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ESD SUMMER READING FOR
FACULTY

SUGGESTIONS FROM JOE
SUSSMAN JUNE 1, 2003

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Rosalind Williams-- "Retooling: A Historian Confronts Technological Change"--An MIT colleague, now head of STS takes a different view of engineering and MIT. You may not agree with it all but it's worthwhile reading. Prof Williams is the granddaughter of Warren K Lewis, the founding head of Chemical Engineering at MIT and chair of the Lewis Commission in 1949, which led to the formation of MIT's School of Humanities and Social Science.

She has a very interesting chapter called "The Expansive Disintegration of Engineering" aka "The profession formerly known as Engineering". She talks about the modern-day SoE at MIT and the changes that are wrenching the various departments, the role of ESD and BED. I am sure some in the SoE will be upset by her views. She is concerned that expanding the notion of engineering a la ESD can be damaging but at the same time, she decries the narrow view--non-integrative-- of earlier engineering programs. She also has a chapter on 're-engineering MIT' in the Champy sense. She was undergraduate dean during that and learned a good deal about MIT culture from the process

Albert-Laszlo Barabasi-- "Linked: The New Science of Networks"

The author is a professor at Notre Dame with a physics doctorate. The book is kind of "pop" but I found it quite interesting. He traces network theory from Erdos and random networks, Granovetter and the importance of weak links to the development of scale-free networks, governed by power laws and the formation of hubs--the web without a spider--self-organization, the edge between order and disorder. If a network is growing and if new nodes attach preferentially to nodes that are already well connected, hubs and scale-free behavior is exhibited. He discusses "fitness" of particular nodes, makes an analogy to the Bose-Einstein condensate and how this reads to winner takes all behavior, like Microsoft. He notes that scale-free networks are resilient against (random) failures of nodes because the network is decentralized and vulnerable against explicit attacks where the enemy attacks the important hubs. He talks about Al-Qaeda as a network but notes that the underlying rationale for people joining the network as new nodes has to be addressed if the network is to be defeated--there are too many hubs to kill the network otherwise.

He claims a strong tie between networks and complexity and makes a pretty good case.

Martin Rees-- "Our Final Hour: A Scientist's Warning: How Terror, Error, and Environmental Disaster Threaten Humankind's Future In This Century--On Earth and Beyond"-- This is brand-new and I have it on order. It was positively reviewed by the NY Times on Sunday, May 18. Rees is the Astronomer Royal and a professor of cosmology at our partner, Cambridge U. With all the possible disasters "Bioterror, nuclear war, asteroids or nanopaticles", he rates civilization's chances of survivals as no better than 50-50

John McMillan--Reinventing the Bazaar: A Natural History of Markets.

A very readable discussion of markets and how they relate to other societal systems and especially of interest to us is how they relate to innovation.

Some of His Emphases

Tragedy of the Commons -- fishing and overfishing; Chronic Overfishing -- no one owns the fish and that's the problem

Public Goods -- like basic research -- are underproduced by the market -- but are important.

Economic Growth is critical to human welfare, improvement and growth in human rights *requires* markets and markets require property rights.

Importance of uncertainty by buyers, sellers, investors, the state and asymmetries in information

Externalities cause markets to under-perform, i.e., congestion

Central planning doesn't work, BUT government is indispensable

But decentralization has limits too -- the Internet needs some central control (e.g., domain names)

Where is the cut-off between public and private provision of goods? (p. 161)
The question: What are the public goods needed to make markets work well?

Inequality and poverty are different concepts -- economic growth reduces poverty (usually) but not necessarily inequality.

The closer to equal wealth distribution a nation is, the faster its growth rate (usually). Growth is not the whole of the solution to poverty. But it is an indispensable part of it."

Economic growth requires investment which leads to improvements in human welfare AND, for investments, you need markets. Technological progress helps for which you need financial institutions AND you need government. Markets don't inevitably hurt the poor.

After Churchill -- markets are the worst way to do economies we have come up with yet, except for all the other ways! -- but you do need government as a partner!