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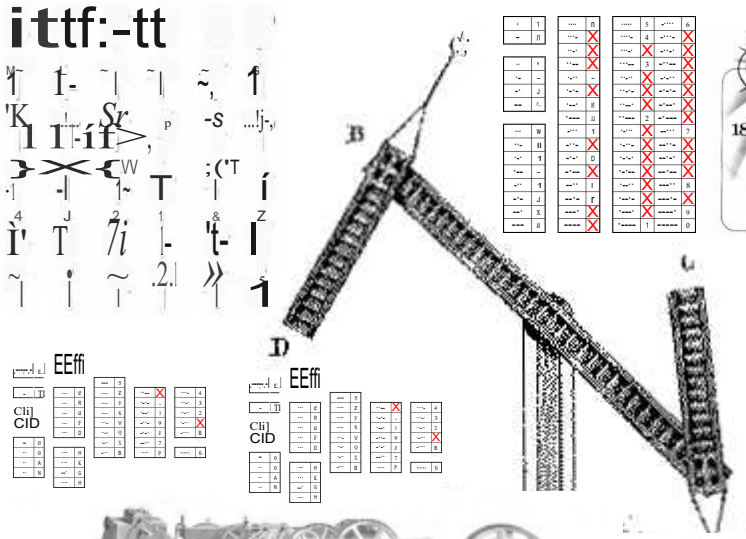
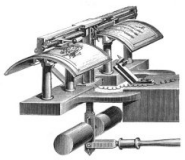
IN THIS ISSUE





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YOU CAN FAX ME

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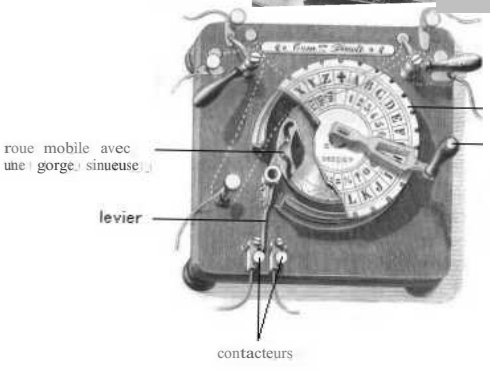
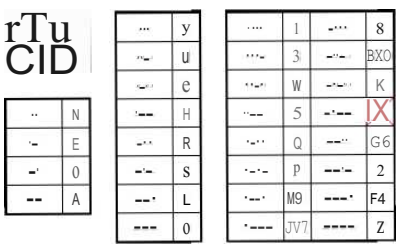




News About Mercurians

Fellow Mercurian Robert H. Claxton, Professor Emeritus of History, State University of West Georgia, has completed a 307-page book manuscript on the history of radio in Argentina, which he has titled "From 'Parsifal' to Peron: The Origins of Radio Broadcasting in Latin America." "Parsifal," the title of Wagner's final opera, was the first program broadcast in Argentina in August 1920. Prof. Claxton is looking for a publisher.

Claxton's is one of the few book-length studies in any language of the early history (1920-1944) of radio in that region. Topics included are: early methods to popularize radio, Argentine amateurs and the contributions of their technology toward improving receivers, Argentine manufacture of radio equipment, micro-histories of pre-World War II stations in both the Buenos Aires and the provinces, Argentine experience with non-commercial radio, radio and Argentine nationhood (a builder of internal unity, international radio agreements, and internal regulations), and the influence of radio on Argentine society (the confluence of swings toward democracy in Latin America and media innovations, how radio instilled ideas about social democracy, and ways radio provided new economic opportunities.) The study ends with a bibliographic survey of early radio elsewhere South of the border.

New Mercurians

We now have ten student subscribers. The newest ones joined during the Atlanta meeting. Their names, schools, and research interests are:

Robert Buerrglener, University of Chicago
tourism; transportation and communication

Allison Marsh, Johns Hopkins University
industrial tourism

Laura A. Pokalsky, Georgia Tech
security and surveillance technologies and privacy issues

Andrew Russell, Johns Hopkins University
political and cultural aspects of standards and standardization, especially communication standards

Heike Weber, Munich Center for the History of Science and Technology, Deutsches Museum, Munich
currently at the National Museum of American History, Washington, DC, working on consumer electronics

In addition, Prof. **Julie Wosk**, in the Department of Humanities, SUNY Maritime College, Ft. Schuyler, the Bronx, joined the Mercurians at the Atlanta meeting.

Welcome all to the Mercurians!

Dissertation Abstract

Jay Olugbenga Oguntuwase, "The Role of Media in Nation Building Processes and the Peculiarity of the Nigerian Nation State." Department of Philosophy, University of Lagos, Akoka, Lagos, Nigeria.
E-mail: jaytuwase@yahoo.com.

The role of communication in Africa has a direct relationship with the level of development. This thesis will not only examine the role of media in nation-building in general, but also will consider the peculiarities of Nigerian society that derived directly from the social, political, economic, religious, cultural, and historical antecedents that gave birth to the "geographical expression" now called Nigeria, as well as how the media have impacted the nation's societal growth and development positively and negatively over the years. The thesis also will do an exhaustive sojourn into the whole gamut of communication and philosophy of communication vis-à-vis the roll of the media in nation building and societal development. This research will not only be descriptive but projectively prescriptive.

This thesis cannot emphasize too greatly the statutory role of the media as the fourth realm of the state as political watch-dog of the rulers and as mediators in societal conflict management and resolution. The media also perform social and educational functions and provide entertainment and information, as well as defend human rights and facilitate democratic ideals, justice, and fair-play in governance.

The thesis will situate the development of mass media and their changing roles within different historical epochs of Nigerian history. During the colonial period, the role of mass media was essentially in support of nationalism and emancipation. After independence, their role became that of national unity and consolidation, and later towards the collapse of the first republic, the media became instruments of propaganda and political manipulation. This changing pattern continued to the present day with newly emerging roles and characteristics. This thesis will trace these developments and the factors responsible for them with a view to understanding not just the Nigerian situation, but that of Africa and other third world countries with similar histories and development.

This thesis should provide some insight into the general pattern of the role of the media in nation-building and the problems often associated with it in Africa and third world countries in general. It also will provide greater appreciation of how media in modern societies can help to facilitate nation-building and societal developmental processes.

Encyclopedia of Military Communications History Seeks Authors

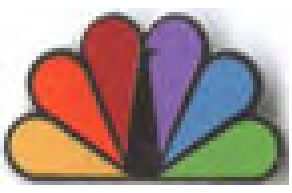
In preparation for publication in three years, this new one-volume work will cover ground, naval, and air communications on both the tactical and strategic levels. Christopher H. Sterling of George Washington University will edit the volume with the valuable help of an advisory board of military and civilian authorities. The text will contain some 300 entries ranging over all of military history. Sterling is now seeking interested authors to write entries. For further information, including a listing of available entries, please see:
http://www.chrissterling.com/proj-ilencyc.html
Christopher Sterling can be reached directly at: chriss@gwu.edu

Sterling just completed the three-volume *Encyclopedia of Radio* published by Fitzroy Dearborn in 2004. The work won an American Library Association RUSA (Reference and User Services Association) award.

History of NBC

Michele Hilmes, author and editor of several volumes on broadcasting history, University of Wisconsin professor of media and cultural studies, and Director of the Wisconsin Center for Film and Theater Research in Madison, has begun assembling a volume on the history of the National Broadcasting Company (NBC) that will examine aspects of its history from the earliest pre-network days to the present time.

One of the very first true broadcasting networks, NBC, with its two linked chains—Red and Blue—virtually invented the commercial network system, dominated the development of early television, and continued even to the present multichannel age to play a leading role in television programming and practice. It also is the only U.S. network whose history has been preserved in depth, with collections of papers, scripts, and recordings available to scholars both at the Library of Congress and at the Wisconsin Historical Society in Madison.



Davidsarnoff.org Updated

If you have not looked recently, please visit www.davidsarnoff.org, which has expanded image galleries and two substantial on-line texts: a history of the Victor Talking Machine Company and Vladimir Zworykin's memoir. More texts are to come on-line shortly, thanks to the work of several volunteers. We welcome submissions of unpublished writings that will help students and scholars understand the operation of RCA. Currently the site receives over 11,000 page requests a month.

Alex Magoun's *David Sarnoff Research Center*

Alexander B. Magoun, *David Sarnoff Research Center: RCA Labs to Sarnoff Corporation*, Arcadia Publishing, 2003.

This publication is a delightful pictorial history of the heart of the Radio Corporation of America (RCA): its laboratories in Princeton, N.J. The book chronicles the construction and development of the labs from 1941 to 2002.

It contains more than 200 vintage photographs of some of the exceptional engineers and their accomplishments including, for instance, James Hillier, Harry Olson, Jan Rajchman, and George Heilmeier. Each photograph is accompanied by a short and concise description of the individual or technology.

Magoun begins each of five chapters with introductory paragraphs describing the changing context for innovations covered in that time. The book also shows the social life of the lab, including company picnics, bowling leagues, and canoeing.

The David Sarnoff Library is home to over 25,000 photographs. Magoun has selected the best to illustrate his book. Each is a complementary image of some of the innovations from the labs, including color television, transistors, digital memory, LCDs, medical electronics, and digital video.

Alex Magoun is the executive director of the David Sarnoff Library, and a long-time member of the Mercurians.

The book is available from Aracdia Publishing, www.arcadiapublishing.com, for $19.99.

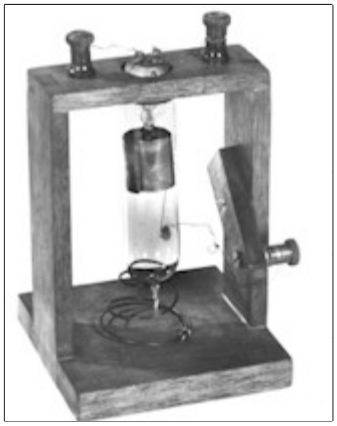
If you would like to know where the NBC logo comes from, visit this URL:
http://www.nbc17.com/nbc17/1333030/detail.html

New IEEE Milestones

Fleming Valve

The Fleming valve was dedicated as a new IEEE milestone by the UKRI Section on 1 July 2004.

John Ambrose Fleming, a British scientist and professor at University College in London, is credited with what may be one of the most important developments in the history of electronics. Following his work as a consultant for the Edison Electric Light Company from 1881-1891, Fleming became a scientific consultant to the Marconi Wireless Telegraph Company in 1899.



Fleming Valve

Fleming knew about—and had himself investigated—the Edison Effect, which had been discovered in 1883. Shortly after his groundbreaking work with the incandescent lamp, Thomas Edison was conducting an informal experiment with his innovation. When he introduced an extra electrode into the bulb, he realized that, even though the electrode was not part of the bulb's circuit, it could carry a current when it was of a positive potential relative to the filament. This so-called Edison Effect was later interpreted to be a flow of electrons from the hot filament to the extra electrode.

Fleming used this phenomenon to rectify a weak wireless signal. The oscillations of a wireless signal are too rapid to cause a galvanometer needle to move, but if only the tiny current flows in one direction are sent to the galvanometer, it will show a signal. During one of his experiments, Fleming wired an old vacuum tube into a radio receiving circuit, and was able to achieve this effect. On 16 November 1904 Fleming applied for a patent for what he originally named an oscillation valve, and what later became known as the Fleming diode.

While it had an immediate practical use in its ability to detect messages sent by Morse code, the Fleming valve later was more important as a precursor to a new tube. After reading Fleming's 1905 paper on his oscillation valve, American engineer Lee de Forest in 1906 created a three-element tube, which, it turned out, could function as an amplifier and oscillator as well as detector. Thus, through its initial and future applications, the Fleming valve laid the foundation for the field of electronics.

Telstar

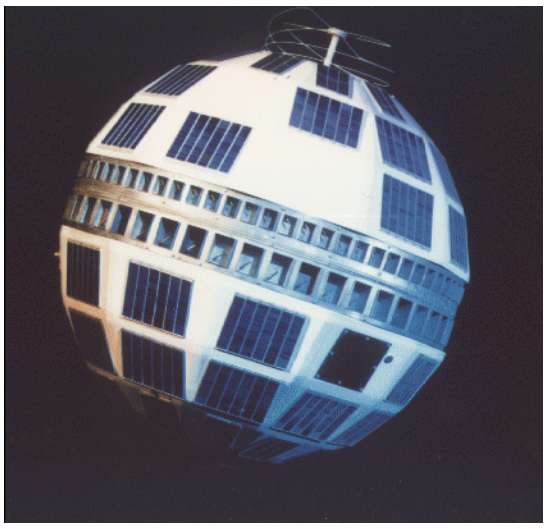
"Three Countries on Two Continents Celebrate One Major IEEE Milestone," by Erica Vonderheid, Assistant Editor, *The Institute.*
From *The Institute*, vol. 26, no. 9 (September 2002): 3.

Before 1962, the only way to broadcast European television programs in the United States was to save it on magnetic tape and send it across the Atlantic by airplane courier. But the launch of the Telstar satellite changed that and brought engineers in the United States, the United Kingdom and France closer together.

The IEEE History Center celebrated this with three Milestones in Electrical Engineering and Computing dedications at Andover, Maine, USA; Goonhilly Downs, Cornwall, UK; and Pleumeur-Bodou, France.

"Telstar made us citizens of the world in a way we had not been before," said 2002 IEEE President Ray Findlay at the Goonhilly Downs dedication ceremony on 11 July 2002, 40 years after the first broadcast.

The satellite was launched from Cape Canaveral (now the Kennedy Space Center), Florida, USA, on 10 July 1962. The next day, viewers in Europe watched an image broadcast from Andover of an American flag waving. Then, similar images were transmitted from France and England to the United States. This broadcast was the result of an agreement among American Telephone and Telegraph (AT&T), Bell Telephone laboratories, NASA, the British Post Office, and the French National PPT (Post Office).



Telstar Satellite

"Telstar did more than bring live television to people around the world," said Joel Snyder, 2001 IEEE president at the Andover dedication. "It also made worldwide telephone service possible and paved the way for communication industries including cable television and international electronic data transfer."

The French Roots of the Fax

Jonathan Coopersmith

In 1994 the French edition of Jules Verne's *Paris in the Twentieth Century* was published to great acclaim. Written in 1863 but not discovered until 1989, the manuscript depicted the Paris of 1960 including fax machines that enabled businesses to operate over vast distances. Verne did not concoct the idea of a fax machine out of thin air, but credited "Professor Giovanni Caselli of Florence" with the invention.[1] When Verne, always attuned to current technological developments, was writing, the Abbé Giovanni Caselli not only had transmitted facsimile images from Paris to Lyon but had created the first fax machine to actually enter regular service.

Caselli was only one of several experimenters with facsimile during the 1860s, but he was the most successful and famous. The French interest in transmitting images faded by the early 1870s, replaced by a greater interest in automatic printing telegraphy. This brief state promotion was the highwater mark of fax telegraphy; not until the early 1900s would facsimile again reach the level of commercial operations. The French advancement of facsimile was not an aberration, a meander down a technological dead-end, but an attempt, using the most modern technology by people operating within the mainstream of telegraphy, to improve the speed and reliability of telegram transmission. The failure of fax can be represented better as the success of other technologies in meeting the criteria set by the French telegraph authorities.

Giovanni Caselli (1815-1871?) entered a religious order in 1836, but his unsuccessful participation in a political movement for Italian unification caused him to switch to scientific research and teaching physics in Florence. Like many others, he dabbled in telegraphy and in 1856 built his pantelegraph (or "all-telegraph," a universal telegraph that could transmit anything).

His need for financial and technical support, a problem even more demanding in the 19th than the 20th century because of the lack of dedicated venture capital institutions, prompted a move in 1856 to Paris, which vied with London as the world's most hospitable city for electrotechnology. It was a wise move, for Caselli found a welcoming and supportive environment to turn his idea and early experiments into commercial reality.

Apparently via the physicist J. B. L. Foucault, Caselli met Paul Gustave Froment (1815-1865), whose workshop produced some of the most precise and impressive electrical equipment of that era. Caselli's idea and design benefited from Froment's expertise and painstaking mechanical construction, starting with his creation of a working model of Caselli's pantelegraph in 1858 and extending to a visit by Emperor Napoleon III to Froment's workshop on January 10, 1860.[2]

Napoleon III watched Caselli transmit a drawing of the emperor between two machines on a local circuit. Meant to attract royal attention, the demonstration succeeded admirably. Intrigued, the emperor provided the authority for a January 22 140-kilometer transmission from Paris to Amiens, which included a score by Rossini along with a note from the composer. This demonstration also succeeded, prompting Napoleon III to state that the "Pantelegraph did great honor to Italy, and was a discovery of which France herself might be proud."[3] Caselli had found, if not a patron, an interested advocate in the Emperor of France.

Certainly, Caselli's politically adroit transmission of a likeness of the empress did not hurt his cause, even though "the picture was considerably interrupted by messages traveling the same course, and had dots and dashes all over it, but was nevertheless recognizable."[4]

As important as the emperor's interest was, the French telegraph authority was particularly active in exploring the possibilities of pantelegraphy in the 1860s to transmit messages faster. Furthermore, fax's replication of the original message attracted official interest because it produced a written record and did not require training operators to learn International Morse code. Ultimately, these attributes of faster speed, easier operator training, and a written record would triumph—but for automatic printing telegraphy in the 1870s.[5]

In 1863, the government established a commission to experiment with Caselli's pantelegraph. Following successful transmissions from Paris to Lyon and to Marseilles, the state council announced on April 24, 1864 that the French telegraph agency would provide pantelegraph service between Paris and Lyon. On April 16, 1865, service officially began between Paris and Lyon with service between Paris and Havre added two weeks later.[6]

Strikingly beautiful in appearance, the Caselli apparatus was very complex and demanded careful tuning.[7] Caselli overcame the challenges of power and synchronization by employing two pendulums. He suspended a two-meter pendulum from a large iron frame with a 16-lb iron bob. Two electromagnets on opposite sides of the frame regulated the bob's motion. A second half-meter pendulum controlled the local battery which activated the electromagnets.

Instead of a cylinder or flat plate, Caselli used two curved metal tablets, so the machine could transmit and receive simultaneously if desired by taking advantage of the time when the transmitting stylus was off the tablet for half a pendulum oscillation. The two tablets also balanced each other. The large pendulum moved a lever which in turn moved a tablet across a stationary stylus.

The French Roots of the Fax (continued)

Each revolution also turned a screw, so that the tablet moved in two dimensions under the stylus. While the stylus touched the surface of the metallic paper, the main battery was shunted; when the insulated writing broke the contact, current passed to the receiver. The receiving operator maintained synchronization by watching a vertical line at the edge of the paper. If the line was not straight, the apparatus was not synchronized, and the operator adjusted the pendulum swing accordingly.

Unlike earlier systems, the sender could use ordinary ink but still needed tin-coated "silver paper." The clips that kept the paper flat on the tablet maintained a circuit. The receiver used an iron—later platinum—stylus on paper dampened with a potassium ferricyanide solution to produce blue marks. A regular Morse set was easily accommodated to the Caseilli equipment so the operators could communicate with each other.[8] The American engineer Frank Pope noted that "Fine close handwriting, such as you would put on a postal card, was transmitted with reasonable rapidity and with very great perfection."[9]

A standard message sheet was 111 millimeters (4.4 in.) long and 27 millimeters wide (1.1 in.), adequate for 25-30 words. Since the stylus moved at 1 revolution per second and the spacing was 1/4 mm, a message required 1 minute and 48 seconds under optimum conditions, which rarely occurred. Using smaller messages with finer writing, operators achieved a peak performance of 60 messages in one hour between Paris and Lyons, but 20-25 messages per hour proved more realistic.

Apparently, the French telegraph authority selected the Paris-Lyons route because they assumed the large number of financial transactions between the two cities would benefit from handwritten messages and signatures to ensure authenticity. The premise proved both correct and erroneous. According to an 1867 report, 4853 of 4860 Caselli transmissions between Lyons and Paris in 1866 involved finance or business. Most users, however, continued to send ciphered messages over the conventional telegraph.[10] Imagery was not essential.

More practical problems doomed this experiment in facsimile, especially illegible messages and high cost. Caselli's "greasy kind of ink" and poor synchronization often led to illegible dispatches, which might be retransmitted but rarely refunded. Writers had to carefully compose their messages, avoiding spotting or crinkling the foil paper. Errors might be removed by lightly scraping the ink off and then dusting with a feather.[11]

Despite the electromagnetically controlled pendulums, obtaining and maintaining synchronization remained a serious problem. Contemporary and later observers like Thomas Edison and William Sawyer considered the pendulums "not practical enough" and the system's "great defect."[12] Unless perfectly synchronized, the faxed messages often arrived blurred, sometimes to the point of illegibility.[13]

More importantly, faxing cost far more than regular telegraphy. The French telegraph administration charged, quite reasonably, by the square centimeter, not the word. At 20 centimes per square centimeter, a message cost at least 6 francs plus another 6 to 24 francs for the metallic sheet, depending on size. In contrast, a regular telegram cost as little as two francs.[14]

Caselli was not the first or last to develop and try to commercialize facsimile in France. In 1858, at the newspaper *Moniteur*, Lucy Fossarieu demonstrated a pen to mark the receiver's plain paper. The system was comparatively crude with a crank-and-cog system providing power and synchronization. This impractical mechanism to provide movement was probably why the machine faded from sight.[15]

Impracticality also characterized Gaetano Bonelli's typo-telegraph.[16] To speed transmission and minimize the synchronization problem, the inventor, the Director-General of Sardinian Telegraphs in the mid-1850s, deployed a comb with several teeth instead of a single stylus. Poor synchronization would only expand or compress the letters, not distort them.

The insurmountable economic problem was that each tooth needed its own circuit. His ultimate version had five teeth and required five separate circuits, although a short message of 20-25 words took only 15-20 seconds to transmit. Bonelli also employed type, which was put on a little car and rolled on rails past the comb, creating a more three-dimensional contrast for the styli, but increased the time and effort needed to prepare the message.[17]

In 1867, Jean J. E. Lenoir, the inventor of one of the first practical internal combustion engines, patented and built a fax machine with a simplicity of design that contrasted markedly with Caselli's. Synchronization depended on two conical pendulums, a flywheel at the receiver, and a relay that needed the combined current of the main batteries at both ends. This arrangement left the synchronization overly dependent on the quality of the telegraph line and the resultant transmission.[18] Guyot d'Arlincourt's fax machine employed a different approach—tuning forks—to synchronize the sender and receiver.[19]

Most importantly, telegraph administration employee Bernard Meyer (1830-1884) created "one of the most ingenious and effective" solutions. Instead of

The French Roots of the Fax (continued)

Caselli's stylus tracing over a curved plate, a spiral rib rolled over the message on a rotating cylinder. Only one point of the paper was in contact with the rib at a time. At the receiver, an electromagnet, when activated by the transmitting current, pressed the paper up against the inked rib. A conical pendulum provided synchronization. [20]

In 1869, the Commission for the Improvement of Telegraph Equipment (*Commission de perfectionnement du matèriel télégraphique*) studied four facsimile systems —Caselli's, Dutertre's, Henry Cook's and Meyer's, and rated Meyer's the best.[21] The French telegraph authority installed Meyer's system in actual operations between Paris and Lyons for a "considerable time" in 1868-69, replacing Caselli's system. Meyer's system took only 1.5 minutes to transmit the basic 30 cm square message, which was twice as fast as Caselli's machine and faster than the Morse system.[22]

Unfortunately for Meyer, the Morse system was yesterday's telegraphic technology. Improved telegraphic equipment that transmitted faster, but which also automatically produced a written message, put the final nail in pantelegraphy's coffin in the early 1870s. In dispatches per hour, Caselli's system could handle 20-25 and Meyer's 75, but the automatic systems of Wheatstone and Baudot in the 1870s could handle 100 and 200 respectively.[23]

Indeed, Meyer transferred his pantelegraph principles and experience into multiplexing, sending several messages simultaneously, and multiple telegraphy, using multiple instruments on the same line. In 1872, he demonstrated his first multiple telegraph, transmitting between Paris and Lyons. Perhaps Meyer's—and facsimile's—greatest contribution to telegraphy was "to the contemporary technological milieu as another utilization of synchroncity in telegraphy and as a stepping stone for the creation of a new form of fast telegraphy." Meyer's synchronization system for facsimile proved ideal for multiple telegraphy.[24] Multiplexing and automatic transmission of regular telegrams destroyed the attraction of facsimile.

In the 1860s, facsimile was not a fringe technology, as the awards bestowed on its inventors illustrate. At the 1867 Paris Exhibition, judges gave gold medals for telegraphy to Caselli and d'Arlincourt and a silver medal to Lenoir. Cyrus Field and David Hughes received the grand prizes.[25]

The attempt to commercialize pantelegraphy soon failed because they could not compete economically with the rapidly evolution of regular telegraphy. While faxing produced images, its throughput could not match the new automatic multiplexing machines, machines based in part on fax technology. Also, cost was prohibitive. As important, only a few machines were built, restricting their usefulness only to the few cities equipped with machines, unlike regular telegraphy which could reach any city or town.

FOOTNOTES

[1]. Jules Verne, *Paris in the Twentieth Century*, trans. Richard Howard (New York: Random House, 1996), 53.

[2]. "Necrologie," *Annales Télégraphique*, 8 (1865): 379; Emilio Pucci, *L'inventione del FAX. La transmissione fac-simile nella seconda meta dell'Ottocento* (Milan: Edizioni SEAT, 1994), 32. Froment also improved and manufactured David Hughes' telegraph in the 1860s. In the 1870s, his successor firm, P. Dumoulin-Froment, performed similar services for the Baudot system. Reflecting a similar recognition of the importance of manufacturing, Edme Hardy won a gold medal in 1873 from the Société d'Encouragement pour l'Industrie Nationale for his manufacture of Meyer's pantelegraph. Andrew J. Butrica, "From *inspecteur* to *ingénieur*: Telegraphy and the Genesis of Electrical Engineering in France, 1845-1881," Ph.D. diss., Iowa State University, 1986, 163, 203.

[3]. "The Pantelegraph," *The Electrician*, November 9, 1861, 10. See also, "Foreign intelligence," *Times*, February 22, 1862, 10; Pucci, 33.

[4]. Alvin F. Harlow, *Old Wires and New Waves: The History of the Telegraph, Telephone, and Wireless* (NY: Arno Press, 1971), 203.

[5]. Butrica, 55; Major Webber, R.E., "Multiple and other Telegraphs at the Paris Exhibition," *Journal of the Society of Telegraph Operators*, November 27, 1878, 437. From 1856 to 1866, the number of transmitted messages grew from 360,299 to 2,842,554 and bureaus from 167 to 1,209. A decade later those numbers were 8,080,984 messages and 2,890 bureaux (Butrica, 78).

[6]. "Loi relative à la taxe, 1 des dépêches privées, dessins, etc., transmis par le télégraphe au moyen de l'appareil autotélégraphique; 2 des dépêches télégraphiques privées échangées entre les navires en mer et les postes électro-semaphoriques du littoral," 27 Mai—3 Juin 1863, in Collection Complète des Lois, Décrets, Ordonnances, Règlements et Avis du Conseil d'Etat (Paris: Directeur de l'Administration, 1863), 548; "The May-June Number of Annales Télégraphiques," *The Electrician,* July 3, 1863, 98; "Bulletin et chronique," Annales Télégraphique 8 (1865): 365-68.

[7]. This section is based on George B. Prescott, *Electricity and the Electric Telegraph*, 3rd ed. (New York: D. Appleton & Co., 1879), 745-56.

The French Roots of the Fax (continued)

FOOTNOTES (continued).

[8] "Arrangements of M. Caselli for Obviating the Effects of the Discharge Current in Signalling," *The Electrician* (July 17, 1863): 121-22; "Mr. Culley on 'Printing Telegraphs,'" *The Electrician* (April 15, 1864): 305.

[9] F. L. Pope, "Discussion," *Transactions of the American Institute of Electrical Engineers* II (1885), 24.

[10] Louis Figuier, *Les Merveilles de la science* (Paris: Fornes-Jouvet, 1867), cited in Pucci, 45; Pope, "Discussion," *Transactions of the American Institute of Electrical Engineers* II (1885), 24.

[11] Augustin Privat Deschanel, *Elementary Treatise on Natural Philosophy* (New York: D. Appleton and Co., 1887), 822; "Bulletin et chronique," *Annales Télégraphiques* 1865, 366.

[12] Thomas Edison similarly disparaged the approaches of Bakewell and Bain because they used complex clockwork systems for synchronicity. Edison to John Clark Van Duzer, December 6, 1868, in Reese V. Jenkins et al., eds., *The Papers of Thomas A. Edison: Vol. 1: The Making of an Inventor, February 1847-June 1873* (Baltimore: Johns Hopkins University Press, 1989), 90.

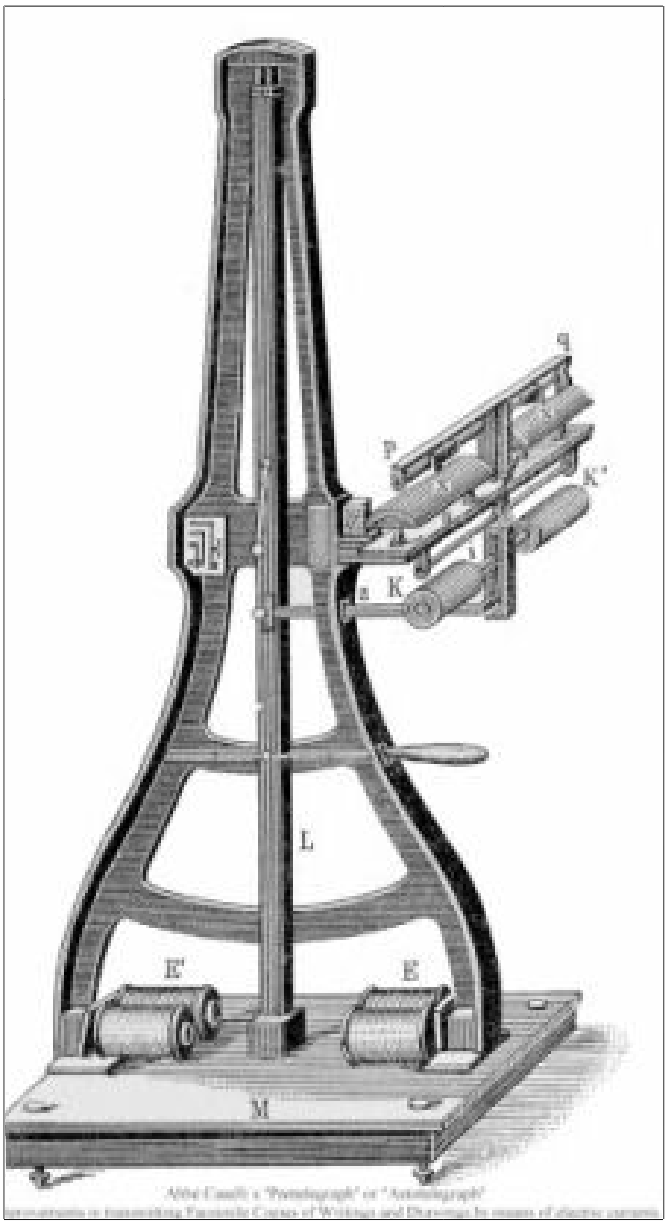
[13] "Mr. Culley on 'Printing Telegraphs'," *The Electrician* (April 15, 1864): 305; Deschanel, 824.

[14] "Lois, Décrets et Arrêtés concernant l'Administration des Lignes Télégraphiques," *Annales Télégraphiques* 8 (1865): 327; Ernest Saint-Edme, "Physique industrielle: Télégraphie électrique: le télégraphe autographique de M. Meyer," *Annales Industrielles* 1 (1869): col. 504.

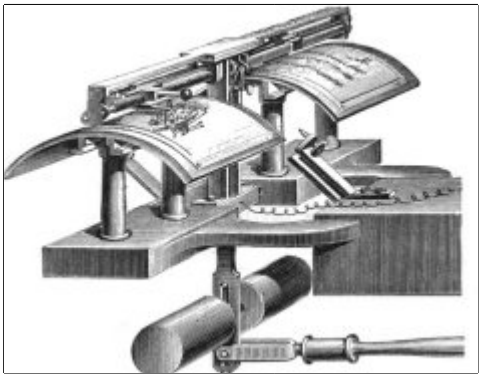
[15] "The Pantelegraph," *The Electrician* (November 9, 1861): 10.

[16] "The International Exhibition, 1862," *The Electrician* (October 2, 1863): 260.

Caselli's Pantelegraph from Louis Figuier, *Les Merveilles de la Science* (Paris, 1866)



Detail of Pantelegraph Operation (below)



Instead of a cylinder or flat plate, Caselli used two curved metal tablets. , so the machine could transmit and receive simultaneously if desired by taking advantage of the time when the transmitting stylus was off the tablet for half a pendulum oscillation. The two tablets also balanced each other. The large pendulum moved a lever which in turn moved a tablet across a stationary stylus. Each revolution also turned a screw, so that the tablet moved in two dimensions under the stylus. While the stylus touched the surface of the metallic paper, the main battery was shunted; when the insulated writing broke the contact, current passed to the receiver. The receiving operator maintained synchronization by watching a vertical line at the edge of the paper. If the line was not straight, the apparatus was not synchronized, and the operator adjusted the pendulum swing accordingly.

From Submarine Bells to Sonar: The Submarine Signal Company, 1901-1946

John Merrill

As the twentieth century opened, the maritime industry and the military—with its first practical submarine—shared technological needs and common interests below the surface of the oceans.

Commercial shipping needed to develop undersea sound devices to enhance the safety of merchant shipping by alerting ships in the presence of rocky coasts. With the draft of steel ships increasing, warning of natural hazards and the presence of shipwrecks along coasts became important. Knowledge of the ocean bottom also was needed to lay underwater cables for telegraph, telephone, and power systems. Because of the vagaries of sound in air, sirens and foghorns were limited as shipping warning devices. Methods for determining ocean depth were awkward to use. As a result, using sound in the sea—both for maritime alerting and later for determining depths—received new attention.

On April 11, 1900, the U.S. Navy purchased John P. Holland's *Holland VI*, the first practical submarine, and a strong interest in sound in the sea quickly arose. By 1914, the world's navies owned 400 submarines and by 1982, they had 1000. In 1905, at a meeting of the Institute of Naval Architects, Captain Reginald Bacon, Royal Navy, head of the growing British Submarine Service, suggested the possibility of detecting submarines by the noise of their engines, but noted that electrical propulsion caused the noise to be very slight.[1]

Starting in 1898, Arthur J. Mundy, Elisha Gray, and Joshua B. Millet conducted experiments on the North Shore of Cape Ann, Massachusetts, at Mundy's home, on the use of a sea buoy with an underwater bell and a receiving microphone located on a ship to warn of hazards. By 1901, Millet and Mundy had developed a practical system for an underway ship to detect the underwater bells. That same year, Mundy, Gray, Millet, E. C. Wood, and others organized the Submarine Signal Company to pursue the development, sale, and installation of such underwater bell systems.

Underwater Bell System.

The underwater bell system consisted of two tanks 16 inches square and 18 inches deep filled with a chemical solution denser than water. A waterproofed microphone hung in each tank. The tanks were secured below the waterline inside against the ship's hull in the port and starboard forepeak without the necessity of cutting a hole in the side of the ship.[2] Microphone outputs were fed to a pair of telephone receivers mounted on the bridge. A switch allowed the listener to use either the port or starboard microphone. A bearing of the sound waves from the bell could be found by adjusting the ship's course. Lightships were the first to use underwater bells. Some bells were operated with steam; others, with compressed air. In 1903, the Submarine Signal Company installed the first of its bells in Boston Harbor on Lightship 54. On later sea buoys, wave action coupled with a spring mechanism activated some underwater bells. Ranges typically were about eight to ten miles.

German Ocean Liners.

On June 5, 1905, *The New York Times* reported on ocean liner submarine bell signaling systems with generous praise. The officers of the North German Lloyd liner *Wilhelm de Grosse*, recently arrived from Germany in New York, extolled the system's advantages. The other German Lloyd ocean liners *Kaiser Wilhelm II* and *Kronprinz Wilhelm* were equipped similarly. En route to New York from Germany, as the *Wilhelm de Grosse* neared the coast, a signal of six rings followed by an additional six identified the presence of the Nantucket lightship.

Acceptance.

Broad adoption of Submarine Signal's systems using underwater bells, initially slow, was fully established by 1912 in America and Europe. At that time, 135 of the alerting system bells were installed worldwide in 24 countries. More than 900 ships possessed the receiving equipment. Circa 1918, 52 United States lightships and 9 buoys were equipped with the bells. After improvements, ranges in the order of 10 miles were typical.

Reginald A. Fessenden.

In 1910, the Submarine Signal Company hired as a consultant Reginald A. Fessenden, a well-known engineer, inventor, and successful radio pioneer who eventually would accumulate 300 patents in his lifetime. Fessenden's objective at Submarine Signal was to develop a more efficient underwater sound source that could be modulated into the dots and dashes of the Morse Code.[3] This further refinement would broaden the Submarine Signal Company's product line.

During his first year with the company, Fessenden developed an oscillator that created high-energy 540-Hz sound waves in the water. The oscillator, which also was capable of receiving, could be used in place of a microphone to change the received sound waves into electrical impulses. As a result, Morse code could be sent at increased speed and at five times the distance of the equivalent underwater bell system. In 1913, Fessenden filed for a U.S. patent for detecting underwater objects based on echo ranging and distance determination using the underwater sound wave travel time to and from the object.

From Submarine Bells to Sonar: Submarine Signal Company, 1901-1946 (continued)

Echoes from an Iceberg.

The loss of the *Titanic* after its collision with an iceberg on April 14, 1912, created considerable interest in determining the presence of icebergs in or near the steamer lanes. As many as 50 to 1000 icebergs every season threatened the western portion of the steamer track from Europe to the United States. In March 1914, Fessenden installed his oscillator on board the U.S. Revenue Cutter Service vessel *Miami* assigned to the first International Iceberg Patrol. The oscillator was suspended in the water from the side of the 190-foot *Miami*. On April 27, 1914, on the Grand Banks off Newfoundland, an iceberg 450 feet long and 130 feet high was sighted. Fessenden's oscillator was directed at the iceberg, and for 3 hours horizontal echoes were received from the iceberg at ranges of half a mile and from one to two and a half miles out. Ocean bottom depth readings also were obtained with the echo ranging.

The Royal Navy.

The Royal Navy held successful trials of Fessenden's Submarine Signal equipment at Portsmouth Harbor. Equipment was procured for installation on ten British "H" class submarines as well as on 24 others under construction. The normal range achieved for passing signals between submerged British submarines was about three miles. This was sometimes exceeded (93 miles was once recorded off the North China coast).[4]

World War I.

U.S. Navy submarines and destroyers operating off Pensacola, Florida, during January, February, and March of 1917 conducted tests of all available listening devices, namely, those of the Submarine Signal Company. The object of the tests was to determine the detection range of the devices under different service conditions. Submerged submarines listened to surface vessels of different types as well as to other submarines. Tests included the detection of submarines by surface craft. The test results pointed out that the submarine was a better listening platform than the surface craft, and that the probability of successfully detecting submerged submarines with existing equipment was remote. Specifying the location of the submarine was an additional problem.[5]

Underwater Sound Test Station.

In February 1917, H. J. W. Fay, Second Vice-President of the Submarine Signal Company, attended meetings with the Naval Consulting Board held to consider submarine detection with sound. Fay requested and received authorization from the board to build a test station for submarine detection near Boston on a point of land in Nahant, Massachusetts, that bordered on the Atlantic Ocean. The Submarine Signal Company, General Electric, and Western Electric pooled their resources, and at their own expense constructed the test station. General Electric already was engaged in communications and submarine detection research for the Navy. Soon, engineers from the American Telephone and Telegraph Company (AT&T) also were at Nahant.[6] The Nahant Experimental Station remained in operation for 20 months, disbanding at the beginning of 1919.

At Nahant, the first problem that Western Electric tackled was to determine the nature of the sounds produced by vessels and the distances at which they could be heard. Available apparatus for this work included the Fessenden Oscillator for sending and receiving sound signals. By incorporating a pilotron tube, an early vacuum tube amplifier recently invented by General Electric scientist Irving Langmuir, it was possible for the first time to detect ship movements at distances of many miles.

C-tube Detector.

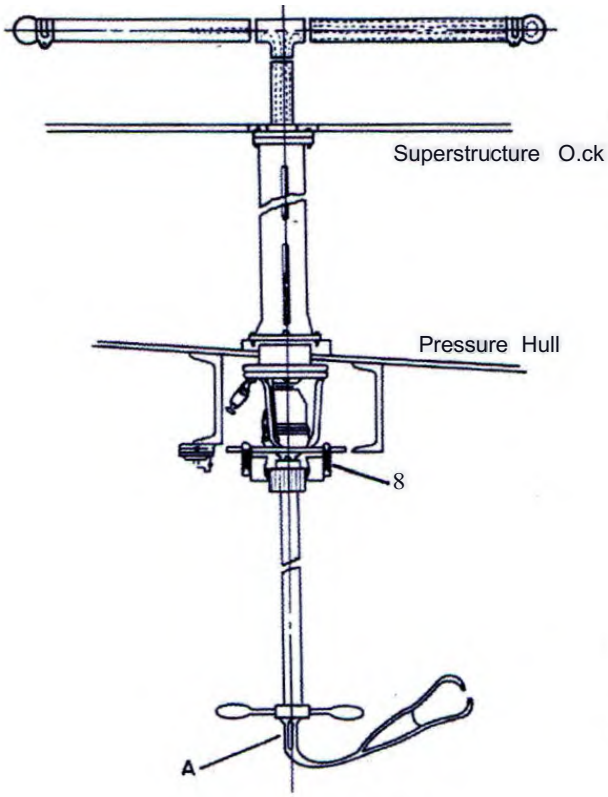
By the fall of 1917, the Nahant group had developed the listening device known as the C-tube (see illustration next page). On 21 August, in less than four months from the start of the investigations, an experimental system was ready for testing. The test conducted in Boston harbor simulated an offensive attack upon an enemy submarine by three submarine chasers equipped with C-tubes and various signaling apparatus to communicate the bearings obtained on the submarine among the three chasers.

The initial low-frequency acoustic sound detector consisted of an inverted T-shaped arrangement. The sensor at the bottom of the T was a hollow pipe three inches in diameter and five feet long fitted with rubber spheres at each end. Frequencies in the acoustic range of 500-1500 Hz were typical. Rubber spheres transmitted the changes in pressure through the vertical pipe to a stethoscope. On surface craft, the tube hung over the side or from the keel. On submarines, it was mounted on the deck. The vertical shaft fitted with a wheel could be rotated until the sound was equal in both ears. This detector was the first use of a binaural method of direction finding. By June 1918, General Electric and Submarine Signal Company had delivered 900 out of a thousand C-tubes ordered by the Navy. The Royal Navy had more than 500 C-tube type detectors by the end of World War I. By 1927, all U.S. submarines were equipped with C-tube systems. The C-tube upgraded with new detection equipment in 1934 and 1935 persisted as an instrument of choice on many submarines.

From Submarine Bells to Sonar: Submarine Signal Company, 1901-1946 (continued)

K-Tube Drifter Sets.

C-tube detectors mounted on a ship's observing platform were hampered by local noise and limited sensitivity. The K-tube, an off-hull (over the side) drifter detector system that used microphones as sensors, overcame these limitations. The system could be towed behind the ship or attached to buoys and set to a depth of 40 feet. K-tube systems were widely used during World War I. They required the ship to be at rest with all machinery shut down during reception. K-tube enemy torpedo detection with the test ship dead in the water was made at 1000 to 1500 yards. Although K-tube detectors located enemy submarines, they did not lend themselves to hunting. The detector achieved acoustic ranges of more than 30 miles.



C-Tube Detector

Three configurations were developed to provide towing at high speed, constant depth, and maintenance of relative baseline with the towing vessel or platform. All three configurations used compensation to determination direction. In addition, the company developed a destroyer submarine detection system in the fall of 1917 that used Fessenden's oscillators, which were made at the Submarine Signal Company's Boston factory. It allowed the observing vessel to follow submarine movements. Four oscillators, shielded from each other by sound screens, were located in the forward water tank. With adjacent oscillators connected to a pair of telephone receivers, the submarine's direction was determined by sound level; compensators provided the angle to the target.

The Fathometer.

After the World War I, Submarine Signal continued to work on detecting sound in the sea, but now added radio applications to its gamut of products. In 1923, the firm introduced the Fathometer, the registered trademark name for the world's first commercial depth sounder. It provided accurate and detailed permanent recordings of underwater topography, and was based on horizontal and vertical sounding experience with the Fessenden oscillator from prior to World War I.

During 1924, the first Fathometer was installed and tested on the Merchants and Miners Transportation Company 440-foot liner the *S.S. Berkshire*. Another test run took place from Baltimore, Maryland, to Cape Charles, Virginia. The instrument successfully observed the ocean floor at depths from 5 to 1500 fathoms while the liner was running at full speed. Consequently, the Navy, Coast and Geodetic Survey, and Shipping Board gave their approval to the Fathometer.[7]

The first three V-class submarines—the *Barracuda*, *Bass*, and *Bonita*—were launched in 1924 and 1925, with an additional six by 1933. The *Bonita* carried a new device, the Submarine Signal Company's electro-acoustic Fathometer. For the first time, a submarine had the ability to measure the depth of water under its keel accurately and instantaneously.[8] The article "Sonic Sounding" in the Naval Institute Proceedings of February 1943 noted: ". . . by 1929 the U.S. Hydrographic Office was receiving reports of deep-sea sounding daily. At that time, practically all ships had been equipped with sound depth apparatus of the Fessenden type, developed by the Submarine Signal Corporation."

Echo-ranging in Post War Period.

The development of echo-ranging equipment benefited from hurried World War I submarine detection research as well as real wartime antisubmarine implementation of techniques and strategies. Foremost among the wartime efforts was the use of piezoelectric materials in transducers and detection with ultrasonic frequencies. These concepts were investigated and demonstrated but not brought to the equipment level during the war years. Immediately after the war, quartz and Rochelle salt continued to receive attention. Magnetostriction used as a

From Submarine Bells to Sonar: Submarine Signal Company, 1901-1946 (continued)

transducer followed followed later. Nonetheless, support for and interest in submarine detection research and development lessened.

Naval Research Laboratory (NRL).
The primary mission of the NRL, established in 1923, was to perform applied research to support naval operations. Through the interwar years, the NRL Sound Division provided the Navy's technical leadership in the development of underwater detection systems. The Navy built 97 destroyers and 45 submarines during the 1930s. The Submarine Signal Company, assigned some of the production, soon became a significant manufacturer of the Navy's detection equipment prior to and during World War II. Up until 1943, the firm was the dominant supplier of echo-sounding and echo-ranging equipment to the Navy. A competent naval authority stated that over 90% of the war's submarine sinkings involved Submarine Signal Company apparatus.[9]

During the late 1920s and early 1930s, the NRL developed a series of echo-ranging devices, some of which the Submarine Signal Company had in production by 1933. New improvements, such as streamlined domes, permitted operation at speeds on the order of 15 knots. The equipment was installed on both destroyers and submarines.

The Bathythermograph.
Understanding how the ocean moves and mixes heat requires accurate and continuous measurements of temperature at various depths with a bathythermograph. Whether sound waves are bent upwards or downward in water is a function of the ambient temperature. In 1936, Carl Gustave Rossby and Athelstan Spilhaus at MIT developed prototype instruments to make temperature depth profiles. Sea tests of their apparatus took place under the aegis of the Woods Hole Oceanographic Institute. Columbus Iselin, a Woods Hole scientist, suggested that the bathythermograph could be used to detect submarines underwater. Iselin contacted the Submarine Signal Company's Vice President, H. J. W. Fay, regarding the manufacture of bathythermographs.[10] On August 10, 1938, the company filed for a patent and began production. The patent, in Spilhaus' name, assigned the rights to the Submarine Signal Company.

Radar at Submarine Signal.
During the interwar period, some of the Submarine Signal engineers conducted radio research. When interest in radar increased in the late 1930s, the business' engineers held 13 radar-related patents.[11] The company became heavily involved in the development and manufacture of Navy radar equipment shortly after the National Defense Research Committee established the MIT Radiation Laboratory in November 1940 and throughout the remainder of World War II. Some Navy vessels carried equipment from all three of the firm's development groups: sonar depth, sonar ranging, and radar.

In 1946, the Submarine Signal Company completed 45 years of vital participation in the evolving field of underwater detection. It was well known in the defense industry for its Fathometer and its substantial wartime manufacture of sonar and radar systems. On May 26, 1946, Raytheon, a larger company, purchased the Submarine Signal Company and—as a division of Raytheon—continued its research and development in underwater detection and other related areas.

FOOTNOTES.
[1] J. B. Millet, "Submarine Signaling by Means of Sound," Professional notes, *Naval Institute Proceedings*, 21 (June 1905): 532-33.
[2] Richard W. Wright, "Raytheon's History Pertaining to such Research-Development as is Relevant to the Submarine Signal Portion Beginning with 1901," Raytheon Company, March 16, 1955, AR-124.
[3] Marvin Lasky, "Review of Undersea Acoustics to 1950," *Journal of Acoustical Society of America*, 61 (February 1977): 286.
[4] Royal Navy Communication Association, "Wireless In Early Submarines," http://www.rnca.org.uk/history/rnca1b.htm, June 7, 2002.
[5] "History of the Bureau of Engineering Navy Department during World War," United States Navy, 1922, p. 47.
[6] Daniel J. Kelves, *The Physicists* (NY: Alfred A. Knopf, 1978), p. 120.
[7] Wright, p. 30.
[8] John D. Alden, *The Fleet Submarine in the U.S. Navy: Design and Construction History* (Annapolis: Naval Institute Press, 1974), p. 16.
[9] Wright, p. 12.
[10] Gary E. Weir, *An Ocean in Common: American Naval Officers, Scientists, and the Ocean Environment* (College Station: Texas A&M University Press, 2001), p.130.
[11] Wright, p. 14.

Looks like a school of whales.
They're a bit old for a school.

University?
University of Whales.

Training Air Force Communications Officers in the 1960s

Ronald R. Thomas

Since the invention of the telegraph, civilian and military schools have taught students how to operate and repair communications equipment. Far less common were schools to train people to supervise and manage the operations and workers of communications systems. However, during the 1960s, that is exactly what the U.S. Air Force did.

The 1960s was the era of the Cold War and the war in Vietnam. As a result, the Air Force needed thousands of new officers to supervise and manage its communications systems and equipment as well as experienced enlisted communications personnel. The service wanted young communications officers to enter their first assignment well trained and totally prepared for their new duties.

Ideally, the Air Force would have preferred that its communications officers have a degree in mathematics, science, or engineering. The reality, however, was that the majority of newly commissioned second lieutenants had a liberal arts degree in fields ranging from art to zoology. Given the urgency of the Vietnam War, the Air Force was willing to spend a great deal of time and money to train them to be communications officers.

Communications Officer School.

The Air Force communications officer school was located at Keesler Air Force Base in Biloxi, Mississippi, but the actual classroom buildings were at a facility between Biloxi and Gulfport, Mississippi, that formerly had been a private boy's school.

The communications officer course lasted 43 weeks. In addition, a two-week review of basic mathematics was available for students who might need it. Many students took advantage of the opportunity to refresh their math skills and were glad they did.

The course consisted of two major sections. The first comprised 25 weeks of electronic principles followed by the second section, 18 weeks of equipment training. (See the insert "Communications Officer Course Outline.") After the first 25 weeks, a very small number of students might attend a different equipment course to become ground electronics, computer, or avionics officers. Most, however, continued with the 18 weeks of equipment training to become communications officers.

A new class of 10 to 15 students started the course on a regular basis and stayed together for the entire 43 weeks. At any given time, hundreds of officers were going through the program and were at various stages in their training.

The physical limitations on classroom space necessitated that students attend class in six-hour shifts, one running from 6 A.M. to noon and the other from noon to 6 P.M. A third shift from 6 P.M. to midnight was added when needed. Naturally, students who hated 8 A.M. college classes tried to avoid going to class on the 6 A.M. shift.

Students began the 25 weeks of electronics principles with two weeks of instruction in direct current, followed by three weeks of alternating current. The following blocks of instruction progressed through electronic components and circuits. Even though the mathematical problems required only algebra and trigonometry, there were a lot of them—and they could be complex and challenging. It was an era of slide rules, and the students used them throughout the entire course. The sixties also witnessed the transition from vacuum tubes to transistors, so students had to learn about both.

Course instructors were Air Force officers and a small number of civilians. The same instructor taught one class of students for six hours a day, five days a week,

Communications Officer Course Outline

Electronic Principles.

Block Number	Weeks	Description
I	2	Direct Current
II	3	Alternating Current
III	2	Rectifiers, Filters, and Power Supplies
IV	4	Amplifiers and Oscillators
V	4	Transmitters and Receivers
VI	3	Timing Circuits and Computer Principles
VII	3	Propagation Principles and Radar Principles
VIII	4	C-E Administration and Programming

Equipment.

Block Number	Weeks	Description
IX	2	Base Communications and Telephone
X	2	Teletype and Facsimile
XI	2	HF Radio Facilities
XII	2	Radio Relay Facilities
XIII	2	Data Link and Communica--tions Procedures
XIV	3	C-E Command and Air Traffic Control Systems
XV	2	Applied Problems
XVI	3	Cryptography and Electronic Warfare
Total	43	

Training Air Force Communications Officers in the 1960s (continued)

for two to four weeks, until a specific block of coursework had been completed. Instruction consisted of classroom lectures and some hands-on laboratory work.

At the end of each week, there was a quiz; at the end of each block of instruction, a closed book final exam and a student evaluation of the instructor's performance. Instructors were expected to teach, and students were expected to learn. If a student failed a final exam, both the student and the instructor were in big trouble. Also, students had to complete two hours of homework each day. Any student who failed a weekly quiz had to spend two hours a day at a formal school study hall until successfully passing the next weekly quiz.

Life at Keesler AFB was not all study. There was time on weekends to relax at the beach or to make a trip into New Orleans. Many friendships sprung up among the single officers, most of whom lived in the Bachelor Officer Quarters (BOQ). Married officers usually lived in off-base housing and often hosted class parties.

While most of the officers going through the course were newly commissioned second lieutenants, a few older first lieutenants and captains hoping to change career fields attended too. Occasionally, an officer from a foreign country also followed the school's coursework.

Much to their amazement, liberal arts graduates discovered that they could learn to understand electronic principles. By the time the course progressed to the 18 weeks of equipment training, they were old hands at absorbing unfamiliar information, passing tests, and moving on to the next block of instruction.

The course's equipment section enabled students to see how the electronic theory came together in actual hardware. Suddenly, those electronic components became a high frequency radio transmitter or a telephone system. The theory clearly had an application, and there was a light at the end of the tunnel.

Near the end of the course, students received orders for their first duty assignment. Everyone filled out a "dream sheet" stating where they would like to be assigned, but took whatever they got. Students rarely failed to complete the course and receive an assignment as a communications officer.

Because most of the officers who went through the communications officer course held reserve commissions, many left the Air Force after four years of active duty. Their training and experience, however, did not go to waste. Rather, it formed the foundation for many successful careers with Bell Telephone, Collins Radio, RCA, and other companies.

Who Invented the Telephone?

John Liffen, curator of communications at the London Science Museum, recently uncovered documents labeled "confidential" in the museum's archive which show that Philipp Reis (1834-1874) a science teacher in Friedrichsdorf, Germany, invented a working telephone 13 years before Alexander Graham Bell created his apparatus, and that British telephone executives covered up the fact. Specifically, Sir Frank Gill, then-chairman of Standard Telephones and Cables (STC) of Britain, ordered the papers to be concealed.

The documents outline experiments conducted in 1947 on several early telephones, as the STC was arranging a business agreement with AT&T. They reveal that Reis's 1863 instrument creation called a "Telephon" was able to both transmit faint speech and receive "good quality" speech. The tests, according to Liffen, were suppressed by STC because they thought that the findings might jeopardize their negotiations for a new commercial agreement with AT&T. A memo written by Liffen's predecessor at the museum, Gerald Garratt, dated March 18, 1947, bears this out. The document explained that the "immediate reason for this reticence" was the business deal being negotiated then between STC and AT&T, and that "the mutual relations would not be improved by any suggestion . . . that Graham Bell did not invent the telephone."

The concealed documents add to the growing body of evidence that Bell was not the first to invent a working telephone. Readers of this newsletter are familiar with the claims of another inventor, the Italian Antonio Meucci, who lacked sufficient funds to patent his own telephone invention. Paul Charbon, in his history of the phonograph, *La Machine parlante* (1981), points out what he sees as a technologically necessary connection between the inventions of the telephone and phonograph, as well as their connection to various 19th-century inventions that attempted to create a visual record of human speech.*

Erika Dittrich, director of the Reis House Museum in Friedrichsdorf, is convinced that Reis was the telephone's true inventor. As evidence, she points to an entry in Reis's journal in which he described his telephone project as early as 1860. His initial telephone model had little in common with anything in use today. For example, the sound transmitter consisted of a model of the human ear carved out of oak and used sausage skin.

This story originally appeared in *The Daily Telegraph* of London as Roger Highfield, "Debate over who invented first phone hushed up for 50 years," December 1, 2003. It can be seen at:
http://www.telegraph.co.uk/news/main.jhtml?xml=/news/2003/12/01/nphone01.xml

*Material added by the editor.

The Challenge of Preserving Telegraphic History

Roger W. Reinke

The art of telegraphy is not lost. However, it is rapidly becoming something that exists only in the memory of a few. The science of telegraphy is still found in modern communications technology, but the passing of dots and dashes is all too apparent. Some efforts to maintain the art are being made, but beyond the use of Morse code, the effective preservation and presentation of telegraphy's instruments, ephemera, and operational methodology is disappointing.

Fortunately, there are exceptions to this rather pessimistic outlook. A few radio amateurs still use old landline telegraph equipment on the air, and a modest number of former railroad and commercial operators share a Morse wire using original instruments, the only artifice being the Internet or the public switched network. Surviving telegraphers offer demonstrations of how messages were sent and received to appreciative audiences, but the analogy of the telegraph and the computer is seldom noted. The Internet does provide ready access to several web sites containing much historical information and illustrations of artifacts. Unselfish, uncompensated individuals are due thanks for their contributions, but the long-term view regarding personal preservation initiatives is not encouraging.

Considering the undisputed influence of telegraphy from 1844 to 1900, suffice it to say that the preservation of telegraphy in all its aspects is worthwhile. Andrew Carnegie, who started his remarkable career as a telegraph messenger and quickly became a young telegraph operator, had the following written on the crown molding above his library: "All that man has thought and done is preserved, as if by magic, in books." Indeed, many books written over the years help us to understand the who, how, when, and why of telegraphy, but the preservation of artifacts helps to put those words in a meaningful material context. Books alone cannot convey all that is of significance.

Collections of telegraphic material help to make the reminiscences of the original practitioners more understandable and perhaps more accurate. Preservation of valuable historical material, however, may be only incidental to the actual collecting motivation which might range from pure and simple nostalgia to the compulsive urge to possess the biggest or best collection. Pecuniary gain may be a factor as well, because there is an active market for uncommon telegraphic artifacts of all kinds.

For those telegraph collectors sincere about trying to share their interests in a way that can be useful to present and future generations, there seems to be no clear path. Organizations—such as the Antique Wireless Association, which enjoys well attended annual meetings, a broad membership base, and a permanent, chartered repository for materials of significance to its members—are envied. The association greatly benefits from the fact that radio may be appreciated by doing no more than flipping a switch—and that's still the case today. The arcane art of telegraphy involves a "secret" code that, unfortunately, oftentimes represents an obstacle to understanding. Lacking familiarity with the subject, support for preservation efforts is difficult to generate.

A review of past telegraphic preservation efforts offers a lesson or two. In early 1880, Western Union stalwarts Anson Stager, Charles Taylor, F. A. Armstrong, and J. C. Matoon proposed that the "telegraphic fraternity" meet in Cincinnati on September 7, 1880. The invitation to this first National "Old Timer's" Reunion included a request: "We desire that each one will secure any *relics of old-time telegraphy* [italics original], and send them or bring them for temporary exhibition." The reunion was intended to produce reminiscences of the very first days of telegraphy. J. J. Flanagan reported that Ezra Cornell "exhibited the Morse telegraph instruments in New York and Boston as a curiosity, at twenty-five cents admission, but so little popular interest was felt . . . that the receipts therefrom were barely sufficient to pay his personal expenses."

Out of this reunion was born the Old Time Telegraphers' Association. At the second reunion in 1882, members decided to combine the social activities of the Society of the United States Military Telegraph Corps (the Civil War operators) with the Old Timers. At the third reunion in 1883, the Secretary was to make "suitable arrangements for the safe keeping of any relics," but the proceedings do not describe what material, if any, was held by the two organizations.

The Old Timers' membership grew throughout the late 1880's and the 1890's. The "boys" (wives and even some female operators were included) liked to get together and reminisce, but for certain years apparently the proceedings never were published. Those that were are replete with anecdotes, jokes, and especially laudatory and lengthy descriptions of telegraphy and telegraphers. If there was any organized effort to collect artifacts and/or documents in any objective way, such was not noted until the early 1900's.

On July 30, 1901, L. B. MacFarlane, the Old Timers' President, wrote to Charles A. Tinker, President of the Telegraphic Historical Society of North America (founded in 1895), in response to Tinker's proposal to consolidate the two groups. MacFarlane responded: "While it is true that the principal object of our Association has been to review and enjoy early acquaintances and friendships, we should remember that we are also to efficiently foster and encourage such other

The Challenge of Preserving Telegraphic History (continued)

worthy kindred purposes . . . One of the most valuable of these would be the collection and preservation of historical data relating to the art of telegraphy."

The Old Timers agreed to the proposal at their 1901 meeting, and altered their name to the Old Time Telegraphers' and Historical Association. At a later reunion, a member observed that the Historical Society had "gathered a valuable collection of early telegraph apparatus including many of Professor Morse's original instruments. When the two societies combined the relics were deposited in the Smithsonian Institute [sic] at Washington where they have been since on display."

Perhaps because of the merger of the Old Timers and the Historical Society, the 1901 proceedings contained the first formal attempt at historical preservation. John Brant, a Western Union employee and secretary of the Old Timers, included his "Suggestions" at the very end of the publication. They read in part as follows:

A FEW SUGGESTIONS TO MEMBERS

"Formal papers on subjects relating to telegraphic history and sketches of personal experiences are very desirable, and it is hoped members will furnish them as soon as practicable. While it is expected that not every member will immediately prepare such a paper, each can aid in the work . . . some of the Association's needs: Books, pamphlets, telegraphic newspapers, newspaper clippings, manufacturers' catalogues of instruments, and other publications relating to telegraphy.

"Manuscript documents . . . books, message blanks, and other forms. . . . Telegrams having historical interest . . . catalogues of books, relics, etc. in the possession of public institutions or private individuals. Photographs of telegraphers . . . telegraph offices. . . . Instruments, batteries, insulators, specimens of wires, submarine cables, etc. Addresses of persons having in their possession anything of interest to the Association. Any of the articles referred to can be sent to the Association as a gift or as a loan, or they can be placed on exhibition in the Smithsonian Museum, subject to the order of the owner. Articles for deposit in the Smithsonian may be sent to the Secretary, who will return official receipts to the owners."

Explicit as these suggestions were, the result was dismal. At the next reunion, Secretary Brant stated: "There has been but one contribution of historic value—a photograph album containing portraits of many men connected with the Telegraph service of bygone days . . . It does not seem to me that the historical feature of the Association is appreciated as it should be by its members." Brant's "Suggestions" were reprinted once more, but they did not reappear in later Reports.

In 1905, when the Old Timers met in New York City, the proceedings reported: "A room at the headquarters hotel was set aside for an extensive exhibit of telegraph apparatus and document relics." But something else stole the show: "A tiny telegraph key, manufactured for the occasion by J. H. Bunnell & Co., the smallest ever made, yet absolutely perfect in every detail, was the souvenir of the evening. . . . About 800 were thus given out, but only those seated at the [banquet] tables received these greatly prized mementos." Bunnell miniature keys now command high prices on Internet auctions. At the 1909 Reunion in Pittsburgh, the H. J. Heinz Co. presented the ladies with silver pickle forks, the market for which, in contrast, is unremarkable.

At the 1913 Detroit reunion, an interesting story was told. According to the secretary, John J. Ghegan had "some old relics" that he wanted to show the members. Ghegan then declared: "The case I hold in my hand contains a set of miniature instruments that were made for Professor Morse by the old house of Chester, which many of you old timers remember. I came across this set of instruments last November, in the heart of Louisiana. An operator for the Postal Telegraph Co. had them in his possession. They were won by him at a raffle some fifteen years previous. At that time, they were owned by a man who was an operator for the New Orleans *Times-Democrat*, and who was taken sick and had to part with them to raise funds. He had won them in a similar manner some ten years before."

Ghegan tried to trace their history from 1913 back to the time of their manufacture, but made little progress until he learned that a man named Dubois, who had been superintendent of the Chester factory at the time the instruments were made, was still living, and that he had a son working in the factory of Mr. Fred Pearce. He telephoned Mr. Pearce's son, and learned that Dubois was still living in a little town called Oceanport. As he drove through the town, he saw an old man sitting on a porch. As luck would have it, this was the Dubois he sought. Ghegan then brought back from his car the miniature telegraph instruments and showed them to Dubois. His face lit up as if he had met some old friend. "I helped make it." After a pause, he add: "It was the year the first Atlantic cable was laid [1858]." He said they were presented to Morse, and that there was quite a celebration at the time. It was the only telegraph set of the kind that was made. No information was available on what happened to them between the celebration and the first raffle. Ghegan then passed the instrument case around to those attending the meeting. Whether Ghegan completed his research on the instruments, or what the eventual disposition of the instruments was, the record is silent.

Some of the Old Timers' favorite anecdotes

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concerned sending and receiving speeds. At the 1919 reunion, the association formed a committee that annually selected two distinguished members acknowledged to be proficient telegraphers for a period of six years. Edison's Orange, New Jersey, laboratory recorded their messages for the archives. At the 1926 reunion, the committee reported that it had fulfilled its charter. The messages were recorded on an "indestructible disc," but this writer does not know if the disc actually survived.

During the next few years, a few contributions came in to be placed in the Association's archives. In 1923, J. B. Taltavall, the Old Timers' Historian, wrote: "Important negotiations are now pending for space for the archives of the Association." In 1927, Donald McNicol, Association historian, noted: "the Association's historical relics have been moved from the offices of Telegraph and Telephone Age [Taltavall was its publisher] to a showcase in the offices of J. H. Bunnell & Co., No. 32 Park Place." Furthermore, "procuring a permanent depository for the Association's relics . . . might induce members of the Association to forward literary and apparatus relics of the telegraph in their possession and now widely scattered." McNicol recommended that a small room in downtown New York—donated for this purpose—be maintained through contributions and a one dollar per year assessment of the members. His proposal apparently was not acted upon. Although McNicol kept an inventory of the Association's relics, the descriptions posted in the Association's reports from those years offer little detail beyond, for example: "Round, metal base Morse telegraph sounder of the '60's . . . relay with large coils . . . Rare specimen of Morse 'hump-back' telegraph key of the '60's."

At the 1928 Omaha reunion, McNicol recommended that the artifacts he had collected, that is, those that had not been forwarded to the Smithsonian Institution, be combined with the Edison collection at the Engineering Societies Building on 39th Street in Manhattan. The Association concurred. Apparently Henry Ford had his eye on the Edison collection, and as the Ford Museum was being built, he and Thomas Edison got the Association's Board of Directors to consent to transferring the entire collection to the Ford Museum at Dearborn, Michigan.

In 1930, at what was probably the last reunion of the Old Timers, McNicol reported: "Whatever the Association possessed in the way of historical apparatus is on display in the Dearborn museum." McNicol also noted that the Rosenwald Museum of Science and Industry, Chicago, and the Museum of the City of New York also intended to gather "all of the historical apparatus still available."

McNicol cited Western Union for their cooperation, and particularly R. H. Underwood. Underwood related that Western Union had donated apparatus to the Ford collection, and intended to produce some replica instruments for the upcoming 1933 World's Fair in Chicago and for other museums. Underwood also observed: "Unfortunately, the telegraph exhibit at the Smithsonian Institute [sic] in Washington has not been kept up to date but we are now cooperating with the Museum in building up an exhibit."

As the Old Timers acquired what they could in the way of a significant collection from a largely apathetic membership, a few Western Union employees saw a need for historical preservation. It was not until 1990, however, that a scholarly effort was made to document what survived. At that time, Robert S. Harding compiled a catalog of the Western Union Telegraph Company collection, 1848-1963, for the Archives Center of the National Museum of American History, Smithsonian Institution. According to Harding, H. W. Drake, an electrical engineer, established the Western Union Museum in 1912, and collected instruments and other apparatus and devices used for displays, advertising, and in settling patent litigation.

Following the Chicago World's Fair, the Western Union Museum was renamed the Western Union Engineering Museum, and old instruments and material were solicited from various Western Union offices nationwide. In 1969, the museum closed because its space was needed for offices. Some material was sent to the Smithsonian, but most was transferred to a storage facility in Allentown, Pennsylvania. Finally, in 1971, what remained of the Western Union collection was donated to the Smithsonian. Harding's compilation is a valuable guide to the impressive documentary materials held by the Smithsonian. Unfortunately, the great majority of instruments and related hardware is stored away, with no similar register available. Recently, the Smithsonian made digital photographs of many of its telegraph instruments, with the intent of making the photos available through the Internet.

The displays of objects at the Smithsonian and Ford museums are welcomed, but frustrating—because they represent only a fraction of all their respective telegraphic holdings. The exhibits in general provide appropriate guidance, sometimes including artifacts found nowhere else in the public domain. A minor disappointment is that interpretation occasionally is in error (a sounder is labeled a relay, etc.)

Today many private telegraph collections exist, some with significant and valuable material. As noted above, the motivation for collecting may vary, as does the willingness of their owners to share their collections with

The Challenge of Preserving Telegraphic History (continued)

others. A common problem, however, is the ultimate disposition of the collection. Large museums often impose restrictions on donated collections that may be unacceptable to the donor. A smaller organization may be eager to have a collection, but can only display or store a small portion of it. Heirs have utterly no interest in "clickers and those things you pound." Too often, the decision is simply to sell off the collection. There are no easy answers to the question of disposition.

The Old Timers fell on hard times during the Great Depression. The 1931 reunion was cancelled, and it is believed that they never met again. The Toledo Morse Telegraph Club carried on the traditions of the Old Timers for several years, until it, too, disappeared. Now, in 2004, the Morse Telegraph Club offers a valuable medium to keep some history alive, but it has no resources to establish and control a permanent, comprehensive collection of telegraphic history.

Perhaps it is best that preservation responsibility rests largely in the hands of the Smithsonian and Ford museums. The downside of this situation is that telegraphy must compete with interests of much greater popular appeal. When you couple that competition with the current trend of displaying and describing artifacts "in context," the result can be only a partial representation of the whole. Understanding telegraphy's historical role may be enhanced by this approach, but do the curators' techniques, such as interactive displays—manipulating a key or twisting the handle of a messenger call box, for example—preserve telegraphic history?

Judgment in that regard is left to the professionals, but there comes to mind the "Random Notes" of the 1927 Old Timers reunion. The anonymous author (who should be forgiven for a bit of hyperbole) wrote: "At San Francisco this year the Western Union capitalized the occasion by setting up in the Market Street window of their main office an exhibit of early telegraph instruments. The display was of interest not only to the 'Old Timers,' but the populace of the town at times blocked the street to get a view of a 'Caton' sounder or a 'Chester' relay. Rembrandt, Corot, nor Whistler have anything on the early designers of telegraph instruments, in the way of permanent fame." Seems like there ought to be something worth saving.

"The press, the machine, the railroad, the telegraph are premises whose conclusion once a thousand years have passed no one has dared to draw as yet."

—- Friedrich Nietzsche (1880)

A FLIGHT OF FANCY . . .

It is tempting to imagine a permanent facility devoted to telegraphy. Its resources would be assembled with the help of private collectors and other donors. Many examples of special interest museums exist. The National Association of Watch and Clock Collectors Museum in Columbia, Pennsylvania; the Museum of Independent Telephony in Abilene, Kansas; and the Historical Electronics Museum in Baltimore, Maryland come to mind. The Antique Wireless Association's Museum near Rochester, New York, has an extensive collection of telegraph instruments—especially those found in wireless operations—but, understandably, telegraphy per se is not the primary interest. Reality intrudes. The financial support required to establish and maintain a "telegraph museum" is nowhere in sight.

MEANWHILE IN CUBA . . .

On May 10, 2004, ETECSA (Empresa de Telecomunicaciones de Cuba), a joint venture of the Cuban government and an Italian company, officially inaugurated the Museo de las Telecomunicaciones (Telecommunications Museum) in its main administrative building. The museum covers a substantial area on the ground floor of the plateresque building, which once was the headquarters of the Cuban Telephone Company, but now is home to the country's largest telephone switching center.

The museum collection includes quite a few interesting antique telegraph and telephone instruments—including some early twentieth century apparatus handmade by Cuban artisans—a working automatic telephone switching unit, and some submarine cable exhibits. The Cuban Society for the History of Science and Technology helped with the exhibit panels and narrative materials and prepared for the occasion a book on the history of Cuban telephony (see p. 27).

"All in all," fellow Mercurian José Altshuler* reports, "it looks fine to me, though a lot of research must still be done to correctly arrange and present the exhibits on a rigorous foundation, for which the ETECSA management is willing to allocate some funds. The organization also has promised to free up additional space for exhibits. This is an old cherished idea which is beginning to be realized as an attractive reality."

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Out of Cameroon: The Media and the Message

Charles Verharen

Festus Eribo and Enoh Tanjong, eds. ***Journalism and Mass Communication in Africa: Cameroon***. Lanham and Oxford: Lexington Books, 2002. x + 169 pp. Illustrations, bibliography, appendix, list of contributors. $65.00 (cloth), ISBN 0-7391-0377-6.

This bold new study stands out as "the first twenty-first-century book on mass communications in Cameroon" (p. vii). Eight of its fourteen African authors have taught in the Department of Journalism and Mass Communication at the University of Buea in Cameroon. Two of the remaining seven teach in the United States, while the rest teach in Nigeria, Kenya, and Uganda. The authors are well-placed, in the words of co-editor Festus Eribo, to take "a step forward from intellectual colonization, a momentuous break from the past when parachute field workers from Europe and America dominated epistemological research on African communication" (p. vii).

Cameroon is a first-rate place to conduct a study of mass communication in Africa. One of the few African countries whose food production rate tops its population growth rate, it has a literacy rate greater than sixty percent. Around three hundred fifty students are enrolled in the mass communication program at the University of Buea, a university much smaller than the national universities in Yaounde and Douala. The work targets an audience of "policy makers, scholars, critics, and observers of international communication, political science, and other disciplines" (p. x). Its primary methodology is qualitative research, although some of its studies use quantitative data. Its final chapter, for example, is a fascinating quantitative study of media content in East and West Africa. That chapter's aim is to establish a database on media content in order "to make a case for promoting authentic African values for social change" (p. x).

Unsurprisingly, many of the authors return to a theme that is inimical to "authentic African values": domination of the media by government and business interests. In the first chapter, "Evolution of the Media in Cameroon," Muluh Henry and Ndoh Bertha detail the post-independence Cameroonian government's reluctance to introduce television to the country. The authors note that Cameroon shared an "antitelevision policy" with apartheid South Africa (p. 3). While Cameroon started planning to introduce television in 1962, "Cameroonians waited for 23 years for television to make its debut," some twenty-five years after independence (pp. 13-14). Even today Cameroon's cable system operates by reason of a "secret agreement" between a signal company and a government minister of post and telecommunications (p. 15). The increasing popularity of satellite dishes has furthered government loss of media control to private business interests, which are themselves intimately connected to the government.

The loser in this exchange is the "authentic African value" of a community's responsibility for the production of what it consumes. Because most films on video are in English, "video projectors have replaced the film projector in most, if not all, cinemas in Anglophone Cameroon" (p. 13). The government's failure to support the film production sector has led to video clubs in the Cameroon market and to homes with VCRs that purchase large numbers of Nigerian videos. The government claims the radio portion of the electromagnetic spectrum is "public property," but the "media are expected to implement government policies and to explain government actions to the people with the aim of winning active participation in the task of nation building" (p. 8). The government was reluctant to finance independent film production that "could be critical of the established order" (p. 11). Nevertheless, at present the broadcast sector is deregulated but always subject to the seamless bond between government and business. Henry and Bertha view the current stage of media evolution in Cameroon as quite inimical to "authentic African values." Proliferating video clubs and cable companies show pornographic films—"programs not necessarily suitable for African audiences"—to a hungry and sometimes young audience (p. 16). Such remarks call for a wider reflection on globalization's impact on "authentic African values" through the media. Perhaps that is a matter for another volume. Also missing in this volume is more extensive general reflection on appropriate reforms of ownership and control of mass media in the African context. While the issue is of global concern, specific attention to questions of justice and autonomy in the Cameroon media context can serve as models for more global reflection.

For example, a government that insists that the electromagnetic spectrum belongs to the public appears to foster justice and autonomy for its people. If that same government also controls the content of the media for the purposes of its own survival and flourishing, however, the public's mistrust extends beyond the government to the media workers themselves. Enoh Tanjong and George Ngwa, in "Public Perceptions of Cameroonian Journalists," find that journalists, for example, may be characterized as "biased, unprofessional, unethical, ignorant, and weak," as well as "corrupt, lazy and shabbily dressed" (p. 17). The authors cite a survey of heads of households in the municipality of Buea showing that more than 90 percent of the respondents strongly disagree that there is

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freedom of press in Cameroon and more than 66 percent strongly agree that Cameroonian journalists are corrupt (p. 22). While journalists belong to the working class, "they tend to adopt and reproduce the views of the owners of the press and the ruling oligarchies in many developing countries" (p. 19). In focusing on developing countries, the authors miss the opportunity to remark on the same phenomenon of "alienated consciousness" in media workers throughout the world. Those who pay the piper call the tune. The problem appears to be exacerbated in Cameroon only because there is less need for concealment.

George Ngwa, in "Communication and the Empowerment of the People," remarks on the irony that "globalization is supposed to be the best for every individual in the global village" (p. 27). Nevertheless, some aspects of globalization are irresistable, since technology is a two-edged sword. Ngwa cites the presidential elections in Senegal as an example "where private radio stations thwarted the ruling party from fraudulently winning" (p. 28). In Cameroon the government's "illegal monopoly" of radio broadcasting helped to drive an increase of newspapers from less than ten in 1990 to more than one hundred fifty at the turn of the century. Ngwa proposes a Cameroonian model of communication "built on oral traditions, user-friendliness, low cost and low technological inputs" (p. 30). One of the model's chief goals would be the "inclusion of the 'illiterate' poor that were formerly marginalized" (p. 30).

Several of the essays appear to suffer from lack of attention to Cameroonian content in addressing generalized communication issues. However, the volume's point is to serve both a Cameroonian and a wider audience. Co-editor Eribo calls the book a "one-stop volume on mass communication in Cameroon" (p. vii). While not specific to Cameroon, the essays on aesthetics in television production, effective public communication, communication research, and survey methods nevertheless serve as excellent models of reflection on these subjects. Cameroonian students and researchers who do not have access to a wider literature will profit greatly from them. Other essays on public relations practices, advertising, and content analysis, however, animate their general discussions of these topics with historical examples taken from Cameroon.

Julius Che Tita's essay, "The Development of Book Publishing," is an exemplary look at the details of life in Cameroon. Tita's account of the Sultan of Foumban's invention and dissemination of an indigenous Cameroonian script is fascinating (p. 67). Publishing at the time of the Sultan's death in 1932 was and continues to be "a risky business" (p. 69). Libraries receive little government support, books are kept "under lock and key and are jealously protected from the students" (p. 72). Most worrisome is the fact that the Cameroonian government, unlike most other African countries, has not incorporated local languages into the educational system. In contrast, Ghana has published more than five hundred local-language titles (p. 73). Most devastating is Tita's claim that the World Bank's policy of International Competitive Bidding "requires that only publishers in the north [Europe and North America] can provide books financed by the World Bank to developing countries" (p. 76).

Tita's essay deserves expansion into a book that would examine case studies in other African, Asian, and Oceanic countries together with careful scrutiny of World Bank and other international financial organizations' policies on in-country publishing. I also would like to see a revised edition of this volume that includes an examination of present and future uses of the Internet as a medium of mass communication in Cameroon, along the model of Tita's essay.

The volume's final essay moves beyond Cameroon to analyze Nigerian and Kenyan print media for the "Africanness" of their content (p. 134). The authors, Charles Okigbo, Festus Eribo, Mary Kizito, and Christine Kyayonka, make the bold claim that the surveyed media "do not seem to be strong adherents of the traditional Western paradigm, which emphasizes the unusual, the negative, and the controversial" (p. 149). Their claim is perhaps philosophical rather than empirical, and I would like to see further research on such generalized statements under the hypothesis that the "unusual" and the "controversial," if not the "negative," are topics of widespread interest throughout the world. The surveyed media use Western news sources, but rely principally on their own reporters and correspondents. Especially important is the authors' claim that the surveyed media, unlike their Western counterparts, take "an optimistic view of the African situation" (p. 149). The final paragraph of this essay summarizes the principal thesis of the book: "The mass media in Africa undeniably carry the burden of their foreign origin, while still trying to meet the demands and expectations of their indigenous audiences" (p. 150). The book itself stands as the best example of this tension. We can only wish that it could have been published in Africa and still have its deserved effect on the wider world.

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Active Radio: Pacifica's Brash Experiment

Jon Bekken

Jeff Land, ***Active Radio: Pacifica's Brash Experiment***. Minneapolis: University of Minnesota Press, 1999. 182 pages, paper. ISBN 0-8166-3157-3. $56.95 cloth; $18.95 paper.

Founded in 1949 as a single station on the then-unpopulated FM band, Pacifica has since grown to a five-station network and a national program service carried on scores of other radio stations, as well as inspiring the founding of community radio stations across the United States and Canada. Jeff Land's history of this vital experiment in broadcasting argues that Pacifica's significance goes far beyond its rediscovery of listener sponsorship, pointing instead to its attempt to develop a praxis of radical democratic media deeply committed to (and engaged in) movements for social justice and cultural exploration while also serving as a forum for reflection and dialogue.

Active Radio draws on interviews with Pacifica founders, program guides and other documents, and Pacifica's extensive taped program archive, which contains hundreds of thousands of hours of live performances, political debates, documentaries, and other programming. (However, few tapes survive from Pacifica's first decade.) Land focuses on the flagship Berkeley and New York City stations, which played key roles in shaping Pacifica's vision and practice, but which were also the locus of heated internal struggles that reverberated throughout the network but rarely took on the same intensity elsewhere. And although cultural programming always played a major role in Pacifica's schedule, and often dominated it, Land offers only limited discussion of the first point on Pacifica's prospectus: "encourag[ing] and provid[ing] outlets for the creative skills and energies of the community" (p. xi). While Land points out that Pacifica's founders never believed lectures, news analysis, and discussions alone could bring about the transformation of public consciousness they sought, these more overtly political forms nonetheless dominate this volume.

Land begins with a historical chapter on the rise of corporate broadcasting between 1927 and 1934, the general outlines of which will be familiar to most scholars of media history. The second chapter turns to Pacifica founder Lewis Hill, and the pacifist movement out of which his vision for Pacifica emerged. While serving in Civilian Public Service camps with other pacifists during World War II, Hill came into contact with many of the people who would help launch Pacifica. Torn between a fear of incipient authoritarianism and the hope of radical social transformation, these COs hoped acts of moral witness would galvanize public consciousness. Hill quickly grew skeptical of this approach, instead turning to radio in hopes of engaging fellow citizens in a process of dialogue and reflection that could transform listeners' consciousness and ultimately lay the basis for reshaping society.

Active Radio situates Pacifica within an indigenous tradition of democratic radicalism stretching back to Thomas Paine and which gave shape to a vision of democratic broadcasting that began with a commitment to a multiplicity of voices and perspectives on the air, but which also sought to engage its audiences in a process of mutual exploration into culture and ideas. Born amidst the post-war anti-communist consensus, Pacifica was brought into being by pacifists committed to presenting their ideas to the community, but also to opening up the liberating potential of radio as a medium for popular communication that had been widely anticipated in the 1920s, and quickly smothered by the imperatives of corporate domination.

Land sees three reasons for Pacifica's persistence where previous experiments in alternative broadcasting failed: Hill's visionary leadership and the loyalty he inspired from the early staff, its modest origins far from the centers of power (enabling it to become firmly established before the barrage of attacks that followed Pacifica's national expansion), and the hospitable milieu the San Francisco Bay Area offered nonconformists even in the 1950s. But while the founding staff shared Hill's vision, within a few years new staff and Pacifica Foundation officers chafed under what they saw as an autocratic management style. By 1953, Hill (and several of his supporters) resigned, returning as foundation president a year later after the Ford Foundation withheld part of its grant in response to what it saw as managerial chaos. After Pacifica's directors overrode Hill's refusal to offer severance pay to two staffers he had fired in 1957, Hill (who also suffered from crippling arthritis) committed suicide.

Land identifies several tensions at the core of Pacifica's experiment. One was Hill's conception of the audience. At the same time that he sought a transformation in social consciousness, he always conceived of Pacifica's audience as single individuals, who brought an alert involvement to their listening on a par with that of the programmers. Committed to radical egalitarianism in its internal workings (all staff were paid the same wage, for example), "preaching to an audience that at times numbered in the hundreds of thousands inflated egos that had little need of enhancement, occasioning bitter internecine struggles" (p. 45). Opening the airwaves to listeners (some of whom paid less atten-

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tion to technical issues than was necessary for truly great radio) sometimes led to a situation where individual programs and programmers spoke to small bands of committed co-thinkers rather than maintaining a dialogue with broader publics. Land teases out many of these tensions, most interestingly in his discussion of panel discussions where these issues were debated over Pacific's airwaves by some of the era's leading public intellectuals. The book is at its richest in Land's richly nuanced considerations of discussions and documentaries that engaged the dominant issues of the 1950s and 1960s, often in programs that combined innovative discursive formats with a vibrant radical critique. Such programs brought the attention of professional red-baiters, the Senate Internal Security Subcommittee, the Federal Communications Commission, and ultimately the Supreme Court—attention that forced the station to expend badly needed funds on legal fights, touched off bitter disputes over how to respond to charges of communist domination, and which ultimately encouraged internal pressures toward centralization and professionalization.

One chapter explores Pacifica's early self-identification as "free speech radio," drawing heavily from Alexander Meiklejohn, who spoke on the subject over Pacifica's airwaves. The network was so deeply identified with the issue that its reporters were the only ones permitted to cover Berkeley Free Speech Movement meetings. Pacifica's commitment to giving airtime to diverse voices also led to accusations of obscenity and indecency in FCC and Senate hearings and ultimately in a landmark Supreme Court decision (the Carlin case) that went against the network. Land gives substantial attention to Pacifica's conception of and commitment to free speech, and of the attacks it engendered, offering a useful supplement to the existing literature on the legal issues.

While Pacifica generally is regarded as the pioneer of community radio, Land notes that some Pacifica veterans explicitly rejected this characterization, counterposing the early emphasis on programs that engaged committed listeners as rational individuals to the later rise of "Third World" and "women's" departments that differentiated communities on gender, racial, and other lines. But at the same time, Pacifica programmers were pioneering "free radio," opening wide swathes of the schedule to a melange of music and poetry (live and otherwise), sound effects, open telephone lines (often allowing listeners to speak with each other on air), and agitation. Some of these new programs made compelling radio, some did not, and many had a tendency to fragment listeners and value personal identity in ways that undermined the sense of a communal project so essential to Pacifica's vision and its survival. In the 1970s, Pacifica also began struggling to develop a multiracial audience. Many of the (unmentioned) conflicts that were tearing Pacifica apart as this book went to press had their origin in these struggles and contradictions.

One of Pacifica's enduring contributions was its demonstration that listener sponsorship could provide a viable, long-term method for financing radio. Pacifica's founders saw commercial sponsorship as the primary cause of the mediocrity and banality of existing radio broadcasting. Freed from its constraints, they believed, radio could be used for truly significant communication—freeing broadcasters and listeners alike from these shackles. Listener sponsorship, Hill argued, produced a "creative tension" between broadcaster and audience, inspiring and necessitating a constant exchange that would enrich the programming and transform both the broadcasting and listening experience. Yet listener sponsorship was not an immediate success. After fifteen months of broadcasting, KPFA had secured only 270 subscribers (though several hundred people had appeared on its programs) and had to sign off the air for nine months while volunteers raised funds to return their station to the air with more than a thousand subscribers. Soon afterward, the Ford Foundation weighed in with a large grant, establishing a pattern of mixed support that has persisted ever since. When the number of sponsors began to decline in the 1970s, Pacifica responded by seeking larger individual contributions and increasing its reliance on grants—strategies that tended to enhance the power of the national foundation, station management, and those who could provide the sort of "professional" programming granters recognized and understood.

Pacifica launched its second station in Los Angeles in 1959 and accepted the donation of a New York City station the next year. (Land does not discuss the later Houston and Washington, D.C. stations, the former of which was literally bombed off the air for a time.) At the outset, local staff controlled each station's programming, exchanging selected programs on tape to supplement local offerings. But the licenses were held by the national Pacifica Foundation, which also controlled much of the grant funding and ultimately controlled staffing decisions.

Land takes his story up to 1977, as Pacifica sought to cope with mounting debts, an increasingly balkanized schedule, and an intensely loyal but declining audience. WBAI and Pacifica managers responded to the crisis with firings, an attempt to remake the schedule around minority (largely music) programming, and charges of racism leveled against their detractors. In response, paid staff and volunteers unionized, demanded the right to negotiate over the schedule, and in February

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1977 occupied the studio for several weeks before reaching a settlement that resolved few if any of the underlying issues.

Rather than address the two decades that followed—decades in which these issues remained the focus of intense struggle, even as Pacifica built its national network and gradually whittled away at local community (and staff) autonomy—Land moves on to explore the meaning(s) of community as they played out at Pacifica. In the Vietnam War years, the project of ending the Vietnam War, and the New Left's conviction in the power of the imagination, bound the programs and audiences together. But as the schedule became dominated by smaller publics, it became increasingly difficult to articulate a coherent vision—a sense of community that could transcend particular identities and locations. Navigating this fractured terrain as the audience dissipated (in some cases wooed by NPR and alternative FM stations in a much more diverse radio universe), Pacifica programmers sought to develop a new sense of community in a context where the notion of a unitary public or community was increasingly distant. Land concludes that despite a high cost, Pacifica successfully transformed itself, creating a new vision in which Pacifica would give voice to the marginalized and voiceless. Land's conclusion makes clear his admiration for Pacifica's accomplishments, as well as his recognition of the difficulties of realizing the utopian visions of its founders. But he concludes on an optimistic note, arguing that although Pacifica has been able to transform the larger society, "its overall programming provides an ongoing chorus of voices, calling to mind an ideal of a peaceful, democratic, global community yet to be realized" (p. 148).

The jacket copy claims that Pacifica "served as a model for National Public Radio and the Public Broadcasting System," a legacy that would certainly have horrified Lewis Hill and many if not most of those who followed in his footsteps. While it is no doubt true that public radio learned from Pacifica and borrowed some elements from it, NPR never aspired to anything approaching the radical transformation Pacifica's founders sought not only in the public mind, but also in the way media interacted with their publics. While Land does a good job of drawing out these visions, and the contradictions that perhaps inevitably lay at the heart of the project, he neglects important structural issues that had at least as much to do with the conflicts that have raged within Pacifica since its founding. Questions of internal democracy, structures of accountability, and the implications of the network's growing reliance on grants were, it seems, generally swept under the carpet by Pacifica's founders. These issues pervade *Active Radio*, rarely acknowledged as such, but constantly recurring. Also missing by and large is a critical evaluation of Pacifica's audience. As Land acknowledges, Pacifica demanded a deeply committed audience. While many listeners no doubt experienced Pacifica's programming much as they might listen to any other radio program, many others responded with their money, their thoughts, and their time. If the recent turmoil at Pacifica demonstrates anything, it shows that many listeners still feel a keen sense of investment in their station. Such a devoted, active listenership, it seems to me, demands to be studied in its own right—not simply through the lens of its financial contributions and participation in call-in programs.

Finally, Land's decision to focus on Pacifica's first three decades allows him to avoid the difficult questions posed during the difficult struggles that tore the network apart in the 1990s, and nearly led to its demise. To a large extent these issues were presaged in the controversies he does discuss, taking sharper form in the 1980s as notions of community, accountability, diversity, free speech, and the strong pull of financial sponsorship and the regulatory regime came into conflict. The contradictions that led to mass demonstrations, occupations of some Pacifica stations, rebellions by listeners and staff, lawsuits, and threats to sell off Pacifica stations had deep roots which demand more attention. Addressing them would have made for a more challenging text, perhaps, but also an infinitely richer one.

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New Books by a Mercurian

Harold Cones, John Bryant, and Martin Blankinship. ***Zenith Radio, The Glory Years, 1936-1945, Illustrated Catalog and Database***. Atglen, Penna.: Schiffer Publishing, Ltd., 2003. 182 pp. Illustrations. $29.95 (soft cover), ISBN: 0764318837.

Zenith Radio, The Glory Years, 1936-1945, Illustrated Catalog and Database is the most complete compendium ever produced of specific information dealing with Zenith radio models between 1936 and 1945. The book consists of three major sections: the illustrated catalog, the database, and the annual notes.

The illustrated catalog is the most comprehensive collection of images of Zenith products ever assembled. It is a nearly inclusive visual record of products manufactured during the time period covered by this book. The database lists all Zenith products produced between 1936 and 1945.

A wealth of model information that is almost impossible to obtain otherwise is presented in an easy-to-read tabular form. Finding information is easy for historians, hobbyists, and radio scholars. Included are such unique features as grill cloth similarities and a rarity and value guide. Zenith product identification methods and serial number data also are in the database section.

The annual notes section highlights a variety of information pertinent to each year but not covered in the tables. Examples of such information are restoration notes, factory variants, dials, cabinet finishes, and knobs.

Harold Cones, John Bryant, and Martin Blankinship. ***Zenith Radio, The Glory Years, 1936-1945, History and Color Portraits***. Atglen, Penna.: Schiffer Publishing, Ltd., 2003. 256 pp. Illustrations. $34.95 (soft cover), ISBN: 0764318829.

Zenith Radio, The Glory Years, 1936-1945, History and Color Portraits continues the Cones-Bryant series on the history of the Zenith Radio Corporation. The first book, *Zenith Radio, The Early Years, 1919-1935*, chronicled the rise of a small regional radio manufacturer to national prominence and survival of the Depression. *The Glory Years* carries the company through a period of trend-setting product development and highlights Zenith's contribution to the war effort. Profusely illustrated, *The Glory Years* contains 366 illustrations, many never before published, and many in color, featuring 180 color portraits of pristine Zenith radios and products. Continuing the detail to documentation established in *The Early Years* (which was the recipient of the prestigious Houch Award for Radio Documentation from the Antique Wireless Association), the text is extensively documented from contemporary written accounts, interviews with past employees, and material from the recently discovered McDonald Files. The writing style will appeal equally to hobbyists, historians, and radio scholars.

Significant highlights include major photographic documentation of the radio production facilities at the 6001 West Dickens Avenue plant, 14 photographs of period movie stars with Zenith Radios, and first-time published accounts of Zenith's role in the development of frequency modulation (FM) and television.

John Bryant and Harold Cones. ***The Zenith Trans-Oceanic: The Royalty of Radios***. Atglen, Penna.: Schiffer Publishing, Ltd., 1995. 160 pp. Illustrations, map. $24.95 (soft cover), ISBN: 0887407080.

This is the previously untold story of the Zenith Trans-Oceanic, the world's most romantic and expensive series of portable radios. Long a companion of kings, presidents, transoceanic yachtsmen, and world explorers, the Trans-Oceanic also was carried into battle by American troops in three wars. Its great popularity—despite its steep price—came from generations of armchair travelers who used its shortwave capabilities as a window on the world. With access to the Zenith corporate archives, as well as their long experience as radio enthusiasts and writers for both the popular and scholarly press, Bryant and Cones present the story of the development and use of the Trans-Oceanic throughout its rich forty year life.

John Bryant and Harold Cones. ***Dangerous Crossings: The First Modern Polar Expedition, 1925***. Annapolis: Naval Institute Press, 2000. xiv, 206 pp. Illustrations, maps. $29.95 (hard), ISBN: 1557501874.

The 1925 MacMillan arctic expedition was the first major geographic expedition to use aircraft and shortwave radio. Experiments conducted during the expedition had very significant impact on the development of long-distance communication and the use of aircraft in harsh environments. It also was Admiral Byrd's first exposure to the Arctic. He returned the following year and flew over the pole. The research of Bryant and Cones took them to the Peary-MacMillan Arctic Museum, the National Archives, the archives of the National Geographic Society, and the private papers of Eugene F. McDonald and second-in-command of the Naval Arctic Unit, Lt. M.A. "Billie" Schur.

More Book News

El Teléfono en Cuba, 1849-1959

A history of the telephone in Cuba, *El Teléfono en Cuba, 1849-1959*, has been published as a result of a close collaboration between the Cuban Society for the History of Science and Technology (Sociedad Cubana de Historia de la Ciencia y la Tecnología, SCHCT) and ETECSA (Empresa de Telecomunicaciones de Cuba). Its authors are Basilio Catania of Italy and Miguel González, Roberto Díaz Martín, and José Altshuler of Cuba.

The book traces the most important events about the introduction of the telephone in Cuba, beginning with the first voice transmission experiments of Antonio Meucci in the Teatro Tacón in 1849. It also covers the first telephone service established in the country (1882), the concession of a telephone monopoly to the Cuban Telephone Company (1909), the first automatic system in service in Havana (1910), and the use of Cuba by ITT as a springboard to the European market in the 1920s, as well as a field laboratory for testing new equipment later on. The book ends with the placing of the telephone service under government control in 1959 and its subsequent nationalization in the following year.

In 1999, on the occasion of the 150th anniversary of Meucci's telephone experiments in Cuba, the SCHCT and ETECSA celebrated the event and published a book, *Primeros Experimentos Telefónicos de Antonio Meucci/ La Habana, 1849* (Havana: SCHCT, 1999).

Mercurians may request a complementary copy of *El Teléfono en Cuba* from José Altshuler via e-mail at: jea@infomed.sld.cu.

Books Jim Haynes Recommends:

Lightning Man: The Accursed Life of Samuel F. B. Morse by Kenneth Silverman. "I haven't read it yet."

Signor Marconi's Magic Box by Gavin Weightman. "I don't have the expertise to comment on its accuracy, but it is a good read of Marconi's life revolving around his wireless telegraphy technology and business."

Inventing America by Pauline Maier, Merritt Roe Smith, Alexander Keyssar, and Daniel J. Kevles. "I haven't read it yet, but this is a college-level American History text which is said to give fair weight to the role of technology in shaping history. Two of the authors were interviewed in the latest issue of *Invention and Technology*.

New German Books

Bernd Sösemann, Hrsg. ***Öffentliche Kommunikation in Brandenburg/ Preußen. Eine Spezialbibliographie***. Beiträge zur Kommunikationsgeschichte 13. Stuttgart: Franz Steiner Verlag, 2002. 365 S. Bibliographie. € 48.00 (kartoniert), ISBN 3-515-08172-0.

[Translation: Bernd Sösemann, editor. ***Early Communications in Brandenburg/Prussia: A Special Bibliography***. Collaboration in the History of Communications Number 13. 2002. 365 pp. € 48.00.]

Reviewed by Ulrich Rosseaux, Lehrstuhl für Sächsische Landesgeschichte, TU Dresden. Review published by H-Soz-u-Kult (July, 2003) at: http://www.h-net.msu.edu/reviews/showrev.cgi?path=56941061765308.

Albert Abramson und Herwig Walitsch, Hrsg. ***Die Geschichte des Fernsehens***. Paderborn: Wilhelm Fink Verlag, 2002. 437 S. 78 s/w Abbildungen. € 50.00 (gebunden), ISBN 3-7705-3740-8.

[Translation: Albert Abramson and Herwig Walitsch, editors. ***The History of Television***. 2002. 437 pp. 78 b&w photographs. € 50.00.]

Reviewed by Michael Grisko. The review was published by H-Soz-u-Kult (March, 2004) at: http://www.h-net.msu.edu/reviews/showrev.cgi?path=41791084717239.

The following table of contents indicates the chronology of television development that the editors have used:

Archäologie und Vorgeschichte des Fernsehens: 1671-1879
Frühe Entwürfe und Erfindungen: 1880-1899
Die ersten Geräte: 1900-1911
"Elektrisches Sehen auf Entfernung": 1911-1920
Die frühen Kameraröhren: 1921-1924
Die mechanische Ära beginnt: 1925-1927
Die Einführung des Kineskops: 1928-1929
Zurück ins Labor: 1930-1932
Das Ikonoskop: 1933-1935
Der Londoner Fernsehdienst: 1936-1939
Das erste NTSC: 1940-1941

Please note the Abramson obituary, page 29.

Neil Postman (1931-2004)

Neil Postman was an inspiration and mentor for many communication studies people, including some who have contributed to *Antenna* and the Mercurians. Lori Breslow, one of the founders of the Mercurians, was one of his students. Much has been said about Postman and his impacts on communication studies. He also regularly received a copy of *Antenna*.

Neil Postman, a native New Yorker, was born in March 1931 and graduated from the State University of New York at Fredonia in 1953. There, he was not only an honor student, but played center on the college basketball team and became the school's all-time leading scorer, for which he was inducted into the Fredonia Sports Hall of Fame.

Postman received a master's degree in 1955 and a doctorate in education in 1958, both from the Teachers College, Columbia University. He came to New York University in 1959 as an assistant professor in the English department, and taught at the school for over 40 years.

In 1971, Postman introduced the term "media ecology" and—with the assistance of his mentor, Marshall McLuhan—founded a graduate program under that name in the communications department of New York University's Steinhardt School of Education. The program, which grew in prestige over the years, examined the relationships between society, culture, and media influence. In 1989, Postman became chair of the department of culture and communication at Steinhardt, and served at the helm for 13 years before stepping down in October 2002.

Postman's work formed the basis for much of today's media study and criticism. He was the author of 20 books and over 200 articles, many of which appeared in the *New York Times Magazine*, the *Atlantic*, *Saturday Review*, the *Washington Post*, the *Los Angeles Times*, and *Le Monde*. For a decade, he also edited *Et Cetera*, a journal of general semantics.

Among his early works of note were the textbooks *Television and the Teaching of English* (Appleton-Century-Crofts, 1961); *The Uses of Language* (Holt, Rinehart and Winston, 1962), and *Language and Reality* (Holt, Rinehart and Winston, 1967), followed by *Teaching as a Subversive Activity* (Delacorte, 1969), written with Charles Weingartner, a frequent collaborator; and *Teaching as a Conserving Activity* (Delacorte, 1979).

His later books included *The Disappearance of Childhood* (Delacorte, 1982; Vintage, 1994); *Amusing Ourselves to Death: Public Discourse in the Age of Show Business* (Viking, 1985; Penguin, 1986); *Conscientious Objections: Stirring Up Trouble About Language, Technology and Education* (Knopf, 1988; McKay, 1992); *How to Watch TV News*, with Steve Powers (Penguin, 1992); *Technopoly: The Surrender of Culture to Technology* (Knopf, 1992; Vintage, 1993); *The End of Education: Redefining the Value of School* (Knopf, 1995; Vintage, 1996); and *Building a Bridge to the 18th Century: How the Past Can Improve Our Future* (Knopf, 1999; Vintage, 2000).

Postman was a vocal critic of the media, especially of TV news reporting. In *Amusing Ourselves to Death: Public Discourse in the Age of Show Business,* he charged the television industry with making entertainment out of the world's most serious problems by presenting television news with all the trappings of entertainment programming, including theme music and "talking hairdos." Only in the printed word, he felt, could complicated truths be rationally conveyed.

Postman gained acclaim in the 1990s with his *The Disappearance of Childhood*, an indictment of television's powerful appeal to children and TV's inability to segregate youngsters from adult programming. He warned that an era of mass communications was stunting the minds of children as well as adults. His core message was that television conflated what should be the separate worlds of children and adults. It did so, he contended, by steeping the minds of children in vast amounts of information once reserved for their elders and subjecting them to all the desires and conflicts of the adult world. If all the secrets of adulthood—including sex, illness, and death—are opened to children, he wrote, cynicism, apathy, or arrogance replace curiosity for them, short-circuiting education and moral development.

Postman's *The End of Education: Redefining the Value of School* called for alternative curriculums to foster a healthy intellectual skepticism, a sense of global citizenship, respect for America's traditions, and appreciation of its diversity.

Prof. Neil Postman died Sunday, October 5, 2003, at New York Hospital in Queens. He was 72 and had been suffering from lung cancer.

Sources used to compile this article:

- Jennifer C. Smith, "Top media critic dead at age 72; Neil Postman founded Steinhardt program," *The Washington Square News*, October 7, 2003.
- Wolfgang Saxon, "Neil Postman, 72, Mass Media Critic, Dies," *The New York Times*, October 9, 2003.
- Anthony Violanti, "Neil Postman Dies; Wrote About Impact of Television," *The Buffalo News,* October 9, 2003.

Sources from New York University:

- "Neil Postman, University Professor of Media Ecology, dies at 72," October 10, 2003, posted at: http://www.nyu.edu/education/steinhardt/db/news/1046.
- "On-line Magazine Lauds Postman's Contributions to Media Studies," *Flakmagazine,* January 06, 2004 at: http://www.nyu.edu/education/steinhardt/db/facnews/7.
- "A tribute to Neil Postman" at http://www.nyu.edu/education/steinhardt/historyphotos/postman_sound.html

Al Abramson (1922-2003)

Television historian Albert Abramson died on Wednesday, December 24, 2003. He was among the most important chroniclers of the technical development of the medium, and had authored a host of important articles as well as four seminal books on the subject, the most recent published less than a year before his death.

Abramson was born on June 9, 1922 in Chicago, but grew up in Los Angeles. After he served with the Army Air Force during World War II (where he first learned electronics), he studied at the film school and took an undergraduate degree at the University of Southern California. He then spent 36 years as a television cameraman, crew chief, video editor, sound technician, and video engineer at the CBS Network's Television City in Los Angeles. He worked on many different network programs, including variety, comedy, and drama shows. He held two patents, one for a 3-D television system that did not require use of special glasses, and the other for a super-bright television projector. He "retired" from CBS in 1987 and took up active television consulting for several firms, including work with the Public Broadcasting Service for their documentary on the medium's history.

Long attracted to the complex story of television's development, he published his first article on the history of television's recording methods a half century ago in 1954, expanding it a year later into his first book, *Electronic Motion Pictures: A History of the Television Camera* (University of California Press, 1955). In text, diagrams, and photos, he related the rise of electronic television including early attempts to effectively record what was seen on the screen. He also predicted the digital television projection systems that are now being installed at theaters here and abroad. Two decades later, still the only serious history then available, it was reprinted to make it available to another generation of researchers (Arno Press, 1974).

In the years that followed, Abramson sought out many of television's surviving pioneers and recorded their stories. These included Zworykin, von Ardenne, Albert Rose, the BBC's D. C. Berkinshaw, and many technical figures here and abroad. Drawing on these as well as extensive archival work over the years Abramson published seminal articles on the development and improvement of TV recording methods, as well as three important biographical papers on Vladimir Zworykin (July 1981), mechanical TV pioneer C. Francis Jenkins (February 1986), and electronic TV tube pioneer Philo Farnsworth (November 1992). All of these appeared in the pages of the respected *SMPTE Journal* (he was a life member of the Society of Motion Picture and Television Engineers, among many other organizations, including the IEEE). His Zworykin paper formed the core of his later extensively-annotated biography, *Zworykin: Pioneer of Television* (University of Illinois Press, 1995) which received glowing reviews. In each of these studies, Abramson maintained a careful balance in considering and comparing conflicting claims of "firsts" from a variety of individuals and companies. He became widely recognized (and cited) as *the* technical chronicler of the medium so important in American and worldwide households. In 1996, he was honored for his historical writing with the J.P. Taylor Award of the Antique Wireless Association.

Abramson was a tenacious researcher and collector of the paper record of television history, holding his own extensive text and pictorial archives from which he was able to write his final work—a careful technical history of television that appeared in two volumes. After a long search for a publisher (and nearly 30 rejections!), *The History of Television, 1880-1941* (McFarland, 1987) appeared. After a chapter tracing the work done to 1880, ten chapters traced the increasing pace of effort on, first, mechanical, and then electronic means of television. His scope was world-wide, and he dealt equitably and carefully with the host of conflicting claims as to who invented what. The book appeared in a German translation as well: *Die Geschichte Des Fernsehens* (Munich: William Fink Verlog, 2002). Delayed by his other projects, a shift in location and health problems, the continuation (and what became Abramson's final book), *The History of Television 1942-2000* (McFarland, 2003), was published less than a year before his death, and was nominated for the prestigious Kraszna-Krausz book award. Here again, he traced the development of the television camera, methods of recording, the rise of color, and applications of television technology including the early work on high definition systems. That the story was becoming more complex is indicated by the second volume's larger page size and use of a two-column format to contain the full details.

After more than six decades living in the Los Angeles area, he and his wife relocated in 1997 to a retirement home in Las Vegas, to live closer to his two children. Abramson was a devoted husband and father for 53 years and is survived by his wife, Arlene; his son Jay and daughter Susie; and a sister, Beatrice (two brothers died earlier). Abramson had a delightful sense of humor and love of life. He was always willing to share his extensive knowledge of television's development with other researchers. Anyone who knew and worked with him benefited from both his assistance and his friendship.

—- Christopher H. Sterling
George Washington University

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 $2.00 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.

Business Matters

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