



## Mark Weiser and the origins of ubiquitous computing

**John Tinnell: The philosopher of Palo Alto: Mark Weiser, Xerox PARC, and the original internet of things, Chicago: University of Chicago Press, 2023, 368 pp, \$29.00 HB**

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In today's world, technology seems to touch every aspect of our lives. It seems that now more than ever, we can point to innumerable common practices that have become automated and digitalized. The use of networked computational devices by both end users and corporations has become, in a word, ubiquitous. In many ways, the era of rapid technological growth we find ourselves in currently can be traced back to the work of the pioneering computer scientist, Mark Weiser. It is widely accepted among technologists today that his original vision of “ubiquitous computing” played a large part in setting these events into motion in the first place. Yet the emergence of our technologies and the ways we use them has turned out to be something radically different from what Weiser had in mind.

As John Tinnell carefully explains in *The Philosopher of Palo Alto*, Weiser had in fact hoped for a future that would place computation all around us. Devices would perform specialized tasks regularly to enhance and improve our quality of life. The goal, however, according to Weiser's view, was for these technologies to function always on the periphery of human perception. They were never meant to place any unreasonable demand on our attention. Operating in this manner, the devices designed to support human affairs could do so and at the same time leave space for us to connect with the world and each other in essentially human ways.

Driven by a wealth of relevant source data and deep archival research, Tinnell's biography offers a thoughtful and in-depth analysis of how Weiser came to influence the direction of technological growth in Silicon Valley during the 1980s and 1990s. However, more than just the story of Weiser's professional career is told. Numerous details about his personal life are included that offer a compelling and holistic understanding of how Weiser operated as a technologist. He is portrayed above all as deeply human. A complex, creative, highly intelligent, and emotional being. As

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Tinnell accounts for in myriad ways throughout the biography, these are the intrinsic values that propelled Weiser's grand vision of ubiquitous computing.

In the first part of the book, the reader is offered a glimpse into Weiser's teenage years and early adulthood. At sixteen, Weiser took on his first part-time job as a programmer at Stony Brook College in Long Island. Though he spent many late nights working at computer terminals, Weiser also took great interest in the humanities, specifically, in philosophy. He quickly became inspired by Michael Polanyi's notion of the "tacit dimension" and Martin Heidegger's phenomenological view that people, the world, and the things in it are fundamentally "entangled." Both of these thinkers maintained the importance of humans' direct relationship with their environment and how gaining a better understanding of this interaction could promote a better understanding of reality. Tinnell frequently returns to Weiser's attraction to these kinds of ideas. Weiser's deep appreciation of philosophy informs his method of research and development.

In early adulthood, Weiser is depicted as deeply emotional and even slightly troubled. Tinnell offers quotes from Weiser's personal journals that express a powerful desire to connect with others, a need to be held and cared for. Yet, Weiser was also largely reclusive. He spent many hours in dull windowless rooms staring into the abyss of the screen during graduate school at the University of Michigan. It was around this time that he came to realize the value of "reciprocal attention" shared between humans. Tinnell highlights well that Weiser's wariness of devices that demanded users' attention stemmed from his fundamental belief in the power of human connection.

After earning his PhD, and only a few years into working as a professor of computer science at the University of Maryland, Weiser and his family relocated to California so that Mark could work for the legendary Xerox PARC research laboratory in Palo Alto. It was in that humble yet widely respected think tank that he and other researchers collaborated on a multitude of projects. Tinnell spends much of the book expanding on the trajectory of Weiser's career at PARC as it was at this institution that his most innovative and inspired ideas came to be. It is well demonstrated that Weiser never compromised the importance of thorough experimentation and development for the perceived necessity to push the latest product onto the masses.

The most valuable technologies, in Weiser's opinion, were those that could do the work of computers or tablets and yet function seamlessly in the background. It was in an article he wrote for *Scientific American* in 1991 that Weiser was able to widely introduce his personal approach to ubiquitous computing. Its opening line immediately intimated his divergent, yet revolutionary vision. "The most profound technologies are those that disappear" (Weiser 1991). The PC or tablet could never fit into this schema. It was seen as intrusive and required the totality of its user's attention. For Weiser and his colleagues at PARC, true value was seen in the ability to integrate computational processes into the everyday things we do. One such example would be the implementation of sensors in offices that would adjust the dimness of light and temperature based on ambient sources. This differed greatly from others' emphasis on the importance of making these adjustments from a screen. Weiser felt strongly that not only would shifting attention to the screen undermine the ability to concentrate on

one's work, but that it would also distract the user from the very environment they were attempting to modify.

Perhaps Weiser's ideas came too far ahead of their time. Perhaps the tech consumer base might never be prepared to adopt the ideas he dreamt up. The point that Tinnell makes, by telling Weiser's story, is that he had a brilliant and sustainable vision that was highly revered and at the same time thinly implemented into the mainstream. It will be the task of each reader to decide just why and how things played out the way they did. Though I wager that Tinnell is fond of Weiser and his ideologies, his biography does not come off as an explicit advocacy of either. He offers an objective and factual account of Weiser's life that is meticulously researched and well analyzed.

Sadly, we find that Weiser's vision never truly had the chance to be realized. This may be the most tragic part of his untimely death in 1999. However, the reader is offered an intimate understanding of how Weiser spent his final days. Upon learning that the cancer he suffered from was both aggressive and terminal, he ultimately set aside professional and even personal goals in order to spend every moment he could with family and loved ones. This part of the book goes a long way to explaining what made Weiser so special. On the one hand, he was one of the most innovative and intelligent computer scientists of his time. Yet, on the other hand, he cared deeply for the people he loved and always made time to foster the connections he made with them.

Overall, Tinnell does an excellent job of portraying Weiser as a complex and yet simply sensitive person. The story of Weiser's life can offer comfort to those who may feel overwhelmed by the many demands that technology makes on our attention and the constant interactions we seem forced to have with it. Just knowing that there was a leading and respected visionary whose intentions were always aimed at a technological system that would truly connect humans can offer hope for future research and development. I take this to be the greatest contribution the book has to offer.

Though Weiser's death may have cut short the trajectory of his work, we can thank Tinnell for widely publicizing its promise. We can look to his project as one that might inform a more "Weiserian" approach to future tech development. On a variety of levels, Weiser's humble vision serves as a reminder that there are important considerations to be made when creating and advancing new technologies. It shows, as well, that there are just as many directions the growth of new technologies can take and that the best path, as Weiser himself would have suggested, is always the one that promotes and cultivates genuine human relations. Tinnell's writing is highly accessible and, as such, would fit appropriately on the bookshelf of anyone from a computer science PhD candidate to the lay reader with even a casual interest in emerging technologies.

## Reference

Mark Weiser. 1991. The Computer for the 21st Century. *Scientific American* 265 (3): 94–104.

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