

currently available, “we are unlikely ever to chart the full scope of neural phenomena associated with a mental state, even a simple one.”

While most neuroscientists agree with Damasio that consciousness is rooted in biological processes, he goes a step further in emphasizing the importance of the body as a whole rather than the brain alone in the experience of consciousness. He concurs with other neuroscientists that consciousness contributes to adaptability and evolution, but he isn't afraid to make the surprising suggestion (although perhaps not surprising to some pet owners) that animals may possess a rudimentary form of consciousness.

I found *Self Comes to Mind* a delight. But despite Damasio's attempts to address a general audience as well as other neuroscientists, readers with little knowledge about the brain may well experience the cognitive equivalent of seasickness. Still, all is not lost for first-time brain-book readers. Start with the appendix, a lucid summary of the main elements of neuroanatomy and neurophysiology. Next, read chapter 10, “Putting It Together,” in which Damasio sets out his main points minus the jargon-dense and peer-directed hairsplitting of earlier chapters. After that, you'll be reasonably equipped to start reading this book from the beginning. If you do, you will embark on an intellectual journey well worth the effort.

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The Engines of Progress

Reviewed by Mark Reutter

WHEN WE THINK OF GLOBAL power, we think of political or military might or the clout of big corporations. We certainly don't ponder horsepower, a unit of measure originally developed to compare the output of steam engines with the pulling power of draft horses. Vaclav Smil wants to change that. In *Prime Movers of Globalization*, he examines the role of diesel and gas tur-

PRIME MOVERS OF GLOBALIZATION:

The History and Impact of Diesel Engines and Gas Turbines.

By Vaclav Smil.
MIT Press.
261 pp. \$29.95

bine engines in the worldwide economy. Both convert the chemical energy of fuel into the mechanical power—horsepower—that drives objects through the air or across water.

These mechanical powerhouses are the Rodney Dangerfields of globalization, suggests Smil, an environmental scientist at the University of Manitoba and the author of some 30 books. Buried in the bowels of ships, diesel engines move billions of tons of foodstuffs, fuel, and industrial goods between continents. They also propel trains, trucks, and barges. Whirring reliably underneath the wings of planes, gas turbines make possible the flight of jetliners that transport more than five million passengers a day.

While these machines have received little attention, Smil writes, they have “led to epochal shifts in world affairs,” most noticeably the rise of China as the world's manufacturing hub. A modern container ship such as China Shipping Container Lines' *Xin Los Angeles* can transport 24 times more goods than the first container vessels could in the late 1950s. Moreover, it can be loaded and offloaded about 20 times faster than in the days of grappling hooks and sweaty longshoremen, by cranes that are themselves usually powered by diesel engines.

The diesel engine was pivotal in freeing land and sea commerce from the shackles of the thermally inefficient steam engine. German engineer Rudolf Diesel developed the theoretical design in the 1890s, but because the engine's high-pressure system made unprecedented demands on the working parts, several decades passed before it gained widespread use. By then, diesel production had been commandeered by aggressive U.S. upstarts such as Cummins (trucks), Fairbanks-Morse (ships), and General Motors (locomotives).

The gas turbine for jet propulsion is another case in which technical improvements occurred incrementally after the first big leap of invention. Patented by both British and German engineers in the 1930s, the jet turbine was met with skepticism by military authorities and was not commercialized until a Boeing 707 (using a Pratt & Whitney turbo) took flight in 1954. Subsequently, turbine-powered jets rapidly replaced propeller-driven aircraft.

If diesels and turbines have made it possible to shuttle ever-increasing payloads of cargo and people among the continents, they have also changed commercial relations among nations. Consider that the manufacture of both engines was the exclusive preserve of Western nations (plus Japan) through most of their history. No longer. Nearly all large diesel engines designed by European companies are now made in Asia. This is in keeping with Asia's rapid rise to dominance of ocean shipping, with China now accounting for nearly half of the traffic handled by the world's top 20 container terminals.

Backpedaling from his overall claims for the beneficial nature of these two prime movers, Smil adds up the environmental costs of transporting more and more freight and passengers over long distances. In 1996, international shipping accounted for just 1.8 percent of the global carbon dioxide released by fossil fuels. By 2008, ocean shipping was responsible for about four percent. Aviation releases about half the carbon dioxide that shipping does, but jetliners emit greenhouse gases into a more environmentally fragile part of the atmosphere. Still, Smil sees no reliable or affordable alternatives. "Green power" has not found any niche on the high seas or in the air. For the foreseeable future, the global economy will rely on diesel engines and gas turbines.

Smil is a discursive writer who rarely finds a detail about engines that he doesn't want to share, which makes for heavy going at times. And he overplays his insistence that international trade agreements take a subordinate role to diesels and turbines as the drivers of globalization. In fact, both political power and horsepower shape the world's commerce. One sets the rules, the other delivers the goods.

But his descriptions of the mechanics of modern shipping, as well as earlier waves of globalization propelled by steamships and tall-mast vessels, make for stimulating reading. By scrutinizing common yet often-overlooked technologies, Smil offers a fresh and useful perspective on world economics.

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RELIGION & PHILOSOPHY

A Feast of the Spirit

Reviewed by Jonathan Rieder

BLACK CHRISTIANITY HAS always had an ambiguous relationship to American culture. If African slaves grew to embrace Christianity, they did so in their own way: hallowing Exodus and wondering, "If God delivered Daniel, why not every man?" Thus was born the amalgam "Afro-Christianity"—a universal-

istic faith drenched in particularity. The "African-ness" was a matter of style, too, given in moan and shout, which often led whites to view black religion as exotically emotional. Even Martin Luther King Jr. was known to recoil at the sight of a preacher "jumping out" and "screaming with his tune."

Not the least of the virtues of *Preaching With Sacred Fire*, a smorgasbord of an anthology, is to remind the reader of the dazzling array of black preaching. There's plenty of the fire that readers might expect. Toward the end of "The Eagle Stirreth Her Nest," delivered around 1941, the legendary C. L. Franklin, father of Aretha Franklin and King's favorite preacher, breaks into fervent chanting. But that wasn't fireworks for its own sake; Franklin had already well explored his main theme, God's love and mercy. In his 1987 sermon "Chaos or Creation," Charles G. Adams, known as "the Harvard Whooper," launches his signature crescendo only after parsing the doctrine of *creatio ex nihilo*.

Style, then, can be the vehicle of substance and not its enemy, and in *Preaching With Sacred Fire*, all manner of stylists abound: cerebral, mystical, whimsical, tender, contemplative, offbeat, angry, sublime. Some of the most beautiful moments are gently lyrical. Gardner Taylor, now retired as pastor of Brooklyn's Concord Baptist Church of Christ, asks in a 1982 sermon, "Do you sometimes in the solitude of your own reflection weep a silent tear as the words of that hymn come to you, 'Was it for crimes that I have done, / he groaned upon the tree?'"

PREACHING WITH SACRED FIRE:

An Anthology of African American Sermons, 1750 to the Present.

Edited by Martha Simmons and Frank A. Thomas.
W.W. Norton.
960 pp. \$45