

BOOKS & ARTS



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Clear benefit: maintaining a clean environment should be a political priority.

Avoiding system failure

An upgraded version of capitalism is needed to protect the world's resources.

Capitalism 3.0: A Guide to Reclaiming the Commons

by Peter Barnes

Berrett-Koehler: 2006. 216 pp. \$22.95

Robert Costanza

An astronomical number of words has been written on the complex set of problems facing humanity, such as climate change, peak oil, poverty and AIDS, especially in comparison with the number devoted to serious solutions. There is also a growing recognition that these problems are systemic — solving them will require changes to the way society operates, the basic capitalist system.

Peter Barnes is a progressive businessman who created a successful company, Working Assets, that donates 1% of its revenue (not just its profits) to environmental causes. Now he has produced a landmark book that gets to the heart of one of the most important systemic problems of the current capitalist system, and proposes workable solutions. He argues that the previous (1.0) and current (2.0) versions of capitalism that evolved up to the twentieth

century, under conditions that no longer hold, are in serious need of an operating-system upgrade. Version 3.0 must address the conditions and problems we face now. Barnes fully recognizes the benefits of capitalism, and does not recommend replacing it wholesale with something completely different. But he also recognizes the major flaws in version 2.0, and describes some of the features that will be needed in version 3.0 to fix them.

A major flaw, according to Barnes, is the failure of the current system of capitalism to adequately value and manage the commons. The commons, or more descriptively the common wealth, includes the atmosphere, clean water, oceans, airwaves, social networks, cultures and many other things that are essential to sustainable human well-being, but that either cannot or should not be put under private ownership (in other words, our natural and social capital assets). The failure of communism can be traced to the desire to put too many assets into the commons. But capitalism 2.0 puts too few of humanity's assets into the commons, or leaves them as open access to be plundered by

private interests. Barnes' capitalism 3.0 would recognize the importance of the commons as a separate and distinct sector of the economy that deserves to be valued and 'propertized' — but not privatized. The commons can be treated as property without privatizing them by creating various kinds of common property institutions, including trusts.

An analogy might help at this point. What if your computer's operating system started inadvertently overwriting some of the system files that allowed it to function? At first, this may not be a big problem, or even noticeable. But eventually it will cause the system to crash. This is Barnes' analogy for the operation of the current capitalist system. By inadvertently depleting our natural and social capital assets, which are external to the market and therefore unvalued by the market, capitalism 2.0 is leading us towards a system crash. We need to upgrade the system to stop and reverse this depletion and prevent the crash.

One could argue that governments (especially democratic ones) already represent the public interest and the commons sector of the

economy, and in some cases may even over-represent it. But governments have too often become the representatives of private corporate (rather than public) interests and are thus not performing this function adequately, leaving the commons underrepresented, undervalued and underprotected.

Barnes' basic recommendation is the creation of trusts to manage common property rights. An example is the Alaska permanent fund, a trust set up by the state of Alaska to manage royalty payments for oil and gas extraction. Other examples include the various land trusts, easements and concessions that have evolved and been used effectively by non-governmental organizations such as the Nature Conservancy and Conservation International. Barnes' vision would greatly expand these modest beginnings to cover all our common natural and social capital assets (while leaving private property intact). These common assets are estimated to be worth several times more than all the world's private assets combined (see *Nature* **387**, 253–260; 1997).

A good example would be an atmospheric trust to manage carbon dioxide (and other air pollution) emissions. The various cap-and-trade systems proposed so far for CO₂ would fit nicely into the trust scheme, especially if permits were auctioned to emitters, rather than given away free of charge. The trust would set the caps (reducing them over time), collect the auction fees (which would increase as the cap was reduced), and use the revenues to protect and enhance the asset (by investing in renewable energy, for example, or paying private landowners to sequester carbon). The trust could also distribute a fraction of the revenues to all citizens on a per capita basis, as Alaska does now with oil and gas royalties, in the form of tax credits and dividends. This would reverse the regressive nature of fees on carbon emissions because large emitters would pay more into the trust than they got back, whereas small emitters would get back much more than they pay in. On the global scale, this payment could also help to substantially alleviate poverty.

The details of how to pay individuals while avoiding bureaucratic corruption and excessive transaction costs would need to be worked out, of course, and this would be no mean feat. But this is just the kind of challenge that creative capitalists (version 3.0) would warm to.

Upgrading capitalism will not be without trauma (think of the last time you upgraded your computer system), but it is long overdue and is essential if the capitalist system is to survive another century. There are many devilish details to work out, but the upgrade is already under way and gaining momentum. Let's hope the system doesn't crash before it can be completed. ■

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Neurons and knowledge

Second Nature: Brain Science and Human Knowledge

by Gerald M. Edelman

Yale University Press: 2007. 203 pp.

£16.99, \$24

David Papineau

In 1972, at the age of 43, Gerald Edelman won a Nobel Prize for his work on the molecular structure of antibodies. Since then he has written a series of books about the human mind, starting with *Neural Darwinism* (Basic Books, 1987) and including *The Remembered Present* (Basic Books, 1990), *Bright Air, Brilliant Fire* (Basic Books, 1992) and *Wider than the Sky* (Yale University Press, 2004). In his latest book, *Second Nature*, Edelman turns his attention to epistemology. His aim is "to ground the theory of knowledge in an understanding of how the brain works".

Epistemology, or the theory of knowledge, is traditionally the preserve of philosophers, and is a house with many mansions. At the start of modern philosophy, René Descartes aimed to show how our beliefs could be placed on absolutely firm foundations. More recently, philosophers have become suspicious of Descartes' aspirations to certainty. As a result, many now agonize about how we should define 'knowledge' if it doesn't require certainty. Others seek to develop epistemology as part of probability theory, analysing the relation between evidence and estimates of the likelihood of events. And there are others still who see epistemology as an essentially practical enterprise whose task is to sift accurate modes of thought from unreliable ones.

Edelman sees little value in any of these philosophical efforts. He dismisses most of them as "armchair operations" that are not empirically testable. Even the more practically minded philosophers are criticized for ignoring the 'neural underpinnings' of knowledge. In Edelman's view, only a 'brain-based epistemology' will yield real results. In principle this sounds like an exciting project, but in the end the book is disappointing. Edelman covers a lot of ground in relatively few pages, but it is not always clear what he is trying to say.

The first few chapters focus on consciousness, on the not unreasonable grounds that knowledge presupposes consciousness. As will be familiar to readers of his previous books, Edelman takes consciousness to depend on 're-entrant activity' resulting from reciprocal

signalling between different regions of the brain. It is hard to know what to make of this theory. Unsympathetic critics will ask what distinguishes re-entrant activity from the feedback projections that are familiar to all brain researchers. We might also ask how the theory measures up to Edelman's own high standards of scientific testability. For example, his theory implies that frogs are not conscious, as they lack sufficiently complex brains. But how are we to test this claim, in the absence of any independent criteria for frog consciousness?

When Edelman turns to knowledge itself, he is not much more explicit. Early on he promises "an account of knowledge that relates truth to opinion and belief, and thought to emotion by



Intelligent robots such as Darwin VII evolve neuronal connections in response to environmental stimuli.

including aspects of brain-based subjectivity in an analysis of human knowledge". It doesn't get much more definite than this. Edelman provides some general observations about neuronal development, pattern recognition and the evolution of language, but he doesn't explain exactly what epistemological questions these observations are supposed to answer.

The most substantial part of the book is a section on intelligent robots. Edelman describes a series of devices with sensors and computer-simulated brains that have been built in his Neurosciences Institute in La Jolla. The brains are modelled on human anatomy, complete with versions of visual cortex, inferotemporal cortex and hippocampus. They are not preprogrammed, but evolve neuronal connections

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