

DEPARTMENT: THINK PIECE

On Logistical Histories of Computing

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The history of computing is not a history of making *computers*. This is not to say it is not invested in stories of systems, accounts of components, programming languages, and application software—or in the hackers and hobbyists who made them meaningful. On the contrary, accounts of making *the* computer are endlessly fascinating. It is when we begin to talk about more than one that interest tends to falter. When the wonder of invention falls away, what is left is the minutia of manufacture—another unit on the line, another requisition, another stop on the great global supply chain. But it is precisely in this long *logistical* history—the one concerned with assembly revisions and inventory management, part prices, and labor costs—that we find the entangled origins of the messy machines people actually use.

Attempts at this history tend to be surprisingly constrained, confined to small groups or almost singular entities. Too often, it is the *reception* of the computer that is made social, not its production. But computers, in all their plural possibility, are a product only possible in the era of supply chain capitalism [1]. In exploiting legal and economic peripheries, differences in gender, race, and class, they have not just grown into patterns of labor exploitation and environmental abuse, they emerged from them. From this perspective, for example, women have always been critical to the history of computing machines, and not only in their formative roles as human calculators or early programmers. In manufacturing, female labor—and the deliberate exploitation of the liminal economic spaces woman often occupied—was central to enabling the production of the personal computer at a global scale.

In the mass manufacture of the Apple II, to follow a single thread, we leave behind the apocryphal origin of the two Steves in the garage for an already sprawling supply chain stretching from Silicon Valley to

Singapore. When printed circuit boards arrived in those early days, they came to Stevens Creek Boulevard, where the nascent firm's administration occupied half of the office, and the "factory" the other. But getting them populated and into the plastic cases that marked the computer's transition from hobbyist kit to a consumer product required a low-cost labor force: a group of (so-called) "housewives" spread throughout the valley, stuffing circuit boards to be delivered daily by station wagon.

At the very least, this pattern of labor connects the computer to a longer history of domestic manufacture—to the kind of "putting-out system" once employed for shoemakers and seamstresses. But if you consider that the talk of "houses" meant cramped apartments, and that "wives" was a patronizing descriptor for working women, many newly arrived from Southeast Asia or Mexico and paid by the piece, you find troubling connections to the history of sweatshop labor in even the earliest accounts of our machine's mass-manufacture [2].

Apple, like many other computer companies, no longer has a factory. The last time they spoke about running one was before the launch of the iMac. Online ordering, Steve Jobs explained, meant a "different kind of store," and it necessitated a "different kind of factory" [3]. But while the build-to-order Power Macs he introduced in 1997 suggested a turn toward increasing variety, the longer lasting outcome was to simplify Apple's offerings. Computers were now split into parts rather than products—and fewer finished goods and standardized components coming "off the shelf" allowed companies to make their inventories "leaner." The Power Macs might have been put in for production at the company's own facilities, but the scale of the iMac's success a year later cemented the shift to a more outsourced assembly. With a software system capable of connecting the company to an interchangeable network of parts suppliers, manufacturers, and resellers, it was not difficult to switch out a few firms here and there. In two years, the factory was so "different" that Apple did not even run it. Foxconn did. And stories of sweatshops at home could be exchanged

for more distant accounts of grueling labor regimes, untold environmental degradation, and workers protesting by threat of suicide.

It is now an almost universal truth that computers are “made in China,” but that label masks the countless countries traveled on the way. The question of where computers are made, and how—at scale—is less present in our history than it should be. While there is no simple account of something made with hundreds of parts, in hundreds of places, in almost every instance these connections reveal how complex decisions about making “computers” shaped the future of “the computer.” As recent scholarship increasingly turns to more detailed examinations of these logistical histories, [4] we begin to consider accounts of how, for example: the use of off-the-shelf components for systems like the IBM 5150 enabled the rapid manufacture of PC compatibles and clones; how production constraints for floppy disks and audio cassettes served to distribute different kinds of software across North America, Europe, and East Asia; how centralization of hard disk manufacture in places like Thailand accelerated solid state adoption after natural disaster disrupted the supply chain; or how production capability for plastic cases made the Apple II seem like a serious product, while the availability of translucent plastics made the iMac a playful one. We might consider how software has been developed to simulate what was once just the other side of the office, providing tools for increasingly more distant acts of assembly. Or we might begin to grapple with the industrial processing of what is left inside all these discarded boxes. After all, it is not only *the* computer that has a history, but each and every one coming off the logistical line.


REFERENCES

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- [3] S. Jobs, *Apple Media Presentation*, Nov. 10, 1997.
- [4] M. Hockenberry, N. Starosielski, and S. Zieger, Eds. *Assembly Codes: The Logistics of Media*. Durham, NC, USA: Duke University Press, 2021.






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