What is Qi?

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I've finally arrived at my question. This is the question which has been at the basis of my pursuit for let's just say 10 years. Yes, my quarter life crisis began about a decade ago. After the dust settled, I found myself in the childhood room back in my parents house in suburban New Jersey. Finally, I had enough space and time to think. To actually think. To dig in. To ignore the world and find out what actually interested me and why. I had each day, everyday, to spend as I saw fit and I ended up just thinking all day about big questions and big answers. The title of this essay, "What is Qi?" was unknowingly the question I was asking myself underneath of all the other questions.

At 25 years of age, I needed to begin looking for my next move, my next job, my next play. I quickly came to the conclusion that computers were the technology and direction, as both physical product and computational science, was the direction I needed to pursue. Unbeknownst to me, what is Qi is actually, surprisingly, underneath of the layers of complexity, the actual question I would now say was the right question. I was looking for something even though I had no reference to the idea or actual knowledge at the time, of what I now think to be true about what I was actually wondering about.

Computation, the capital 'C', is a rich and fundamental field of science, physics, thermodynamics, and philosophy, and to me has always been under explored but widely practical. I knew I wasn't misleading myself to fall down this rabbit hole because no matter where I went I thought there would be a worthwhile result.

But let me be clear, my inability to understand what I was actually looking for was only equally met by my reliance upon passion for the subject I was trying to exploit. It was years that I took and gave myself to ask the same questions about computation over and over and over again in different ways to different people from different books across different mediums and to varying degrees of success and satisfaction. Computation is a motherfucker.

There was also a rather obvious yet difficult to name aspect of computation which plainly stated is energy. "How does a computer run?" How does it operate? Computers need energy, just like the rest of us and all of nature. So within computation was another side quest; it seemed, as the exploration of energy. What is energy? How does energy work? Where does energy come from? What is not energy; wasted, stranded, unexploitable energy. We'll eventually come back to these questions with answers, I promise, but they are truly fundamental explorations.

Back to computers. Computers are no different in their function than anything else it seemed. Simply, computers cost money to assemble, money to make workable, in ways I knew not, through programming and developing and engineering. Quickly it became clear that I wasn't learning a new technology, "computer", I was actually learning a new language. And learning new languages seemed like not what I was signing up for. This is an entirely different ball game from what I was expecting. Learning a language for what? Who was going to pay me? Especially someone who left investment consulting because I was unwilling to play the credential game. I'm a non-native hobbyist programmer trying to speak computer language to get money to learn more about something else. Got myself into a weird loop. I was convinced that I had to develop the skill so that I could justify the time to learn the ways of computers, in order to answer the bigger questions I had. But, let's give it a shot! I tried a few avenues, they didn't work. I tried boot camps, online universities, free courses, books, tutors, YouTubes — no one I knew knew how to program nor could they accelerate my learning time. Somehow, I never even got past hello world. Python seemed clean, but Java or whatever else I didn't even understand how to set up the environment. It bewildered me from the start. I was more bewildered and made it less far than all other language classes I took throughout elementary, middle, high school and college; Spanish, Portugues, Italian, French, Russian all made more sense than computer language. All in pursuit of getting a job to earn money to not be a loser. I gave up on programming.

Now on to the energy front.

I wondered why solar energy wasn't catching on at the rate I assumed it should. An idea permeated while staring out the window during my quarter life crisis; the sun is fundamental. To all systems. Including computers. An obvious and innocent statement really.

But the sun is the basis for all energy on earth, directly or indirectly. Okay, sure geothermal comes from the temperature and pressure gradients across the gravity well of our iron inner core and tectonic plates, but ultimately no one was going to seriously compare geothermal to the outputs of coal, oil, gas, nuclear or the outputs of our star's energy. If the sun was the source, then I expected solar panels to proliferate like computers were. I expected solar panels to be everywhere. So I began looking for solar panels in every neighborhood, every rooftop, every open field, in every presidential executive order, and every major company who was pushing the adoption of solar as our sole (soul) mission. Lackluster results. "Solar's expensive, unreliable, doesn't scale, subsidized scam, etc etc."

Well, one company was. Tesla. But again, no one seemed to understand what Tesla and Elon Musk were saying. The very first thing I learned about Elon Musk was that he, like me, believed we should capture the sun's energy in the most efficient way possible. Elon was acting on it. He was going to exploit this simple fact, while I enjoyed pondering the idea of it. At least I'll invest in Tesla I told myself.

Elon simply hasn't stopped nor deviated from that path as far as I can tell, and I've watched every single minute of every single podcast, biography, broadcast, interview, and master plan that Elon has appeared in. Also, in my pursuit of answering the energy question, I realized I might get closer to answering one of my computer questions. What do computers do, actually, with the energy they consume? What are they outputting from the input? These are rather naive and ground level questions that I'm somewhat embarrassed to admit here that I was asking. As I sat there, a 25 year old in a faux quarter life crisis, wondering what computers do and where energy comes from, I simply pursued those questions to my heart's desire. These were inner questions for no one else, and I had the room to breathe them to life. In 2017, I went to Tesla to sell batteries and solar panels, I ended up as a car salesman, and quit in 2019 because I found an answer that satisfied me.

Solar panels would proliferate if batteries proliferated at an accelerated rate or if the electrical utility companies would innovate on the electrical grid. Who do you think had the capacity, the drive, the knowledge, the balls to innovate? It sure wasn't the monopoly of oligopolies. Unfortunately, I didn't come to Tesla to be a car salesman, but I did learn the viable pathway to the proliferation of solar panels and so I walked away with a fundamental insight about where the world was inevitably going, and I bet on it. Though I should have stayed to have my TSLA options vest over 4 years, that was dumb.

The inevitable evolution of energy dynamics on Earth, and my articulation of it, was actually too small of a system to explain the question still fresh and fiery hot in my mind about computers. What is a computer, what does a computer transform, how does it transform whatever it transforms, why is that useful, why will that continue, who stands to profit from it? Remember, I'm still having my quarter life crisis and need to get a job to make money and not be a loser.

Enter covid.

Covid was actually a nice pause from the soccer I was coaching and photography I was contracting. No social connections, no travel, no distractions. I sat in my 6th floor, north Philadelphia apartment, pontificating about the novel coronavirus, fat-tails, and the incongruity of a collapsing social order while the stock market whipsawed as I made a fortune. It was at this moment, in pure suspension, that Stephen Wolfram launched the Wolfram Physics Project in April 2020. This was a revelation, at a time with the world at a standstill, one of the world's pioneering computer scientists was launching a fundamental theory of physics and I was his audience. Each day, every day, I watched physicists use the mathematical tools, programs and software engineering they built to answer questions about the universe and I had all the time in the world to learn it.

Within a year, I was hired at Wolfram Research. This was my pitch to Stephen Wolfram for what I wanted to work on:

Computational Irreducibility is the Source of Robust Value in Economics

On a recent interview, Stephen Wolfram said the following: "Computational irreducibility is the source of robust value in economics... in a sense, proof-of-work is a crazy, inner bottle version of that process." I'd like to explore this idea as deeply as possible, because I believe there is a major connection between computation, energy, and value — which is fundamental to the field of economics and has yet to be fully explored. To make this idea more tangible, this project's goal would be to map the computational irreducibility of Bitcoin's proof-of-work mechanism with the total amount of electricity used to secure it. Building this foundational link in Wolfram Language will be the starting point of understanding economic value, by creating a universal metric based on computation and electricity, and from that starting point we can materialize additional layers of economic activity on top of this core model.

Exploration of the Bitcoin blockchain would occur via Wolfram Language functionality. Importing data into WL and visualizing the hash rate of computation, electricity used to perform computation, and economic value currently priced in Bitcoin would be the major sources of data needed. Between current WL functionality and retrieving public blockchain information, I'm sure it's feasible to get the data needed for this project. Then it's just about producing specific metrics, visualizations, and synthesis to offer a theory of economics based on computational irreducibility.

This project is innovative because, as a trained economist, I've always believed there was something missing from my field of study and this is the project I would tackle to complete it. This idea seems possible now for two main reasons: 1) I've only recently become aware of the tools within Wolfram Language and the immense power it offers and 2) Bitcoin's proof-of-work seems to be a major link between computation, energy, and value and is only 12 years old. Ultimately, the field of economics could use more scientific rigor and I believe this is the direction it should take!

Shortly thereafter I joined Wolfram on the blockchain team as an intern. I read everything Stephen Wolfram and the company wrote or produced, and I began again to earnestly learn computers, programming and what computation actually is.

For those who don't know, Stephen Wolfram wrote a book in 2001 called "A New Kind of Science" and basically no one has read it from cover to cover. I don't consider that as much an impressive feat as catching up on all of his other content. This is a scientist doing science in public as you would hope scientists would. He built the tools he needed, he uses the tools he built, and he publishes research using those tools. These tools are used by math students around the world, by researchers and scientists around the world, and he eats his own dog food to say the least.

If one was going to adopt a new framework of physics, I had little to lose by adopting his. So I did.

I'm now 5 years at Wolfram, the "Head of Blockchain Research & Education", and I have my answer to the question for which I came to Wolfram.

"What is Qi?"

To Be Continued: March 31st, 2026