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January's Museletter begins with an essay revisiting the ancient Chinese classic, "Tao Te Ching," drawing inspiration for the challenges of today. Some of those challenges are the topic for the second essay (co-authored by J. David Hughes), "Climate Change and Energy Transition: The 2023 Scorecard".

An Ancient Chinese Text That's Surprisingly Relevant Today

While rummaging through a bookstore in Iowa City decades ago I happened upon a slim volume with the intriguing title, *Tao Teh King by Lao Tzu: Nature and Intelligence*, translated by philosopher Archie Bahm. As a 20-year-old, I was in a state of full rebellion against my Christian upbringing, the consumerist culture around me, and the pointless violence of the Vietnam War. I was looking for alternative ways of understanding the world, and was taking classes at the University of Iowa on existentialist philosophy and early Buddhist texts. Lao Tzu's very first sentence hooked me: "Nature can never be completely described, for such a description of Nature would have to duplicate Nature." The book advised a modest way of life emulating nature's way. For years afterward, Lao Tzu would be my constant companion, and I still occasionally read that tattered copy.

There are many other translations of *Tao Te Ching* (this is the English spelling that appears most frequently; a fairly accurate phonetic rendering is *Daodejing*). Indeed, it's one of the most frequently translated books. Bahm's version, which dates from the 1950s, is today not regarded as being scrupulously true to the Chinese text, but it's clear, coherent, and sensible.

In 1973, ancient Taoist manuscripts were found in southern China, including the earliest then-known text of *Tao Te Ching*, dating from the second century BC. This discovery greatly improved scholars' understanding of the book and its origins. Twenty years later, an even older version, similar to the one found in 1973, was discovered in a tomb near the town of Guodian in the province of Hubei. This manuscript was dated to the fourth century BC.

Recent translations of *Tao Te Ching* put its chapters in the order found in these recently discovered versions, and also reveal new meanings in many passages. Experts now believe that the book began as a set of orally transmitted sayings, and that some of the text consists of additions and revisions introduced by the scribes who put it in writing. Nothing reliable is known of the supposed author Lao Tzu (a name that simply means "Old Master"); the book may be a

compilation of ideas that originated with a scattered group of wandering sages rather than a single author.

None of this diminishes the usefulness of the insights in the text. Don't be dazzled by appearances, the Old Master tells us. Don't go to extremes. Live simply, and closely observe natural phenomena like forests and streams. From the [Stephen Mitchell](#) translation:

Knowing others is intelligence;

Knowing yourself is true wisdom.

Mastering others is strength;

Mastering yourself is true power.

If you realize that you have enough,

You are truly rich.

If you stay in the center

and embrace death with your whole heart,

you will live forever.

Understanding any ancient text requires some knowledge of its historical context. Early Chinese history is unfamiliar to most Westerners, so here's the briefest of overviews. The Shang dynasty, which flourished in the second millennium BC, is the first dynasty of traditional Chinese history for which there is clear archaeological evidence. In 1045 BC, King Wu of Zhou overthrew the Shang dynasty, but his descendants slowly lost power. The former Shang lands were divided into hereditary fiefs, over which the king had dwindling control. At the same time, raids by nomadic tribes from the north intensified toward the end of what historians call the Western Zhou period. The subsequent Eastern Zhou period is divided into the Spring and Autumn period (770-481 BC) and the Warring States period (475-221 BC), and it's these latter two periods that form the backdrop for the composition of *Tao Te Ching*. A powerful kingdom (the Shang dynasty and its remnant in the early Western Zhou period) was disintegrating through civil wars and invasions by neighboring tribes, requiring people at all social levels to rethink their relationships to one another, to government, and to nature.

Confucius (Kong Qiu) lived from about 550 to 480 BC, during the Spring and Autumn period. His profoundly influential philosophy centered on personal and governmental morality, justice, kindness, and veneration of ancestors; it also emphasized rulers' duty to their subjects. Proclaiming himself a transmitter of earlier values, Confucius promoted a bureaucratic, hierarchical, and legalistic vision of the ideal society. *Tao Te Ching* may have been composed orally during Confucius's lifetime and written down somewhat later, during the Warring States period. Taoism seems to have been, in part, a reaction to Confucianism—a response that emphasized spontaneity over etiquette, genuineness over duty, and the superiority of nature over humanly-imposed social and technological order.

In the Afterword to his translation of *Tao Te Ching*, sinologist Victor H. Mair makes a strong case that early Taoism was influenced by the Yogic tradition of southern Asia. Mair points out that both Yogic and Taoist spiritual practices centered on breathing exercises, postures, and meditation, which were claimed to yield superhuman abilities. Both *Tao Te Ching* and the [Bhagavadgita](#) (a key early Indic sacred text) taught that enlightenment could be achieved through non-attachment. Mair also shows significant linguistic parallels between these two texts and argues that it is much more likely that the earlier-documented Yogic tradition influenced China, rather than that Taoism traveled to India.

However, Taoism has its own unique flavor that differentiates it from Yoga. Taoism's naturalistic trail of thought became most visible and tangible in its subsequent expressions in Japanese Zen [gardening](#) and [architecture](#) (Zen was Japan's offshoot of the Chinese Chan Buddhist tradition, which was deeply influenced by Taoist teachings).

Beyond its interest for historians, *Tao Te Ching* has special significance for anyone trying to find a sane path in today's world. We are in the very last stages of the greatest empire that ever has been, or likely ever will be. Fossil-fueled technology has driven humanity farther than ever from nature's way. This did not happen because humans are inherently evil; we are expressions of nature. We are simply victims of our own success: social evolution led some societies to develop capitalism, which then made it possible for them to access and use fossil fuels (as I've explained at much greater length [here](#)). We've temporarily exceeded nature's limits, in terms of our population size, our overall rates of energy and materials usage, and the amount of pollution we're spewing. As a result, the impressive social, economic, and technological structures we've built in the past couple of centuries are set to come tumbling down. When they do, we may enter our own Warring States period.

Inevitably, the survivors will try to make sense of what has happened. In the wake of collapse, there may be neo-Confucianists who promise to Make Civilization Great Again through obedience to authority and worship of the past. And there may be wandering sages who teach their followers to learn from nature and embrace simplicity.

It's worth noting that a philosophical bifurcation in the wake of imperial decline may have occurred in another important historical instance. Authors James Valliant and Warren Fahy argue in [Creating Christ: How Roman Emperors Invented Christianity](#) that Christianity began as a Roman imperial project to co-opt Jewish messianic, monotheistic radicalism while maintaining the organizational and ideological essence of the Empire—even as the Empire itself disintegrated. That project succeeded brilliantly, but alternative philosophies nevertheless survived or cropped up later. The Franciscans, who offered a nature- and peace-loving counter-philosophy, were co-opted back into the Catholic fold. Pagans and witches were persecuted or burned, while Indigenous peoples were converted, enslaved, or slaughtered. There is every reason to suppose that, as our current global industrial civilization crumbles, there will be similar splits between a dominant narrative (techno-civilization was great, but it was sabotaged and must be restored) and humbler alternatives (techno-civilization was a mistake; it's nature that's great).

I'll leave the last words to the Old Master, this time from the Bahm translation:

Whenever someone sets out to remold the world,
experience teaches that he is bound to fail.
For Nature is already as good as it can be.
It cannot be improved upon.
He who tries to redesign it, spoils it.
He who tries to redirect it, misleads it.

Climate Change and Energy Transition: The 2023 Scorecard

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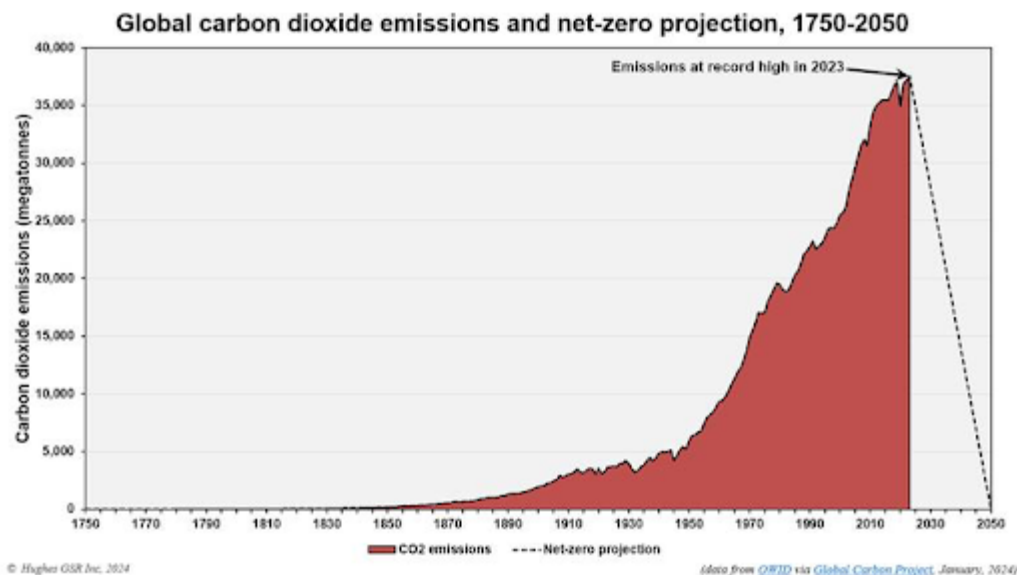
The numbers are in. Last year was the [hottest on record](#) by a wide margin. The planet is now 1.48 degrees Celsius warmer than it was before the fossil fuel revolution. Global heating is accelerating. This year (2024) is likely to set another record because the latter half of last year featured an *El Nino* climate pattern that continues to influence global weather. The last colder-than-average year, according to NOAA, was [1976](#).

The United States experienced a [record number](#) of billion-dollar weather disasters in 2023. Canada's wildfires in June resulted in an unprecedented flurry of air-quality alerts in the Northeast and Midwest of the U.S., with New York temporarily suffering the worst air quality of any city in the world. Wildfires also devastated Maui.

Elsewhere in the world, Libya, Guam, Malawi, and Peru experienced horrific floods. According to the United Nations, drought now affects [a quarter of humanity](#). [Developing countries](#) were stuck with proportionally higher recovery costs on a per-capita basis.

The solution to climate change is to reduce and reverse the decades-long trend of annually increasing greenhouse gas concentration in the planetary atmosphere. So, let's see what the numbers tell us on that score. The carbon dioxide (CO₂) level in Earth's atmosphere is now over [420 parts per million](#), up from 315 ppm in 1958 when the first direct measurements commenced. The atmospheric CO₂ concentration has been increasing at [over 2 ppm per year](#) for the past several years.

This added CO₂ in the atmosphere comes from human activities that release carbon dioxide (and other greenhouse gases) into the air. U.S. carbon emissions were [down 3 percent](#) in 2023 due mainly to an ongoing national switch from burning coal to burning natural gas for generating electricity. But worldwide carbon emissions were up 1.1 percent compared to 2022. Since climate change is a global problem, it is the global statistic that matters.



Most emissions are energy-related, so phasing out fossil fuels in favor of low-carbon energy alternatives is critical. While it's too early to report final data for renewable energy additions in 2023, last June, the International Energy Agency (IEA) [forecasted](#) that global renewable energy generation capacity would increase by a record 440 GW for the year (total world renewable energy generation capacity, including hydropower, stands at about 4,500 GW).

However, confusion sometimes results from failure to distinguish *production capacity* from *actual generation* since solar and wind installations typically generate only 20 to 50 percent of their theoretical capacity due to variations in sunlight and wind.

So, let's look at the actual generation numbers. Of the roughly [30,000 terawatt hours](#) of electricity generated globally in 2022, [8,500 terawatt hours](#) (29 percent) came from renewables—over half of that from hydropower.

We must be careful to distinguish between “electricity” and “energy”—another frequent source of confusion. Electricity's share of all end-use energy usage remains stable at about 20 percent. After accounting for conversion factors, renewables (including solar, wind, hydro, geothermal, biofuels, and traditional biomass—i.e., burning wood for cooking and heating) provide about [16 percent](#) of total world primary energy.

Nuclear energy also entails relatively low levels of carbon emissions, but its share of world energy fell to a [multi-decade low](#) in 2023, and nuclear projects are notoriously slow and expensive to bring online.

To reach net zero emissions by 2050 (which [the IPCC considers necessary](#) to cap warming at 1.5 degrees Celsius) by providing 100 percent of total global energy from renewables, we would need a nearly ten-fold increase in renewable energy production, even assuming zero growth in overall global energy demand during that time.

Annual additions of solar and wind capacity would have to increase by well over an order of magnitude (10x) compared to the current record rate. Electrification of transport, manufacturing, agriculture, and other sectors would also need to accelerate dramatically.

In its [Net-Zero Roadmap](#) report published in September 2023, the International Energy Agency (IEA) recognized the extreme difficulty of achieving these increases in renewable energy and suggested instead that 19 percent of final energy will still come from fossil fuels in 2050 and that final-energy consumption will be reduced by 26 percent.

To remove the resultant emissions, the IEA estimated that one billion metric tons per year of carbon dioxide would need to be captured by 2030, rising to 6 billion tonnes by 2050. Mechanized technologies for carbon capture and storage (CCS) and direct air capture (DAC) that would be required to do this have been [criticized](#) as being too expensive, too energy intensive, and underperforming in terms of their goal.

Currently, [about 2 billion tonnes of carbon](#) dioxide is captured annually, nearly all by forests; only [49 million metric tons](#) are being removed from the atmosphere by carbon removal technology projects across the world. About 80 percent of that captured carbon is used for “enhanced oil recovery.”

Meanwhile, over [37 billion metric tons](#) of carbon dioxide are being released by human activities, primarily from the burning of fossil fuels.

We can conclude from these scorecard numbers that, as of the start of 2024, humanity is not on track to avoid catastrophic climate change. The likelihood of limiting warming to 1.5 degrees Celsius (the goal stated in the [Paris Accords](#) of 2015) is now extremely remote. Indeed, that threshold may be exceeded [within just the next few years](#).

If world leaders genuinely hope to change these trends, dramatic action that entails reevaluating current priorities will be required. Not just fossil fuel subsidies but also continued growth in global energy-tied economic activity must be questioned. Otherwise, we may be destined to fulfill the old adage: “If you do not change direction, you will end up where you are heading.”