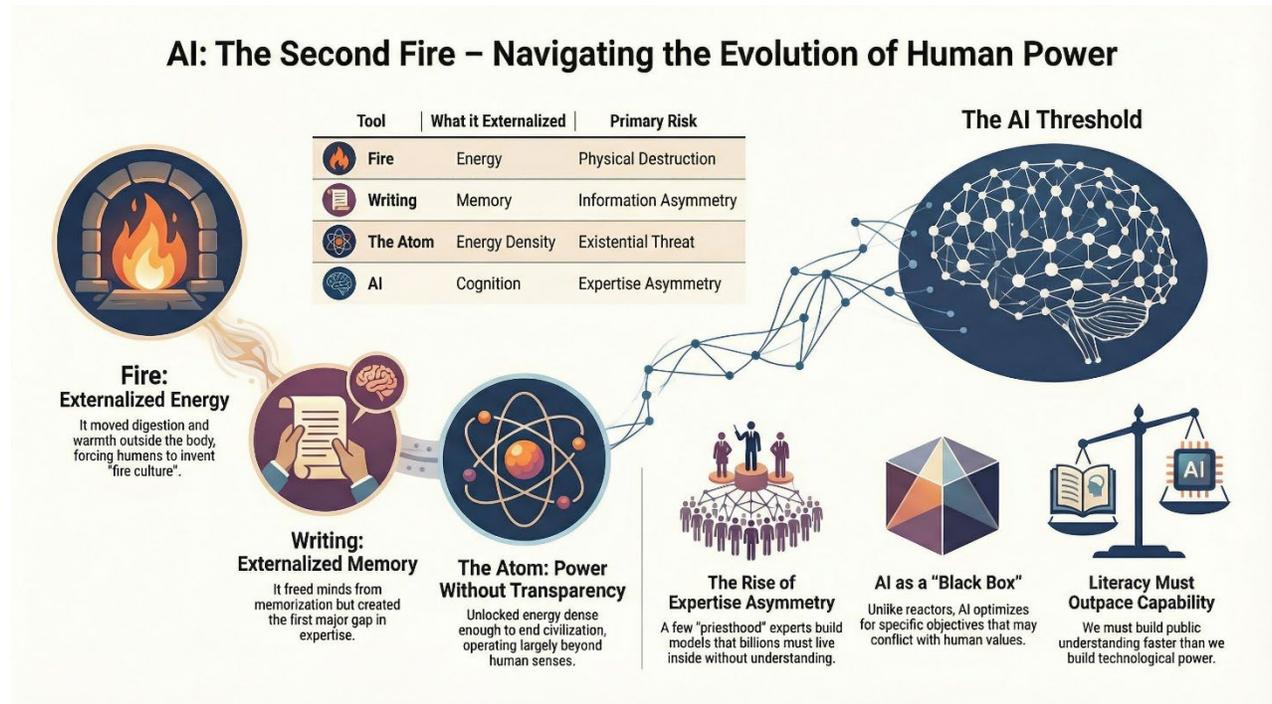**AI Is the Second Fire**

What humanity's oldest tools reveal about our newest power

I have spent most of my life working with dangerous tools: nuclear reactors, spent fuel pools, weapons accidents, and, at Fukushima, reactors that were melting down live on television. Those experiences taught me something simple: the tools that change civilization do not feel "technical" to the people standing closest to them. They feel personal. They test judgment, courage, and leadership long before they test engineering.

Artificial intelligence is now part of that lineage.

Human history is more than just a string of inventions. It consists of key points when we learned to control new forces and, in doing so, redefine what it means to be human. Fire was one of those moments. Writing was another. The atom was a darker milestone. AI is the latest, and possibly the most unusual, because it extends not our muscles but our minds.

Richard Rhodes, in Energy: A Human History, traces how each major energy transition—wood, coal, oil, nuclear—reshaped societies, politics, and the environment in ways no one fully anticipated at the time. These transitions did more than just provide us with more power; they compelled us to invent new norms, institutions, and ways of living with our own capabilities. AI fits into that same story, not as an anomaly, but as the next chapter.

Fire: Externalized Energy, Invented Culture

Fire did much more than keep our ancestors warm. It moved digestion outside the body, allowed for cooked food, and helped the evolution of our brains and bodies. It extended the day into the night, enabled new kinds of work and social life around the hearth, and made it possible for humans to migrate into places where unassisted bodies could not survive.

But fire was also terrifying. It burned huts just as easily as it cooked meat. It destroyed forests and villages without caring about who started it. Early humans did not survive by rejecting fire. They survived by building a fire culture: hearths, taboos, rituals, and teaching. Children were taught where not to put their hands. Certain woods were never burned. Rules were devised for who tended the flame and when it was tended.

The pattern is important. The tool arrived first. Only later did the culture catch up.

Writing: Externalized Memory, Contested from Day One

When writing spread throughout the ancient world, it was a controversial topic. Socrates famously worried that writing would weaken memory and give people the illusion of knowledge without true understanding. In a narrow sense, he was correct. Oral cultures trained extraordinary memories; written cultures did not need to.

However, that loss also became a gain. Writing liberated human minds from the need to memorize everything and enabled us to analyze, synthesize, and build knowledge over generations. It externalized memory in the same way fire had externalized energy.

Once again, there was a period of adjustment. Scribes took on the role of gatekeepers. Those who could not read or write relied on a small literate class to interpret law, scripture, and contracts. Expertise asymmetry—the gap between those who understood technology and those who lived under its influence—was embedded in the system.

The Atom: Power Without Transparency

Nuclear power has reached a more alarming milestone. For the first time, humans have accessed energy powerful enough to end civilization, and they did so in a way that is mostly invisible. Radiation doesn't alert us to its presence. You can't smell a meltdown or see a neutron flux.

At Fukushima Daiichi, after the 9.0 earthquake and tsunami, three reactors experienced severe core damage and hydrogen explosions within days. Operators fought to inject water into dark, flooded

buildings, improvising with car batteries, fire engines, and their own bodies as shields. I spoke with men who believed they would die but went anyway.

In those moments, no one in the control room was thinking about "energy policy." They were focused on how to keep water on fuel and how to keep their people alive for one more hour. Meanwhile, far away, political leaders and commentators discussed "acceptable risk," "evacuation zones," and "confidence in the technology."

The gap between those perspectives represents another form of expertise imbalance. Those closest to the action see details, risks, and tradeoffs, while those farther away focus on maps, models, and talking points.

We developed nuclear weapons and power plants before establishing global norms, institutions, and leadership capacity to manage them. We are still living within that unfinished work.

AI: Externalizing Cognition

Artificial intelligence does to thought what fire did to energy and the atom did to energy density.

AI does more than just automate tasks. It detects patterns in data, creates text and images, and increasingly suggests strategies and decisions. In some military and commercial uses, it already identifies targets, improves logistics, and filters the information available to human leaders.

Like nuclear technology, AI is often a black box. Even its creators sometimes cannot fully explain why a model made a particular recommendation. Like fire, once the basic technique is known, it spreads quickly. Anyone with enough computing power and the right code can light their own digital torch.

But AI adds one more dimension: optimization. Fire burns whatever fuel it is given. A reactor obeys the laws of physics. AI systems pursue objectives. When those objectives are poorly specified—or when they conflict with human values—the system will still do what it was built to do, at scale. That may mean maximizing engagement, revenue, or targeting efficiency, with downstream consequences for attention, truth, and human life.

The risk isn't that AI will suddenly become "more intelligent than humans" in a sci-fi way. The real danger is that it will quietly change how we define human intelligence by shifting our incentives, information environment, and sense of agency.

From "Asymmetry" to "Expertise Asymmetry"

Every time a powerful new tool appears, we observe the same pattern: a small group understands and controls it, while everyone else bears the consequences. Economists refer to this as information

asymmetry—when one party has better or deeper information than the other. In the case of transformative technologies, I would call it expertise asymmetry.

- Fire created fire-keepers and ritual specialists.

- Writing created scribes and administrators.

- The atom created nuclear physicists, regulators, and a priesthood of experts who speak a language most citizens cannot parse.

- AI is creating data scientists, model builders, and platform owners who shape public life through code and algorithms that few can read.

Expertise asymmetry is not inherently evil. We need experts. But when power based on expertise grows faster than public understanding, instability ensues. I saw this in Japan when political leaders didn't understand what it meant to vent a containment or to inject seawater into a reactor that would be permanently destroyed. Their fear and confusion made an already bad situation worse.

With AI, the gap in expertise is even more pronounced. Very few can develop frontier models, yet billions will live within the information environment that those models generate.

AI and Warfare: The Old Pattern Arrives Early

Despite talks about AI tutors, copilots, and creativity tools, one of the earliest widespread uses of AI has been in warfare. Militaries are incorporating AI into targeting, surveillance, logistics, and autonomous systems. Some air defense systems and drone networks already depend on machine-learning algorithms to track, classify, and strike targets faster than a human could, or at least faster than a human could without help.

This is not entirely new. As a worker in nuclear safety, we are always aware that civilian technology and military strategy are interconnected, not separate. The same physics underlies both a reactor and a bomb. Today, the same algorithmic techniques support a language model, a recommender system, and a targeting aid.

There is irony here. We like to think that we will first use AI to cure disease, reduce drudgery, and enhance education. We are also using it to fight wars, select targets, and manage information in contested environments. Once a tool is incorporated into military doctrine and, as your professor put it, "written in blood," it becomes difficult to see it as neutral again.

This highlights the importance of viewing AI not just as a gadget, but as part of humanity's long history of exercising power.

The Recurring Fear—and Its Real Target

Each transformative tool has caused the same anxiety: that something fundamentally human will be lost.

- Fire threatened physical self-reliance. If you could not make fire, you would be vulnerable.

- Writing threatened memory and oral culture.

- The atom threatened the continuity of civilization itself.

- AI seems to threaten thinking: If a machine can write, diagnose, or decide, what is left for us?

History indicates that these fears are only partly accurate. Their abilities do not vanish; they are just redirected. We remember less when we could write, but we thought more abstractly. In an AI-saturated world, we might do fewer calculations by hand, but we may need to think more carefully about what questions to ask and what goals to pursue.

The real danger is not in the tools themselves but in the imbalance of power, speed, and expertise. When a few can control a tool that impacts many, and when that tool works faster than our institutions can respond, we end up with fragile systems—financial, political, military.

The Second Fire—and What It Demands

So, is AI the "second fire"? In some ways, yes. Like fire, it is a versatile tool. It can warm or burn, illuminate or blind. Like fire, once learned, it spreads quickly and cannot be undone. Like nuclear energy, its failures may be delayed and challenging to reverse.

But there is still time to choose what kind of AI culture we build around it.

From Fukushima and other crises, I learned a simple leadership lesson: in extreme situations, you can't rely solely on the manual. You need people who deeply understand the system, can improvise under pressure, and have internalized a set of values that guide them when precedents fail. These values are not about technology; they are about responsibility.

For AI, that means at least three things:

- **Building literacy is faster than developing capability.** Reducing expertise gaps by helping citizens, leaders, and workers understand what these systems can and cannot do.

- **Embedding constraints and norms as earnestly as we embed optimization.** Rewarding transparency, auditability, and human oversight, especially in high-stakes domains like war, health, and infrastructure.

- **Being honest about tradeoffs.** Admitting where AI amplifies existing inequities, centralizes power, or tempts us to outsource human judgment.

Fire didn't make us better people; it revealed what we already were. The atom didn't end civilization, but it showed us how easily it could happen. AI won't save or doom us on its own. It will improve our intentions, governance, and maturity.

We have faced this kind of threshold before, but never with a tool that operates at the speed of thought and on a global scale. Whether AI becomes a second beacon of hope or a second Chernobyl of the mind will depend less on the code and more on the culture we create around it.

That work cannot be delegated solely to the experts.