



CONNECTIONS *news*

www.telcomhistory.org

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Dave Felice, editor

A message from our director

In this edition, you'll read about a great opportunity to make your THG membership go farther to support the work of the Telecommunications History Group. See page two.

All of the items from the J.K. LaRue collection have now been moved from Santa Cruz to Seattle. THG's new curator Remco Enthoven is working diligently to get everything unpacked and back on display at the new Seattle facility, to be known as WAverly 7, a project that will take several months to complete. THG volunteers are setting up a new switchroom in that building.

The name of Seattle's new facility is an homage to telephone exchange names. The building's street address is 927. In the alpha-numeric naming format, the address becomes WAverly 7. The exchange name wasn't used in Seattle, but was used in Newark, New Jersey.

Readers are commenting on stories in *Connections News*. One veteran phone technician says his bosses warned him about "blue boxes" that hackers used. But in all his time, the technician says he never saw a homemade device to send switching signals. You can see more about comments on page 11 of this edition.

The transmitters (microphones) and receivers (speakers) that we take for granted today are the result of a lot of thought and a good dose of serendipity. A.G. Bell and Thomas Watson were really stepping off the edge 150 years ago. An experiment at the Connections Museum demonstrates how the founding principles changed the world of communications.

As always, if you have a suggestion for a story, something you'd like to see in the newsletter, or a comment about a story, let us know. Put the word "Editor" in the subject line and send e-mail to: telcomhist@aol.com. Remember, this is your newsletter, so all of your ideas will help improve the publication.

Renee Lang
Managing Director



This mug from Omaha radio station KLNG shows the CBS Radio logo in 1973. The station uses stylized candlestick phone imagery to promote its news and talk format "Calling Radio"

Challenge Grant returns: Double Your Impact for Telecommunications History!

We are thrilled to inform you a generous anonymous donor has once again issued a \$20,000 Challenge Grant to support Telecommunications History Group.

This means every dollar you donate between now and August 31 will be matched one-to-one, and double the power of your contribution!

These funds are vital for the completion of our new museum in Colorado, ongoing preservation of our one-of-a-kind archives, and continued maintenance of our rare, working electromechanical switches. Your contribution and the Challenge Grant match will ensure that this living history remains functional for the next generation of researchers, telephone enthusiasts, and visitors to THG museums.

Help us unlock the full amount: Whether you are a long-time member or a new donor, your gift today goes twice as far in keeping the dial tones humming and the documents safe. If you are renewing your membership, that also counts toward the Challenge Grant.

Don't delay. Visit telcomhistory.org/challenge to make your tax-deductible donation or use the enclosed envelope to send a check and help us meet the challenge!

New project reflects Telstar legacy

The age of communications satellites begins with the development of Telstar by Bell Laboratories in 1962 and '63. Telstars are the first commercial satellites specifically for communications. In the latest iteration, the nation's top three cellular companies are joining in a project to extend mobile coverage in rural and remote areas by using satellites.

Under the agreement, the companies will pool spectrum resources and satellite partnerships to bring coverage to under-served locations. The key feature of the system is to use "direct-to-device" technology, connecting through orbiting satellites instead of terrestrial cell towers. The companies must go forward with contracts and closing conditions before the agreement can be finalized.

The Wireless Infrastructure Association describes direct-to-device (D2D) as an emerging addition to existing networks. According to WIA, the weaker satellite signals require line-of-sight connectivity, so indoor and urban service might still remain limited. The wireless trade association says D2D is a supplemental function to fill gaps in remote or rural areas and locations affected by disasters.



The current agreements that T-Mobile, AT&T, and Verizon have with satellite providers will continue independently.

Starlink alone already has over nine million customers, and 9,000 satellites in orbit.

Recreating the First Telephone Call: A 150 Years Later Experiment at the Connections Museum

A wonderfully audacious experiment at the Connections Museum in Seattle celebrates the 150th anniversary of the invention of the telephone.

In two online video programs, Peter and Sarah of the Museum set out to recreate Alexander Graham Bell's March 10, 1876 call to Thomas Watson, using historically accurate reproductions of the original equipment. What began as a casual look at some museum artifacts quickly turned into an engineering adventure — complete with tuning forks, salt water, goat-skin diaphragms, and a surprising amount of shouting.



The project started with a set of reproduction devices built by Bell Telephone Laboratories sometime between 1925 and 1960. A story in the December 1925 Bell Labs Record says the Labs made the reproductions at the request of the associated operating companies which wanted to set up historical displays. These included early transmitter and receiver models based on those used by Bell and Watson during their experiments. Peter and Sarah realized that while these models were made primarily for display, some of them were constructed in such a way that they might actually be made to work.

The team focused on two pieces:

- A liquid transmitter, Bell's early attempt at a microphone using a needle dipping into conductive fluid, and
- A primitive electromagnetic receiver, essentially a very early "earbud".

The receiver test was both comical and revealing. Sarah could hear only a faint "dinging" sound until she positioned it perfectly — after which she suddenly recognized a voice sent to it from the audio output of a laptop. "I could totally hear a voice... it sounds like an educational video," she said. The device worked, but only barely.

The transmitter, however, was a different story. Its diaphragm, originally meant to be taut, was limp and unusable. As Peter observed, "This diaphragm is way too loose...flapping in the breeze". Without a tight membrane, similar to the head of a drum, the transmitter produced almost no signal. Only later did they discover that the reproduction liquid transmitter they were using was actually fabricated incorrectly. Properly made, the transmitter would have three screws around the rim which could be used to tighten the membrane.

Back at his workbench, Peter began fabricating new diaphragms. His first attempt used a piece of plastic zipper bag stretched tightly and clamped with wire. Surprisingly, it worked.

"There's a real signal here now..." Peter said. He had to shout very loudly into the device, and he recorded the output and sent it to Sarah who, despite the extremely narrow frequency range, said she could understand him. "I unmistakably heard your voice right away," she said, noting that her brain filled in the missing detail from the context.

A second diaphragm made from soaked and dried bongo drum skin performed even better. Sarah was impressed: "I was really amazed at how much definition you got out of the words 'liquid transmitter'". Bell had tried both diluted sulfuric acid and salt water in his initial experiments and found that they both worked. Peter chose salt water because it felt safer.

The ultimate goal was to send live speech from one room to another. Using the original receiver model, this proved impossible, the output was simply too faint. But when they substituted a receiver from an 1880s wooden wall phone everything changed. Sarah reacted instantly: "Yes, I can

hear this, Peter. Yes, I can." The sound was still quiet, but unmistakably intelligible — an astonishing result for a system using no amplification, only batteries, salt water, and a 19th century understanding of acoustics and electricity.

The experiment also shed some light on the historical record. Bell's notebook mentions that after the famous "Mr. Watson, come here..." moment, they struggled to reproduce the result. After their own time spent fiddling with wires, needles, and liquid levels, Peter and Sarah

concluded: "They just got really, really lucky for a few minutes that day."

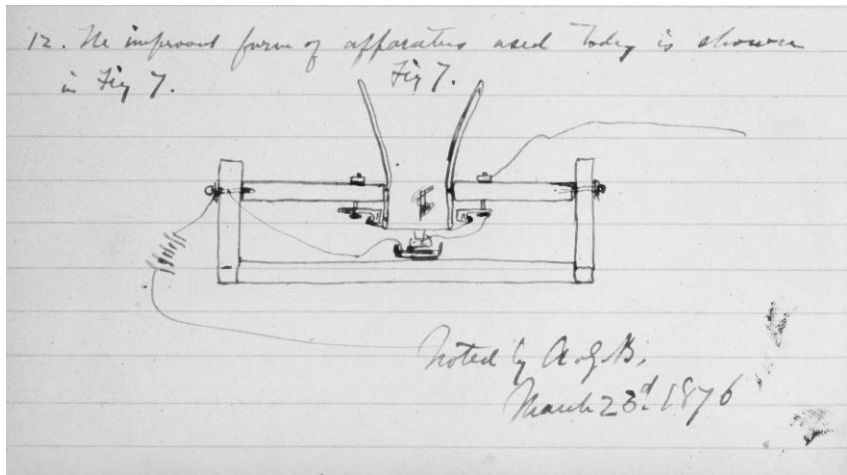
The team not only recreated the principle of the first telephone call but also gained a visceral understanding of the ingenuity, frustration, and serendipity behind one of history's most important inventions.

The most important outcome for Bell was surely not the liquid transmitter design, which he soon abandoned, but that

it must have given him the confidence to know he was on the right track and to keep experimenting and improving until he had a commercially viable product.

You can watch the two videos on the Connections Museum YouTube channel, as well as a third video answering some viewer questions. The programs are available at <https://www.youtube.com/@ConnectionsMuseum/videos>.

Original THG story by Peter Amstein



Good night, and good luck

The history of broadcast journalism is changing radically as the radio network of Edward R. Murrow goes silent. Over the years, millions of people have relied on CBS Radio for accurate and responsible international news and information. In the first half of the 20th century, entire families would gather around a single console radio to hear CBS Radio broadcasts, beamed over the air by powerful Western Electric transmitters and sent nationwide on AT&T Long Lines.

CBS RAD

The network's current owner, Audacy Inc., cites declining audiences and lower revenue –

described as "challenging economic realities" – as reasons for the change. Broadcast consultants also point out that the current trend is to move as much content as possible to a video platform. Contemporary audiences are not likely to wait for an hourly newscast, when they can get instant news at the flick of a wrist.

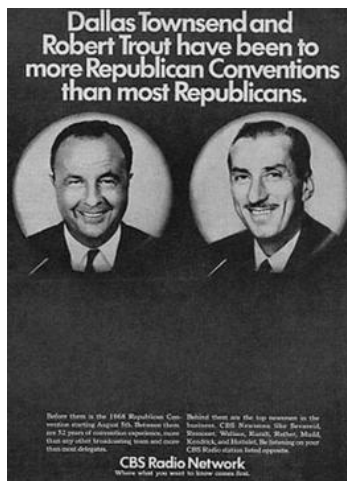
Re-branded by Audacy as "CBS News Radio", the network ceased broadcasting on May 22, after nearly 100 years of operation.



CBS fed radio news to 700 affiliates. The broadcasts included the historic "World News Roundup", the longest-running news broadcast in the country, anchored for many years by newsman Dallas Townsend.

CBS Radio phased out its entertainment programming – Ellery Queen, Ozzie and Harriet, Arthur Godfrey, Gunsmoke, Ed Sullivan, and Jack Benny – by the 1960s. The network successfully revived the radio drama format with "CBS Radio Mystery Theatre" in the mid-70s. Renowned actor E.G. Marshall hosted the program.

CBS (Audacy) owns and operates numerous stations across the country, including historic KCBS in San Francisco and WINS in New York City. Several of the CBS stations have an all-news format, which can



sustain loss of network news. Many independent radio stations have already switched to USA Radio News or Radio News Network (RNN).

Associated Press also operates an hourly and expanded audio news service. In many instances, microwave and even satellite links replace the broadcast phone lines from AT&T and Regional Operating Companies.

Some observers suggest the Telecommunications Act of 1996 sped radio's decline by allowing companies to buy multiple stations.

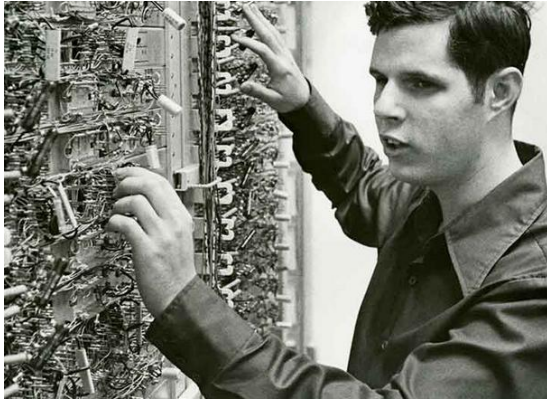


Veteran CBS newsman Dallas Townsend in a broadcast booth. Note the use of Western Electric Altec 639A microphones.

Story by Dave Felice, an award-winning member of National Writers Union, from personal experience and internet sources

***Joybubbles* movie getting attention**

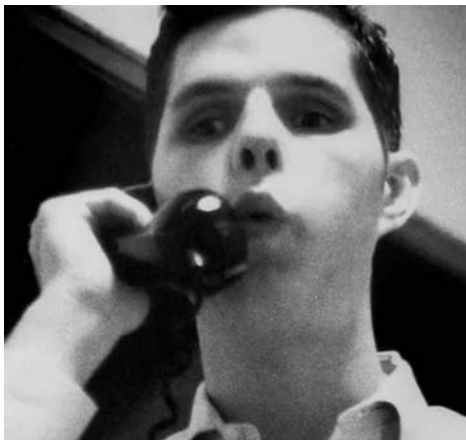
The documentary film about phone phreak Joe Engressia is making its way in film festivals across the nation. The story of how the blind person— later known as Joybubbles —hacked into phone switches by whistling even has an arrangement for European distribution. Director Rachel Morrison says she's extremely pleased by the positive critical reception for the movie.



As a child in the 1950s, Engressia learned how to manipulate the global phone system by perfect-pitched whistling a 2600Hz (cycles per second) tone. Joybubbles' eagerness for social connections sparked a subculture that had a monumental impact on modern technology. The personal response to loneliness led Joybubbles to become a leader in modern hacking culture described in Phil Lapsley's book, [Exploding the Phone](#). The social aspects of the story are often overlooked in technology history.

Writing for the organization Disability Belongs™ ([DisabilityBelongs.org](#)), Senior Vice President Lauren A. quotes the film's producer, saying "...the compelling story is totally about blindness, but not about blindness, while putting accessibility at the forefront." Butler, who is blind himself, says: "People with disabilities are so often on the cutting edge of technology and society and are responsible for so much positive change that happens in the world, but they do not often get the credit."

Lauren A. says blind and disabled people continue to face barriers in discrimination, unemployment, and being under-estimated. She praises the *Joybubbles* movie for its accessibility efforts, notably closed captions and audio description devices. She says this provides an "equal opportunity...for viewers to completely immerse themselves in the experience." Commenting on production, Butler says "Creating an audio description track did not slow us down."



Overall, reviews of the film are mixed. Some critics praise the documentary for its creative approach to highlighting disability and human connection, as the film uses archival audio and inventive visuals. Because *Joybubbles* veers away from traditional approaches, some critiques suggest the documentary is not cohesive.

A story in the Winter 2025 edition of *Connections News* talks more about Joe Engressia's life and exploits. Lapsley's book, considered the definitive work on phone hacking history, is available from many sources including the *Connections Museum* gift shop.

Original THG story by Dave Felice with material from multiple internet sources

Wataweih - A Very Special Directory

On Norfolk Island, the phone book is still part of the social fabric, and contains a feature found nowhere else.

Wataweih is the Norfolk language word for "hello" and also the title for the directory with a "Fast-Find" section. The concept of community comes to life in the part of the phone book which lists residents by their nicknames instead of their full legal name. "Fast-Find" is probably the only place in the world to find a phone number for Bookie or Huggy. Feathers has a listing for home and mobile phones.

Nicknames are essential to life on Norfolk Island. The island is in the South Pacific, about 1,000 miles east of Sydney and 600 miles north of New Zealand. Many residents are descendants of *HMS Bounty* mutineers, resulting in a small variety of surnames, such as Christian, Quintal, Nobbs, and Adams. Dozens of residents share the first and last names, so nicknames are necessary identifiers. Some residents might even have to pause to remember someone's formal name.

Because most Norfolk residents know each other by first name or nickname, the phone book becomes a reminder of a living social network shaped by generational history.

The island's community connections are reinforced by five-digit telephone numbers.

Communal meals are common. Drivers greet other motorists with a "Norfolk wave" consisting of a raised index finger or even a full hand motion. Before new phone books are prepared, customers are invited to "pop into" the print shop to make sure their listing is correct. Residents of Norfolk speak English, as well as the local language rooted in Old English and Tahitian vocabulary and grammar.



Fletcher Christian and others who mutinied against Capt. William Bligh in 1789 outgrew their first settlement on Pitcairn Island, far to the east. In 1856, Queen Victoria authorized land grants allowing the Pitcairn refugees to resettle on Norfolk, an abandoned former British penal colony.

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Bear	Devil	Glover
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Bella	Diesel	Griffo
Biddi	Diesel (Finch)	Grin
Bing	Doby	Gumboots
Blitti	Doodus	Gumby
Bonnet	Mobile	Mobile
Boo	Doosy	H
Booda	Drake	Hess
Bookie	Drill	Honey
Boonie	Duck	Honkey-Dorey
Boot	Dude	Hook
Barry	Dussa	Hose
Mobile	F	Huggy
Boy	Father	Hussein
Bubby		

Phone company meets challenge of massive event

The 1993 World Youth Day (WYD) exemplifies the extraordinary role of telecommunications in large scale special events. Held in Denver, August 10 through 15, WYD was one of the largest events in the city's history. The event featured two appearances by (now Saint) Pope John Paul II, a meeting with President Bill Clinton, and up to a million participants.

Hundreds of U S WEST personnel from multiple departments rapidly connected miles of wire to make World Youth Day happen. "Remarkable employee efforts and departmental cooperation have made preparations smoothly," said Strategic Account Manager Alan Magnuson, quoted by editor Ron Dulle in the *U S WEST Today* employee newsletter.

Early in the planning, I worked in desktop PC support for USWC Public Policy. The event preparation team asked for me to be assigned to the multi-departmental group, headed by Mary Pat McCormick, the wife of USW Chairman Dick McCormick. The offices were in the World Trade Center at 16th and Broadway.

I spoke Italian with the Vatican seminarians in the planning organization. Sometimes it was necessary to find the correct Italian word to describe technical activities. For example, *rete* (ray-tay) means network. A personal printer is *la stampatrice* (feminine), while a large work group printer is *lo stampante* (masculine). A seminarian once asked me "*che vuol dire sign on?*" (what does sign on mean?). I replied, "*deve dire il computer chi sei per autorizzazione*" (you have to tell the computer who you are for authorization).

On another occasion, the seminarians made a test journey from Stapleton Airport to see what difficulties people who didn't speak English might encounter. I recall asking them how they got

along, and they replied "*divertente*" (amusing).

U S WEST loaned Memorex Telex 1280 DOS computers, running a Novell network. We negotiated with a local shop called WhizBang Computers at 8th and Lincoln for hardware service. The computers came equipped with 128KB memory. WhizBang provided chips that we installed on expansion circuit boards to get maximum 640KB.

Phone order activities which would normally take days were completed within



hours. Security requirements and command centers for the Pope and president were high priorities. Orders tripled in just one week. For national and international media at the Radisson Hotel (uptown), hundreds of lines were rapidly set up. Locations such as the top of the state capitol building, Civic Center Park, and parking areas for campers all got phone connections.



"At Cherry Creek State Park, a unique one-time venue, over 250 lines are in place for vendors, media, and others with additional lines available if needed," wrote *U S WEST Today* editor Ron Dulle on August 10. "Almost every hotel, McNichols Arena National Western Complex, Stapleton, and Mile High Stadium also got additional services."

Over 200 employees were involved in providing phone services just for World Youth Day. Assignments, installation, central office, and coin employees were pressed to meet the needs of almost 200,000 national and international guests.



U S WEST Cellular leased or rented about 300 phones to major accounts and event organizers. Completion of a new cell site near Cherry Creek Park as expedited, and the system at Mile High Stadium was enhanced.

Employees also had to deal with huge crowds, congestion, and street closures while getting their work done. On Friday, August 13, there were so many pedestrians clogging 16th Street Mall that shuttle bus service had to be suspended. It is difficult to see distinguishing features in pictures

from Sunday's Mass service because of the vast expanse of hundreds of thousands of attendees.

Pope John Paul II met with President Bill Clinton at Regis College. The Pope also spoke at a welcoming ceremony at Civic Center Park, and arrived at Mile High Stadium by helicopter.

The Archdiocese of Denver has given *Communications News* permission to reprint these photographs by James Baca of the *Denver Catholic Register* newspaper.

World Youth Day is celebrated every two or three years to enable young people to express their Roman Catholic faith. The event in Denver was the first in North America or any English-speaking country. Law enforcement and city officials were said to be astonished by a sharp decline in violence and crime during the event. The state Motor Vehicles Department issued a limited green-on-white World Youth Day specialty license plate.



Although large scale public events still pose challenges, advancements in technology have significantly reduced the requirements and opportunities for traditional phone companies. Cellular service, in particular, lessens the reliance on fixed and coin service. And most news organizations now have their own mobile microwave equipment operating at very high frequencies to transmit large amounts of data. Small microwave antennae, usually mounted on a van or truck, can transmit and receive signals for broadcast.

Telecommunications History Group original story by Dave Felice

Native crisis phone services expand in Washington

Working with the state health department and Volunteers of America, Washington State's 9-8-8 mental health crisis line provides unique additional services. The Native and Strong Lifeline now offers culturally sensitive text and chat counseling services specifically for American Indian and Alaska Native people.

Fully trained Native counselors operate the only 9-8-8 line where tribal members and descendants with close community ties answer all calls, texts, and chats.

According to Washington's health department, Native communities have the highest suicide rates of any racial or ethnic group in the United States. "Suicide is preventable and specialized support can make a difference," says Michele Roberts of DOH Prevention and Community Health. "These new services provide additional options for mental health support through 9-8-8 for Native and Indigenous people."



Native and Strong Lifeline, a sub-network of the 9-8-8 Suicide and Crisis Lifeline, is administered by Volunteers of America Western Washington. Since its launch in November 2022, the Native crisis line has answered over 15,000 calls. "Adding chat and text ensures that more of our people can reach out in a safe and comfortable way," says Skyler Nomee, a lifeline coordinator.

The Native Lifeline is free, confidential, and available full-time. According to Volunteers of America, there are 29 tribal groups in Washington. (<https://www.voaww.org/tribalservices>)

Short number reaches crisis counseling nationwide

In a new report, Associated Press says "over 4,400 fewer U.S. teens and young adults died by suicide" in the first two-and-a-half years of 9-8-8 counseling. AP says this indicates the program is working well despite funding challenges.

The 9-8-8 Suicide and Crisis Lifeline short code dialing routes calls to a network of full-time mental health services in North America. The nationwide toll-free service started in 2022, replacing the National Suicide Prevention Lifeline which required 800 service 10-digit dialing.

Setting up the three-digit dialing required significant planning and coordination by health care providers, government agencies at all levels, telephone companies, and constituent groups. Numbering Plan Areas (NPAs) with the 988 prefix had to change to 10-digit dialing (82 locations) or, in the case of Area Code 701, take the exchange out of service.

Massachusetts officials also requested that the service route calls to actual physical location, similar to 9-1-1. This enabled callers to connect to counseling services nearest to their location. Many search engines and list the phone number as the first response to queries related to suicide.

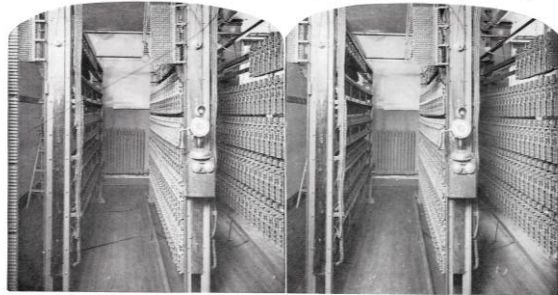
In 2024, tribal leaders in Washington reported that 9-8-8 calls were being misrouted in the 564 Area Code because the NPA was not updated in the routing table. People calling from the 564 NPA couldn't get Option 4 to connect to the Native and Strong Lifeline. By February 2025, the problem had been corrected in the 30 exchanges affected.

In addition to the Native services, three other sub-networks provide specialized counseling. They are Spanish, LGBTQ+, and Veterans. Sign language support is also available.

Reconnecting: Sears, dimes, and *Edmund Fitzgerald*

Sears Roebuck and Co. phone switching

An eagle-eyed reader notices THG's stereopticon card picture is the same as the small picture of the Sears switching office shown in the Spring 2026 Connections News. These Stereopticon cards were donated to THG by Paul D. Briggs estate in 2013.



No. 15 AUTOMATIC TELEPHONE SWITCHBOARD.
SEARS, ROEBUCK & CO., CHICAGO, ILL.

No. 15. AUTOMATIC TELEPHONE SWITCHBOARD. Sears, Roebuck & Co., Chicago, Ill.

This view of an interior in our great mercantile institution represents what is undoubtedly one of the great inventions of this electrical age. It is located in the basement of the Administration Building and is our automatic telephone switchboard. We have installed automatic telephones throughout our entire establishment for interdepartment communication. We therefore own our own telephone plant as used by department managers and their assistants. The great advantage of this system lies in the fact that the switchboard is purely automatic, no switchboard operators being required. You will notice in the foreground, resting on the bell box, what looks like an ordinary telephone. In the center of this instrument you will observe a dial with notches around the right half; these notches are numbered from one to ten. This dial revolves to the left, and to get a given department, say No. 123, the receiver is taken off the hook, the index finger inserted in notch number one and the dial pulled around to the left until the finger strikes the index just to the left of the lower center of the dial, when the dial is released and permitted to return to its original position; then the finger is inserted in notch number two and the operation repeated; then the finger is inserted in notch number three and the dial turned to the left as before. This has registered in the automatic switchboard the connection for phone No. 123, and when you press a button in the base of the instrument it rings the bell in department 123, just the same as it would be rung by a girl calling from the ordinary switchboard. The great advantage in this style of telephone is that communications pass from one department to another in absolute confidence. It is not possible for anyone else to hear a conversation passing over the wire. We have 325 automatic telephones installed in this plant. In addition to this automatic telephone system we also employ the services of the Chicago Telephone Co. for long distance purposes, as illustrated and explained in another view.

Stereopticon images are photographed with two lenses, one slightly offset, to give the visual impression of depth. The "double" photos are displayed with a special viewing device, reversing the lenses.

Pay phones, dimes, and more

Regarding the newsletter story on Jim Croce's "Operator" recording, readers offer other dime-related phrases. Chuck Berry's 1956 recording "Too Much Monkey Business" mentions phone trouble: "Pay phone, dime gone, will mail, oughta sue the operator for tellin' me a tale." Singer Tom T. Hall, known as "Storyteller," mentions things that are "only worth a solitary dime" in his 1972 song "Watermelon Wine".

In the 1962 recording "If I Didn't Have A Dime", Gene Pitney sings that playing a record on a jukebox enabled him to attract a romantic partner. In the version sung in Italian, Pitney asks for someone to loan him *un soldino* (coin or penny) for the jukebox.

The first documented American use of "dime a dozen" in 1895 describes the cost of eggs. It's believed the expression meaning plentiful and ordinary is from 1796 when dimes were first issued. Smokey Robinson sings "pretty girls come a dime a dozen..." in his 1960 recording "Shop Around".

And there are almost endless references to the "dime store" as a place where things don't cost much.

Fine dining on a Great Lakes ship

A *Connections News* reader in upstate New York recalls how his father, a marine equipment supplier, told of having Thanksgiving dinner aboard the *SS Edmund Fitzgerald* one year. Like everything else on the giant ore-carrying ship, food service on the *Fitz* was first class, often rivaling many fine restaurants.

