Volume 17, No. 2 May 2005

ANTENNA

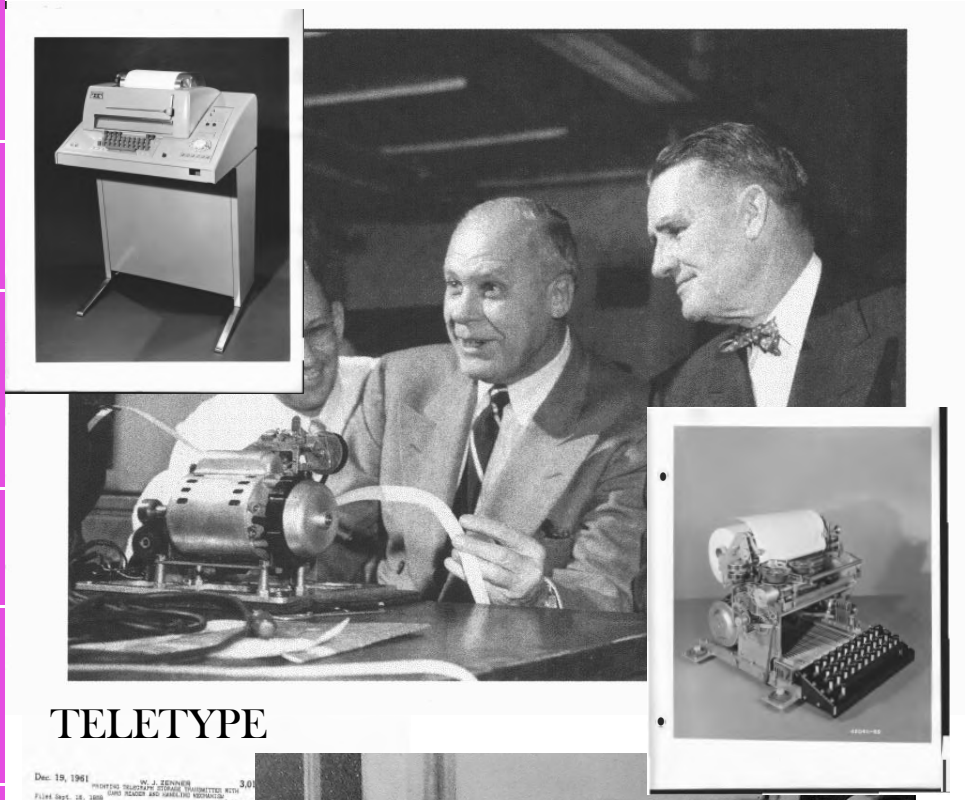
Newsletter of the Mercurians

Special Interest Group
Society for the History of Technology

Publication costs met in part by support of the Shiers Memorial Fund

WWW.MERCURIANS.ORG

IN THIS ISSUE



Dissertation Précis
"Wiring the World" by Jonathan Winkler

Jonathan Winkler, "Wiring the World": United States Foreign Policy and Global Strategic Communications, 1914-1921," March 25, 2004.

This dissertation is a study of United States foreign relations during the First World War. It seeks to explain how civilian and military officials discovered the great importance of global communications technology to the nation's diplomatic, military and commercial interests abroad. These officials perceived the existing network of submarine telegraph cables and long distance radio stations to be insufficient, and the industries too greatly influenced by foreign powers, for the nation's needs. They then acted to correct the problem through a variety of domestic and international policies. A complex story largely overlooked by historians, it encompasses U.S. relations with Europe, Latin America, and Asia, and examines two distinct technologies. Built upon archival research in private and public records from the United States and Great Britain, this interdisciplinary work covers diplomatic, military, intelligence, technologic and business history.

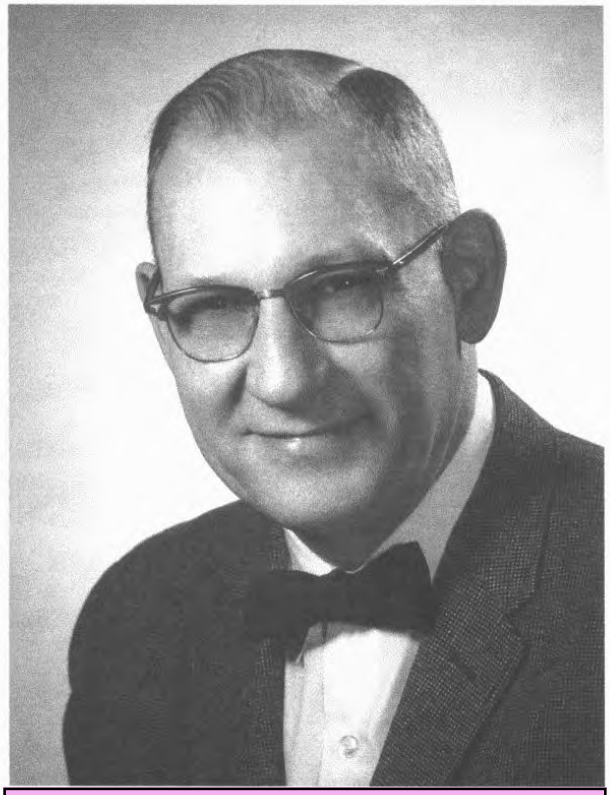
The first serious, sustained interest of the United States government in submarine telegraph cables and long distance radio occurred with the start of war in 1914. The British destruction of the German prewar global network and the corresponding imposition of censorship on British-controlled cables affected the ability of the United States to communicate freely with areas of commercial or political importance. At the same time, the ongoing development of radio and the growing number of radio stations across the Western Hemisphere built or operated by Europeans led the U.S. Navy to be concerned about the security of communications, the danger of signal interference, and violations of neutrality. In an effort to redress these problems, State Department officials assisted those companies seeking to expand their cable operations overseas. Meanwhile, Naval officers worked to construct a centralized radio network to suit the service's strategic requirements. Political and ideological problems, however, frustrated efforts to build a larger public or private network throughout the Americas.

The U.S. entry into the war raised a host of additional problems. The need for continual contact with the American Expeditionary Force in Europe in the face of a deteriorating transatlantic cable network and the danger of submarine attacks led directly to a new high power interallied radio network. The experience of censorship and the acquisition of intelligence passing via cable or radio also revealed to U.S. officials not only the tremendous value of such systems, but also the potential vulnerability of the country's diplomatic or military messages when passing over networks controlled by other countries. The tremendous growth in overseas commerce during the war also raised the demand for rapidly improved communications links with South America and Asia as well. Altogether these factors led senior Wilson Administration officials and military officers to accelerate efforts to link the country by submarine cable or long distance radio with places of political and economic importance to the United States.

Following the experience of World War I, public and private officials continued their efforts, but with mixed results. At the Paris Peace Conference, President Woodrow Wilson and Secretary of State Robert Lansing fought to ensure that the allied powers did not parcel out the former German cable network to America's further detriment. International negotiation over the cables, the fate of the former German colony of Yap, and overall communication issues continued with some success into the 1920s. U.S. companies succeeded in expanding service to South America, a key area, and developed plans for additional cables to Asia and Europe. Postwar supply problems complicated this growth, however, and a federal effort to jump-start a domestic cable manufacturing industry to support more cables failed. Aware that the expansion of a cable network centered in the United States would mean more traffic passing through American hands, State and War Department officials meanwhile continued into peacetime the traffic monitoring intelligence operation later termed the "Black Chamber." At the same time, U.S. Navy concerns over the future of radio technology and allocation of scarce wavelengths led to federal encouragement for the creation by General Electric of a new company, the Radio Corporation of America, to keep powerful new transmitters out of the hands of potential rivals such as Britain's Marconi company.

Although of limited success in the short run, the efforts of officials at that time set important diplomatic and institutional precedents for later developments in telephony, shortwave radio, satellite communications, and even the Internet in the decades that followed. The story of how the United States came to appreciate the strategic significance of communications amid the First World War is the first chapter in the larger history of how the United States created the global infrastructure—from cables to satellites to the Internet—that underlay its rise to predominance during the twentieth century.

Walter J. Zenner, 1904-2004



Walter J. Zenner

Walter J. Zenner was vice-president for R&D at Teletype Corporation until his retirement in 1964. He then co-founded Extel Corporation in 1966.

Born in Chicago in 1904, Zenner graduated from Armour Institute (now Illinois Institute of Technology) in 1928. Upon graduation, he and three fellow alumni joined Teletype Corporation.

Teletype had just achieved a marketable product and was hiring its first class of new engineers to do further development. In 1930, Western Electric purchased Teletype to supply the Bell System with teleprinters for its new TWX service. Teletype and its one-time sister company Teletypesetter were always very engineering oriented. Most of the top executives came from the engineering staff and were capable inventors as well as managers. Walt Zenner was very much one of these.

Teletype Corporation developed a world-class ability to design and mass-produce intricate machinery of high quality. This ability was especially valuable during World War II. To quote from Walt's own history: "Immediately after the Japanese attack at Pearl Harbor, Congress issued a Declaration of War and the nation shifted to a war economy. Strategic materials were listed. These could not be used with approval, which was generally called a 'priority'."

Teletype already had been supplying products to the U.S. government, but these were only a small part of its total production. When the Army Signal Corps was asked if they would need any teletypes during the war, they replied, "No. This war will be fought over the telephone." Consequently, Teletype had to find other war work. The Hudson Motor Company, which had a prime contract to make machine guns, subcontracting to Teletype the manufacture of machine gun parts.

Before factory work actually started on machine gun parts, however, the Signal Corps was back. Their first answer had been incorrect. In fact, teletypes would be needed in very large numbers. Much of the communication would be via radio which the enemy could intercept. There was no practical technology available for enciphering voice traffic, or for using the human voice for transmission of previously enciphered (garbled) traffic. Moreover, much of the traffic was data, not voice, transmissions. Data transmission required a written record at the receiving end, and so was better served by teletypes than by telephones. The Model 15 teletype became the "work horse" for military communication, vital to the movement of millions of men and women, vast quantities of munitions, hundreds of thousands of vehicles and logistical supply items, and thousands of planes to and from every corner of the world.

Teletype, like other firms, was to know some unfamiliar assignments, but its real war task was to manufacture its own communication equipment and to produce that equipment in the greatest possible quantities in the shortest possible time. The Wrightwood plant in Chicago plant went to three shifts, and the firm leased additional space and hired thousands of new employees.

During the war years, Walt Zenner often worked through the night in his home office, then left for his office at the plant when the sun came up. In addition to the standard products. Teletype received some unfamiliar orders, including cryptographic machinery such as the high-grade SIGABA (see page 10).

Walt Zenner continued to lead Teletype into the era of electronics and ASCII. After retirement he started a second career, first developing a stock ticker able to select which transactions would be printed, and then a dot-matrix teleprinter. The teleprinter, produced by the Extel Corporation, which Zenner had founded, became quite popular with news wire services until computers and satellite transmission brought an end to that kind of operation. Between the two companies and some work on his own, Walt Zenner accumulated about 120 U.S. patents.

Message Communications From Morse Code to E-Mail

Ronald R. Thomas

Message communications have a long and interesting history. Unfortunately, other forms of communications over the years have overshadowed them. They have, nevertheless, played an important role in land, sea, and air communications.

Telegraphy.

Electrical message communications began with Morse code telegraphy. It is difficult to appreciate that telegraphy took communications from the speed of a rider on a horse to the speed of light. However, telegraphy was labor intensive; skilled operators were needed to send and receive every message. In addition to the local office operators, there were telegraph operators who served as the mechanism for switching messages. An operator at a central location would receive a message over a local line from an outlying location. He or she (there were some women operators) would then retransmit it on a trunk line to an operator at another central location. That operator then would retransmit it over a local line to an operator at the final receiving location.

Usually, the faster and more experienced operators were employed on the trunk lines, and the less experienced operators worked the local lines. To speed up transmissions, operators often used abbreviations and special codes. There was always a conflict between speed and accuracy. Also, the possibility for error increased every time a message had to be retransmitted.

To further complicate matters, there were actually two Morse codes. The American Morse code was used in the United States, and the Continental Morse (also called the International Morse) code was used in Europe. While these two codes had many similarities, they also had differences. Having two codes became a problem when submarine telegraph cables were placed in service between the U.S. and Europe. In the U.S., an operator had to copy a message in International Morse code on the submarine cable, then hand it over to a different operator who retransmitted it in American Morse code on the U.S. telegraph system. Operators at the submarine cable office usually specialized in just one code. Nonetheless, a small number of operators could send and receive both codes.

Telegraphy was sometimes used for personal communications. Its primary application, however, was for business communications. The Western Union Corporation came to dominate U.S. telegraph operations, and the company played a large role in enabling business to grow and expand across the United States.

Wireless.

When Guglielmo Marconi created his system of wireless telegraphy at the turn of the 20th century, he extended electrical message communications to ships at sea. In addition to emergency communications (SOS), wireless telegraphy was used for routine administrative communications and for passengers' personal communications. Wireless telegraphy utilized the International Morse code, which further complicated the two-code issue.

Wireless operators had to contend with interference from other stations, atmospheric noise, and signal fading. These problems further taxed their abilities to maintain reliable communications. Nevertheless, wireless telegraphy on ships had a very long run. It was not until the relatively recent advent of satellite communications that those systems were finally eliminated. Wireless Morse code communications also were used in the 1930s and 1940s on aircraft during international flights.

Wireless telegraphy also made possible personal message communications. Called amateur (Ham) radio, it enabled Ham operators to exchange messages with other Hams all over the world. Unfortunately, Ham radio required learning the International Morse code and passing a test to obtain a license. Its popularity, therefore, always had been rather limited. Still, it added a new dimension to message communications.

Teleprinter.

The efficiency of the telegraph industry was limited because of its need for trained operators. There also was a physical limit to how fast even the best operator could send and receive Morse code. The answer to this speed problem came in the form of the teleprinter. The teleprinter had a typewriter-like keyboard for sending messages and a printer for receiving messages. A teleprinter allowed a skilled typist to send messages at a high rate of speed without having to know Morse code. When receiving messages, anyone could watch them being printed out. In addition, a teleprinter could create paper tapes to transmit messages at much greater speeds than anyone could type. This feature further increased the value of the teleprinter to the telegraph industry.

The teleprinter enabled the establishment of a worldwide public teleprinter network called the Telex service, an acronym for "teletypewriter exchange." The Telex was a 66.67 word-per-minute five-bit code system. Private companies could have their own teleprinter and send Telex messages to other companies across the U.S.

Message Communications From Morse Code to E-Mail
Ronald R. Thomas (continued)

and around the world. In the United States, Telex service was available from the Western Union Corporation.

Later, the Bell system offered TWX service. TWX, an acronym for "teleprinter exchange," was a 100 word-per-minute system that used an eight-bit code. It was available primarily in the United States, with some limited service to Canada and Mexico.

These services utilized systems that were fundamentally incompatible. When Western Union purchased the TWX network, it connected the TWX and Telex networks via a computer-controlled message switching system.

Computer Control.

It sounds trite, but computers really have changed everything, especially message communications. Starting in the 1970s, many organizations set up their own private, computer-controlled message switching systems for internal message communications. Often, those systems also had access to the Western Union Telex and TWX public networks. However, personnel did not have direct access to message switching systems; they had to take their messages to a central message center within their facility for transmission.

In the 1990s, the computer-controlled message switching capability of the Internet made e-mail widely available to everyone. Individuals now could send and receive e-mail messages directly from their personal computer. This was a dramatic improvement that ensured the popularity of e-mail messages. Today, e-mail is so ubiquitous that it is easy to forget the long history of message communications. Understanding how far we have come may help us to appreciate more fully the wonder of today's Internet e-mails.

Marconi Collection Saved

The University of Oxford announced on December 6, 2004, that it and the Marconi Corporation plc had reached an agreement to transfer the historic Marconi Collection to The Bodleian Library and The Museum of the History of Science, both part of the University of Oxford. Marconi agreed to gift the collection to the university where it will have a safe and secure future, thereby preserving the integrity of this unique collection. Through the generosity of the Wireless Preservation Society, a full time archivist will be appointed to catalog the collection over the next three years.

Dating from 1895, this unrivalled collection consists of Marconi artifacts, apparatus, and printed material. It includes: the early patents, such as the famous 7777 patent which in 1900 solved the problem of multi-station operation without mutual interference; the apparatus used in the first transatlantic wireless transmission of 1901; a wealth of historical documents, including telegrams sent during the Titanic disaster of 1912, whose subsequent Board of Enquiry endorsed the recommendations of Guglielmo Marconi that fundamentally improved safety at sea and saved countless lives; and items relating to the birth of broadcasting, such as the microphone used by the legendary Australian diva Dame Nellie Melba to broadcast the world's first live recital in 1920.

The Museum of the History of Science will put on permanent public display some of the over 250 artifacts from the Collection. In an adjacent building, The Bodleian Library will house the thousands of papers, letters, and other printed material going back to 1895, making them available for viewing and research access. The BAFTA award-winning website marconicalling.com, based on the Marconi Collection, also will be transferred to the university.

Oxford has begun planning a major exhibition of items from the collection scheduled for the Spring of 2006. In addition, it is expected that Oxford will work together with the Essex Record Office and the Museums Service in Chelmsford, so that a representative set of historical items from the collection will be on display at an appropriate location in the town, which was the original home of the Marconi Company from 1898.

When the Teletype became computerized . . .

Recent Books of Interest to Mercurians

John Bray. *Innovation and the Communications Revolution from the Victorian Pioneers to Broadband Internet*. London: The Institution of Electrical Engineers, 2002. Pp. xx + 313. Hardcover, $65.00.

John Bray's history of telecommunications and related matters is told from the British point of view. The author was a lead engineer for the British Post Office on the TELSTAR satellite project. Radio broadcasting, he relates, started in a "slower but better controlled" fashion in Britain than in the United States. Bray does not hesitate to include developments in the United States. He evidently worked with many AT&T engineers.

The history is distinguished from other technology histories by the attention shown to the people involved. According to Bray, early inventions often can be identified with a single person. For example, Rudolf Kompfer invented the traveling wave tube, but later inventions came from teams. Who invented mobile communications? The first person described is Alessandra Volta; the last invention discussed is video on demand. The treatment does not lend itself to deep analysis of the technology. Some of the diagrams, such as an electronic telephone switching system, hint at what is not explained. The writing is clear and succinct. Students and others will enjoy the vignettes of the people involved. A history like this one puts a context around particular inventions and shows the great sweep of advances in electronics and broadcasting.

SOURCE: *STS Newsletter,* nos. 137 & 138, Fall/Winter 2003, available on the web at: http://www.lehigh.edu/~insts/newsletters.htm

John Steele Gordon. *A Thread Across The Ocean: The Heroic Story of the Transatlantic Cable*. New York: Pocket Books, 2003. Pp. 256. Paperback, $19.95.

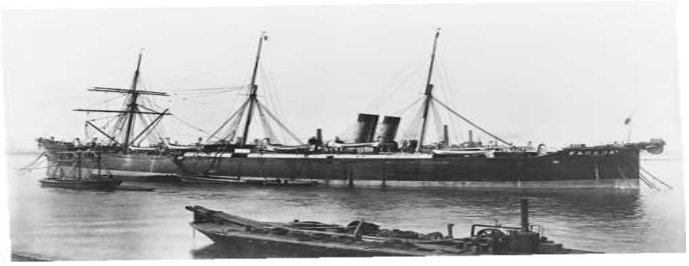
More than a half dozen attempts had to be made until a reliably functioning transatlantic submarine cable was laid down—when Andrew Johnson was President. Within a month of its completion, a second cable also was functioning. The broken cable from the last unsuccessful attempt was retrieved with grappling hooks and a new section spliced on. The entrepreneur who initiated the project and made it work was a New Yorker from a prominent family, Cyrus Field. Mr. Field's talents were in raising money and organizing big projects—the focus of the book. He depended on others for engineering advice, not all of which obviously turned out to be valid.

The first cable used thin wires, probably to reduce capacitance, but the resulting high resistance in the wire, which was not helped by impurities in the copper, smeared out the dots and dashes so badly that the initial ninety-nine word message from Queen Victoria to President Buchanan took sixteen and a half hours to transmit. The cable carrying this message failed, for unknown reasons, a few months later. The first several cables broke because the weight of the cable already in the ocean put great strain on the remaining cable as it left the ship. The final cable was designed to be less dense—a bigger volume per pound, so the load was less—and hence the buoyancy was greater. During the whole project Field's energy and impatience pushed the project along but also contributed to the failures. For example, he insisted on going ahead before the machinery was perfected, the workers experienced, and the science understood. Gordon also makes clear the significance of rapid communication.

A functioning cable meant that British troops were not sent to India from Newfoundland to quell an already finished mutiny, unlike the Battle of New Orleans, which took place two weeks after the war was over, because the relevant information did not reach commanders in time. An instructor teaching courses in Electrical, Materials, and Mechanical Engineering, as well as the Implications of Technological Change, could fruitfully build on this story. The students will enjoy it; they should also be inspired by what was accomplished.

SOURCE: Book notice courtesy of *STS Newsletter,* nos. 137 & 138, Fall/Winter 2003, available on the web at: http://www.lehigh.edu/~insts/newsletters.htm.

The *STS Newsletter* is published by Lehigh University's Science Technology and Society Program. The STS Program at Lehigh University was founded in 1972 and is one of the oldest such programs in the United States. More information on the program can be found at: http://www.lehigh.edu/~insts/insts.html.



Recent Books of Interest to Mercurians (continued)

Gillian Cookson. *The Cable: The Wire That Changed the World.* Tempus Publishing. October 2003. 224 pp. ISBN: 0752423665.

This is the compelling story of how the first transatlantic cable was laid—the people who dared, the people who lost, and the people who profited. It tells of the dramatic attempts to cross the Atlantic during the 1850s and 1860s from the first failed attempts to the project that finally succeeded. An inconceivably audacious attempt to overcome the forces of nature in the name of human progress and technology, the laying of the cable was to change forever our means of communication. The speed with which information could now be transmitted was unprecedented and revolutionized the face of news and the global economy.

An import from Britain, Cookson's account of the first transatlantic telegraph is more phlegmatic, and perhaps less dramatized, than historian John Steele Gordon's *A Thread across the Ocean*. Whenever the cable laying goes awry, Cookson notes the fact, whereas Gordon shades the event with the heave of the ship or the snap of the parting cable. But in its quiet manner, Cookson's effort is just as appealing a saga. Assigning credit for the ultimate success in 1866 is one of her narrative's organizing principles; another is the financing of the endeavor. A chance encounter in a New York hotel lobby set it in motion in 1854, when a Newfoundlander telegraph engineer (Frederic Gisborne) was put in touch with a rich paper manufacturer (Cyrus Field) seeking a new world to conquer. Field persuaded fellow financiers to put up the cash, but they ran out of money by 1858 and yielded the project to British interests—though Field was an ever-present proselytizer. Handsome illustrations add value to Cookson's exposition on a popular topic.

Paul Starr. *The Creation of the Media: The Political Origins of Modern Communication*. Basic Books. March 2004. 496pp. ISBN: 0465081932.

In this sweeping history, Paul Starr shows how politics created our media world, from the emergence of the first newspapers and postal systems in early modern Europe and colonial America to the rise of the mass press, telecommunications, motion pictures, and broadcasting in the twentieth century. Critical choices about freedom of expression, ownership of media, the architecture of networks, secrecy, privacy, and intellectual property have made the modern media as much a political as a technological invention.

The American Revolution, Starr argues, set the United States off on a path of development in communications that diverged sharply from patterns in Europe. By the early nineteenth century, when the United States was neither a world power nor a primary center of scientific discovery, it was already a leader in postal service, newspapers, and popular journalism, then in development of telegraph and telephone networks, later in the whole repertoire of mass media and entertainment. The rise of the media has become the story of an American ascendancy—and an American dilemma. The framework of communications established in the United States has proved to be a source of economic growth, cultural influence, and even military advantage for the country. But the media have also become a constellation of power in their own right, upsetting the classical vision of the role of the press in a democracy. The *Creation of the Media* not only presents the media in a new way; it also puts American politics into a new perspective.

Paul Starr is Professor of Sociology at Princeton University and co-editor of *The American Prospect*. His book, *The Social Transformation of American Medicine*, won the 1984 Pulitzer Prize for general nonfiction and Bancroft Prize in American History. He lives in Princeton, New Jersey.

Chrisanthi Avgerou, Claudio Ciborra, and Frank Land. *The Social Study of Information and Communication Technology: Innovation, Actors, and Contexts*. Oxford University Press. September 2004. 290 pp. ISBN: 0199253528.

This book is a useful text for advanced students of information and communication technology (ICT) courses and for those studying ICT in related areas: Management and Organization Studies, Cultural Studies, and Technology and Innovation. As information and communication technologies permeate every sphere of society—business, education, leisure, government, etc.—it is important to reflect the character and complexity of the interaction between people and computer, between society and technology. For example, the user may represent a much broader set of actors than 'the user' conventionally found in many texts: the operator, the customer, the citizen, the gendered individual, the entrepreneur, the 'poor', the student. Each actor uses information and communication technology in different ways. This book examines these issues, deploying a number of methods such as Actor Network Theory, Socio-Technical Systems, and phenomenological approaches. Management concerns about strategy and productivity are covered together with issues of

Recent Books of Interest to Mercurians (continued)

power, politics, and globalization. Topics range from long-standing themes in the study of information technology in organizations, such as implementation, strategy, and evaluation, to general analysis of information technology as socio-economic change. A distinguished group of contributors—including Bruno Latour, Saskia Sassen, Robert Galliers, Frank Land, Ian Angel, and Richard Boland—offer the reader a rich set of perspectives and ideas on the relationship between information and communication technology and society, organizational knowledge, and innovation.

David Christopher Arnold. *Spying from Space: Constructing America's Satellite Command and Control Systems.* 232 pp. 25 b&w photos. Bib. Index. Texas A&M University Press. February 2005. ISBN: 1585443859.

On August 14, 1960, a revolution quietly occurred in the reconnaissance capabilities of America. When the Air Force C-119 Flying Boxcar Pelican 9 caught a bucket returning from space with film from a satellite, the American intelligence community gained access to previously denied information about the Soviet Union. The Corona reconnaissance satellite missions that followed lifted the veil of secrecy from the communist bloc, revealing, among other things, that no "Missile Gap" existed.

This revolution in military intelligence could not have occurred without the development of the command and control systems that made the Space Race possible. In *Spying from Space*, David Arnold tells the story of how military officers and civilian contractors built the Air Force Satellite Control Facility (AFSCF) to support the National Reconnaissance Program. The AFSCF also had a unique relationship with the National Reconnaissance Office, a secret organization that the U.S. government officially concealed as late as the 1990s. Like every large technological system, the AFSCF evolved as a result of the interaction of human beings with technology and with each other.

Spying from Space fills a gap in space history by telling the story of the command and control systems that made rockets and satellites useful. Those interested in space flight or intelligence efforts will benefit from this revealing look into a little-known aspect of American achievement. Those fascinated by how large, complex organizations work also will find this an intriguing study of inter-service rivalries and clashes between military and civilian cultures.

Gavin Weightman. *Signor Marconi's Black Box.* Da Capo Press. 2003. 312 pp., index, illus. ISBN: 0-306-81275-4.

Weightman's extremely readable biography of Marconi is also a suspenseful tale of the efforts and reverses in the race to span the north Atlantic with a radio signal. One of the aspects of Marconi as an inventor that the book does a good job of bringing out was that he pushed the bounds of what the technology of the time was capable of. The structural problems of erecting eighty-foot (or higher) antenna masts on windswept and exposed coastlines were daunting, and there were repeated collapses. The storage batteries for his transmitting stations were the height of four or five storey buildings. The reader gets a sense of how risky such a technological venture was from a financial as well as an engineering point of view.

Weightman does an excellent job explaining the technology itself, and he adds interest to the book by devoting much space to Marconi's legitimate rival inventors such as Reginald Fessenden, as well as the outright charlatanism and financial swindles of the DeForest Wireless Telegraphy Company (whose misleading of investors provides a cautionary tale for understanding current high-tech stock market practices). The book tends to be favorable to Marconi, skating lightly over his personal peccadilloes, and it is a colorful and lively view of his life, and of the political and cultural events of the times.

Readers interested in technology, in early twentieth century history, or in Marconi will find *Signor Marconi's Magic Box* a fascinating visit to Edwardian England, as well as a story of engineering triumph.

Margot Fuchs. *Georg von Arco (1869-1940): Ingenieur, Pazifist, Technischer Direktor von Telefunken: Eine Erfinder-biographie*. Verlag für Geschichte der Naturwissenschaften und der Technik. 2004. 349 pp. Illus. ISBN: 3-928186-70-1.

This is sorely needed biography (in German) of Georg von Arco by Margot Fuchs, who works in the historical archives of the Munich Technical University. Von Arco, a Catholic with Jewish parents on his mother's side, worked as an engineer in the Kriegswirtschaft despite being a pacifist, and was once director of the Telefunken company.

Karl-Heinz Spieß, editor

Medien der Kommunikation im Mittelalter

Karl-Heinz Spieß, ed. Medien der Kommunikation im Mittelalter. Beitraege zur Kommunikationsgeschichte. Stuttgart: Franz Steiner Verlag, 2003. 323 pp., illustrations, bibliography. € 62.00 (cloth), ISBN 3-515-08034-1.

Reviewed by Andrew D. Ganaway, German Department, University of Wisconsin. Published by H-German (October, 2004).

Medien der Kommunikation im Mittelalter, edited by Karl-Heinz Spieß, is a collection of essays from the editors of the Mittelalterzentrum at the University of Greifswald, who organized the lecture series "Medien der Kommunikation im Mittelalter" in the winter semester 2000-2001 as an interdisciplinary effort on the form and function of communication past and present. The series, of which this work is volume 15, previously addressed only early modern and modern topics. This is the first volume to consider the medieval period. As the preface mentions, a great deal of new research has been done in recent years on expanding the discourse on communication history in relation to the Middle Ages. The work includes the disciplines of history, art history, archeology, as well as German and Romance literature studies. It also covers forms such as the body, objects of daily life, letters, pictures, coats of arms, theater and fliers. The definition of the concept of communication is not entirely clear, and each author in this work has, at least to some extent, a different take on its uses. Communication has become an almost universal category in this sense without any clearly defined constraints. I am left with the impression that the editors believe communication, as a category, deserves a place beside class, gender, and the nation in determining how we make sense of the world. This theory suggests that one can reconstruct a sense of meaningful communication via a particular means of media that greatly improves our understanding of the past.

Although this field is potentially vast, Volker Depkat in the first essay provides an excellent discussion of terminology and its relation to the concept of historical communication and historical media. His essay establishes a basis for further research into these areas. Media history is the history of the technological means by which messages are passed. Communication history is the history of social communication in which media history plays a major role. He is particularly focused on the works of Habermas and Luhmann, giving clear summaries of their positions as well as being critical of their limitations. The essay takes the view of Habermas, who understands communication as a means of acting and behaving in the world. For Habermas, a theory of communication would be that truth is not absolute for all societies at all times; it is constantly renegotiated. Communication is centered on success in that it aims for mutual understanding. Truth in communication is an assumption that individuals make in order to allow communication to function. The second part of his essay addresses communication in respect to particular use in medieval studies. Finally, he provides a brief discussion of the methodological problems of this type of study. The work is rewarding to read more than once and provides an excellent guide and orientation for the rest of the volume.

Christina Gransel's essay forms a nice complement to the earlier essay. In addition to addressing technical developments in mass media in modern history, it covers communication history as well as media concepts, the arrangement of categories, models of development, and the evolution of terminology. The essays on advice-giving (by Doris Ruhe) and letters (by Jürgen Herold) focus on the traditional written text. Doris Ruhe's essay, which applies communication history to Old French courtly texts, is particularly interesting, because it provides a social historical context in which the literature is analyzed. Essays by Hedwig Röckelein, Ulrich Müller, Ludwig Biewer, Klaus Krüger, Robert Fajen, and Nikolaus Henkel also focus on other forms of communication, covering a variety of topics with many examples and illustration. For example, Röckelein considers the transfer of saintly relics, Müller brings in the use of archaeological evidence to aid the concept of communication history in explaining economic cultural ties, and Krüger considers the applicability of linguistically understood communication to the meaningfulness of graphic representations, the attempt to represent "speaking" in a visual form. Biewer's effort to assert the existence of a symbolic communication system in coats of arms of central European nobility does not seem to achieve the aim of this volume of applying communication history to medieval studies, because he does not prove that there is meaningful communication along a broad enough field, supposing too much assumption of truth by the participants, and because he does not demonstrate that this can be evaluated at the same level as painting or writing. Robert Fajen shows clearly in his essay how certain contents of a medium of communication can shift into another medium by showing the same motifs used in the romance *Le livre du Chevalier errant* (1395-96) by Thomas III and Markgraf von Saluzzo, and some years later in a fresco cycle in a family castle.

Karl-Heinz Spieß, editor *Medien der Kommunikation im Mittelalter* (continued)

All of these essays provide detailed studies into different communication media. The final essay (by Falk Eisermann) addresses the development of the printing press and the great revolution in communication via the use of fliers in a political context, marking a traditional boundary of medieval studies. The volume shows that medievalists are grappling with major theoretical issues and provides a valuable resource of data in well-written essays. The topic seems, perhaps, too focused and would benefit from a broader theoretical base by also considering historical theories of post-colonialism or the more recent criticism of post-colonialism in trans-nationalism. Still, this work makes an excellent introduction for students or scholars wishing to explore the idea of communication history relevant to medieval studies. It also offers a starting point for scholars to expand their perspective on their own medieval research via the concept of communication. The authors have demonstrated how the use of communication history can take already thoroughly discussed areas of medieval studies and shed new light on how we might approach and understand particular topics. I would recommend this book to scholars wishing to understand the current state of medieval studies in Germany or to teachers trying to offer students an

SIGABA cryptographic machinery

David Sarnoff Updates

WEBSITE UPDATE.

The David Sarnoff Library website has been updated with a revised bibliography and new online texts, including:

1. Ken Kilbon's manuscript on the history of research at RCA, 1919-1964;
2. Ed Herold's memoir of life as an engineer and research director at RCA (apologies for misdirected internal links), including his leadership of the shadow-mask CRT development project and RCA's initial transistor developments;
3. A brief memoir of color television by the chief engineer of CBS's television factory in the early 1950s;
4. Loren Jones's letters from Moscow during RCA's installation of Stalin's TV system in the 1930s; and
5. B. J. Thompson's diary of research management at the RCA Radiotron factory in Harrison, NJ, in the mid-1930s.

The website also features the world's oldest LCD watch, not ticking but still in operation 32 years later.

The website for the David Sarnoff Library is: www.davidsarnoff.org

SYNTHESIZER ANNIVERSARY MARKED.

"Any Sound You Can Imagine: The Fiftieth Anniversary of RCA's Electronic Music Synthesizer," took placed on April 14 in the Sarnoff Corporation's Auditorium. An evening devoted to the invention and sounds of the world's first electronic music synthesizer using binary sequencing—the technique used in synthesizers today—the event featured Princeton University Professor Emeritus Milton Babbitt, who discussed his experiences working with RCA's staff in composing and recording music on the synthesizer. Throughout the evening, recordings of music composed on and for the synthesizer by Professor Babbitt and members of the RCA Labs were played. Alexander Magoun, executive director of the David Sarnoff Library, illustrated the background to RCA's musical invention, and Radcliffe Fellow Rebecca Mercuri explained its operation.

RCA chairman David Sarnoff announced the Mark I on January 31, 1955. Designed and built at RCA's Laboratories in Princeton, the Mark I was intended to reduce costs for recording mood, lounge, and soundtrack music. The Mark II featured magnetic tape recording and was intended for the world's largest record manufacturer, RCA Victor. When RCA Victor balked, the company donated the three-ton instrument to the Electronic Music Center of Columbia and Princeton Universities in 1959. Princeton University professor Milton Babbitt, Charles Wuorinen, and other serial composers used the Mark II not for the production of pop music, but to realize their theories of modern composition.

David Sarnoff Updates (continued)

THEREMINIST KIP ROSSER.

In 1930, Americans had to have a theremin—or so David Sarnoff and RCA hoped. On April 23, this "hands-off" electronic musical instrument was featured at the David Sarnoff Library, where visitors had an opportunity to learn and hear more about the amazing theremin.

Imagine a person standing in front of a simple wooden box, plugged into the wall. Then, using only a series of hand movements in the empty air, he or she begins to fill the room with music. It sounds like a violin—or is it a cello? Or is it a woman singing? The sight of this method of creating music is just as bizarre and magical as it was in the fall of 1929, when the RCA Victor Company in Camden rolled out the commercial version of Leon Theremin's curious device. Kip Rosser, returning from acclaimed performances in New York City, played throughout the day in the Library and spoke and performed in the Auditorium.

With his formal training in theater, Rosser's appearances turn into wonderful combinations of genre-hopping music (from classical to jazz to pop and back again), stories, performance art, and audience participation. At the Library, Rosser played on one of Robert Moog's limited-edition, 50th anniversary digital theremins. "Everyone says the theremin is incredibly difficult to play," said Rosser. "Well, so's the violin. If you have an ear and you practice, you will improve."

Telegraphic Message Practice
John McVey

Some resource pages on telegraphic message codes and message practice, 1870-1945, can be found at: http://www.jmcvey.net/cable/index.htm.

Emphasis in these resources lies in the uses and users of telegraphy, centering on telegraphic code dictionaries. The resources include (1) a somewhat dated introduction to my research interests and the topic generally; (2) extracts of code and phrase combinations from a few codes; (3) specimen pages from some 20 codes, both general and specialized; and (4) a guide to other resources. Those resources include extracts from articles and monographs about telegraph codes, lists of codes, transcriptions, and telegrams. Some biographical data encountered accidentally on such figures as Edward Barron Broomhall (1848-1929), William Friedman (1891-1969), and Donald Murray (1866-1945) are found there as well. I hope to augment these resources with others dealing with the literature on the codes or with thesauri and classification.

SHOT Meeting Information

This year SHOT is meeting in Minneapolis in conjunction with the annual meeting of the History of Science Society from November 3 to 6., instead of in October. As usual, however, the annual meeting of the Mercurians will take place in conjunction with the annual SHOT meeting. Unless there is a change of circumstances, the Mercurians meeting will take place during the breakfast timeslot on Saturday, November 5. See you there!

Antenna is published for the Mercurians, a Special Interest Group of the Society for the History of Technology. Two-year subscriptions are US$5 for delivery in the United States and US$10 elsewhere. Single issues are $1.50 per copy. Please make all checks out to SHOT in US dollars, write Mercurians on the memo line, and mail to Andrew Butrica at the address below.

Antenna
P.O. Box 534
College Park, MD 20741-0534