

BOOK REVIEW

Silicon: From the Invention of the Microprocessor to the New Science of Consciousness by Federico Faggin. Waterside Productions, 2021. 290 pp. ISBN-13: 978-1-949003-41-3.

REVIEWED BY ROSEMARIE PILKINGTON

Rpilkin603@aol.com

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I was a little apprehensive about reviewing this book because I know little about engineering or the inner workings of the computer, but in the interest of full disclosure, I wanted to know more about Federico Faggin. Twenty years ago, returning from an afternoon trip during the SSE conference in San Diego, I sat next to him on the bus and mentioned that since we last met I had lost the vision in my right eye, which I was still adjusting to physically and emotionally. He volunteered that he had lost the vision in his left eye when he was a youth in Italy and lightly commented that depth perception, which concerned me, was only an issue for six or seven feet. His admission and attitude were not only a revelation, but an inspiration for me: If this eminent gentleman had made world-changing inventions, was a successful businessman, and had a happy social and family life despite monocular vision; I certainly could get on successfully with my life as well.

Silicon is the fascinating story of Federico Faggin's remarkable life, but it is also his personal journey from scientific materialism to an awakening to a deeper level of consciousness. He divides his narrative into his four "lives."

His first life took place in his native northern Italy where he was a brilliant student with a wide range of interests. He became interested in computers and transistors, which had been recently invented, and he

read all he could independently since it was not taught in his school. His fascination deepened and he got a job with Olivetti where he learned much more than he could have at school and which become pivotal to his subsequent career.

He did, however, wisely return to academia to learn advanced physics, math, and quantum mechanics, “the somewhat mysterious theory that explains how semiconductors like germanium and silicon behave,” (p. 14) but also because he recognized that he might not get far at Olivetti without a university degree.

After graduation he was hired by CERES, a startup company run by his old boss from Olivetti. CERES was the Italian representative of General Microelectronics, the first MOS integrated circuit company based in Silicon Valley. He was sent to California to learn about this technology. His job there ended, but with his new knowledge he was hired by the Italian subsidiary of SGS-Fairchild near Milan where he developed their first MOS process technology and designed their first two integrated circuits.

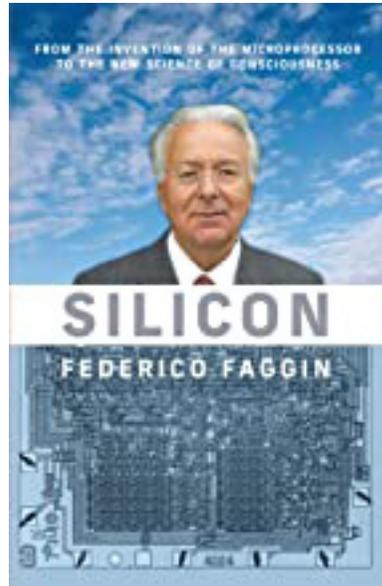
Two events marked the beginning of his “second life”: his being sent to Silicon Valley for six months in an exchange of engineers and his falling in love with California, and his marriage to the one and only love of his life, Elvia, in 1967.

Combined with the account of his career adventures, throughout the book is his personal story: his happy marriage, adjusting to the American way of life, building a home, having a family, and eventually evolving spiritually. The book is really a joint chronicle of personal development and the development of Silicon Valley, a new frontier. Faggin notes:

Few of our neighbors could claim to have been born in California and this fact brought us together and made us feel even closer to each other. We were all pioneers, even if we arrived in a Boeing instead of a horse-drawn wagon. (p. 45)

Even though I knew nothing of the technology, Faggin’s clear narrative was easy to follow, and I could grasp the difficulties he encountered, the significance of his experiments, the resistance of “superiors,” and his indefatigable striving to solve each problem and attain his goals.

There is drama, too, in the treachery of stolen ideas, others getting patents on his inventions, and other frustrations of working for large established firms. He did not just become angry, he became wiser, and on the silicon design that was “the essence of the first microprocessor,” he etched his initials, “F.F.” which proved useful later when he left Intel, for whom he was working, and they tried to “disavow” his “paternity” of it. It was proof of his authorship “reproduced millions of times and present in every chip produced—A claim that could not be erased” (p. 71).



His negative experiences with them led him to start his own company, Zilog, and his “Third Life.” The story of his hard work, his setbacks, and his euphoria when in January 1971 at his age of 29 the world’s first microprocessor was born, makes for an exciting read.

Never content to rest on his laurels, he pursued other things. “The microprocessor was like a child to me, a kid who had come a long way in the world and could now take care of itself” (p. 140). Onward to new challenges!

He took his family on an extended vacation to Italy and considered that time of self-reflection and self-examination the first step on a spiritual journey. He was free from financial care, but free to do what?

His interest in Artificial Intelligence led him to study biology and neuroscience, but dissatisfied with reductionist materialist explanations he became interested in consciousness, which he realized was a “fundamentally unsolved problem” (p. 155), and he decided that it could be studied only through first-person experiences. Therefore, he decided to study it using himself.

By the late 1980s, financially secure, his home life happy, he still felt dissatisfaction and questioned further the meaning of his life and whether or not death was the end of everything. But, Faggin reports,

every time he despaired he would perceive a “point of light,” which gave him enough hope to want to live.

One night in December of 1990 on a holiday trip to Lake Tahoe, he had a profound life-changing peak experience whose essence was love. In his attempt to explain what is most probably an ineffable occurrence, he declares, “This experience contained an unprecedented force of truth because it felt true at all the levels of my being. At the physical level, my body was alive and vibrant like I had never felt before. At the emotional level, I experienced myself as an impossibly powerful source of love, and at the mental level I knew with certainty that all is ‘made of’ love” (p. 160).

Faggin’s outpouring reminded me of a similar one in an interview I did in Rome with another north-Italian-born genius, Emilio Servadio in 1985, just five years before Faggin’s epiphany. Once during an experiment with Eileen Garrett in which they took LSD, Servadio had the same sort of peak experience during which he declared, “For the first time in my life I know what Love with a capital L is.” He had another later in India while walking in a field near sunset when “like a thunderbolt” he had an ineffable “cosmic experience” that lasted for only a couple of minutes but was unforgettable (Pilkington, 1987, 2010, p. 92).

The next phase of Faggin’s story he dubs “Living a Double Life,” for at this time he was continuing his life as an astute businessman and creative inventor and entrepreneur but at the same time searching for meaning and exploring his inner emotional self.

His team at Synaptics developed the touchpad and touchscreen technology, which took off when Apple developed the iPhone, creating a market, and his company benefited by producing touchscreens for other companies and PCs. Meanwhile he continued his “peak experience” by further opening the door to other experiences. He engaged a transpersonal therapist who helped him open up to his inner self, recover repressed memories, and to have a deeper understanding of himself. As he says, “with the same dedication I had showered into technological and scientific research, I committed to discovering the truth about myself, beyond the perceptual distortions fostered by prejudices . . .” (pp. 177, 178).

During this period he had an Out of Body Experience, before he

had ever heard of an OBE. This event filled him with even more wonder and curiosity about the nature of reality and consciousness.

Eventually he gave himself over completely to his “Fourth Life,” devoting himself to “developing a model of reality based on the assumption that consciousness is irreducible” and that it is “an irreducible property of nature” (p. 192).

Faggin explores the meaning of consciousness and the qualia, the physical sensations and feelings, emotions, thoughts, and spiritual feelings that we experience. He argues that the prevailing belief that consciousness “emerges from unconscious atoms and molecules” cannot account for the “existence of our inner conscious experience and knowing” (p. 195).

Here he delves into the realms of Quantum Field Theory and Entanglement, electromagnetic energy, and general relativity. As a non-physicist I found these last chapters difficult and, as the author suggests, read them over a few times to try to absorb some of these new (to me) concepts. For the past several years I have believed that a true understanding of psi phenomena, especially large-scale physical phenomena, will only be understood by future discoveries in the quantum and bio-quantum areas of science.

In the final section Faggin illustrates the differences between computers/objective knowledge and living organisms/subjective knowing, i.e., the difference between man and machines as well as the fundamental limitations of the scientific method in exploring inner reality. He postulates the existence of “nousym,” a holistic and dynamic “substance” forming both the quantum and classical world “in which it appears as physical energy” (p. 230). He explains that the classical world has only an outer aspect (bits), while the quantum world has both outer (entangled qubits) and inner aspects (entities with consciousness and free will).

He expresses the concern that if we don’t take the primacy of consciousness and free will seriously we run the huge risk that “the entrenched materialism, reductionism, and the information technology based on them will become enslaving idols” (p. 231).

Faggin, who has added so much to our technology, maintains that it must help us discover our true nature:

Just like the invention of the engine amplified our human muscular power, so, too, computers, robots, and AI can amplify our *mechanical* intellectual power and free us from monotonous, repetitive, and dangerous jobs. This great potential, however, must be placed at the service of the spiritual, mental, emotional, and physical progress of *each* human being. (p. 233)

A bibliography is provided as well as five appendixes, the last one explaining his theory of “One and the Consciousness Units.”

Federico and Elvia Faggin have created a foundation supporting various programs to advance the understanding of consciousness through theoretical and experimental research. <http://www.fagginfoundation.org/>

REFERENCE

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