

How electricity came to be: its innovators and their sparks

FLEET FIRE; THOMAS EDISON AND THE PIONEERS OF THE ELECTRIC REVOLUTION

By L.J. Davis

Arcade, \$25.95, 360 pages

REVIEWED BY WOODY WEST

And then there was the time Thomas Alva Edison electrocuted an elephant. Intentionally.

Edison's zapping of the elephant followed an associate's electrocution of a dog, then a calf and then a horse. The quadruped slaughter was intended by Edison to demonstrate the lethality of Alternating Current, which his competitor, the talented George Westinghouse, was using in his lighting systems; Edison was a proponent of less economically efficient Direct Current to which he had committed resources and reputation, and he was frantic to discredit Westinghouse.

The lurid electrocution episode in the late 1880s is but one of the many illuminating waysides in L.J. Davis's "Fleet Fire" about the coming of electricity. The book relies on secondary sources and, as a signpost of the writerly future, also lists two pages of websites he has used. The literature on the principals in these pages is vast, and this book could have been a cut-and-paste job in the hands of a less competent writer.

Mr. Davis, however, brings to the account the novelist's grasp of character and context and the journalist's eye for the pungent and anecdotal — in both of which callings he has credentials. As a result, this is a coherent and informative narrative. The author provides a primer for those of us who are toward the doltish end of scientific literacy:

The ancients were aware only of magnetism, one of the four basic forces of the universe — along with gravity, weak force and electricity. Eventually, in 1600, William Gilbert, the personal physician to Elizabeth I, published "De Magnete," coining the terms magnetism and electricity.

A century and a bit later, Londoner Stephen Gray managed to transmit electricity along 765 feet of thread. At mid-century, a Dutch physicist named Pieter van Musschenbroek was able to store electricity in a foil-wrapped jar of water, a device that became known as the Leyden Jar — the first battery. "For years thereafter, French kings amused themselves by using the Leyden jar . . . to shock long lines of handholding clergymen, courtiers, and

It is a crowded cast of often improbable characters: There were inspired tinkers, geniuses half-demented in their obsessions; there were entrepreneurs who barely understood the principles with which they were wrestling; there were theoreticians and engineers, not often embodied in the same individual during the "golden age of invention."

The modern era begins with Ben Franklin, that indefatigably curious fellow and one of the sanest in the pantheon of what Mr. Davis calls the "Electric Revolution." The mythic tale of kite, key and lightning in 1747 is reprised in sophisticated detail. Franklin both "reflected and shaped the intense practicality that was becoming an American national characteristic," writes Mr. Davis.

Electricity "made nothing," so Franklin abandoned his experiments; electricity baffled him, writes Mr. Davis, and he didn't realize its possibilities.

The "Electric Revolution," Mr. Davis contends, began almost 20 years earlier than the Industrial Revolution, which was launched by Richard Arkwright's mill and James Watt's steam engine, but it took until the 1830s before it "bore its first practical fruits."

It may be said that Franklin begat the Englishman Humphry Davy, who redefined the science of his time, as well as his successor, Michael Faraday. And Franklin also begat Luigi Galvani, and Galvani begat Alessandro Volta and his battery in 1800. Thirty years after Volta, the electromagnetic telegraph came to be. Another 40 years and Edison was at work on his light bulbs and electrical power stations. And these experimenters begat Guglielmo Marconi two decades further with his primitive wireless telegraph, and Reginald Fessenden's radio. And so ingeniously forth.

As Mr. Davis notes about this by-guess-and-by-gosh boil of science and technology, "[N]obody really invents anything. Instead, people assemble them, and there are usually five or six diligent strivers working on the same device at any given time."

"Fleet Fire" offers vignettes of the grunts, if you will, of the revolution, the men without whose work the names that shine today would not remain so prominent.

A blacksmith in upstate New York, Thomas Davenport, improved on sometime watchmaker Joseph

Henry's magnet (Henry would become the first secretary of the Smithsonian Institution) — dozens of individuals seeking a source of abundant, inexpensive electricity to produce a useful electrical motor. It is an intricate history.

Mr. Davis spends a good deal of time with Samuel Finley Breese Morse, a successful but dissatisfied painter who became interested in electricity when he was 41. He had what the author calls a "eureka moment" and devoted his life, which he would thoroughly fictionalize later, to produce a functional telegraph. A kindly man but difficult, Morse thought slavery was "an excellent idea," writes Mr. Davis, and during the Civil War was a prominent "Copperhead." He persevered and in 1844, "What Hath God Wrought" zipped over Morse's line from Baltimore to Washington. By 1861, with Morse at one point down to 7 cents to his name, the first transcontinental telegraph was strung to San Francisco.

Comes now Cyrus Field, a successful paper manufacturer in Massachusetts, who was convinced that America and Europe could be connected by telegraph. An impulsive and romantic, Field's five agonizing attempts to devise and to lay the first trans-Atlantic cable are a tale as fraught as, to contemporaries, the first moon landing.

But Edison is the star of this show. He typified the dominance of "the self-made amateur." He was, writes Mr. Davis, as "flexible and manipulative with the truth as Morse," with a stunningly fecund mind. Born in 1847 and with at most four years of schooling, he began as a telegrapher, fiddling with the early devices so critical as American economic and commercial development erupted.

"He knew a great deal about telegraph systems, and in 1870 almost everything in the world that was electrical was a child of the telegraph," writes Mr. Davis. His great years were the half decade between 1876 and 1882, when he was a folk hero of Elvis dimension. These were the years when inventions ranging from the phonograph to the light bulb to the central power plant began to touch and transform the lives of everyone in the country.

Without demolishing Edison's iconic glow, Mr. Davis provides a more informative, and flavorful, portrait. Fertile as his mind was in the lab, in business he was a lamb to be

shorn, and both the rapacious rail-roader Jay Gould and Cornelius Vanderbilt who owned Western Union and railroads, got their share of fleece. The great J.P. Morgan would rescue him.

Frantic when concentrating on an idea, at his lab in Menlo Park "Edison continued to sleep on tables and floors, he invariably sported a huge chaw of tobacco in his cheek, and his only concession to the weakness of the flesh was a regular mid-night lunch served to his crew . . . There were never any clocks in the invention factory, and Edison never knew and never cared what time it was. Once, belatedly realizing that a new hire hadn't secured lodgings, he told him to take the rest of the day off and find a room. The new man looked out the window. It was the middle of the night."

All of this and much more, in the phrase of local news on television (a tip of the hat to the forgotten Philo Farnsworth).

"Fleet Fire" is a book that will keep a reader turning pages late into the evening — reading light turned high.

Woody West is associate editor of The Washington Times.

The Ascent of the Software Civilization

TECHNOLOGY euphoria was in the air and stock prices were stratospheric. The shares of some software and computer services companies jumped a hundredfold in a few years. "Never before has the stock market shown quite so much enthusiasm about an industry," a writer for *Fortune* magazine observed.

The year was 1968.

History may provide no sure guide to the future, but it does offer context and insight for the present. And, given the proper twist, history glimmers with a certain knowing humor. In his incisive, panoramic book, *"From Airline Reservations to Sonic the Hedgehog: A History of the Software Industry"* (MIT Press, \$29.95), Martin Campbell-Kelly delivers all three — context, insight, even occasional humor. His treatment of the similarity in the computer mania of the late 1960's and the Internet bubble of the late 1990's is one many telling observations.

Mr. Campbell-Kelly's book is not for everyone. He is an instructor in computer science at the University of Warwick in England and is a professional historian. His is not a book of insider gossip or of recreated scenes of clashing egos and executive tirades — the stuff of so many business books. Instead, it is the product of his reading and distilling of books, professional journals, magazine and newspaper articles and historical archives over the last four decades.

The result is a sweeping survey of the software business since the early 1950's, its evolving structure, economics and marketing. The product and company names are so numerous that, at times, they seem to race by in a blur — Cincom, Cullinane, Panosophic, Cytation, Famicom, Xenix, Comshare, Syncsort, SuperWriter, MacNeal-Schwendler and hundreds more. The book is a ready reference for any misguided soul who wants to create a computer trivia game.

Yet, along the way, Mr. Campbell-Kelly pauses for longer passages on subjects ranging from the role of the government's SAGE air defense-and-surveillance system to the decision by I.B.M. in 1969 to "unbundle" hardware and software sales. The unbundling was "a turning point," the author says, because it ensured a sizable software industry separate from hardware.

Mr. Campbell-Kelly gives the United States government credit for creating a market for programmers in

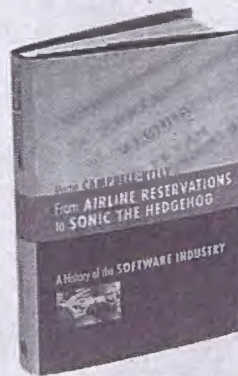
SAGE, a name derived from "semiautomatic ground environment." About \$150 million was spent on its software, and thousands of programmers were trained to work on the project — a veritable "university for programmers." Its alumni went off to populate corporate data centers and to start companies elsewhere. SAGE also tackled a host of technical problems in real-time transaction processing that eased the way for I.B.M.'s development of the Sabre online reservations system, called "the Kid's SAGE," for American Airlines.

Time and again, the book shows that what seems new in the software industry in fact echoes the past. The engineers who used software formed user groups starting in the 1950's with SHARE, whose members came from companies that used I.B.M. 704 computers. The group's name, though capitalized, was not an acronym. It was what the group did; it shared programs and expertise to help drive down programming costs.

This was when software was treated as a marketing cost of hardware instead of as a stand-alone product. But, as the author writes, "one of the abiding legacies of the user groups was the perception of software as a free good." In their attitude and behavior, the user groups were very similar to those engaged in today's open-source software projects like GNU Linux, an operating system that is distributed free and is steadily improved and debugged by a network of programmers.

IN the late 1960's and early 70's, there was great excitement about — and investment in — the notion of computing as a utility-like service that could be delivered to offices and homes to solve all manner of problems. The idea flopped because it proved to be too complex a challenge to write the software needed to distribute computing as a service from a central time-shared machine to many users. Besides, microcomputers, later called personal computers, were about to arrive, putting affordable computing on desktops thanks to the miracle of the microprocessor.

Today, the utility concept is making a comeback. This time, the industry is betting that 30 years of advances in software, hardware and networking can deliver utility com-



mand" computing, and Hewlett-Packard, Sun Microsystems and others have similar offerings. Companies like Salesforce.com are offering software as a service in an emerging market for so-called application service providers, or A.S.P.'s. "Because the concept was never fully tested in the 1970's," Mr.

Campbell-Kelly writes,

"history has few lessons to offer the A.S.P. industry." Well, the A.S.P. start-ups certainly hope so.

As software became a product in its own right, marketing became more important. In the fledgling personal computer industry, some of the tactics were particularly inventive. In 1980, George Tate, a former electronics industry salesman, began marketing a database program he named dBase II. There was no "I," but "II" suggested a second, improved product. This ploy was not uncommon. But in 1983, Mr. Tate took the more imaginative leap, renaming his company Ashton-Tate.

"There was no Ashton," the author writes, "but it was considered a euphonious and high-sounding name."

Mr. Campbell-Kelly argues convincingly that Microsoft's stature in the software industry as a whole tends to be overstated. After all, he notes, Microsoft dominates only about 10 percent of the industry, while it has no such sway over large portions of the software business like corporate software, software contractors and consultants.

"If this book serves no other purpose," he writes, "I hope it will serve as a corrective to the common misconception that Microsoft is the center of the software universe around which all else revolves."

Mr. Campbell-Kelly is dismissive of the federal antitrust suit filed in 1998. "Exactly why the action was brought remains a mystery," he writes. He is fastidious with footnotes, but there are none near that sentence. It's his opinion, period.

He may not understand the Microsoft antitrust suit, but he lucidly analyzes Microsoft's mastery of using software and business acumen to build a lucrative technology platform. In Microsoft's case, of course, the technology platform is the Windows operating system. The company encouraged and helped software developers write programs that run on the Microsoft platform, increasing the value of Windows and prompting even more applications to

WHAT THEY'RE READING

David B. Readerman, 46

Equity growth strategist, Thomas Weisel Partners

BOOK "The Mind of Wall Street" by Leon Levy with Eugene Linden (2002)

WHY "I'm reading this to gain a historical perspective from an accomplished Wall Street veteran on the boom-bust cycles of Wall Street. His insights on the importance of building a partnership with smart, trusted partners, how to assess business and financial risk and his deep value investment methodology were important lessons that I gleaned from the book."

Robert R. Glauber, 63

Chief executive, NASD

BOOK "The South Sea Bubble" by John Carswell (2002)

WHY "We need to see the Internet bubble in historical context and be sensitive to the danger of regulatory overreaction. For example, when the South Sea

bubble burst in 1720, Parliament outlawed new corporations, short sales, futures trading and options trading. Some of these laws remained on the books for over a hundred years, although they were flagrantly disregarded."

Leslie R. Caldwell, 45

Director, Department of Justice Enron Task Force

BOOK "Paradise Alley" by Kevin Baker (2002)

WHY "It is a terrific historical novel focused on life in Manhattan during the Civil War, chock-full of vivid characters confronting the issues of the day — immigration, racism, war, the draft riots and the struggle of daily existence. The story is told from several perspectives, including that of several memorable female characters and an African-American man, making the book deeper and more memorable than the usual wars and conquest tales of historical fiction."

COMPILED BY KATHLEEN O'BRIEN

be written on top of Windows. Economists call this commercial snowball "network effects."

It is nothing new, really. I.B.M., as Mr. Campbell-Kelly explains, did the same thing with its operating system for the I.B.M. 360 mainframe and follow-on products.

And Sony, in video game consoles, deftly used software to build its technology platform and a thriving ecosystem of game developers supporting its PlayStation platform. Once Sony mastered the economics of software, Sega's Sonic the Hedgehog never had a chance. □



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*****From the Original Arno Press Collection*****

Telecommunications:

In one volume - the development of European telephone networks near the turn-of-the-century plus a comparative study fifteen years later

Bennett, A. R.

THE TELEPHONE SYSTEMS OF THE CONTINENT OF EUROPE. 1895; and

Webb, Herbert Laws

THE DEVELOPMENT OF THE TELEPHONE IN EUROPE. 1910

The first half of the 1890s marked a period of rapid growth in the development and adoption of telephone service throughout Europe. Together with technical considerations, Europeans had to decide whether their telephone networks were to be left to private entrepreneurs, private monopolies, or to be placed under government ownership. First published in 1895, A. R. Benriett's work surveys the expansion and ownership of telephone systems in Europe. The author provides interesting background material on the problems encountered during the initial stages of the practical application of a means of rapid communication. H. L. Webb supplements Bennett's survey with a discussion of telephone systems fifteen years later. With emphasis upon the telephone in Great Britain, Webb expands his comparative study to include developments all over Europe and the Near East. 1895 and 1910 are years that marked the end of significant periods in the growth of the international telephone service. These two studies provide an unusual and important summation of the great technological advances in telephone communications before the outbreak of World War I.

LC 74-4666 London, 1895, 1910

ISBN: 0405060335 Two vols. in one \$40.95 **Ships Immediately**

The official governmental record of the U.S. Army Signal Corps in World War I when telegraph, telephone and radio were first used effectively in military operations Chief

Signal Officer, U. S. Signal Corps

REPORT OF THE CHIEF SIGNAL OFFICER: 1919

World War I marked the first time that the U.S. Army Signal Corps made combined use of telegraph, telephone and radio, in addition to motion pictures, photography and other new technologies. These documents of the 66th Congress provide an extensively detailed and illustrated discussion of all aspects

of the development of the modern Signal Corps, its operations during the European campaign, how it developed its own technologies, and many examples of actual battlefield maneuvers employing telecommunications. Although technically a part of the annual report for the fiscal year 1919, General Squiers' report traces the entire 1917-1919 period of American involvement in the Great War and its immediate aftermath as it related to the Signal Corps.

LC 75-4671 Washington, D.C., 1920

ISBN: 0405060378 illus. \$51.95

Ships Immediately

A unique, detailed and illuminating account of the experiments and role in the early stages of television of Philo T. Farnsworth

Everson, George

THE STORY OF TELEVISION: The Life of Philo T. Farnsworth

Philo T. Farnsworth (1907-1971), a television pioneer, experimented in the 1920s to develop the image dissector system that was eventually perfected to the degree that RCA was forced to purchase rights to Farnsworth's patents. This was the first time RCA was the purchaser instead of the seller of such rights. George Everson, one of Farnsworth's financial backers, has written the only detailed biography of one of the last of the individual inventors to succeed in an age of business-dominated research.

LC 74-4677 New York, 1949

ISBN: 0405060424 illus. \$26.95

Ships Immediately

Experimentation with pre-electronic television systems described in this biography of a British television pioneer

Tiltman, Ronald F.

BAIRD OF TELEVISION: The Life Story of John Logie Baird

Ronald Tiltman has written a detailed contemporary biography of John Logie Baird, one of Britain's most illustrious early experimenters with mechanical television. The author concentrates on the inventor's activities in the field during the 1924-33 period. By utilizing illustrations, Tiltman provides an interesting and important view of pre-electronic systems as developed by their chief proponent.

LC 74-4697 London, 1933

ISBN: 0405060610 \$20.95

Ships Immediately

In one volume--three valuable first-person documents on early telegraphy by one of Morse's most important backers and partners during the 1830s and 1840s

An Original Anthology

EYEWITNESS TO EARLY AMERICAN TELEGRAPHY

A.) Vail, Alfred

THE AMERICAN ELECTRO MAGNETIC TELEGRAPH: With the Reports of Congress, and a Description of All Telegraphs Known, Employing Electricity or Galvanism. Philadelphia, 1845

B.) Vail, Alfred

DESCRIPTION OF THE AMERICAN ELECTRO MAGNETIC TELEGRAPH: Now in Operation Between the Cities of Washington and Baltimore. Washington, D.C., 1845

C.) Vail, J. Cummings

EARLY HISTORY OF THE ELECTRO-MAGNETIC TELEGRAPH FROM LETTERS AND

JOURNALS OF ALFRED VAIL. New York, 1914

Incorporating a book and two reports, this anthology offers an invaluable primary source of information on the beginnings of American telegraphy. Vail's book relates the history of telegraphy to 1845 while the initial report describes the first American telegraph service. The second report, compiled by Vail's son, presents excerpts from Vail's diaries and letters relating to the telegraph.

LC 74-4698 New York, 197

ISBN: 0405060432 illus. \$34.84

Ships Immediately

This "Blue Book" remains the best available statement of the Federal Communications Commission's thinking on radio station programming standards

Federal Communications Commission

PUBLIC SERVICE RESPONSIBILITY OF BROADCAST LICENSEES

Popularly known as the "Blue Book" because of its original paper cover, this now classic publication includes information of the legal basis for FCC regulation. It provides examples of programming practices, and discusses a survey of several years of the financial earnings of broadcasting that indicate the ways in which stations might be able to schedule a greater number of public service programs. The "Blue Book" continues to provide the clearest presentation of the Federal Communications Commission's attitudes about the programming standards of broadcasting stations.

LC 74-5225 Washington, D.C., 1946

ISBN: 0405060645 \$20.95 **Ships Immediately**

Early government positions on the development of and patent control by the radio industry, including broadcasting and international communications

Federal Trade Commission

REPORT OF THE FEDERAL TRADE COMMISSION ON THE RADIO

INDUSTRY: In Response to House Resolution 548, 67th Congress, Fourth Session, December 1, 1923

A major source of key documents on the critical early development of wireless communication and broadcasting, this study deals in detail with the manufacture and sale of radio apparatus and international traffic arrangements. It includes the major contracts, patent pooling arrangements and financial data of the key firms of the early 1920s.

LC 74-4680 Washington, D.C., 1924

ISBN: 0405060467 \$33.95 **Ships Immediately**

A useful and compact survey of radio experimentation that spans 50 years

McNicol, Donald

RADIO'S CONQUEST OF SPACE: The Experimental Rise in Radio Communication

Written by a man who participated in many of the important events of which he writes, Radio's Conquest of Space is a detailed, fully documented, and scholarly treatment of the technical development

of wireless and radio. Starting with the early theories of telegraphy, the author discusses wireless experimentation in the late 19th century, later developments in transmission and reception methods, vacuum tube technology, and early commercial broadcasting. Name and subject indexes are included in this handy and most useful volume.

LC 74-4689 New York and London, 1946

ISBN: 0405060521 illus. \$31.95

Ships Immediately

An engineer and designer of cable equipment writes a vivid account of the early years of cable laying
Smith, Willoughby

THE RISE AND EXTENSION OF SUBMARINE TELEGRAPHY

Smith's autobiographical book covers his world-wide experiences in the dangerous and exciting occupation of laying cable for intercontinental telegraph communications during the mid-19th century. Among the fascinating and vivid accounts of what those early expeditions were like, the author tells about the 1865-66 missions with the Great Eastern that resulted in the successful link-up of the Atlantic cable, one of the greatest technological achievements of that century. The Rise and Extension of Submarine Telegraphy is, at the same time, a useful historical reference and a thrilling adventure story.

LC 74-4695 London, 1891

ISBN: 0405060580 illus. \$35.95

Ships Immediately

Abramson, Albert

ELECTRONIC MOTION PICTURES: A History of the Television Camera

A veteran CBS television engineer, Albert Abramson has written an invaluable, comprehensive and readable technical history of electronic television including information on the equipment and techniques employed in the field. Electronic Motion Pictures is an especially significant work because of the author's unrivalled emphasis upon the development of the TV camera. It begins with a brief discussion of the mechanical predecessor systems, and then considers the early work of Zworykin and others in the 20s and 30s. Additional topics include: an analysis of the relationship between early television and film technologies; television advances in the 40s; and the postwar introduction of commercial television including both black and white and color systems. Also heavily emphasized are the televising of motion pictures and the changes in the TV camera itself. Well documented and clearly written, Electronic Motion Pictures constitutes an indispensable reference to the subject.

LC 74-4663 Berkeley and Los Angeles, 1955

ISBN: 0405060319 illus \$26.95

Available 5/30/2000

A definitive history of the earliest telegraph systems preceding the institution of the Morse system as a world standard

Fahie, John J.

A HISTORY OF ELECTRIC TELEGRAPHY TO THE YEAR 1837: Chiefly

Compiled from Original Sources and Hitherto Unpublished Documents

Divided into sections covering various types of telegraph and famous for having thrown light upon the pioneering work of Edward Davy, this survey of the earliest telegraph systems covers the developments through the commercial patents granted in England to Cooke and Wheatstone before the

internationalization of the Morse system. It is the most exhaustive record available of early telegraph pioneers and their inventions, as well as being the first work of an accomplished electrical communications historian. Arno reprinted the sequel in the 1971 History of Broadcasting series. Extremely thorough, with many documents reprinted or extracted this is an essential reference work.
LC 74-4675 London, 1884

ISBN: 0405060440 illus. \$42.95

Available 6/15/2000

A panoramic, yet detailed perspective of the Civil War by telegraphers on both sides of the battle lines
Plum, William Rattle

THE MILITARY TELEGRAPH DURING THE CIVIL WAR IN THE UNITED STATES, With an Exposition of Ancient and Modern Means of Communication, and of the Federal and Confederate Cipher Systems; Also a Running Account of the War Between the States. Volumes One and Two.

With an Introduction by Paul J. Scheips.

The Civil War as seen and reported by the telegraphers in both the Northern and Southern armies is the subject of this remarkably detailed study. The role of the telegraph in various areas and campaigns of the war and how it affected the outcome of military struggles are discussed against a background of other important factors. These include system design, operators, salaries and operating conditions, the struggle to control the communications medium, experiences of captured telegraph operators and information on military communications. An appendix to this interesting perspective on the Civil War contains the annual reports of the Chief of Military Telegraph.

LC 74-4690 Chicago, 1882

ISBN: 040506053X \$60.95 **Available 7/01/2000**

Insights into the early development of radio telegraphy and telephony

Blake, George C

HISTORY OF RADIO TELEGRAPHY AND TELEPHONY

There was a great deal of important technological experimentation and invention before the widespread adoption of radio communication characterizing the 1920s. With highly technical detail, supplemented by footnotes and a 50-page bibliography, Blake chronologically arranges descriptions, patents, documentary extracts and illustrations, thereby making the History of Radio Telegraphy and Telephony an extraordinary reference. The author has included complete coverage of early wireless schemes and developments, carrying his study through the period of rapid radio service expansion during the 1920s. Although technically detailed and comprehensive, his book conveys all of the excitement and wonder of early radio experimentation.

LC 74-4667 illus. London, 1928

ISBN: 0405060343 \$39.95 **Available 8/01/2000**

One of the earliest studies of the telephone, the microphone and the phonograph in a single volume

Du Moncel, Count Theodore, A. L.

THE TELEPHONE, THE MICROPHONE AND THE PHONOGRAPH

The first English edition of a work originally published in Paris in 1878, this book is an important early

contemporary account of the gestation of three important and interrelated inventions. Heavily documented and supported by valuable engraved illustrations, most of Count Du Moncel's work is devoted to telephones. He discusses telephone development and competing systems as well as describing the experimentation taking place during the period of Bell's 1876 patent application. Briefer attention is given to the initial stages of microphone technology and information is included about Edison's phonograph.

LC 74-4673 New York, 1879

ISBN: 0405060394 \$25.95 **Available 8/01/2000**

One of the greatest technological achievements of the 19th century - underwater cable laying - is vividly described in this rare and lavishly illustrated volume

Bright, Charles

SUBMARINE TELEGRAPHS: Their History, Construction and Working

In 1850 a submarine cable was laid between England and France. After an initial failure in 1857 and several more defeats during the early 1860s, the first completely successful laying of a telecommunication cable between Valentia, Ireland and Heart's Content Bay in Newfoundland took place in 1866. This constituted one of the greatest and most important scientific achievements in an age of many rapid and far-reaching technological advancements. Charles Bright was the chief engineer of the early Atlantic cable-laying firms. His professional account of the early history of failure and eventual triumph in this endeavor covers all aspects of the tremendously complex project. The author's comprehensive and detailed coverage is strengthened by a profusion of contemporary engravings.

LC 74-4669 London, 1898

ISBN: 0405060351 \$63.95 **Available 10/01/2000**

An unusual volume offering a detailed contemporary history of the importance of the telegraph during the American Civil War

Brown, J. Willard

THE SIGNAL CORPS, U.S.A. IN THE WAR OF THE REBELLION

With an Introduction by Paul J. Scheips.

When read with Plum's extensive discussion, *The Military Telegraph During the Civil War* in the United States, also included in this collection, Willard's detailed history provides a complete picture of the military's use of telegraphy during the Civil War years. Based upon in-depth research and illustrated with engravings, photos and maps, Brown's work traces the campaigns of the war and the significance of the signalling techniques employed during battle. The author, who advanced from private to officer in the Signal Corps during the war, had access to official records in writing this comprehensive survey, a project lasting more than 8 years.

LC 74-4670 Boston, 1896

ISBN: 040506036X \$89.95 **Available 10/01/2000**

A.T. & T. tried to suppress this devastating attack on the Bell interests when it was first published.
Danielian, Nooba R.

A. T. & T.: The Story of Industrial Conquest

Upon its publication in 1939, the *New Republic* favorably reviewed *A. T. & T.: The Story of Industrial*

Conquest, pointing out that "it bears the unmistakable marks of a skilled hand and an inquiring mind ... a penetrating analysis that no one interested in American economics can afford to miss." The New York Times considered the book "a major contribution to the education of social scientists and public officials who are seriously concerned with practical problems or regulating monopolies," and the New Yorker said that it "may turn out to be a classic." American Telephone and Telegraph was not in the least enthusiastic about this heavily documented account of the company's technical and patent operations and several decades of its financial and political maneuvers - A. T. & T. promptly purchased and destroyed whatever copies it could, and issued a book-length rebuttal two years later. N. R. Danielian's book, however, remains one of the most penetrating and revealing muckraking publications of the century.
LC 74-4672 New York, 1939

ISBN: 0405060386 \$33.95 **Available 10/01/2000**

A unique study of the early developments in electronic television

Eckhardt, George H.

ELECTRONIC TELEVISION

In 1939 mechanical systems in public communications were almost exclusively in use, yet pioneers were experimenting with electronic television. George Eckhardt has written an easily understood yet technically comprehensive work describing the operations of the Farnsworth and RCA laboratories and containing fascinating illustrations of the first television stations and receivers used in television experimentation during the mid-1930s. Upon publication of this work, New Technical

Books reported: "The art of writing on highly technical subjects in a non-technical light is extremely difficult and the author

is to be given credit for a great accomplishment."

LC 74-4674 Chicago, 1936

ISBN: 0405060408 \$18.95 **Available 10/01/2000**

Still the most detailed biography of one of the giants in the history of telecommunications

Prime, Samuel Irenaeus

THE LIFE OF SAMUEL F. B. Morse, L.L.D., Inventor of the Electro-Magnetic Recording Telegraph

There have been many biographies written and published about the life of this great inventor, yet Prime's detailed study is still the most comprehensive and important of all. His book is equally valuable because it offers a contemporary viewpoint of Morse and because it extensively utilizes extracts and diagrams from Morse's and other's patents. There is no greater tribute to the importance of this work as a classic reference than the fact that later works continue to cite it extensively. Prime traces Morse's life from his early years and original art career through his trials and tribulations with the innovation of the prototype telegraph system. Accurate and filled with important observations and information, The Life of Samuel F. B. Morse is a classic.

LC 74-4691 New York, 1875

ISBN: 0405060548 illus. \$60.95

Available 10/01/2000

A classic presentation of the history of the telegraph and the major telegraph firms through the end of the 1870s

Reid, James D.

THE TELEGRAPH IN AMERICA: Its Founders, Promoters and Noted Men

Here is an often cited panoramic history of the telegraph which discusses the principal telegraph firms and the key persons within them. Throughout his work, Reid stresses the business and economic aspects of marketing this remarkable scientific invention. The importance of The Telegraph in America as a classic reference in the field is under-scored by the fact that the author was active in telegraphy throughout the period he discusses. He thus had a personal knowledge of persons and events under examination.

LC 74-4693 New York, 1879

ISBN: 0405060564 illus. \$69.95

Available 10/01/2000

A revealing collection of official United States Government reports that offer an overview of the radio broadcasting industry in the 1930s and 1940s

An Original Anthology

SPECIAL REPORTS ON AMERICAN BROADCASTING: 1932-1947

A.) Federal Radio Commission

COMMERCIAL RADIO ADVERTISING (Reprinted from 72nd Congress, 1st Session, Senate Document No. 137), Washington, D. C., 1932

B.) Engineering Dept., Federal Communications Commission REPORT ON SOCIAL AND ECONOMIC DATA PURSUANT TO THE INFORMAL HEARING ON BROADCASTING, Docket 4063, Beginning October 5, 1936 Washington, D. C., 1938

C.) Federal Communications Commission REPORT ON CHAIN BROADCASTING. Washington, D. C., May, 1941

D.) Federal Communications Commission AN ECONOMIC STUDY OF STANDARD BROADCASTING. Washington D.C., October 1947

This significant anthology contains four important documents which offer the reader an unusual overview of the radio broadcasting industry during its heyday. First, there is a letter from the FRC Chairman to the Senate answering questions on commercial and educational AM broadcasting. The second document contains a detailed analysis of broadcasting in the mid-1930s just before the inception of FM and television competition. The next offering is the report of a two-year investigation of the role, history and operations of CBS, NBC. and Mutual up to 1940. The final section contains a detailed analysis of changes in American broadcasting in the post-war years of expansion when radio had to meet the challenge of

FM and television. Because of the official nature of the documents in this anthology which contains a wealth of statistical data, Special Reports on American Broadcasting, 1932-1947 constitutes a vital addition to any library.

LC 74-4682 New York, 1974

ISBN: 0405060599 \$57.95 **Available 10/01/2000**

A unique primary source document in Alexander Graham Bell's legal defense of the Bell patents

Bell, Alexander Graham

THE BELL TELEPHONE: The Deposition of Alexander Graham Bell in the Suit by the United States to Annul the Bell Patents

No other source could ever equal Bell's personal and detailed description of the steps leading to his remarkable invention. This description is included in Bell's testimony before various courts in the years 1879, 1883 and 1887 when his exclusive patents rights were being questioned by the United States Government. In preparing his defense, Bell provided important insights into the process of his own experimentation leading to the first crude telephone. In his introduction, Charles H. Swan describes Bell's testimony as "... the most detailed and best arranged statement of his telephone work."

LC 74-4665 Boston, 1908

ISBN: 0405060327 \$36.95 **Available 01/01/2001**

A basic reference to the business, labor, financial, production and advertising trends in radio up to the mid-1930s.

Eoyang, Thomas T

AN ECONOMIC STUDY OF THE RADIO INDUSTRY IN THE UNITED STATES OF AMERICA

Originally a Columbia University Ph. D. dissertation, Thomas Eoyang's volume examines the technical aspects of radio, the economics of radio manufacturing (receivers and tubes), and the economics of the radio broadcasting industry up to the mid-1930s. This important reference utilizes many tables and charts to supplement a well-documented text.

LC 74-4675 New York, 1936

ISBN: 0405060416 \$20.95 **Available 01/01/2001**

The only major U.S. Government investigation of the telephone industry (1939) -an exhaustive analysis of A.T. & T., Western Electric and their corporate and business practices

Federal Communications Commission

INVESTIGATION OF THE TELEPHONE INDUSTRY IN THE UNITED

STATES: Report of the Federal Communications Commission on the Investigation of the Telephone Industry in the United States

This comprehensive final report results from the only major United States Government investigation of the telephone industry. Its lengthier first part consists of 18 chapters filled with data in tabular and text form examining management and control, licensing, patents, research, engineering and standardization, rates, pricing and other facets of the Bell system. The second part reviews legal problems of telephone control and suggests legislative measures. This report remains essential to an understanding of the history and growth of the Bell system into one of America's major industrial giants.

LC 74-4679 Washington, D.C., 1939

ISBN: 0405060459 foldout \$50.95

Available 01/01/2001

Still the definitive biography of a critically important American pioneer radio inventor-innovator
Fessenden, Helen M.

FESSENDEN: Builder of Tomorrows

Based on her husband's unfinished autobiography and her own letters, Helen Fessenden wrote what remains the definitive biography of one of America's most eminent radio pioneers, responsible for the two-way radio, the wireless telephone, the sonic depth finder and the submarine telephone. Using heavy documentation, she traces Fessenden's life as a series of confrontations and crises interspersed with several important achievements: the alternator principle, the first broadcast station (1906), and heterodyne theory. When it was published in 1940, The New York Times called Fessenden: Builder of

Tomorrows, "a valuable and entertaining biography." Books stated that this biography "should be read by all who realize that creative ideas are the only hope of the nation and the race."

LC 74-4681 New York, 1940

ISBN: 0405060475 illus. \$26.95

Available 01/01/2001

The only comprehensive and detailed history of shipboard radio now available

Hancock, Harry E.

WIRELESS AT SEA: The First Fifty Years

Hancock's study covers the history of shipboard radio from its earliest stages of development through the Marconi experiments and encompassing the modern post-war applications of radar and other technologies. A company-sponsored publication, this book stresses Marconi's vital role in the perfection of the wireless with emphasis on technical developments. It does not, however, ignore the impact of shipboard radio on commerce and politics.

LC 74-4683 Chelmsford, England, 1950

ISBN: 0405060483 illus. \$28.95

Available 01/01/2001

One of the best available collective biographies of major pioneers in wireless experimentation

Hawks, Ellison

PIONEERS OF WIRELESS

Here are detailed discussions of leading wireless experimenters, theorists and innovators including: William Gilbert, Galvani, Arago, Michael Faraday, the Hightons, Alexander Graham Bell, J. W. Wilkins, T. A. Edison, D. E. Hughes, Clerk-Maxwell, Marconi, Fleming, Fessenden, Duddell and many more. The collection is well documented, referenced and illustrated.

LC 74-4685 London, 1927

ISBN: 0405060491 illus. \$29.95

Available 01/01/2001

One of the earliest comprehensive treatments of the special economic and legal problems of the telegraph, telephone and radio media

Herring, James M, and Gerald C. Gross

TELECOMMUNICATIONS: Economics and Regulation

Written by an economist and a former member of the FCC, this work is extremely valuable today

because of its detailed coverage of the organization and development of many key precepts still considered basic to the economic regulation of the electronic media. The authors write extensively about the interrelationship of economic and regulatory aspects of public policy and provide an historical overview as well as a close look at regulatory machinery and its functions in the 1930s. Their book is well documented and includes appendices with several key legislative acts and treaties.

LC 74-4686 New York and London, 1936

ISBN: 0405060505 \$38.95

Available 01/01/2001

This seminal pioneer study helped to inspire both professional and public interest in wireless telegraphy

Lodge, Oliver J.

SIGNALLING THROUGH SPACE WITHOUT WIRES: Being a Description of the Work of Hertz and His Successors. Third Edition

Heinrich Rudolf Hertz, one of the most brilliant experimentalists and physicists in the history of science, in 1888 announced to the world his epoch-making discovery of electromagnetic waves. This interesting study is derived primarily from an illustrated lecture given by the author in 1894 in London, detailing the work of Heinrich Hertz and his early successors. The rest of the volume discusses the work of Branley, Popoff, Slaby, Marconi and Thompson and concentrates

on the development and use of the coherer principle and photo-electric phenomenon. Signalling Through Space Without Wires proved to be instrumental in spreading interest in wireless telegraphy and wireless experimentation throughout the world.

LC 74-4688 London, [1900]

ISBN: 0405060513 illus. \$17.95

Available 01/01/2001

A solid analytical study of the radio industry - just prior to federal regulations and the founding of the giant broadcast organizations

THE RADIO INDUSTRY: The Story of Its Development

By Leaders of the Radio Industry

Introduced by David Sarnoff, the 11 lectures in this collection were originally delivered before a business policy course at the Harvard Graduate School of Business Administration. The Radio Industry reviews the history of radio, both technically and economically, and focuses upon legal problems, the first year of the NBC network, radio advertising, and the merchandising of radio receivers. The fact that radio industry leaders of the era gave the lectures at a time when the large network systems were being organized and the Federal Government was moving to control them makes this volume a particularly interesting reference.

LC 74-4687 Chicago and New York, 1928

ISBN: 0405060556 illus. \$25.95

Available 01/01/2001

The standard work on the successful implementation of the Bell telephone and the corporate research and business structure built upon it

Rhodes, Frederick Leland

BEGINNINGS OF TELEPHONY

With a Foreword by General John J. Carty

No other work on the subject has superceded this volume in importance. Written with the full cooperation of the Bell interests, and solidly based upon primary documents, *Beginnings of Telephony* concentrates on the technical rather than business aspects of telephony and carries the study to the middle 1890s. Detailing the inception of the telephone, microphone transmitter, telephone cable, first underground cables, loaded lines, telephone switchboards and long-distance lines, this standard reference provides a solid insight into the formative decades of the telephone.

LC 74-4694 New York and London, 1929

ISBN: 0405060572 illus. \$28.95

Available 01/01/2001

A classic biographical work in defense of Philipp Reis who claimed to have invented the telephone more than 16 years before Bell

Thompson, Silvanus P

PHILIPP REIS: Inventor of the Telephone; A Biographical Sketch

Philipp Reis was one of the better known claimants to the title eventually granted to Alexander Graham Bell. This biography of Reis includes a discussion of Reis' telephone invention, details of his claims to prior completion of his experiments, and many contemporary documents and eyewitness accounts. Thompson provides a great deal of data in support of Reis' claim that he invented the telephone 16 years before Bell. His major contention is that the successful implementation of the telephone was actually the result of the scientific achievements of many people at different times. This provocative and informative biography constitutes a valuable early document in the field.

LC 74-4696 London, 1883

ISBN: 0405060602 \$18.95

Available 01/01/2001

The only detailed biography of the inventor of the microphone

Wile, Frederic William

EMILE BERLINER: Maker of the Microphone

Emile Berliner was one of the "greats" in the history of the development of telecommunications. Perhaps best known for his work with the microphone, he also contributed much to the development of the radio and the phonograph - especially the disc record rather than the prevailing Edison-developed cylinder. In writing this unique biography, the author has made full use of references and extracts from contemporary documents and his text clearly describes complicated technical issues and court litigation. Wile is also successful in recreating the dramatic life of this prolific scientist. The New York Times reported that "Mr. Wile tells the interesting and inspiring story with full appreciation of its dramatic features."

LC 74-4699 Indianapolis, 1926

ISBN: 0405060629 illus. \$31.95

Available 01/01/2001