, realigning business incentives towards a longer horizon.

4. Part B: Responsible Futures

"The scale of today's challenges means countries and organizations must enhance, and prioritize, their capacity to think and act with a longer-term perspective…in Part B, we aim to shed light on why gridlock prevails where action is imperative…to understand the factors that are undermining political will to act, despite the urgency and extent of the problems." (p.37) Key lessons are distilled from historical examples where impediments to action have been successfully overcome. Elements that contribute to success:

—   *Crisis* is often a stimulant for action, e.g., the Limited Test Ban Treaty of 1963, the Non-Proliferation Treaty of 1968, the G-20 arising from the 2008 global financial crisis, establishing

—   The Financial Stability Board in 2009 and the International Criminal Court in 2002; the Year 2000 Network set up to counter Y2K threats which proved overstated.

— *Mutual Interests* have long been a key ingredient of cooperation and progress, illustrated by the Single Market Programme in Europe, and the 1989 Montreal Protocol to prevent ozone depletion.

— *Leadership* can be decisive in translating shared interests into definitive action, e.g., the achievements of Nelson Mandela, Mahatma Gandhi, Winston Churchill, and Martin Luther King Jr; leadership by Gro Harlem Bruntland played an important role in ratifying the Framework Convention on Tobacco Control in 2003 as the world's first global public health treaty.

— *Inclusion* characterizes many prominent interventions such as the UN, the 1948 Universal Declaration of Human Rights, and creation of the G-20.

— *Networks* counter the paradox of globalization, providing more governance on a global and regional scale without centralization of power and coercive authority; they facilitate equal and open dialogue and trust between participants.

— *Partnerships* bring together stakeholders from government, business, academia, and civil society, e.g.: the IPCC established in 1988 and the Global Alliance for Vaccines and Immunizations.

— *Goals, Prizes, and Indexes* can play an important role in promoting best practice, e.g.: the Virgin Earth Challenge, the Shell Springboard, Transparency International's Corruption Perceptions Index, the Mo Ibrahim Index of African Governance, and the Global Competitiveness Report of the World Economic Forum.

— *National Transformation* offers lessons about progressive interventions on the national level, e.g. South Africa's 1995 Truth and Reconciliation Commission and South Korea's turnaround since the 1960s.

While celebrating these successes, it is also vital to reflect on lessons from many failures:

— *Tragedy of the Commons* when actors seek to maximize consumption of a scarce resource, e.g. the shrinking of the Aral Sea to 10% of its original size by 2007, and the rapid increase in global fishing that has led to the decline of marine biodiversity and compromised ocean resilience.

— *Lack of Intergenerational Vision* as illustrated by disappointing outcomes at the 2009 UN climate change negotiations in Copenhagen and the Rio+20 Summit in 2012.

— *Absence of Global Oversight,* notably during the financial crisis.

— *Resistance of Vested Interests,* notably major tobacco corporations and coal and oil interests.

— *Lack of Awareness* of critical issues; too much information can cloud public judgment and make people more passive; also, too many conversations are closed to too many people.

In sum, what makes change so hard? Five shaping factors must be taken into account:

— *Institutions* built for yesterday, that suffer from legitimacy, authority, and effectiveness deficits;

— today's global governance institutions seem unfit to address far more complex and interconnected challenges within their current configurations and cultures; also, coming to agreement has become more fraught because the number of actors and voices has multiplied on the international stage (this raises questions about the efficacy of world summits).

> *"What is lacking is a bedrock of common values to create a shared ambition for civilization."*

— *Embedded Short-Termism* increasingly driving our politics and business; performance metrics and quarterly earnings targets encourage a focus on short-term stock prices; this can be countered by a whole-of-government approach to long-term planning and various foresight institutions such as Finland's Committee for the Future and the proposal by the World Future Council for an International Ombudsperson for Future Generations.

— *Political Engagement and Public Trust:* engaging young people in politics is vital, yet they are less and less interested in party politics and politics more generally, and increasingly disillusioned with politics as usual and mistrusting leadership, aided by changes in the media and a reduced number of independent journalists and reporting resources.

— *Growing Complexity:* issues are becoming more complex as we see an accelerated pace of change, with many human activities increasingly driving the Earth's system toward dangerous thresholds or tipping points; "there is remarkably limited comprehension or acknowledgement of the scale, urgency, and connectivity of the problems" (p.52); whereas insurance is widespread against personal risks, uncertainty about climate change is used as an excuse not to act.

— *Cultural Biases:* countries lack the capacity to speak to each other openly; what is lacking is a bedrock of common values to create a shared ambition for civilization; hyper-globalization has transformed the core of modern societies, creating both opportunities and tensions, but this does not mean that thinking on the big issues is shared; culture does not explain everything, but it often orients the prism through which we interpret and formulate beliefs.

5. Part C: Practical Futures: Principles and Recommendations

"Fresh thinking is urgently required in order to address critical global challenges and prevent future crises…we aim to contribute meaningfully to the necessary strategic and institutional renewal" (p.57). Five key principles are used to organize the recommendations, which can guide action and institutional change:

1. *Creative Coalitions:* multi-stakeholder partnerships to prompt learning and deeper change, e.g. a) the fight against climate change can be kick-started by a "C20-C30-C40"

coalition that brings together the G-20 countries, 30 selected companies, and 40 large cities; b) a "CyberEx" initiative to identify emerging common threats regarding cyber security while helping companies and governments to minimize future attacks; c) a global network of "Fit Cities" dedicated to fighting the rise of NDCs;

2. *Innovative, Open and Reinvigorated Institutions:* a) 21st century institutions independent of short-term pressures of governing and the 24/7 media cycle, which conduct systematic reviews of longer-term issues; b) build sunset clauses into most publicly-funded international institutions and require a review of accomplishments, to ensure regular reflection of organizational performance and purpose and steering toward long-term resilience; c) optimize new forms of political participation, transparency, and accountability; d) establish "Worldstat" to undertake quality control of global statistics, assess domestic practices, regulate misuse, and improve data collection (this could hasten the ideas of the 2009 Commission on the Measurement of Economic Performance and Social Progress; see Joseph Stiglitz et al, **Mismeasuring Our Lives: Why GDP Doesn't Add Up** The New Press, 2010); e) establish a Voluntary World Taxation and Regulatory Exchange to harmonize corporate taxation arrangements and encourage multinationals to disclose their tax planning and transfer pricing arrangements;

3. *Revalue the Future:* a) adjust political, legal, and economic structures in favor of future generations; b) give priority to proposals made by the Group of 30 on Long-term Finance, especially long-term accounting frameworks; c) give greater attention to "the considerable implications generated by assumptions in current discounting models and their bias against future generations"; the discount rate should be lower, rather than higher; discounting should embrace "a more sophisticated appreciation of the role of ethics, risk, and the scale of possible damages in the future" (p.61); d) invest in people by removing price-distorting perverse subsidies on hydrocarbons and agriculture, with support re-directed to targeted pro-poor transfer; e) develop a Long-Term Impact Index to highlight the importance of investing in appropriate infrastructure and decision-making processes that enhance long-term resilience and inclusiveness.

4. *Invest in Younger Generations:* a) break the inter-generational persistence of poverty through social protection measures such as conditional cash transfer programs (evidence from countries such as Brazil, South Africa, and Mexico suggests that cash transfers can reduce child poverty); b) create new employment and training opportunities for young people through "youth guarantee programs" available to all between, say, 15 and 29 years old, based on successful programs in Germany, the Netherlands, Poland, Sweden, etc. that enable a smooth transition from education to work and prevent long-term unemployment.

5. *Establish a Common Platform of Understanding:* a) articulate a common global vision and ambition to create global belonging among citizens, building on aspirations of the UN Charter, etc.

Concludes that, "As a Commission, we will continue to engage with governments, businesses, NGOs, and civil society in order to take our recommendations forward… By so

doing, we hope that together we can contribute to the construction of a sustainable world for current and future generations. We invite you to engage with us on these issues" (p.65).

COMMENT

This is a *very* sophisticated and important report—a model of multi-disciplinary integration—that covers a lot of ground, with "future generations" as just one of several important themes. Unfortunately, the three parts should have had better labels. Part A on "Possible Futures" is more appropriately seen as *"Megatrends and Needed Actions."* The excellent Part B on "Responsible Futures" would be better described as *"Previous Successes and Barriers to Change."* Part C entitled "Practical Futures" should have stressed the sub-title re-formed as *"Principles and Proposals for a Sustainable World."*

The stark contrast with **Global Trends 2030** from America's National Intelligence Council is illuminating (see GFB Book of the Month, Feb 2013; also a unique Special Issue of the World Future Society's *World Future Review,* 5:4, Winter 2013, entitled ***"The NIC's Global Trends 2030 Report: Comments and Critiques,"*** featuring 13 varied responses by experienced general futurists).

Whereas Oxford Martin and GT-2030 both start out with a set of "megatrends" that are largely similar, the reports diverge sharply after that: the former is strongly *prescriptive,* while the latter is strictly *descriptive.* The GT-2030 report does include a discussion of problem areas trendily mislabeled as "game-changers," an overly brief discussion of wild cards (trendily labeled as "Black Swans") and four "Alternative Worlds" scenarios with little or no relation to the Oxford Martin proposals for a better and more sustainable world (the NIC makes no mention of "sustainability," and egregiously downgrades the risks of climate change). The important lesson here is that scenarios are not necessarily helpful, and can too easily be an amusing but fanciful distraction from articulating what is really needed and how to get there. As a government agency concerned with security, NIC is in no position to make strongly prescriptive comments. But the Oxford Martin proposals could be embodied in a future NIC scenario, if NIC is up for it and truly serious about security and well-being.

It is heartening that the Commission seeks to "take our recommendations forward" and the Oxford Martin School has the extensive financial and intellectual resources to do so. Perhaps this effort, in contrast to many smaller and poorly-funded efforts in recent decades to promote foresight and futures-thinking, can spark greater interest in broad and long-term perspectives for the public good, at a time when they are needed more than ever. If an update to the Commission report is to be made, however, greater attention should be paid to the print and electronic media (which favors sensation, entertainment, "nowness," and political personalities over policy) and to higher education (still characterized by too much specialized trivia and fragmentation). Together, these two sectors may prove to be the most important barrier to a "common global vision" and enhancing "our capacity to work together."

For the historical record, an earlier effort (not among the 551 footnotes of the Oxford Martin Commission) should be noted: **Why Future Generations Now?** (1994, 159p in English and Japanese), from the Institute for the Integrated Study of Future Generations,

with theoretical and moral arguments by Sakae Shimizu (Chairman, Kyoto Forum), Katsuhiko Yazaki (Chairman, Future Generations Alliance Foundation), Kim Tae-Chang (President, IISFG), Wendell Bell (Yale University), Emmanuel Agius (University of Malta; editor, *Future Generations Journal*), Allen Tough (OISE, University of Toronto), and Rick Slaughter (Futures Study Centre, Melbourne).

Security and Sustainability

We can have no security without sustainability. And we can have no sustainability without security. Both security and sustainability are broad and expanding areas of policy concern.

Increasingly, they are overlapping, and it is valuable that they should be seen as such. Many recent books suggest the expansion and overlap of these concerns. Some of the more noteworthy are highlighted below.

1. "Conventional" Security Concerns

The central concern of the Cold War era was nuclear weapons, and this threat has by no means disappeared. *Strategy in the Second Nuclear Age: Power, Ambition, and the Ultimate Weapon* (Georgetown University Press, Dec 2012, 256p) notes the increasing potency of nuclear arsenals and the potential for more states to cross the nuclear weapons threshold. Adding to this threat, *Preventing a Biochemical Arms Race* (Stanford University Press, Oct 2012, 256p) warns that changes in the life sciences and the nature of warfare could lead to a biochemical arms race among major powers, rogue states, and non-state actors. This is complicated by small arms proliferation, as described in *Small Arms Survey 2012: Moving Targets* (Cambridge University Press, Oct 2012, 374p); *The New American Militarism: How Americans Are Seduced by War* (Oxford University Press, 2nd edition, April 2013, 304p), which notes a revival of vast national ambitions coupled with a pronounced "affinity for the sword" (not to mention small arms for individuals); the private sector taking over some military functions as described in *Privatizing War: Private Military and Security Companies under Public International Law* (Cambridge University Press, March 2013, 768p); and *Lone Wolf Terrorism: Understanding the Growing Threat* (Prometheus Books, Feb 2013, 335p), exemplified by the Boston Marathon bombings. Another new form of terrorism, inadvertently inflicted by the US, is *Living Under Drones: Death, Injury and Trauma to Civilians from US Drone Practices in Pakistan* (Oct 2012, 260p; www.livingunderdrones.org), a report from the Stanford and New York University Law Clinics suggesting that drone strikes appear to be making the US less safe in the long term, by fueling anti-US sentiments and recruiting new terrorists.

2. Cyber-Security

Adding to the unsettling developments, above is the emerging cyber threat, as summarized by *Securing Cyberspace: A New Domain for National Security* (Aspen Institute/Brookings, 2012, 202p), which looks at cyberspace as a new battlefield and the threats of cybercrime. *The World of Cybercrime: Issues, Cases, and Responses* (Rowman and Littlefield, Dec 2012, five volumes) covers all major areas in the world of cybercrime. *Cyber Defense: Countering Targeted Attacks* (Government Institutes, 2011, 240p) explains why targeted attacks require changes to security operation. *Fatal System Error: The Hunt for the New Crime Lords Who Are Bringing Down the Internet* (Public Affairs, Feb 2010, 288p; www.fserror.com) describes the evolution of cybercrime to sophisticated organized gangs. *Global Governance*

and the Challenge of Transnational Organized Crime (Center for International Governance Innovation, Dec 2012, 21p) reports that "TOC" is becoming a global priority. *The New Digital Age: Reshaping the Future of People, Nations, and Business* (Knopf, April 2013, 337p), by former Google CEO Eric Schmidt and Google Ideas director Jared Cohen, warns that dozens of states will have the capacity to launch large-scale cyber-attacks, revolutions for better and worse will be more frequent as connectivity spreads, and that there are clear advantages of cyber attacks for extremist groups, inflicting massive damage with minimal resources. With a plethora of threats and strong differences of opinion regarding their intensity and likelihood, especially regarding cyber-attacks and cyber-espionage, the intelligence function becomes increasingly complicated, as described in *The Future of Intelligence: Challenges in the 21ˢᵗ Century* (Routledge, Oct 2013, 240p).

3. Food Security

The broad-ranging concept of "human security," promoted by the UN Development Programme, has grown in importance in the past 15 years, as described in *The Routledge Handbook of Human Security* (Routledge, July 2013, 384p). A major component of human security is the emerging concern for food security, as described by Lester R. Brown in *Full Planet, Empty Plates: The New Geopolitics of Food Security* (W.W. Norton, Oct 2012, 144p), who sees the world in transition from an era of food abundance to one of scarcity. Also see *Food Security: From Crisis to Global Governance* (Routledge, Aug 2013), which looks at strategies for achieving food security, including reforming the Committee on World Food Security. *The Global Farms Race: Land Grabs, Agricultural Investment, and the Scramble for Food Security* (Island Press, Oct 2012, 272p) describes how wealthy countries are racing to buy or lease huge swaths of farmland abroad. *Green Grabbing: A New Appropriation of Nature* (Routledge, April 2013, 416p) shows that some land grabs are done for "environmental" purposes to justify appropriations for food or fuel. In any event, no matter who owns or occupies the land, the *Handbook on Climate Change and Agriculture* (Edward Elgar, 2012, 544p) warns that climate change is likely to have an extensive impact on agriculture around the world, leading to uncertainty and security concerns for crops.

4. Environmental Security and Sustainability

Environmental Security: Approaches and Issues (Routledge, Jan 2013, 302p) points to the emerging field of "environmental security studies"; as described by political scientist Dennis Pirages, the outmoded national security paradigm is "a major obstacle to dealing with growing ecological security threats." Many recent books and reports discuss these threats, but not explicitly as a security concern. For example, *Global Environmental Outlook 5* (UN Environmental Programme, June 2012, 515p) warns that human pressures on the Earth System may pass critical thresholds and change life support systems of the planet. *OECD Environmental Outlook to 2050* (OECD, March 2012, 350p) focuses on four "red light" areas of climate change, biodiversity, water, and health. *Overheated: The Human Cost of Climate Change* (Oxford University Press, Feb 2013, 280p) warns of a first-order social and political disaster ahead. *The Climate Bonus: Co-Benefits of Climate Policy* (Earthscan /

Routledge, Jan 2013, 408p; *GFB Book of the Month, May 2013)* mentions only energy security in its extensive overview of desirable changes to a low-carbon society. Al Gore's *The Future: Six Drivers of Global Change* (Random House, Feb 2013; *GFB Book of the Month, April 2013)* offers an extensive discussion of "outgrowth" of humans to natural resources, as well as the deepening climate crisis, but this is not linked to security concerns. *Climate Change and National Security* (Georgetown University Press, 2011, 310p; *GFB Book of the Month, March 2013),* however, explicitly links climate changes to national security concerns in 19 nations, and the outlook is quite grim in most of them. *Crisis of Global Sustainability* (Earthscan / Routledge, Feb 2013, 188p) calls for immediate and drastic change in our institutions and policies. *Divided Nations: Why Global Governance is Failing* (Oxford University Press, May 2013, 207p) considers the inadequacy of post-WWII institutions in dealing not only with climate change, but with finance, pandemics, migration, and cyber-security. *Global Environmental Governance Reconsidered* (Boston Review/MIT Press, Sept 2012, 320p) addresses emergence of non-state actors, new mechanisms of global governance, and the fragmentation of authority.

The Second Machine Age:
Work, Progress, and Prosperity in a Time of Brilliant Technologies

Erik Brynjolfsson and ***Andrew McAfee*** *(both MIT Center for Digital Business).*
NY: W. W. Norton, Jan 2014, 306p, $26.95. (www.secondmachineage.com)

On the surface, this is a very important book about present and future technologies, jobs, and growing inequality. It is clearly written, plausible, and well-documented. Although oriented to American audiences, it has global import in our globalizing age. It is not directly about security and sustainability (neither term is in the index), although the book could illuminate both concerns, as technology continues its inexorable advance, for better *and* worse.

The first machine age brought the Industrial Revolution: the sum of several near simultaneous developments in mechanical engineering, chemistry, metallurgy, etc. The most important technology was the steam engine, which overcame limitations of human and animal muscle power, leading to factories, mass production, railways, and mass transport.

"Now comes the second machine age. Computers and other digital advances are doing for mental power—the ability to use our brains to understand and shape our environment—what the steam engine and its descendants did for muscle power" (pp.7-8). How this transition will play out is unknown, but it is "a very big deal," for mental power is at least as important for progress and development as physical power.

1. Three Broad Observations

1. ***Rapid Progress Ahead.*** "We're living in a time of astonishing progress with digital technologies"— those that have computer hardware, software, and networks at their core. Just as it took generations to improve the steam engine, it has also taken time to refine our digital engines. The full force of these technologies has only recently been achieved, yet computers will continue to improve and do new and unprecedented things. "Full force" simply means that key building blocks are now in place. In short, "we're at an inflection point" where the curve starts to bend a lot.

2. ***Profound Benefit.*** "The transformations brought about by digital technology will be profoundly beneficial ones." The new era will be better because we'll be able to increase the variety and the volume of our consumption. "Technology can bring us more choice and even freedom," and technical progress is improving exponentially.

3. ***Tough Challenges.*** Digitization will bring with it some thorny challenges, notably economic disruption, because, as computers get more powerful, employers will have less need for some kinds of workers. "*Technological progress is going to leave behind some people, perhaps even a lot of people, as it races ahead.*" (p.11, italics added). The challenges of the digital revolution can be met, but we first have to be clear on what they are, and to discuss the likely negative consequences. They're not insurmountable, but they won't fix themselves.

2. Recent Technological Progress

Six chapters enthusiastically discuss the skills of the new machines (self-driving cars from Google's Chauffeur project, instantaneous translation from IBM's GeoFluent and Google Translate, acceleration in robotics, 3D printing used by many companies to make prototypes and model parts), why Moore's Law has held up for so long (brilliant tinkering leading to constant modification), the digitization of just about everything, the fundamental importance of innovation for growth and prosperity, why innovation and productivity will continue to grow at healthy rates in the future, the life-changing potential of Artificial Intelligence (bringing key aspects of sight to the visually impaired, restoring hearing to the deaf, AI-aided diagnoses in some medical specialties).

Echoing the optimism of the late Julian Simon, the authors exclaim that "there is no better resource for improving the world and bettering the state of humanity than the world's humans… Our good ideas and innovations will address the challenges that arise, improve the quality of our lives, allow us to live more lightly on the planet, and help us take better care of one another. It is a remarkable and unmistakable fact that, with the exception of climate change, virtually all environmental, social, and individual indicators of health have improved over time, even as human population has increased" (p.93). But the main impediment to more progress has been that, until quite recently, many people had no effective way to access the world's knowledge. This situation is rapidly changing with the advent of mobile phones, bringing billions of people into the community of potential knowledge creators, innovators, and problem-solvers.

3. Bounty and Spread

The next five chapters explore the two economic consequences of this progress: *bounty* (the increase in volume, variety, and quality and the decrease in cost of the many offerings of modern technology) and *spread* (the ever-bigger differences among people in income and wealth, likely to accelerate unless we intervene). Topics include marked increases in productivity growth, zero-price products and services not reflected in GDP (e.g. over one million apps on smartphones, Wikipedia, free classifieds on Craigslist, free phone calls on Skype), the ubiquitous bounty of digital photographs, intangibles as a growing share of capital assets (intellectual property, organizational capital, user-generated content, and especially human capital), and the need for "new metrics" other than GDP in the second machine age.

But growing inequality or spread is a major problem. The authors discuss decoupling of median wages from productivity (the bottom 80% of the US income distribution saw a net decrease in their wealth since 1983), increased earnings of the top 1% by 278% between 1979 and 2007 while overall median income has fallen since 1999, economic winners and losers ("digital technologies increase the economic payoff to winners while others become less essential and hence less well rewarded"), the evolving skill set affected by computerization, stars and superstars as the biggest winners due to "winner-take-all" markets (the top 0.01% saw their share of national income double from 3% to 6% between 1995 and 2007), why winner-take-all markets are more common now (digital goods have enormous economies of

scale), the questionable "strong bounty" argument that it will overwhelm the spread and thus no need to worry ("we wish that were the case, but it's not"), technological unemployment despite a growing economy (but most mainstream economists still argue that technology creates more jobs than it destroys), and globalization. *"In the long run, the biggest effect of automation is likely to be on workers not in America and other developed nations, but rather in developing nations that currently rely on low-cost labor for their competitive advantage"* (p.184). The advantage of low wages largely disappears by installing robots and other types of automation; "offshoring is often only a way station on the road to automation."

4. Labor Force Remedies

1. *Individuals.* "Our most fundamental recommendations to students and their parents: study hard, using technology and all other available resources to 'fill up your toolkit' and acquire skills and abilities that will be needed in the second machine age" (p.199). Learn to race with machines. A college degree remains a vital stepping stone to most careers. Most professions still require the skills of ideation, large-frame pattern recognition, and complex communication. "As the labor market polarizes more and the middle class continues to hollow out, people who were previously doing mid-skill knowledge work start going after jobs lower on the skill and wage ladder…this puts downward pressure on wages" (p.202). More surprises are in store, and "it's becoming harder and harder to have confidence that any given task will be indefinitely resistant to automation" (p.203).

2. *National Policies.* The best way to tackle labor force challenges is to grow the economy. To do so, we should teach children well, put digital technology to work (e.g. MOOCs enable low-cost replication of the best teachers, content, and methods), "flip the classroom" by having students listen to lectures at home and do traditional homework at school, raise teacher salaries, lengthen school hours and the school year, champion the innovation engine of entrepreneurship (the best way to create jobs and opportunity), improve matches between jobs and people, support basic research, institute prizes for innovation, upgrade US infrastructure to acceptable levels (one of the best investments the country can make), reform counterproductive immigration policy (of benefit not only to immigrants but to the economy), tax wisely (most economists advocate "Pigovian" taxes on pollution and other negative externalities; also, a value-added tax and higher taxes on high earners).

3. *Long-Term Policies.* Reward employment instead of taxing it; some form of basic income guarantee can help, but better still is a negative income tax that provides an incentive to work. Also, we will need some radical "out-of-the-box" ideas, e.g.:

— A national mutual fund distributing ownership of capital widely;

— Directing technical change toward machines that augment human ability rather than substitute for it;

— Paying people to do socially beneficial tasks;

— Nurturing special categories of work to be done by humans only (e.g. caring for the young and old);

— Awarding credits to companies that employ humans, similar to carbon offsets that can be purchased;

— Providing vouchers for basic necessities like food, clothing, and housing;

— Ramping up government programs like the depression-era Civilian Conservation Corps to clean up the environment and build infrastructure.

[NOTE: Not mentioned but well worth adding to this list are job-sharing programs that match the over-worked with the under-worked, promoting quality part-time work with better benefits (another form of job-sharing), and perhaps encouraging semi-self-sufficiency, e.g. with urban agriculture programs and homesteading. See **Work Sharing During the Great Recession;** International Labor Office, May 2013.]

"Technology is not destiny. We shape our destiny."
— Erik Brynjolfsson & Andrew McAfee

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5. Other Long-term Prospects and Problems

The final chapter emphasizes that the new technologies are exponential and combinatorial, with most of the gains still ahead. Growing even faster than Moore's Law, "in the next 24 months, the planet will add more computer power than it did in all previous history; over the next 24 years, the increase will likely be over a thousand-fold" (p.251). Our generation will likely experience "two of the most amazing events in history: the creation of true machine intelligence and the connection of all humans via a common digital network, transforming the planet's economics." But not all the news is good, because, *"while the bounty brought by technology is increasing, so is the spread."* And this is not the only possible negative consequence.

As we move deeper into the second machine age, "perils from both accident and malice will become greater, while material wants and needs are likely to be relatively less important." We will be increasingly concerned with questions about catastrophic events, genuine existential risks, freedom vs. tyranny, etc. The sheer density and complexity of our digital world bring risks and weaknesses: 1) the digital world is subject to minor initial flaws that cascade via an unpredictable sequence into something much larger and more damaging; 2) tightly-coupled complex systems make tempting targets for spies, criminals, and terrorists ("until recently, our species did not have the ability to destroy itself; today it does"); 3) there are myriad other ways that technology can have unexpected side effects, e.g. addictive gambling, digital distractions, cyber-balkanization of interest groups, social isolation, and environmental degradation; 4) development of fully conscious machines may bring a dystopian "terminator" future, or a utopian singularity; "we honestly don't know; as with all things digital, it's wise never to say never, but we still have a long way to go." (p.255)

"In the second machine age, we need to think much more deeply about what it is we really want and what we value, both as individuals and as a society… Technology is not destiny. We shape our destiny" (Final paragraph, p.257).

COMMENT: IS THIS "REALLY BIG DEAL" WHAT WE NEED?

The Second Machine Age has much in common with several other recent "techno-ecstatic" books on the new digital technology, notably **The New Digital Age** by Eric Schmidt and Jared Cohen, **Big Data: A Revolution That Will Transform How We Live, Work, and Think** by Viktor Mayer-Schonberger and Kenneth Cukier, and **Abundance: The Future Is Better Than You Think** by Peter Diamandis and Steven Kotler (GFB Book of the Month, Aug 2012). All four books promise a better world ahead. Diamandis and Kotler make no qualifications at all, but simply enthuse that, within a generation "abundance for all is actually within our grasp," with no mention of how it will be distributed. The promise of "big data" is hyped in the book's sub-title, with no downsides of infoglut considered. "Googlers" Schmidt and Cohen state that everyone will benefit in the new digital age, but not equally— which is a slight improvement in sobriety.

The importance of Brynjolfsson and McAfee is that they forthrightly venture into the economics of the new digital era, linking the new technologies to the widely-appreciated fact of growing inequality. Although they state that the transformations ahead will be "profoundly beneficial," they also grapple with the "thorny challenges" of technological unemployment and uneven "spread" of the "bounty," with two chapters of suggestions on how to tackle labor force challenges. The authors state that we *can* face up to these challenges, even as the spread accelerates—which they deem likely. But, seriously, folks, how likely is it that Americans and other developed nations will do so to any meaningful degree? Similarly, the Worldwatch Institute says that sustainability is still possible if we do everything right starting now (**Is Sustainability Still Possible?** GFB Book of the Month, Oct 2013), but how likely is that?

The authors mention only in passing that the biggest effect of technological displacement of jobs will be on the developing nations (p.184), which parallels the unfortunate megatrend that the biggest negative impacts of climate change, largely caused by the rich nations, will also impact the poorest nations. And they don't consider the declining quality of many jobs as a result of economic restructuring (e.g., see David Weil, **The Fissured Workplace: Why Work Becomes So Bad For So Many**), or the impact of the new technologies on politics. **The New Digital Age** does consider politics, noting more "revolutions" ahead for better or worse by newly enlightened and connected citizens—especially angry young people who are unemployed or underemployed as a result of the new technologies. We can already see roiling civic discontent in a dozen or so countries worldwide, which does not necessarily lead to better leadership, policies, or jobs (e.g., see **Global Employment Trends for Youth: A Generation at Risk;** International Labor Office, Aug 2013).

Brynjolfsson and McAfee conclude that "we need to think much more deeply about what it is we really want and really value." We *also* need to think more deeply, widely, and rigorously about current social, economic, and environmental trends and possible developments,

as well as the "brilliant technologies" that are driving them. How much and what kind of bounty are we really getting, and at what cost to whom, all things considered? We need nutritious food, potable water, safe and affordable energy, decent housing, adequate infrastructure, and security in many dimensions. But will the Second Machine Age provide more than marginal help in these essential areas? These basic needs are not addressed by Brynjolfsson and McAfee, who focus instead on the wonders of self-driving cars (perhaps important to those traveling to Silicon Valley on California's congested highway 101) and on the flood of information now available worldwide (but not necessarily utilized, or beneficial, and too often a distraction).

The authors make a strong case that "a very big deal" is unfolding—that "we're at an inflection point" where the curve starts to bend a lot. This may be overstated to some degree, but should not be ignored. Similarly, environmental scientists have been warning of various "tipping points" and "abrupt climate changes" ahead (e.g., **Abrupt Impacts of Climate Change;** GFB Book of the Month, Jan 2014). The difference in presentation is that the scientists are restrained in their assessments, often erring on the side of caution and trying not to express undue pessimism. In contrast, those who write about technological change are too often exuberant and overly optimistic. To its credit, **The Second Machine Age** does devote an entire chapter ("Beyond GDP," pp 107-124) to discussing the deficiencies of the obsolete GDP measure of production and progress. It just doesn't go far enough. "True growth is greater than the standard data suggest." (p.119) But if the negatives are subtracted, overall net growth may be much less.

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