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MuseLetter #337 / March 2021 by Richard Heinberg

Dear readers,

This Month's MuseLetter includes two essays. The first is a glimpse at my new book, POWER, which will be out in September (and will be available soon for a [pre-release sign-up guided reading group](#)). The second asks what fountain pens (of all things!) can tell us about the evolution of commerce, personal communication, and small-town America during the last century-- and explores how those developments set the stage for the country's political divisions today.

*Best wishes,
Richard*

Understanding Power

This article, the first in a series of five, is based on the forthcoming book, POWER: LIMITS AND PROSPECTS FOR HUMAN SURVIVAL. For information about the book and how to join exclusive pre-release webinars, please go to postcarbon.org/power.

Homo sapiens is Earth's unequivocal champion at gaining and wielding power. We shoot probes to other planets and plumb the depths of the seas. Each year our species extracts and processes 100 billion tons of natural resources that end up as consumer products and building materials. In order to obtain these resources, we move more soil and rock than are displaced by all of nature's forces combined—including wind, rivers, rain, volcanoes, and earthquakes. We do so much mining, transporting, manufacturing, and waste dumping that, purely as a side effect, we're also significantly and perilously altering the chemistry of our planet's atmosphere and oceans. That's power.

Moreover, we have found a multitude of ways to use our outsized human power to subjugate and control one another. We've generated so much economic inequality that a mere seven individuals now enjoy as much wealth as the poorer half of humanity—roughly four billion people. At the same time, we've developed weapons so lethal that the survival of our species depends on our never using them. We influence one another's behavior with debt, laws, prisons, taxes, regulations, borders, facial recognition technology, property rights, advertising, hiring and firing, propaganda, internet and social media algorithms, and a thousand other means.

Power is good; we can't do anything without it. But it's clear that we are

creating some serious environmental and social dilemmas for ourselves. Is it possible that we humans, or at least some of us, now enjoy too much of a good thing? Or is our problem merely that we don't understand power very well, and therefore tend to misuse it?

These questions have bugged me my entire adult life. A few years ago, I decided to undertake a systematic search for answers. I started by focusing on the seemingly simple query: what *is* power?

I spent months doing a literature search (it took so long because a lot has been written), but came away frustrated. Ask a physicist and she'll tell you that power is "the rate of energy transfer," measurable in watts. But that's not how most of us use the word. When we speak of the power of a dictator or a billionaire, we're not concerned about their ability to convey a lot of energy quickly. The kind of power that people wield over one another is usually defined as "the possession of control, authority, or influence over others." How are these two meanings related—or are they? Are we merely using one word to refer to two or more completely different things?

Gradually, through research and thought, I have come to see the many and varied meanings of *power* as inextricably linked. The link is evolution.

Humanity's amazing powers have roots in the plant and animal kingdoms. All sorts of organisms communicate, move, sense, process information intelligently, and exclude others of their kind from access to resources; some even build complex societies with division of labor. We humans have amplified these powers using an increasing array of dazzling technologies—as well as language, a key facilitator of nearly everything we do. For example, over millions of years, insects, birds, and bats independently evolved the power of flight. However, in just the last century, using airplanes, we humans developed the ability to fly faster than a diving peregrine, and higher than an Asian goose soaring above the Himalayas. Using technology guided with numbers and words, we can detect trace chemicals that even a bear's nose can't sniff out, and lift burdens that would crush an elephant.

The ability to do anything whatsoever starts with energy. Controlling the transfer of energy is basic to life; it's the essential business of every cell. In fact, gram-for-gram, the average organism is 10,000 times as powerful as the Sun. That seems unbelievable until you do the math. The Sun is very massive; dividing luminosity by mass yields 0.0002 milliwatts of power per gram. A human, eating an average diet and converting food energy into heat and work, averages 2 milliwatts per gram—and some nonhuman cells can do better than that. Of course, life's power is derivative, mostly originating with sunlight. But living things have unquestionably gotten very good at gathering and managing energy.

Energy is the currency of power, and controlling its transfer enables organisms to do things. Indeed, one key definition of power is, "the ability to do something." We speak of the power of movement, the power of perception, the power of thought, and the power of imagination. While these abilities are very different from one another, they all ultimately depend on energy. *Social power* could be defined as "the ability to *get other people* to do something"—whether by incentive, threat, or inspiration. It's this kind of power that we humans tend to fret over much of the time, and, while it

sometimes seems disconnected from physical demonstrations of power, it's really just another ability made possible by clever energy management. Social power is the ability to influence how others manage *their* energy.

Ways of expressing power have evolved—first through the relatively slow process of biological evolution, and more recently in humans via speedier cultural evolution using language and technology. As a result, we appear (to ourselves, at least) to be the tip of evolution's arrow. But, to mention just the two most extreme options, is that arrow aimed toward godhood—in which science and technology develop to the point where we attain immortality and virtual omnipotence? Or toward extinction—in which we deplete Earth's resources and fight one another to the death over what's left?

Today, as the planet warms and our oceans are being emptied of life, the latter outcome looks disturbingly likely. Whether we extinguish ourselves and most other higher organisms on this planet, or live to enjoy the benefits of power for many millennia to come will likely depend on whether we find appropriate ways to limit our power in the present so as to exert it over a longer period of time. If we are to survive, we must reduce our carbon emissions and other forms of pollution, leave more living space for other species, eliminate nuclear weapons, and greatly reduce economic inequality. Conventional thinking typically proposes to exert even more power through technology to fix the problems caused by our overuse of power in the past, but this merely clouds the issue, delaying a genuine response while problems continue to accumulate and worsen.

Self-limitation of power is, again, a strategy of energy management rooted in evolution. In nature, failure to control or limit power can result in disaster. Each organism maintains homeostasis—a moment-by-moment power balancing act. Ecosystems are shaped by power balances among predators and prey. And some species specialize on rare habitats or food sources, thereby limiting their own numbers. Sometimes individuals sacrifice themselves for the good of the whole—like exploding ants (*Colobopsis saundersi*, found in Malaysia and Brunei), which produce a toxic fluid in their abdomens, so that, when the colony is attacked, some of the workers can blow themselves up, releasing the toxin and killing the invaders.

Power self-limits have also played a role in human evolution. Some Native American societies threw annual feasts in which they gave away all surplus food and other possessions, thereby keeping inequality from gaining a foothold. In the modern world, many nations have instituted democracy as a way to thwart the emergence of tyrants. A few societies have even refused to adopt certain technologies (as the Amish have with television and cars) or energy sources (as the Chinese largely did with coal in the 12th century) because they thought these would be too disruptive to their existing values.

Since we're facing so many existential challenges related to the over-use of power, why aren't we successfully limiting ourselves now? We try, using climate treaties, environmental regulations, wealth redistribution programs, and weapons-restricting negotiations. But there are a host of reasons our power-limiting efforts are failing to avert crisis upon crisis. The foremost reason is the fact that we have recently increased our collective power dramatically and quickly, via fossil fuels—which represent millions of years' worth of ancient sunlight gathered, transformed, and stored by natural

processes. The amazing advantages these fuels have given us tend to delude us into thinking that we can exceed every limit, and can overpower nature and one another without serious negative consequences.

During the last 200 years, per capita energy usage grew eight-fold, while human population expanded at about the same rate. As a result of energy growth, all the things we do with energy became more doable. Transportation, manufacturing, agriculture, and mining exploded in scale. Energy became so abundant that it seemed we could solve any human problem, now or in the future, just by throwing more energy at it. We even reconfigured our economic system so that it assumes and requires perpetual growth.

But growth in fossil-fuel energy can't continue much longer: depletion and climate change will see to that. And even if we make a wholehearted effort to switch to low-carbon energy sources, we face limits to nature's supplies of materials with which to make solar panels, wind turbines, nuclear reactors, and batteries.

The ways we're currently trying to share and manage power are insufficient also because we have failed to understand power itself. Rather than accepting that power limits exist, then surveying them and adapting ourselves to them, we try to finesse or deny them. We respond to climate change by hoping for a renewable energy transition—without questioning the amounts of energy we use or what we do with it. We deal with economic inequality by establishing minimal safeguards for the poor—without examining the structural means by which some people enrich themselves to absurd degrees.

It's high time we discussed power more honestly, compassionately, and intelligently. But first we have to understand what we're talking about.

Fountain Pen as Bellwether

As a writer on environmental topics, I try to limit my purchase of consumer products whenever possible. I do, however, permit myself a couple of extravagances. One is books: my job requires me to be conversant with the latest thinking in my field, so I've accumulated hundreds of volumes on climate change, ecological economics, anthropology, and environmental history. My other vice consists of a modest collection of antique [Parker](#) and [Sheaffer](#) fountain pens made between the years 1924 and 1960. These pens give me daily pleasure as I fill, use, and reuse one after another to write notes, outlines, and lists or to practice a little italic calligraphy. I justify this self-indulgence with the excuse that it doesn't entail much new resource extraction or energy expenditure. Further, learning about fountain pens has provided some useful insights into American economic and social trends during the last century.

The fountain pen is an ingenious handwriting tool developed in the late 19th and early 20th centuries. While good pens were made in Britain, Germany, Japan, and other countries, most of the key technical advances occurred in the hinterlands of the United States.

George S. Parker started the Parker Pen Company in 1892; Walter A.

Sheaffer filed his first patent in 1908 and an application for incorporation in 1913. Both men had been small-town jewelers. Both their organizations initially consisted of a workshop with a handful of skilled employees. And both companies were headquartered in the Midwest—Parker in Janesville, Wisconsin and Sheaffer in Fort Madison, Iowa (where I lived as a young boy). These companies eventually grew to employ thousands of locals; they were the economic engines of their regions.

The beautifully colored pens of the 1930s and early '40s were constructed of brass, gold, and celluloid—an early plastic made of plant-based material treated with various chemicals, adopted first by Sheaffer in 1924. Manufacturers competed to devise new ink filling mechanisms (levers, buttons, vacuum pumps, and plungers) and to enliven their products with pleasing and sometimes futuristic Art Deco shapes. The best makers offered lifetime guarantees.

The functional development of the American fountain pen achieved its zenith around 1950. By then, Parker had introduced its revolutionary “[51](#)” model, whose streamlined barrel was milled from durable Lucite, its cap and trademark arrow-shaped clip fashioned from stainless steel. Its hooded nib kept the pen from leaking ink onto fingers or clothing, and it never skipped. These pens are nearly indestructible. Millions of Parker “51s” were manufactured (and later, hundreds of millions of cheap Chinese knock-offs), and, if you are lucky enough to find one in a junk shop, it will likely require no expensive restoration in order to work as well as it did when it was new—merely an overnight soak in tap water.

During the 1950s, Sheaffer was producing “[Snorkels](#)”—pens that fill by turning a knob at the back of the barrel, thereby extending a tube from the nib at the front; a vacuum pump then draws up ink from a bottle. This was the most complicated filling mechanism ever invented—but one that’s also reliable and fun to use once it’s restored. Again, millions were produced in a wide range of colors and grades of trim. Even the cheapest “Snorkel” is a superbly engineered writing instrument.

By the late '50s, nearly all pen bodies were being manufactured using injection-molded plastics made from hydrocarbons. Molding parts rather than milling them from solid rods of celluloid or Lucite reduced the need for skilled handwork, thereby lowering costs. But gone were the gorgeous mottled and patterned celluloids that had lit up desks, purses, and suit jackets during the otherwise drab Depression.

Fountain pen manufacturing was big business in the first half of the 20th century because nearly everyone did a lot of handwriting. Millions of letters were written to and from troops during the two World Wars, and between family members as they traveled to pursue jobs in distant cities. Billions of written words flowed from the gold nibs of fountain pens (typewriters were for office work). Writing was a personal, tactile, and expressive process, and third-graders spent many tedious hours mastering the [Palmer Method](#) of legible, efficient penmanship.

The decline of the American fountain pen began with the advent of the ballpoint in the '50s. This was a cheaper, more convenient, and often disposable alternative. But nearly everyone’s handwriting went to hell: a

ballpoint pen simply can't be controlled as well as a good dip or reservoir pen (though left-handed writers sometimes disagree). The pen industry's downturn worsened in the 1980s and '90s with the appearance of desktop and laptop personal computers, and steepened to a nosedive in the 2000s with the widespread adoption of hand-held computing devices. Today's third-graders no longer study penmanship. As a result, few children can even decipher (much less reproduce) the cursive "antique writing" that their grandparents painstakingly practiced.

When fountain pen manufacturers fell on hard times in the 1960s, workers started getting laid off. Disposable plastic ink cartridges replaced the many methods of filling fountain pens from glass ink bottles. Parker and Sheaffer were bought by big multinational corporations, and they increasingly produced ballpoints (though both companies also eventually introduced expensive flagship fountain pen models aimed at collectors and fussy executives). Today the factories in Janesville and Fort Madison are shuttered, and current lines of Parker and Sheaffer pens are made overseas.

Something similar happened in dozens of other industries. Markets changed; skilled jobs dried up; and the production of many consumer products shifted from the US to Japan, China, and other countries. Throughout the past five decades, large numbers of talented and ambitious young Midwesterners migrated to the coasts. Their vast, once-thriving region came to be known as the Rust Belt or Fly-Over Country.

The early 20th century was no Eden: while it was a time of industrialization, productivity, and increasing prosperity for many, these trends were enabled by the rapidly increasing and unsustainable use of fossil fuels, the exploitation of poor people across the world for cheap labor, and the intensive looting of the natural environment. The World Wars and the Depression hardly felt like paradise at the time. Nevertheless, compared to what would come later, this period would offer some folks plenty of fodder for nostalgia.

In 2016 and again in 2020, "Make America Great Again" signs popped up on lawns across Wisconsin and Iowa—former hotbeds of farm-based progressive populism. The sentiment is understandable. Of course, the revival of the fountain pen industry was never part of the Trump agenda; Republicans merely directed Midwesterners' simmering frustration toward immigrants and coastal elites. These politicians' promises to revive the coal industry came to nothing—thankfully, from an environmental point of view—and their calls to repatriate manufacturing have likewise mostly gone unanswered. Deindustrialization and the brain drain contributed to political polarization and dysfunction, as the overall economic trajectory of the US was inexorably driven by ongoing processes of fossil fuel depletion, financialization, and globalization. Today, the country is widely viewed as an empire in steep decline, perhaps approaching collapse.

Fountain pen collecting has itself changed: when I started buying pens in the 1980s, new acquisitions came from antique or junk stores. A high-quality Parker or Sheaffer in excellent condition might turn up on an annual or semi-annual basis; and, if I was lucky, it would cost just a few dollars. I learned to do simple repairs by trial and error or by talking to other, more knowledgeable collectors. Today, the vintage pen market has migrated to eBay and regional pen shows. Online, you're bidding against collectors

scattered around the world; prices settle at predictable levels for condition and rarity. It's easier to assemble a collection, but it's more expensive and often not as much fun. YouTube videos teach enthusiasts how to change an ink sac, adjust a nib, or repair a filler.

Fountain pen collecting is a subject of almost no consequence compared to topics I usually write about—climate change, resource depletion, and economic inequality. But it does offer another, perhaps less obviously worrisome and more entertaining, way of understanding the times we inhabit. And it's an activity that may have handy repercussions one day if the grid goes down and we still need to communicate.