From Alcoa to Anacom—Pittsburgh

Michael N. Geselowitz
IEEE History Center

Pittsburgh, Pennsylvania, has for some decades successfully striven to outgrow its reputation as the dirty, hard-edged, industrial-era steel- and aluminum-making capital of the world (companies headquartered there include U.S. Steel and Alcoa). In recent years it has been routinely cited as one of America's cleanest and most livable cities, and it is an excellent tourist destination for any traveler.

The computer specialist on a busman's holiday will know that part of Pittsburgh's success has been a shift to a high-tech economy, fueled in part by research at Carnegie Mellon University (CMU) and at various spin-offs it has engendered. CMU's Department of Computer Science, one of the first in the world, was founded in 1965. Not to be outdone, in 1967 its nearby rival, the University of Pittsburgh ("Pitt"), started to offer a master's degree in computer science. In 1979 CMU upped the ante when, again ahead of its time, it established the Robotics Institute, and the Computer Science Department became the first in the world to offer a PhD in robotics. CMU had also become a leading center for artificial intelligence research.

Pitt responded by being named one of the National Science Foundation's five supercomputing centers in 1986. The important developments that have come out of both schools are well known. As a result, by 1999 the *Wall Street Journal* could dub Pittsburgh "Roboburgh." As a computer-tourist, you are well-advised to visit both of these scenic and historic universities, which, in addition to their computer history, offer a range of museums, galleries, libraries, and historical and architectural attractions. However, you should also realize that the history of high tech in Pittsburgh significantly predates 1965.

Daytime excursion

CMU and Pitt are both located in Pittsburgh's historic Oakland district. Adjacent to both institutions you will notice the lovely Schenley Park, which is the second largest municipal park in Pittsburgh and which contains such important attractions as the Phipps Conservatory and Botanical Gardens and the Carnegie Museum (for the sports-minded tourist, Forbes Field, home of the Pittsburgh Pirates, also stood adjacent until it was replaced by Three Rivers Stadium in 1970).

Most interesting from the history of technology point of view, however, is the monument in the middle of the park to the late 19th-century inventor and entrepreneur, George Westinghouse. Westinghouse, who eventually created a huge network of factories and headquarters in and around Pittsburgh, is best known for his invention and manufacture of railroad equipment, and for his partnership with Nicola Tesla in launching the AC power industry. What may be less well known are the Westinghouse companies' forays into computing.

The complexity of power grids led to the development of analog computers to carry out key calculations, and these devices turned out to be important in the history of computing. The Differential Analyzer of Vannevar Bush at the Massachusetts Institute of Technology—begun in 1927, completed in 1930, and published in 1931—might be the most famous, but Westinghouse Corporation also pioneered such work. The company had already produced a special-purpose DC Calculating Board in 1919, and by 1929 Westinghouse had designed a special-purpose AC Calculating Board!

The company's military experience in World War II, however, convinced Westinghouse engineers that a general-purpose analog computer was needed. So, in 1945 they began to work on the Anacom (*ana*log *com*puter), which was finally completed, and a description was published in *AIEE Transactions* in 1948. Possibly in the running to be one of the first practical general-purpose analog computers, Anacom quickly became an important design tool for large electrical and mechanical systems, and in various generations it survived well into the digital age (although, interestingly, Westinghouse was also one of the very first corporate customers for the pioneering digital computer, the Univac). The story of Anacom was told more fully in the pages of this magazine some years ago ("Edwin L. Harder and the Anacom: Analog Computing at Westinghouse," by William Aspray, *IEEE Annals of the History of Computing*, vol. 15, no. 2, 1993, pp. 35-52).

Shopping and dinner

Having taken in some of the cultural and historical elements of the Oakland neighborhood, you may wish to head to downtown Pittsburgh for some shopping, and for one final interesting piece of computer history. At the corner of Fifth Avenue and Smithfield Street is one entrance, marked by a historic clock (another analog device—see Figure 1), to a giant Macy's Department Store of historical and architectural significance.

Prior to 2006, this Macy's was the "Big Store" of the Kaufmann's Department Store chain, a regional landmark founded in 1871 and first built on this site in 1877. Much to the chagrin of (and with some protest by) local residents, it lost its identity in the consolidation of the

Published by the IEEE Computer Society

retail industry. What even local boosters may not realize, however, is the technological history that happened here in addition to, and as a result of, the economic history. In 1929, with business booming, Kaufmann's had engineer Edward Rogal install what was essentially a remote control, fully integrated accounting system. Two hundred and fifty point-of-sale recorders (essentially terminals) were connected by telephone lines to 15 online typewriters and 20 Powers card punch/tabulators. (James Powers was an inventor who had circumvented Hollerith's punched card patents with a clever mechanical device; by 1929 his company had merged with Remington Rand.) The recorders transmitted data from punched merchandise tags to produce punched sales records, which could help in inventory control and customer billing. The typewriters were used for credit authorization, anticipating the credit card readers of today. Although the system did not survive the Great Depression that hit soon afterward, it helped to demonstrate the business applications of remote and automated computation.

If this foray into computer history and tourism has given you an appetite, be sure to dine at Macy's famous Tic Toc Restaurant (named for the aforementioned clock) before venturing out in search of other local area networking adventures.

Readers may contact Michael N. Geselowitz at m.geselowitz@ieee.org.

Figure 1. Historic clock marks entrance to historic Macy's Department Store.

Visitor Information

- Greater Pittsburgh Convention & Visitors Bureau: http://www.visitpittsburgh.com/
- Carnegie Mellon University and University of Pittsburgh Virtual Tours: http://www.cmu.edu/vrtour/, http://www.tour.pitt.edu/
  (In both cases a walking tour booklet can also be downloaded prior to your visit.)