TELECOMMUNICATIONS HISTORY GROUP

CONNECTIONS news

www.telcomhistory.org 303-296-1221
Spring 2025, Vol. 32, no. 1 Dave Felice, editor

A message from the board president

Normally this space would carry a message from our Managing Director, but Renee has kindly allowed me to have the platform this time.

I'm quite excited about THG's plans for 2025. While many details remain to be worked out, we are planning to open a new museum in the Denver area. The challenge with our existing Denver Museum has always been the limited access we can provide to the public because it is within a secure telecommunications facility.

Our anticipated new museum will not have this limited access problem and will also provide enough space for a much more substantial display of both historic switching equipment and telephone sets as well as many other artifacts. We have secured a fantastic private collection of artifacts which will serve as the basis for this new exhibit. Please look for a full story in the summer issue of the *Connections News*.

Our volunteers in both Seattle and Denver are busy as always conducting tours and working on new exhibits. They have even created a temporary exhibit in the town of Issaquah, Washington in connection with a new staging there of the classic play *Dial M for Murder*.

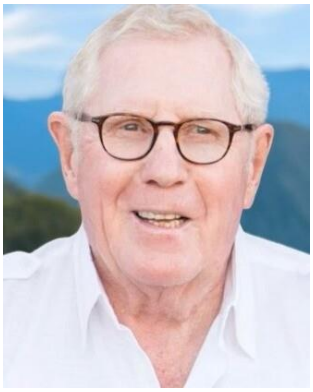
This issue has some great stories including one by Renee and editor Dave Felice on the history of the telephone company in San Angelo, Texas. Enjoy!

Peter Amstein
THG Board President

In Memory

The telecommunications community has lost several highly talented, dedicated, and generous friends in recent months. Dick Callahan, Jim Day, and Chuck Lillis all leave a legacy of significant progress and energetic involvement. We appreciate their contributions and honor their memory.

Dick Callahan



Former U S WEST and international cable TV executive, Richard John "Dick" Callahan died in Denver in October 2024. He was 83.

Callahan, a native of Sioux Falls, joined AT&T after getting an MBA from Creighton University (Omaha). He started as a lineman and rose to become head of Northwestern Bell's South Dakota operations. After Divestiture, Callahan started U S WEST Cellular, one of the world's first cellular telephone companies. He was later named Vice President of U S WEST, where he managed all non-telephone assets for the company, investing in 24 cable and cellular ventures in numerous countries. The biggest firm Callahan managed was Telewest, which became the UK's second-largest cable operator.

After retiring from U S WEST, Dick started his own company, in Denver and London, called Callahan Associates (later Cable Partners) which developed and built cable assets all around the world, including Belgium and Spain.

Callahan was an accomplished athlete in high school. He earned a full scholarship for football at the University of Nebraska, where he played for four years including an outstanding performance in the 1964 Orange Bowl.

Dick Callahan's wife, Celeste, lives in Denver.

Jim Day

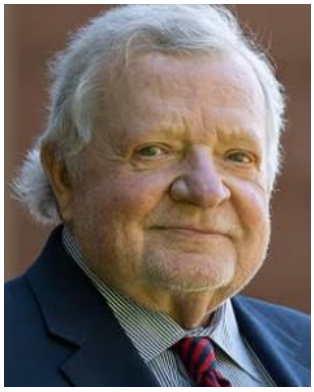
A steadfast advocate for telecommunications history, James E. "Jim" Day, passed away in June, at age 69, in West Haven, Connecticut.

Jim was a longtime good friend of the Telecommunications History Group and its collections. A number of artifacts now displayed in Seattle's Connections Museum were donated by Jim over the years. The donations include the control panels for the popular ringing machine display, and special "senders" for the No.1 Crossbar to allow it to exchange phone calls with the Panel Switch. He was also a reliable source of spare parts and advice for the repair of many of the museum's other older telephone switches.

Jim's workshop in West Haven was a treasure trove of vintage phones, printing presses, pinball machines and other electromechanical wonders. Museum volunteers are grateful to Jim's family for allowing them to collect two truckloads of additional spare parts, tools and supplies from his workshop. The items from the workshop will allow the museum to keep its machines running and delight visitors for many more years.

Known for his love of all animals, Jim Day was recognized for his civic involvement in the West Haven area. He was also ardently active in the Sikh religious community.

Chuck Lillis



Described as a visionary leader in business and education, Charles M. "Chuck" Lillis died in October 2024 at age 83.

Lillis was a native of Overland Park, Kansas. After earning a PhD in marketing at the University of Oregon, he became a professor of business at Washington State University. He later embarked on a business career that included executive roles at Dupont, General Electric, and U S WEST. Colleagues said he had a knack for seeing connections across industries.

The work of Lillis in telecommunications led to co-founding MediaOne, a U S WEST spinoff involved in wireless and broadband delivery over cable. AT&T bought the company in 2000 for $62.5 billion.

Lillis was appointed to the University of Oregon trustees in 2003, becoming chair a year later. He and his wife, Gwen, made the lead gift for a new business college building bearing the family name. They also contributed to university athletics, scholarships, theater arts, and development of relationships with other benefactors. Chuck Lillis was known for generously sharing expertise and experience directly with students on the Eugene campus.

Telephone photo part of Ontario history

This iconic 1907 image shows the four-position manual switchboard at Smiths Falls in Eastern Ontario, about 45 miles southwest of Ottawa. At the time, about a thousand people lived in the village, part of the census for Lanark County.

The switchboard is typical of those in small towns all over the U.S. and Canada at the turn of the 20th Century.

The photo, item 1986.0266.001, is part of the Ingenium Collection of national Canadian artifacts (https://ingeniumcanada.org/centre). Founded in 1967, three Ingenium museums are in Ottawa, part of the traditional territory of the Anishinaabe Algonquin people.

Centrally located in the province, Smiths Falls now has a population of about 9,000. The community, known as a tourist hub with numerous recreational activities, is situated in a parkland setting with the namesake waterfall at the center. The 100-mile Rideau Canal between Ottawa and Kingston runs through the town. Smiths Falls was established by British loyalists as part of a defense plan against invasion from the south by colonial forces during the Revolutionary War.

Currently, Smith Falls is in Area Code 613 (North American Numbering Plan), with two exchanges. Bell Canada provides dial tone, cellular, broadband, TV and home automation services. The country code for Canada is +1.

Bell demonstrates century of innovation

As technology changes daily, it's easy to overlook the myriad contributions of Bell Telephone Laboratories (BTL), Western Electric, and the rest of the Bell System.

Perhaps most prominently, the involvement of Bell Labs in developing cellular phone service (1946-1984) changed world culture. BTL fostered modern communication and technology as the pre-eminent research and development organization for over a century.

Quickly advancing beyond wired telephones and networks, Western Electric built the first commercial radio transmitters (early 1920s) and other high-quality broadcast and recording equipment. Picking up Thomas Edison's cylinder phonograph, research from Alexander Bell's Volta Laboratories led to development of grooved platters for audio reproduction.

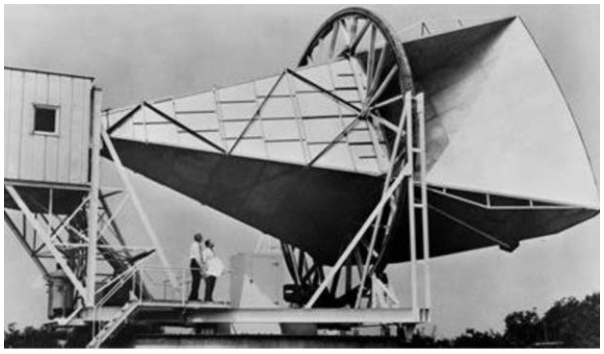
In the almost constant search for better amplification, BTL produced the world's first transistor (1947). The transistor alone is considered one of the most important developments in world history.

Based on work from the previous decade, the UNIX computer operating system was introduced in the 1970s. UNIX provides the operating basis for many servers and personal computers (PCs) in use today. Working with other entities, AT&T introduced commercial satellite communications with Telstar in 1962. BTL pioneered solar energy cells.

Yes, actress Lily Tomlin, through her Ernestine character, may have popularized the image that the telephone company didn't care because it was too big to be concerned. In some cases the customer experience mirrored Tomlin's accurate portrayal. But behind the frustration that tested the patience of customers, Bell companies endlessly sought better technology, economy, and reliability.

The often-heard "Press Star" instruction on business phone calls is a Bell Labs design. Engineers spent hundreds of hours studying and testing the Touch Tone (dual tone multi-frequency) button dialing pad. Even the button arrangement is the product of extensive testing, such as this prototype.

In the 1950s, AT&T Long Lines pioneered point-to-point microwave radio transmission for telephony and broadcast. The microwave signals usually included a multiplexing system. AT&T's T-1 Carrier could carry 24 voice signals over a single 4-wire copper line.



Horn reflector microwave antenna

Based on previous work by Bell Labs, AT&T patented DSL (Digital Subscriber Line) in 1988. DSL expanded internet use by sending simultaneous broadband and voice telephone signals over ordinary copper lines.

The laser, now used in a multitude of applications, came from Bell Labs in 1958.

A. Michael Noll worked at Bell Labs in the 1960s. He is currently professor emeritus of communication at the Annenberg School at the University of Southern California. Noll has compiled an extensive list of inventions, discoveries,

and innovations from the time of BTL formation in 1925 to Divestiture in 1984 (see end note). Many items on this list are highly scientific or theoretical. According to his biography, Noll "pioneered digital computer art, 3D animation, and haptic (touch/motion) communication."

Noll strongly supports commercial research and development: “There are those who believe we should rely on research done at universities with government support. University research has its place, but its distance from the real world, the grant proposal process which discourages risk taking, and its lack of any broader mission, other than to achieve next year’s funding, make it a poor replacement for the industrial research laboratories of the past."

Among his papers and articles, Noll has published a book co-edited with Michael Geselowitz of the IEEE History Center, titled *Bell Labs Memoirs: Voices of Innovation,* printed by Amazon.

His list of significant and most practical BTL contributions includes:

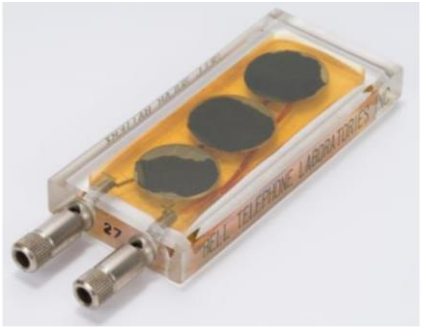
Data center control room

- television transmission, quartz electronic clock, and transatlantic phone service in 1927
- artificial larynx, broadband coaxial cable, and ship-to-shore radio in 1929
- moving coil microphone in 1930
- radio astronomy, teletypewriter exchange, and stereophonic recording on film in 1931
- stereo sound transmission (1933) and stereo phonograph record (1936)
- horn-reflector microwave antenna (1942), point contact transistor (1947)

In the 1950s, Bell Labs developed Direct Distance Dialing, the Bell 101 Dataset Modem, and audio analog/digital conversion. The next decade saw the advanced MOS transistor, Echo communications satellite, light-emitting diode (LED) for optical fiber, the #1 Electronic Switching System (ESS), and magnetic bubble computer memory.

By the 1970s, BTL developed the cellular handoff system, cellular switching, C programming language, electronic blackboard, #4 ESS, video teleconferencing, modular telephone connectors, and the 32-bit microprocessor. Among a multitude of other innovations, the #5 ESS revolutionized telephone switching in the 1980s.

BTL also developed practical applications. For example, designers were always looking for better phones, switching systems, and other equipment to increase reliability and reduce cost.



Demonstration solar electric cell

Model 200 telephone had a one piece handset, with advanced side tone reduction. In the 1930s, Model 300 incorporated network circuitry in the base. Model 500 had a contemporary shell and improved electronics, with both rotary and tone dialing. Touch Tone Model 2500 then became the styling standard, starting as hard-wired and later converted to modular connection. Bell Labs also developed the first Speakerphone, and Picturephone.

The #1 Crossbar switching system (#1XB), first installed in Brooklyn in 1938, could store incoming digits. Crossbar would "translate" the numbers and determine how to send the call.

In 1948, Media, Pennsylvania got the first #5 Crossbar, the phone switch of a growing nation into the 1960s. The #5XB was also the first switch to process customer-dialed Touch Tone. The last #5 Crossbar was built in 1969.

Alexander Graham Bell started the research and development process. He partnered with his cousin, Chichester Bell, and Charles Sumner Tainter to set up the Volta Laboratory in 1880. Volta was part of the Bell Telephone Company. Western Electric was the Bell engineering component. By furthering research into sound reproduction, Volta pioneered the idea of grooves cut into a platter, now known as cutting a record.

Based partly on his work for Bell around 1887, German-American inventor Emil Berliner, got the patent for developing the lateral-cut flat disc. Volta Labs itself obtained 32 patents in its 23-year operation.

Bell and Tainter also experimented with the Photophone, something Bell considered his most important invention. Transmitting voice over a beam of light, the device provided a basis for fiber optics developed a century later.

In 1896, Western Electric consolidated all engineering and manufacturing for the Bell company. The formation of American Telephone and Telegraph three years later included controlling interest in Western. By 1925, AT&T set up Bell Laboratories in New York City to provide all research and development. Western and AT&T shared ownership of the new entity.

In the early 1940s, Bell Laboratories moved to several locations in New Jersey to get away from the congestion of New York City.

Sketch of Photophone receiver

At Divestiture, the federal court-ordered dismantling of the Bell System, the parent AT&T company retained ownership of Bell Labs. Western Electric, then known as AT&T Technologies, and Bell Labs morphed into Lucent. That company later merged with the French company, Alcatel, which focused on telephone support instead of including scientific R&D. Nokia, a Finnish multinational telecommunications company, acquired Alcatel-Lucent. The company has locations worldwide, but the global headquarters is located in Murray Hill, New Jersey, a former prominent Bell Labs site. None of the new companies attempted to re-construct the "vertical integration" end-to-end responsibility that was a hallmark of the Bell System.

SBC Communications (formerly Southwestern Bell Regional Bell Operating Company) purchased what was left of AT&T. The new company is headquartered in Dallas.

Western Electric once owned and operated radio stations in the New York City area, using the company's own equipment. Western continued to manufacture broadcast and audio equipment until an anti-trust settlement in the 1950s limited the company to telephony. The AM transmitter business became Continental Electronics; Standard Electronics got the FM products. Western sold its interests in other audio equipment to Westrex (disc cutting and movie sound) and Altec-Lansing (microphones, commercial sound reproduction, and loudspeakers).

Story by Dave Felice, with material from numerous sources.
A. Michael Noll list at: https://ethw.org/
Bell_Telephone_Laboratories,_Inc._List_of_Significant_Innovations_&_Discoveries_(1925-1983)

Clowning around at the Connections Museum

The THG's Connections Museum in Seattle now has an old wooden wall telephone absolutely unlike any other in the extensive collection. In fact, there's no other phone like this in the world.

A bright red wall telephone with a magneto crank and a comically oversized handset was an important prop in a long-running Seattle TV program. After the show ended, most of the set pieces were either disposed of or went into private hands. The phone artifact had been in a private collection for many years and was finally donated to the museum in 2024.

Clown Julius Pierpont "J. P." Patches was the main character on the award-winning Seattle children's show on KIRO-TV, produced from 1958 to 1981. It was one of the longest running locally produced children's television programs in the United States. The character was played by show creator Chris Wedes (1928 – 2012).

The comic telephone, featured in many of JP Patches' skits, has all of the characteristics that one might expect of a television show prop that had been well-used for over 20 years. It was roughly made to begin, since the resolution of television before HDTV did not require such things as fine detail. The phone has been repaired more than once with black "gaffers' tape." J.P. himself autographed the big red phone, probably at the time it was given to the collector.

Museum visitor reactions to the phone depend on their age and if they grew up in Seattle. Those who did not know the show need an explanation. But for visitors who remember watching J.P. Patches the Clown, the response is one of absolute delight! Patches is also immortalized by a permanent statue in the quirky Fremont neighborhood of Seattle, and now the red wooden telephone at the Connections Museum.

The TV program was immensely popular around Puget Sound and Western British Columbia. The show centered on the antics of Julius Pierpoint (Wedes) and his companion, Gertrude, played by Seattle actor Bob Newman. J.P. lived in a shack at the city dump. *The J.P. Patches Show,* honored with an Emmy, broadcast an estimated 12,000 episodes. Almost all the shows were live and unscripted. The statue shows J.P. dancing with Gertrude.

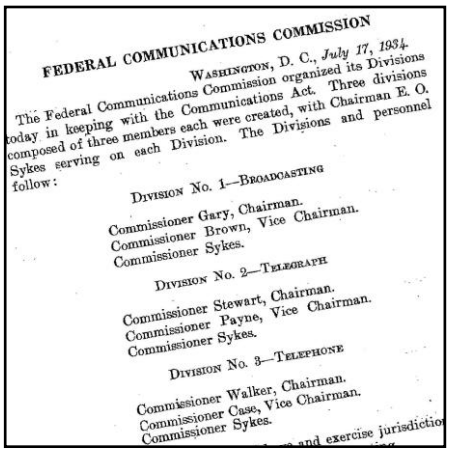
(Emmy, the award for artistic and technical talent in television, is a derivative of *immy,* the abbreviated term for a TV camera's *image orthicon tube*.)

In 2022, the Washington legislature approved a specialty Patches license plate. The proceeds are designated for children's cancer research.

Fremont, known for the zany antics of its residents, is a small neighborhood, west of Interstate 5, along the northwest shore of Lake Union, in what is now almost the center of Seattle. The area was once a separate town until annexed as Seattle expanded northward. Part of a street in Fremont is named "J.P. Patches Place."

Story by Peter Amstein, pictured with Patches phone at Connections Museum

FCC sets up original operating divisions



FEDERAL COMMUNICATIONS COMMISSION

WASHINGTON, D. C., *July 17, 1934.*

The Federal Communications Commission organized its Divisions today in keeping with the Communications Act. Three divisions composed of three members each were created, with Chairman E. O. Sykes serving on each Division. The Divisions and personnel follow:

DIVISION No. 1—BROADCASTING

Commissioner Gary, Chairman.
Commissioner Brown, Vice Chairman.
Commissioner Sykes.

DIVISION No. 2—TELEGRAPH

Commissioner Stewart, Chairman.
Commissioner Payne, Vice Chairman.
Commissioner Sykes.

DIVISION No. 3—TELEPHONE

Commissioner Walker, Chairman.
Commissioner Case, Vice Chairman.
Commissioner Sykes.

and exercise jurisdictio

In its first order of business in July 1934, the newly created Federal Communications Commission established divisions for broadcasting, telegraph, and telephone.

FCC Order #1 set forth how the commission would regulate communications, under the comprehensive Communications Act of 1934. Previously, the Federal Radio Commission governed wireless and the Interstate Commerce had jurisdiction over wired communication.

The FCC now regulates all communications by telephone, radio, television, telegraph and other wire, satellite, and cable in all states, District of Columbia, and U.S. territories. The 1934 Act, amended by the Telecommunications Act of 1996, sets the FCC mission "to make available as far as possible, to all people of the United States, without discrimination...rapid, efficient, nationwide, and world-wide wire and radio communication services with adequate facilities at reasonable charges."

Five commissioners, appointed by the president and approved by the Senate, direct the FCC. Commissioners have five-year terms, and the president names the chair. No more than three commissioners can be of the same political party. The chair appoints seven bureau chiefs to oversee designated everyday operations of communications matters.

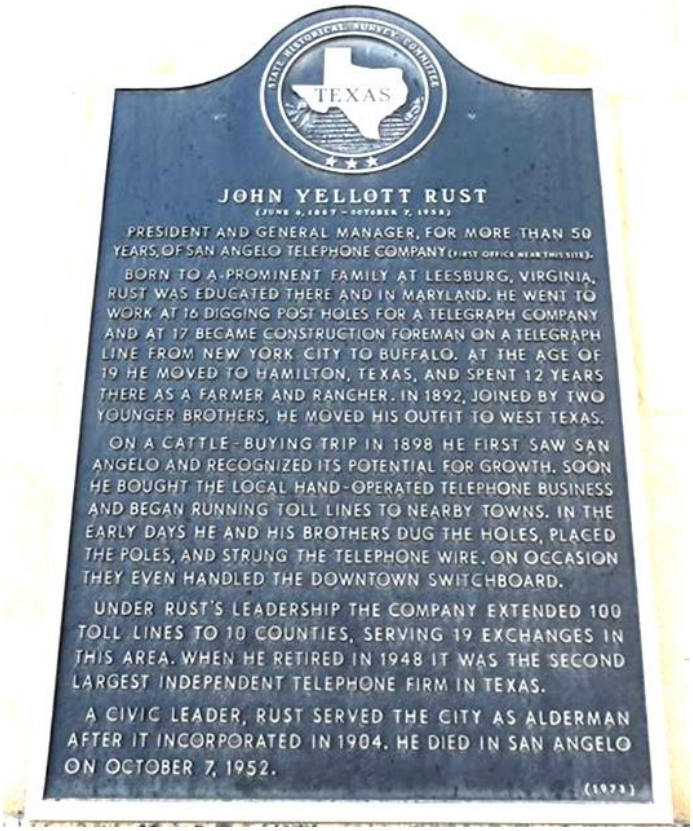
Strong family connections in Texas telephone

In the Telecommunications History Group records is a family story that involves formation of a significant independent phone company.

A few pages of a Rust Family genealogy in the Denver archives tells of the beginning of the telephone company in San Angelo, Texas. In 1899, with his younger brothers Jerry and Lew, John Yellott Rust began to rebuild an existing company for a city of up to 100,000. Customers had single lines and by 1907 San Angelo had switched from magneto ring to common battery.

Agnes Rust Gordon Smith wrote the story in her book Back Then and Now. She was John's daughter. The book was self-published in 1976. Agnes died in 1988.

According to the E.H. Danner Museum of Telephony at Angelo State University: "At the time of (Rust's) purchase, 260 subscribers used cigar boxes with crude transmitters and receivers. Service cost $3.00 for businesses and $1.50 for residential customers. Those prices did not change until 1919."

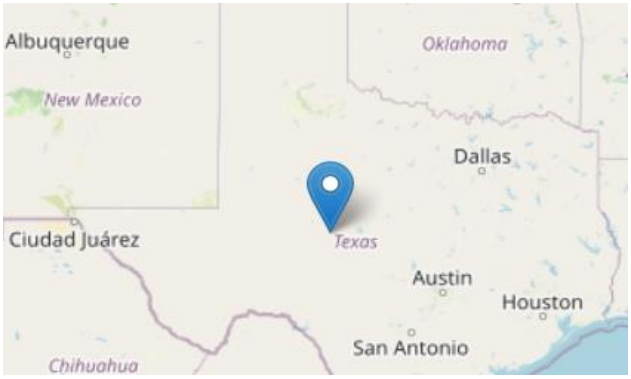


Born in Virginia, John worked on the construction of phone and telegraph lines for Postal Telegraph Company in New York state. In 1885, he moved to Hamilton, Texas as a rancher. He first visited San Angelo on a cattle buying trip in 1898 and reportedly saw the community's potential for growth.

Rust formed a partnership with his younger brothers, Jeremiah Yellott (Jerry) and Dewellyn (Lew). John bought the local telephone business for $5,000, and the brothers started running lines to several other parts of the state.

Lew had experience with American Bell Telephone in Philadelphia. Jerry was first employed by the Bell company, laying cable for five years before going to West Texas.

The Rust brothers were actively involved. According to Agnes Smith, it was a familiar scene for ranchers to see John on top of a telephone pole while his brother, Lew, was playing out and stretching the wire. The Rust brothers dug the holes, set the poles, strung and maintained the wires. Sometimes, they even operated the original cordboard.



Lew Rust bought the Del Rio and Western Telephone Company in 1905. The brothers put the first telephones into twenty-five West Texas Counties. They convinced people the telephone

was not a toy or extravagance. The system grew rapidly, particularly in neighboring oil towns. Prior to the arrival of the Rust brothers, farmers sometimes pooled their resources to buy rudimentary equipment and used barbed-wire fences for connecting lines. Bad weather, particularly rain, often interfered with phone signals.

The San Angelo company had some innovative approaches. Anticipating growth, John Rust started laying cables underground as early as 1928. The company designed and built a vehicle known as "Old Cap." It was the first known line truck built to set telephone poles. Its main feature was a drilling derrick that could be raised and lowered from the driver's seat. Other vehicles in use at the time were operated by hand. "Old Cap" helped to set poles and pull underground cable in San Angelo, Ozona, and Sonora.

According to Agnes, Rust built the last great home-owned public utility of the Southwest. His historical marker (No. 2824) states the company had "100 toll lines to 10 counties serving 19 exchanges" when John retired in 1948. John was titular president of the San Angelo company at the time of his death at age 85 in 1952. General Telephone Company purchased the firm in 1953 and consolidated into General Telephone of the Southwest. Jerry and Lew had already retired from the business.

San Angelo became a regional headquarters for General Telephone. It was the largest independent phone company in the southwest, serving over 300,000 phones in 260 exchanges in Texas, New Mexico, Oklahoma, Arkansas, and Louisiana. The southwest company was a subsidiary of General Telephone and Electronics (GTE), headquartered in New York.

The merger of Bell Atlantic and GTE in 2000 formed a new company called Verizon. After territorial and corporate renaming schemes, Verizon sold its GTE properties in Texas to Frontier Communications. This transfer ended Verizon's landline operations outside the traditional East Coast territory of Bell Atlantic. Verizon sold many of its other wired phone operations and became one of the largest cellular providers. The company still operates traditional landline service in a few eastern states.

Now, in an ironic twist of corporate fate, Verizon is buying Frontier to take advantage of Frontier's significant expansion of fiber optic cable.

San Angelo operates in Area Code 325, with over two dozen prefixes. Some of the prefixes serve traditional land lines, while others are run by Competitive Local Exchange Carriers (CLEC) and cellular companies.

The original San Angelo Telephone company headquarters, at #14 Twohig Avenue in downtown, is a National Historical Landmark. The building was constructed in 1927, for $160,000 "to meet rising demands for...telephone service in the rapidly expanding city" according to the National Parks Service Registry of 1988. The designation describes the

building (shown in 1988) as "a good representative of its (Modern Gothic) style." The two-story structure has a smooth stone exterior with a polished granite base and symmetrical facade. The right side windows have been fitted with vents for heat exhaust, but otherwise the building retains it original appearance. Inside, a highly ornate plaster cast ceiling by local craftsman Dwight Holmes remains intact. The downtown building houses switching equipment. Administrative offices have moved to a suburban location.

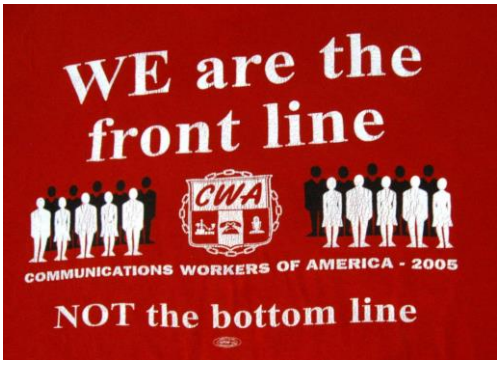
The Rust family descended from Scottish immigrants to Virginia before the Revolutionary War. After settling in Texas, John Yellott Rust and his family developed strong ties to the community. John's wife, Agnes Bustin, came from a cattle ranch near San Saba. He was an alderman in San Angelo when the town incorporated in 1904. Married in 1890, John and Agnes had four children. They were John Y. Rust Jr., George Foster Rust, Armistead (Armie) Rust and Sarah Agnes Rust Smith.

Armie benefited from a sale of assets of San Angelo Telephone in 1945. He bought 19,200 acres of ranch land in nearby Menard and Kimball Counties. He remained active in civic and business affairs, as mayor of San Angelo and president of the Texas Municipal League. Rust was also chairman of the Texas Turnpike Commission, instrumental in building the Ft. Worth-Dallas Turnpike. Armistad Rust then became president of West Texas Broadcasting company, which owned a radio station and San Angelo's first TV station. He was 82 when he died in 1992.

The Danner Museum of Telephony, opened in 1990, is located in Officers' Quarters at Fort Concho National Historic Landmark in San Angelo. Now part of Angelo State University, the museum is named for E.H. Danner. He started as a lineman digging holes for Illinois Telephone Co. in 1928, and eventually became president of General Telephone Co. of the Southwest in 1957.

Original story by Renee Lang, based on THG Archive material. Supplemented and edited by Dave Felice, with assistance from the Texas State Historical Association and multiple other sources.

Union shirt becomes historic



This photo shows the back imprint of a T-shirt from the Communications Workers of America in 2005.

CWA distributed the shirt during contract bargaining with CenturyLink. Although popular with union and non-union workers, even in other industries, the slogan was not used again. No original unworn shirts are known to exist, and all remaining shirts are privately owned.

The King Louie union garment company of Kansas City produced the original shirt. It was printed in Denver.

Your telephone story is important

Do you have a story you'd like to share, an idea for a story, or something you'd like to see? Send e-mail to telcomhist@aol.com. Put the word Editor in the subject field.

TELECOMMUNICATIONS HISTORY GROUP