

From the Editor's Desk



David Alan Grier
Editor in Chief

Early in my career, when I was a new programmer working with a computer design team, I was given the task of connecting a small computer in a remote office to a central machine room about three miles away. In this task, I collaborated with a senior field engineer named Roger. Roger was an old timer. He had worked with the company, Burroughs Corporation, for nearly 30 years and could remember computers built of vacuum tubes. He and I worked in a small, dingy room. Roger assembled the computer and showed me how to operate it. I struggled to configure the software so that the data would move freely back and forth between the two sites. After one particularly frustrating day of effort, Roger turned to me and said "This is the future, man. Once they figure how to make this stuff work, companies will have tiny little offices that are all connected by data communications."

Twenty years later, Roger's moment of prophecy can be seen in *Annals*. *Annals* consists of roughly 25 hard-working people, who work in "little tiny offices" around the world and spend their days sending articles and pictures to each other over the Internet. Once we have prepared the material for an issue, we email it to the IEEE Computer Society Publications Office in Los Alamitos, California. Almost immediately, the articles again take flight on the Internet and go to the home of a freelance editor (for this issue the ever-dedicated Louise O'Donald), who gives the texts a final polish before returning them to the Computer Society and ultimately, the authors for their post-editing review. At the Computer Society, our production team puts together the journal and transmits the files to a printer, where the publication is finally turned into print.

This issue of *Annals* moves beyond our usual form of operations with the addition of guest editors Dave Walden and Ray Nickerson. Dave and I have collaborated on this issue for the last 18 months, though we have only once met face to face. Dave was an early leader of Bolt Beranek and Newman (BBN)—the Cambridge, Massachusetts, company that developed the technology for the Internet, the very system that has supported the production of *Annals*. He has done a wonderful job contacting his colleagues from BBN and convincing them to write articles describing their work at the firm. In this issue, we present the first collection of these articles. These articles tell the story of BBN as a busi-

ness. A second collection will appear early next year. It will deal with the technical accomplishments of the firm.

In the early issues of *Annals*, the writers tended to consider the technical aspects of early computers and avoid business issues altogether. As the journal has matured and progressed, we have increasingly turned to the interaction between computers and business. This interaction is not the only way to look at the development of computers but it is an important one. Historically, there has been a cultural divide between engineers (those who control the technology) and business people (those who control the financing, marketing, and management). Edwin Layton described this division in his famous book, *The Revolt of the Engineers* (Case Western Reserve University Press, 1971). Layton argued that technological work, in the Western world, is done within the context of a company. In such companies, engineers are limited in their ability to control their own fate unless they learn the skills of business. As they learn business skills, they move away from engineering work.

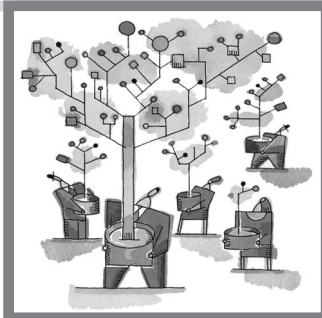
The Internet, of course, has changed the way companies operate. It has concentrated fiscal control and dispersed technical activities. However, this issue is not about the impact of the Internet but about the company that developed Internet technology. BBN was and remains a small technology firm that relied on the skills of highly talented individuals. In this issue, we probe how that organization operated and how its operations shaped the Internet. We learn the problems of structuring such a company, managing its day-to-day operations, providing incentives to its most valuable employees, keeping talented engineers working as engineers, and interacting with more traditional companies.

The history of BBN is well known. Six years ago, one of our editorial board members, Janet Abbate, described the contributions of the firm in her book *Inventing the Internet* (MIT Press, 1999). The articles in this issue move beyond her discussion of BBN because they explore the corporate structure that developed Arpanet technology. Under the best of circumstances, technological innovation is difficult. When a firm tries to move from one set of technologies to another, it can face challenges that will destroy an unprepared company. Yet, BBN moved from being an acoustics consultant to developing computing software to creating

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processors for packet switched networks. In this transition, the company had to change its operations. For one period of time, it attempted to capitalize its innovations and for another, it operated as part of a larger entity. In the end, it found that the role of a small, innovative company based on a small, highly educated staff was the most comfortable place to be.

This issue will take you through the growth of BBN as a company. It will explain some of the stories behind the development of the Internet and will provide a resource for those interested in technological innovation. Through the articles that Dave Walden and Ray Nickerson have assembled and edited, this issue will describe, in its own way, how we moved to the future that my old colleague Roger once saw.



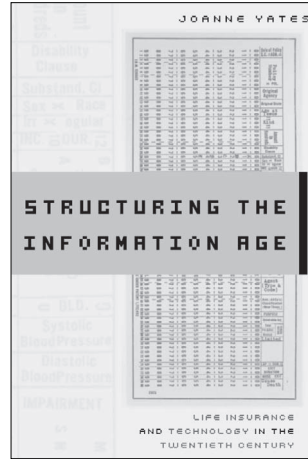
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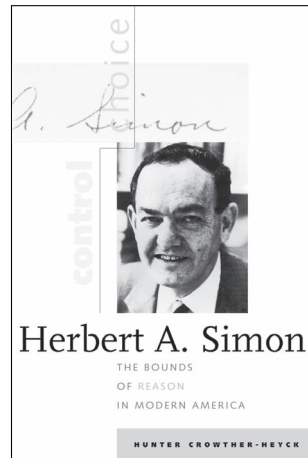
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