

## Reviews

an early and important moment in the history of computing. His treatment of the engineer and mathematician Julian Bigelow, whose important contributions to electronic computing have not previously been fully articulated, is particularly sensitive and captivating.

In the last third of *Turing's Cathedral*, Dyson develops a thesis familiar to those who have encountered his earlier book *Darwin Among the Machines*.<sup>1</sup> Building on the work of the biologist Nils Barricelli, Dyson posits a direct and literal equivalence between biological and computational processes. The machine language of the gene is the same as the machine language of the computer, Dyson argues, and Barricelli was the first to perceive this fundamental relationship. At the center of his argument is a series of computational experiments that Barricelli developed for and ran on the IAS computer between 1953 and 1956. According to Dyson, Barricelli's computer code represents the "Dead Sea Scrolls" that outline the Genesis of what we now know to be the digital universe, one in which iPods and the Internet are now effectively indistinguishable from biological organisms.

It is in developing his grand argument that Dyson is least convincing. He draws heavily on the work of fringe figures such as Barricelli without ever reflecting on why they were never taken seriously by more mainstream scientists. He stretches metaphors and analogies to the breaking point, both those mobilized by his historical actors and those invented by himself (such as his argument that "what we would call 'apps,' Barricelli would term numerical symbioorganisms" or the conflation of self-replication and self-reproduction). This is particularly evident when he talks about the common language of "code" as mobilized by geneticists (as in DNA code) and computer scientists (as in machine code). The historian Lily Kay, among others, has revealed the way in which such shared metaphors traveled, were co-opted, and were transformed fundamentally by computationally minded biologists in the 1950s and 1960s.<sup>2</sup> How seriously such metaphors and analogies were taken varied greatly, and their use continues to be controversial even to this day. Dyson is either unaware of such arguments or has decided to ignore them.

In fact, Dyson's book references almost none of the existing literature in the history

of computing or the history of science, greatly to its detriment. He cherry-picks selectively from the history of computing to support his central thesis and imposes on the past a presentist and universalizing perspective. From reading this book, one would never know that the IAS computer, although pioneering and influential development, was but one of many stored-program computers built in this period or that the computationalist turn in biology was resisted, and continues to be resisted, by many in the life sciences.

The first half of this book is a beautifully written and compelling account of an important moment in the history of computing, but its overreaching and sensationalist conclusions diminish its value and effectiveness. As a historian of computing, there is much in this book that I found useful and interesting, but I would have serious reservations recommending it to a general audience. This is a teleologically driven history in which the outcome is inevitable. We are living in a digital universe, according to Dyson, and it just happened to take us until recently to discover it. To paraphrase one of his numerous Biblical metaphors, God is a computer, and Turing and von Neumann were his prophets.

## References

1. G. Dyson, *Darwin Among the Machines*, Perseus Books, 1997.
2. L.E. Kay, *Who Wrote the Book of Life? A History of the Genetic Code*, Stanford Univ. Press, 2000.

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### **James W. Cortada, *History Hunting: A Guide for Fellow Adventurers*, M.E. Sharpe, 2012.**

*History Hunting: A Guide for Fellow Adventurers* is partially a memoir of Cortada's life as a historian, partially a how-to book, and partially a statement of what Cortada believes are the proper roles of history and historians. As an amateur historian of computing, I think the book is wonderful. It is fun and easy to read. It is educational. It is inspirational.

The book has a brief preface, 10 chapters, and an index. Each chapter is divided into two parts. In the first part Cortada tells stories relating to the chapter's theme, ending with a lessons learned subsection. The second part of each chapter is called "Getting

Started” and includes how-to suggestions and pointers to other resources. In each chapter, Cortada addresses the chapter’s topic and then touches on topics beyond the nominal subject of the chapter. Finally, he pulls the various threads of the chapter together in a useful way.

All 10 chapters are interesting, but four seem particularly relevant to *Annals* readers. Chapter 1 (In the Beginning) describes how Cortada got started in doing history and how the reader might get started. Chapter 3 (Studying the Age of Information) is about Cortada researching and publishing on the history of computer companies and about the special problems of researching history where the information is in corporate libraries, in company brochures, on electronic media, and so forth. Chapter 5 (Big-Game Hunting) sketches the importance of taking on history projects that take many workers to accomplish. Chapter 7 (Researcher as Archivist) emphasizes collecting, organizing, letting others know about, and ultimately finding a follow-on home for research materials. Throughout the book, Cortada is complimentary to librarians, archivists, used bookstore owners, and other such people who so often help historians.

Cortada is likely aiming this book at a spectrum of people, but it has particular relevance for people like me who have had a career in the non-academic-computing-history world and now are interested in researching history and recounting what they learn. I also suspect *History Hunting* would be an outstanding book to assign to graduate and undergraduate history students who have not yet decided between pursuing an academic career or finding some other way to do history while following a less prescribed career path.

Additionally, Cortada’s book tells stories about people and institutions well known in the computing history world, such as at the Charles Babbage Institute and in the realm of the *IEEE Annals of the History of Computing* and its readers. This allowed me to think, “Cortada is one of us,” thus making his book seem even more relevant.

As I said earlier, the book is inspirational. Cortada allows one to dream about ways to contribute to the history of computing and gives guidance for how to actually accomplish useful history work. Partly this is because Cortada—while a highly trained, productive, and professionally well-regarded

historian—is technically an amateur. He has made his living working for IBM, mostly in the company’s sales organization. Thus, from his example, I can imagine what great history work I might have done if I was only (a lot) better organized. Cortada also suggests many specific techniques and resources I could use and thus be a more productive historian. In addition, Cortada is making a case for all kinds of people being involved in doing history and the work of history not being only the province of professional historians. For all these reasons, *History Hunting* has led me to reflect on what amateur historians can do to contribute more to the history of computing.

More of us should write our own memoirs about the historical computing activities in which we participated—memoirs such as Severo Ornstein’s wonderful book *Computing in the Middle Ages: A View From the Trenches 1955–1983*,<sup>1</sup> for example. If we can’t produce a complete book, we should at least post a shorter memoir on the Web, such as one of the “First-Hand Histories” at the IEEE Global History Network (<http://ieeeghn.org/wiki/index.php/Special:FirstHandHistories>). Of course, the *Annals* is also interested in receiving anecdotes from participants in computing history.

Another thing we can do is create a personal website on topics we know well. Good examples are Dan Murphy’s website of “TECO, TENEX, and TOPS-20 Papers” (<http://tenex.opost.com>) and Tom Van Vleck’s “Multicians” website (<http://multicians.org>). Much interesting and useful history can be found on such personal websites.

As practitioners in the computing fields, many of us have a collection of documents of possible historical relevance. We need to talk to the formal archives (such as the Charles Babbage Institute, the Computer History Museum, or other libraries) about whether they want our documents rather than just leaving them for our heirs to dispose of.

We can also be the people who maintain a complete set of working documents for projects on which we work—a potentially valuable resource for posterity or perhaps when the project is famous or historians are digging into the minutiae of how an organization functioned.

Professional historians are better trained to do interviewing and oral history work, but the rest of us can also do interviews of a sort I believe will be useful. I have done many interviews of people involved in the

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history and development of TEX (<http://tug.org/interviews/>) and have been doing interviews for the *Annals* as well. Video interviews, such as those captured by institutions like the Computer History Museum, are also valuable. Amateurs might arrange to video the events of various smaller organizations, as Kaveh Bazar-gan does for conferences in fields in which he is interested (<http://rivervalley.tv>).

There are situations when just having lived through an era of computing history might give an amateur historian a valuable head start on creating a fairly scholarly history; for example, see *History of Computing in India: 1955–2010* by the practitioner and educator V. Rajaraman ([www.computer.org/portal/documents/115328/3634026/2012-12-rajaraman-india-computing-history.pdf](http://www.computer.org/portal/documents/115328/3634026/2012-12-rajaraman-india-computing-history.pdf)).

There are also things that the amateur might have the connections, knowledge, time, or freedom from professional career development constraints to do more readily than a professional academic historian. For instance, an interesting computing history task might be to analyze a historical piece of software, such as the ARPANET IMP code, to see how the code evolved for use in a whole series of packet switches.

Finally, amateurs from the practitioner world might develop, populate, and maintain useful online bibliographies and indexes. Such work (such as <http://tug.org/tugboat/contents.html>) could augment the existing Google-technology-based indexing of some history journals. One especially worthy task would be for someone to maintain an online list of all the privately maintained websites, such as those by Murphy and Van Vleck I mentioned earlier.

Buy and read Cortada's *History Hunting*. I predict you too will find it informative and inspiring.

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## Reference

1. S. Ornstein, *Computing in the Middle Ages: A View from the Trenches 1955–1983*, Author House, 2002.

 Selected CS articles and columns are also available for free at <http://ComputingNow.computer.org>.