

Viewpoint

Alan and I

A personal account of Alan Turing's life and impact.

IFIRST KNEW Alan during my senior year in college. They were not happy times, my college years. My home country Greece was under a dictator's boot, and at school I was stuck studying electrical engineering. Certain topics—communication theory, control theory—I did find inspiring, not so much because the issues they addressed appealed to me, but because their treatment gave me a glimpse of what I was longing for: a brave intellectual universe in which the most fundamental questions are confronted head on and with rigor.

And then I came across the Turing machine. It was a dry definition buried in an article about pattern recognition, if I remember correctly, without motivation or explanation. Based on nothing, I knew immediately that this formal object with the strange appeal is an important exemplar of my ideal universe. I became obsessed with the Turing machine. I longed to learn more about it, but I had no access to a scientific library. I looked up in my English-Greek dictionary the verb “to ture” (I really did). In the end, I managed to piece together the puzzle, how a man named Alan Turing crafted his machine in order to answer the paramount question of his time: what can be computed, and what cannot.

Two years later I was a graduate student at Princeton University (Turing's Princeton, by the way, where I lived for two years in room 2B of the graduate college, which, as legend had it, was Turing's room in the 1930s). Academia was never in my plans: I had

applied to graduate school mainly as a pretext for fleeing fascism. I started classes at Princeton's electrical engineering department with an amused curiosity, while gazing at the landscape around me, my mind open to all opportunity.

And at that critical moment, Alan grabbed me. In Bob Keller's course on automata I indulged in the fascinating intellectual tradition created in the wake of Turing's brilliant definition, and a semester later in Jeff Ullman's second course I was intrigued by a passing mention of the crazy idea *du jour*, a down-to-earth version of undecidability which, at that time, was not yet called NP-completeness. I had found heaven. Three years later, while teaching Turing's legacy at Harvard with my friend Harry Lewis, we started writing a textbook on the subject—a book that now has Alan Turing's portrait on its cover.

Turing was by now well established in my brain, but only through his work on computation: in truth, I did not know Alan. It was a few years later that I absorbed, from Hodges's masterful biography, his times, heroic and tragic, but also his brilliant forays into the bravest scientific frontiers of his era—of our era, actually. This aspect of Turing's legacy, his pioneering work in biology and AI, may have influenced my research career even deeper than his machine. Every so often I teach a graduate course on “Reading the classics,” where we spend a month on Turing, because I think every fledgling researcher must be exposed to the penetrating intellect of Alan, and to his unique writ-

ing, so powerful and so keenly aware of its own greatness and place in history. Alan started to live inside me.

There is a passage in Gibson's *Neuromancer*, just at the end of Part III, where the hero returns to his hotel room to find it full of police officers. “Turing,” they tell him. “You are under arrest.” What they mean to say is that they are officers of Turing police, an AI-busting force in the novel's gloomy future, but that's not important, the sentence created a strange fantasy inside me: What if it is all lies and Alan never committed suicide, but was instead whisked away by admiring Brits in high places? What if he is still alive, hiding somewhere, and watching with utter amusement as his legacy conquers the world?

Alan is not my only intellectual hero, in poetry I idolize Cavafy, one of the greatest poets of the 20th century. One night in the winter of 1997 I went to see, in Greece, a film titled *Cavafy*. I liked it so-so, but as I was leaving the theater I remember that I was moved by the director's gesture, to honor his hero by creating a work of art bearing his name. And right there, at the theater's foyer, I saw a blue paperback hover in the air, and I could read its title: *Turing (a novel)*.

Writing fiction was never in my plans. Over the years I had noticed that I enjoy writing, and that I am fairly good at it, but I had never written a short story or poem. And yet the idea had taken hold of me. That night, I thought of a plot.

By that time, many of us had realized that computer science is no lon-

ger about the computer: The Internet (by which I mean both the network of networks and the application networks running on it) had become by far the most important computational artifact of our times, certainly the most fascinating and worthy of scientific scrutiny. And for me the Internet is Alan Turing's ultimate creation. That our universe is now computational is a direct consequence of Turing's universal machine. Let me explain.

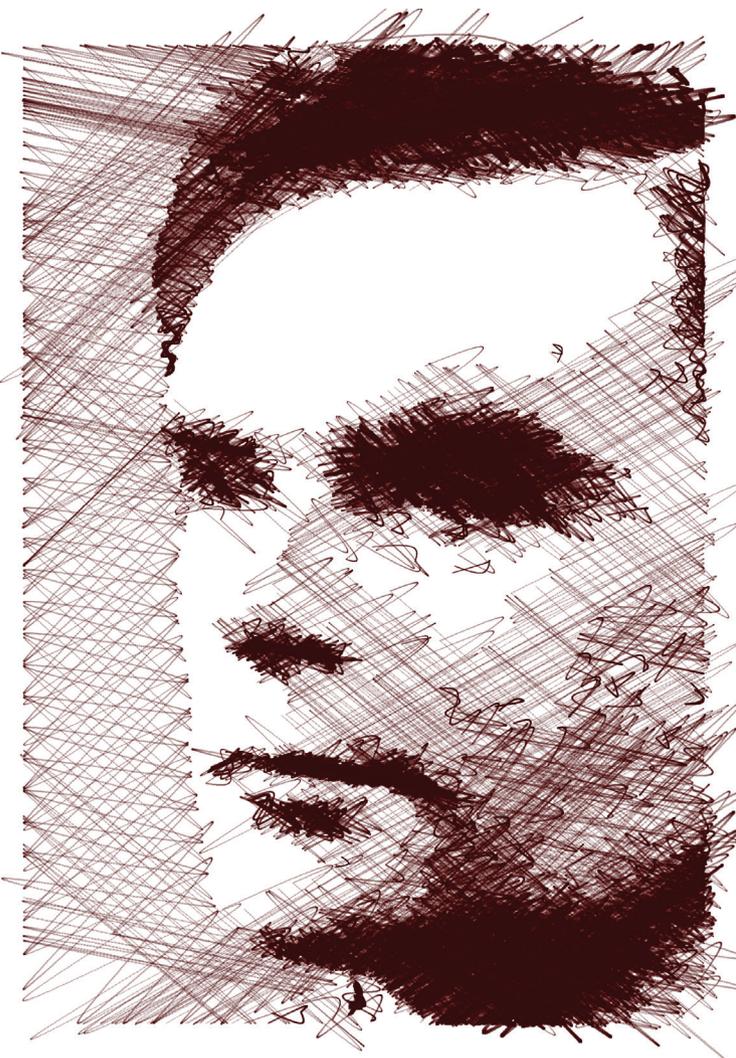
It was fortunate that Turing had created not just his machine, but also its famous universal model. One can wonder why, among the other creators of computational models of his time, he bothered to reach for universality. Perhaps he foresaw software. More likely, he sought a programming exercise worthy of his acumen (don't many programmers in our time come of age through writing a compiler?) By making his universal machine so compelling and graphic, he planted universality into von Neumann's head, and ultimately into the computers as they came to be.

But universality was a minority opinion at that time. The early dreamers of computation, from Aiken and Atanasoff all the way to Zuse, favored specialization. Arguably, universality and software were inevitable, but we can only speculate about the delays and setbacks their advent would have taken without Turing.

Universality is crucial for many reasons that go beyond the software industry. Televisions are not universal, and that is why it took six decades after their invention for the technology to take hold. In contrast, the Web spread like wildfire all over the world immediately after Tim Berners-Lee came up with the "click" in 1989, and that is because in 1989 millions of people had computers on their desks, and those computers were universal, thanks to

Alan, and therefore they could be easily be made to click.

So, I thought that night, if through this Rube Goldberg succession of ideas the Internet is Turing's creation, why wouldn't the Internet return the favor? Why can't a hacked-up SETI emerge somewhere, somehow, that constitutes Turing's comeback to life? And if I bring my hero back, why wouldn't



I shower him with gifts of gratitude, especially things he had missed back then, a happy love life perhaps (after obstacles are overcome, of course), or even make him a great teacher, give him a dedicated pupil, yeah, a Greek man my age, perhaps, an archeologist pining for his unhappy love for an American woman, a startup queen, why not? When I was four years old I happened to visit the island of Corfu with my father the same summer when Turing did. As the night went on, the plot thickened. On the flight to California, I took a stab at chapter one—tak-

ing place, as it happens, in an airplane. For two and a half years I wrote until the book was finished.

Writing *Turing* was, I now reckon, the most powerful experience of my life, right next to my children. It made me cry as I had never cried before; it made me face truths about myself and the world that were neither expected nor easy. One of them (not the most important): I would be writing fiction for the rest of my days. Alan Turing had changed my life again.

Alan feels so close to me, that sometimes his greatness gives me a sense of pride. Because he is among the greatest men who ever lived. And I do not mean only scientists. Through his universality and his wartime cryptography, Turing touched history as fatefully as very few good guys. He was an amazing mathematician and an ingenious engineer, there is no doubt about that, but this does not begin to tell his story. The razor in his mind longed to dissect the mysteries of the world around him, especially the mysteries of life. I think that Alan Turing was obsessed with life. Just remember his theories of phyllotaxis (how leaves are distributed on the plant) and morphogenesis (how patterns are formed during embryo development) and his curiosity about the nature of

intelligence; in fact, his interest in living intelligence is already obvious in his Turing machine paper.

How tragic, then, that life dealt him such a short hand. Turing did science as if the clock was set decades ahead. He also lived his life the same way, to the saddest end. □

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