BOOKS: TECHNOLOGY

Images of an Inventor Hero

Robert Friedel

Alexander Graham Bell. The Life and Times of the Man Who Invented the Telephone. EDWIN S. GROSVENOR and MORGAN WESSON. Abrams, New York, 1997. 304 pp., illus. $45 or C$60. ISBN 0-8109-4005-1.

If ours is indeed an age in which the public is more enamored of celebrities and entertainers than of scientists and inventors—one in which we worship, in Daniel Boorstin's evocative phrases, the "heroes of consumption" rather than the "heroes of production"— we still have some room in our modern pantheon for these quaint, older kinds of heroes. And they occupy more of our mythological space than we always realize. This is certainly true for the way Americans view the great inventors of their past, and the hero-inventors are still associated with their essential mythological images: Edison as the crusty midwestern practical experimenter, the Wright Brothers as youthful tinkerers emerging from their bicycle shop with a flying machine, and Alexander Graham Bell as the genial, grandfatherly teacher of the deaf who combined his knowledge of human speech with a rough-and-ready learning of electricity to give birth to the telephone—and, not incidentally, to one of the great monopolies of U.S. commerce.

Scholars have picked at these and other technological mythologies, with biographers and historians of technology having done a good job of comparing documented fact with well-worn, and sometimes well-engineered, imagery. But the images persist, and they give way only at the margins—and then often only in the minds of the technological critics or the picky historians. Why should this be? Why do these images of technological heroes, seemingly so irrelevant to our contemporary notions of fame and interest, take on such staying power? This too is a question that some scholars have addressed, but the answer is not really so difficult to come by, at least in outline. These inventors humanize the technologies that often threaten to overwhelm us. Their stories remind us that, as large and powerful as technologies become, they are in fact but human creations. Whereas most would acknowledge the oversimplification of the heroic-inventor model—the notion that the great invention springs from the genius's mind, ready to take flight in the workaday world with just a bit of application and business acumen—we are far more reluctant to abandon the kernel of the idea that the individual, with pluck and smarts, is the source of good and interesting things.

This new biography of Alexander Graham Bell reveals that there is at least one other important source of the images that we have of our inventor heroes—the camera. It may not be so obvious at first, but the powerful impressions that the so-called "makers of the modern world" leave on our minds, usually when we are children, result in large part from the photographic images that are so integral to their presentation. Picture in your own mind Bell himself, and you will conjure up a gentle, thoughtful face behind a white beard, powerfully reinforcing the image of the gifted and generous teacher.

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Early flying machines. Three of the last planes designed by Bell and his associates, on the frozen Bras d'Or Lakes, Nova Scotia, in early 1910: the biplane *Baddeck 1*, the Hubbard monoplane, and Bell's own *Oionos*, his final attempt at using a tetrahedral design for powered flight.

It is easy enough to recognize that such images are the product of effort—or even manipulation—because image making is not, contrary to popular impression, solely an art of the late 20th century. A book like this one, however, with its 400 or so photographs, suggests that—in Bell's case, at least—the effect of one or two familiar pictures is easily reinforced many times. Repeatedly, the impression of the kindly, thoughtful professor comes through in setting after setting, only in old age displaced by the kindly, playful grandfather.

Although the text of Grosvenor and Wesson's book constitutes a well-written, competent biographical and historical treatment—of interest to those looking for an informed, but not scholarly, account of the inventor of the telephone and of the first decades of his invention—it is not the text that makes the book truly worthwhile. From the oversized format to the page layout, with its wide outside margins, this work has been designed to show off its pictures. And what wonderful pictures they are! It seems (although the book doesn't discuss this—and it should have) that Bell's father, Melville Bell, was quickly enamored of the newly introduced technology of photography while a young man in Edinburgh, Scotland, in the 1850s. He must surely have been among the first to adopt the now very familiar fatherly habit of documenting the life and progress of his growing family, and the results give us a glimpse of mid-Victorian bourgeois family life that would be valuable and interesting even if it did not picture the formation of a hero-inventor. Informal pictures of the young Aleck and his brothers provide glimpses of childhood that few biographers see, much less get to display.

The photo-documentation is extraordinary for its continuing abundance through youth and adulthood. The authors tell of rummaging around the Bell homestead in Baddeck, Nova Scotia, and finding almost a thousand family photographs, some of them filed but many stuck in old phone books or seed catalogs. Their access to this treasure was but part of the family effort that went into the book—one of the authors (Grosvenor) is the subject's grandson. This should tell the prospective reader that he or she is unlikely to find critical historical scholarship here— although, in fact, the book is admiring and affectionate without being cloying or fawning.

Bell was, it appears, much like that familiar old image. He possessed an astonishing curiosity and he held science and experimentation in high regard. His original calling was that of a teacher of the deaf, the same vocation of his father and grandfather before him. He migrated from Scotland to the New World at mid-century for the same reason as did millions of others: to find a better life. The new technology of telegraphy appealed to him for a similar reason, as he joined many others in seeking a fortune in the possibilities of lucrative invention.

Bell, however, was not like those others, for he had an almost unique understanding of sound, of the human voice, and, eventually, of how these phenomena could be made to interact with electricity and telegraph wires. The telephone was the product of this understanding, made concrete by

The author is in the Department of History, University of Maryland, College Park, MD 20740, USA. E-mail: robert_d_friedel@umail.umd.edu

some dogged experimental work and with the help and urging of an ambitious prospective father-in-law. Grosvenor and Wesson wisely home in on the scene of Bell's famous demonstration at the 1876 Philadelphia Centennial Exhibition as a kind of pivot point in their invention story—here, we can see the invention in real, workable form, powerful enough to convince even the professional skeptics.

This work pays careful and extensive attention to the early years of the telephone—to its corporate career under a number of managers and overseers, before ending up in the hands of the AT&T of Theodore Vail and J. P. Morgan. The early commercialization of the telephone and the creation by AT&T of the U.S.'s greatest and longest lasting monopoly constitute a good story, which is judiciously told. It is even nicely illustrated. But I think, for most readers, it will be seen primarily as filler, because Bell and his family are the stars of the book, even as he himself moves farther and farther away from the center of the telephone story.

In his later years, Bell's technical enthusiasms went in many directions, with a passion for flying machines being the most spectacular of them. His wife, Mabel, turns out to have been every bit as eager in experiments as her husband, and the photographs reveal that the passions that led to giant kites, the invention of the hydrofoil, and numerous other less showy adventures were very much part of a family affair. That image of Bell as the tender grandfather, surrounded by offspring, or reaching out to a deaf child, is still the one that sticks.

PALEOBOTANY

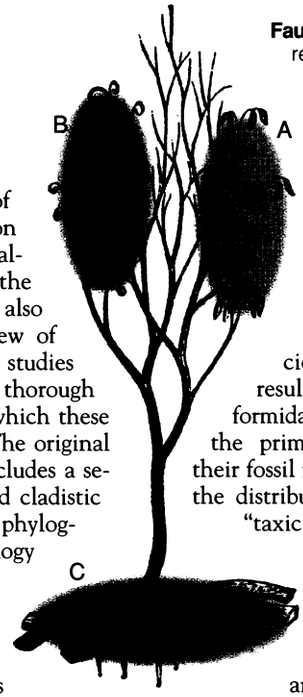
How the Land Turned Green

Richard Olmstead

The Origin and Early Diversification of Land Plants. A Cladistic Study. PAUL KENRICK and PETER R. CRANE. Smithsonian Institution Press, Washington, DC, 1997. xiv, 441 pp. $55, ISBN 1-56098-730-8; paper, $27.50, ISBN 1-56098-729-4.

As a field concerned with phylogeny, paleontology has been eclipsed in recent years by the molecular revolution in biology. A paleontologist often is perceived as the person in the back of the room waving his or her hand to ask "But what about the fossil record?" after a molecular phylogenetic presentation by a speaker who barely knows the organisms about which he or she has been talking—let alone is aware of the implications for phylogeny of the many lineages that no longer exist. Well, what about the fossil record? Even if we can reconstruct the phylogenetic tree for living land plants with DNA sequences, it will tell us rather little about the steps in the evolution of the plants around us today. This is because so many of the lineages that exhibit intermediate forms or unique combinations of forms are extinct today. Yet knowledge of phylogeny is critical to the understanding of morphological evolution—and so paleobotany continues to play a critical role in phylogenetic studies of land plants.

The problem of extinct lineages, of course, is greatest for questions of the most ancient diversifications. Paleobotanists Kenrick and Crane devote their book to exploring the pattern of evolutionary diversification among the earliest branchings of land plants. They were not content simply to present another series of phylogenetic trees based on new or revised data sets (although such trees form the heart of the book), so they also compiled a scholarly review of the history of phylogenetic studies of land plants as well as a thorough discussion of the data on which these studies have been based. The original research presented here includes a series of hierarchically nested cladistic analyses of early land plant phylogeny based on the morphology and anatomy of fossil and living plant groups. These analyses are combined with a thorough review of previously published results of both morphological and molecular studies. What I find most refreshingly novel about this approach are both the honest and evenhanded manner in which the authors present their results alongside those of other researchers and the explicit caveats they issue where data may be wanting or conclusions weak.



Faulty reconstruction. Dawson's 1870 restoration of the early land plant *Psilophyton princeps* based on fossils from Gaspé Bay, Quebec. This is now known to be a composite of three remotely related taxa: (**A**) the trimerophyte *Psilophyton*, (**B**) the zosterophyll *Sawdonia*, and (**C**) *Taeniocrada* [H. P. Banks, S. Leclercq, F. M. Huber, *Palaeontogr. Am.* **48**, 77 (1975)].

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For each level in the hierarchy of early land plants, the authors present the background of ideas on relationships, including reproductions of cladograms from previously published studies. By this means, they frame the critical questions at each level before presenting their new analysis. For each taxonomic group included, they justify their choice of exemplar taxa, and describe the characters and states as they interpret them (data matrices are reproduced in appendices). This presentation is followed by the results of the analysis and their implications. The authors take care throughout to assess the stability of their trees and, hence, the strength of their conclusions. In some analyses, the limited number of species included yields unanticipated results. The book concludes with a formidable summary chapter, in which the primary monophyletic groups and their fossil records are reviewed, along with the distribution and interpretation of the "taxic homologies" (characters often cited as important in land plant classification) as well as an interpretation of important land plant "transformational homologies" (evolutionary series connecting putatively homologous structures in different groups).

The authors do a good job of bringing order to a chaotic field, in which disparate studies, often with contradictory results, have led to a large number of conclusions that are difficult to reconcile with each other. They present a new phylogenetic classification of green plants (green algae and land plants) that integrates their findings with other published results. The book includes a table of synapomorphies for each major clade, as well as a table that identifies the commonly recognized paraphyletic groups (such as "green algae," "bryophytes," and "gymnosperms") and clarifies their relationship to monophyletic groups recognized in the authors' classification. The book also includes a particularly useful appendix with descriptions of the extant and fossil groups that are critical to understanding land plant diversity. I suspect that this volume will become a landmark in the literature on land plant evolution and remain so for many years to come.

The author is in the Department of Botany, University of Washington, Seattle, WA 98195–5325, USA. E-mail: olmstead@u.washington.edu