**Two Antique Telephone
Shows Coming Up Soon!**

Central California Show
November 13, 2004

Southeast Regional Show
January 15, 2005

*See Page 7 for details on both
shows . . .*

Coming next month....

**First in a series of articles on
preserving and archiving telephony
documents in digital format.**

A Conversation with Donald Genaro – a Living Legend of Telephone Design

Jonathan D. Finder, MD

When one thinks of telephone designers, one name tends to come up, that of Henry Dreyfuss (1904-1972). The designers of the early telephones were probably anonymous employees of the Bell System (as well as of the independent telephone manufacturers) who were engineers first and designers second. Bell Laboratories realized that their telephones were lacking in design and so in 1929 held a "Telephone of the Future" contest. This contest was won by a 25 year old man named Henry Dreyfuss.

His first telephone for the Bell System, the WE302 (or "H" mounting), still stands as a hallmark in American design and is still being produced today (after a fashion, by a catalog home furnishing company). Dreyfuss' attention to the human factor in design of telephones is partly why his firm's designs have had such lasting power and why the relationship he and his firm forged with the Bell System would last more than half a century, indeed even beyond his death. The best source on Henry Dreyfuss is a wonderful book called Henry Dreyfuss, Industrial Designer: The Man in the Brown Suit by Russell Flinchum.

What most people do not realize is that Henry Dreyfuss did not work alone, and had a design team that created the above telephones. What made the Dreyfuss team special was their use of *ergonomics*, something that very few design firms had previously used. Ergonomics refers to the science of making the form fit the person. Ergonomics is not what comes to mind when one considers early telephones like the "candlestick" desk stands.

The WE302 was designed "from the inside out" by Dreyfuss associates, for the Bell System, and contrasted with the work of designers who were hired after the fact to "soften" products after they had been created. Dreyfuss' firm used measurements from thousands of people to establish normal values on which to base the human elements of design (like the distance between mouth and ear in the rational design of the telephone handset). These many measurements (the science of which is known as anthropometrics) resulted in the publication of the industry standard guidebook, The Measure of Man: Human Factors in Design by Henry Dreyfuss Associates in 1960. This book remains in print, revised and updated, most recently in 2001, and renamed The Measure of Man and Woman: Human Factors in Design.

Henry Dreyfuss and his firm pioneered the science of ergonomics in design, which would later become the single most dominant force in the industrial design world. Indeed, Dreyfuss' 1950 autobiography was tellingly named "Designing for People." Dreyfuss wrote an article called "Adapting Products to People" in the Bell Telephone Magazine, in which he said "We are not in the profession of style or fashion. Ours is a basic profession; our designing must be generic by nature. If the most contemporary of design can be called "classic," then call us classicists." No one can argue that Henry Dreyfuss Associates have created the classics of telephone design.

One crucial member of Dreyfuss' design team would eventually lead the team after the death of Dreyfuss. This man, Donald Genaro, would work side-by-side with Henry Dreyfuss for 15 years and then carry on the Dreyfuss tradition of design with the human form in mind. As Mr. Genero will describe below in his own words, he is

responsible for critical elements of the design of the Princess, for the complete design of the 2500, and for the creation and design of the boldest change to date of the Bell system: the first "dial-in-handset" telephone, the Trimline. This telephone is the forerunner of every cell phone and cordless telephone in use today, and remains the most commonly produced corded telephone manufactured to this day.

Mr. Genaro has retired from Dreyfuss and Associates but remains active in his community. I recently had the honor of exchanging a few calls and emails with him and he lent me some source materials upon which I based this article. I cannot begin to describe the feeling I had in being able to talk to Mr. Genaro about his career — being able to talk to a person who worked side-by-side with Henry Dreyfuss, and who went on to design nearly every telephone produced by AT&T since 1965. In a sense Donald Genaro is a living piece of history. He might disagree with this but I can tell you I felt like I was able to call and email Watson or Bell as I worked on this article.

First, some basic biography. Donald M. Genaro was born in 1932 in Hoboken, NJ and attended local public schools. He served an apprenticeship at FW Fisher Architects prior to entering the US Army during the Korean War. After leaving the service, he entered the Pratt Institute, where he received a degree in Industrial Design. Mr. Genaro joined Henry Dreyfuss Associates (HDA) in 1956 – a job he applied for even before graduating from Pratt. He worked at HDA from 1956 through 1995. He became an associate at the firm in 1963 and a partner shortly thereafter. Henry Dreyfuss retired in 1969, and Mr. Genaro carried on the tradition of design excellence at his firm for another 25 years – the last 15 years as its senior partner. Mr. Genaro has developed products for AT&T/Bell Labs, John Deere, Polaroid, Singer, American Standard, Banker's Trust, American Airlines, Olivetti, British Aircraft, Matsushita, and Hitachi. He is a member of the Industrial Designers Society of America and has been recognized by awards from many professional organizations. His designs are included in the permanent collections of the Museum of Modern Art and at the Smithsonian Institute's National Design Museum. He holds over 200 patents and has lectured on design at many prominent universities. The Pratt Institute recently put a display out honoring his work. I am happy to have donated a new old stock Trimline from my own collection for this exhibit.

Upon retirement, Mr. Genaro became the Chairman of the Board of Directors of the Pascack Valley Hospital. He also serves the Board of Directors of the Well Care Group, a New Jersey healthcare system. His commitment to healthcare reflects his long interest and dedication in creating designs that demonstrate a concern for the user.

Mr. Genaro and his colleagues at HDA designed nearly every telephone produced by AT&T that is in use today. In 1977, Fortune magazine described the Trimline telephone "one of the 25 best-designed products available in America today." The New York Times, in a review of the Pratt Institute's Exhibition on Industrial Design ("Corvettes to Cuisinarts: Six Decades of Diversity in Industrial Design") used the coined word "beautility" to describe the kind of work featured – a word that nicely summarizes the work of Mr. Genaro – beauty and utility fused.

Donald Genaro has said, "If people notice the design, it has probably failed." This sentiment crystallizes the nature of good industrial design – a natural seeming design of a functional product does not call attention to itself.

I contacted Donald Genaro to learn more about his career, especially about his work with telephone design.

Jonathan D. Finder: Were you trained in electrical engineering?
Donald M. Genaro: My training did not cover electric engineering but an understanding of its basic principles is necessary for an industrial designer to practice successfully.

JDF: Can you tell me a bit about working with Henry Dreyfuss?
DMG: I am indeed fortunate to have had almost 15 years at his side. His main concern was always the user and he insisted that safety, ease of use, maintenance, ergonomic and cost issues be addressed in the design process and that they not be subservient to aesthetic goals. Henry had an abiding and intensive interest in the needs of his fellow

Americans and the designs produced by his office reflected his wish to improve their daily lives through good design.

JDF: **What was your involvement in telephone design prior to The Trimline?**
DMG: When I joined the office [in 1956], the Princess development was fairly well along though I became involved in some detail improvements in handset cradling, recontouring for the touchtone dial and introduction of a "lip" on the base just above and below the dial which permitted the entire set (with handset in place) to be picked up and carried in one hand. This "lip" or undercut, was accomplished by providing retractable pieces (slides) in the tool. "Witness lines" can be seen on the front and back of the Princess base that are the result of these slides.

It should be noted that early Princess sets had no ringer in the base (it was a separate item which attached to the wall baseboard) to make the set as light and petite as possible. The phone was viewed primarily has a bedroom phone; its small footprint was advantageous for night-table placement, and its light weight was considered a plus when one took the phone to use in bed. The lighted dial also reinforced this perception. Cost and skittish rotary dialing problems put the ringer (and some weight) back into the base early on, which caused a slight increase in the set's girth, prompting the "lip" mentioned above.

In those early days, I also had detail involvement on the 554 wall set (creases on the set's shoulder's that allowed temporary placement of the handset during a call), initial speakerphone models, the Call Director set, and numerous pay station facilities (phone booths and shelf units). Just prior to the Trimline, I designed the 2500 touchtone set which retained most of the design features of the 500 set except for the entire front portion of the base which received the flat surfaced removable face plate surround the new dial. Contouring and spacing of the keys was also part of this study.

JDF: **What can you tell me about the development of the Trimline?**
DMG: The Trimline broke from traditional telephone design by combining the transmitter, receiver, dial, and most


Tuesday, February 9th, 1982 at Luchows, N.Y.C.
Don Ameche, star of the 1939 movie The Story of Alexander Graham Bell" with Loretta Young and Henry Fonda, prepares to cut a four-foot-long chocolate cake in the shape of an 1882 model telephone to celebrate AT&T's 100 years of phones for the home. Assisting Mr. Arneche is Don Genaro, Senior Partner of Henry Dreyfuss Associates, designers of communications apparatus for AT&T over several decades.

important components in one lightweight unit. Placed on its base, the design is viewed as a single, sculptured piece. It was a radical departure from previous models, both in its technology and appearance. The basic concept underlying the Trimline was the dial-in-handset which permitted all operations of placing and receiving calls to be done with one piece of equipment rather than two.

Bringing the functioning parts of the phone up to the user had a number of use benefits – e.g., the poorly sighted might dial without glasses; as a bedside phone there were human factor gains in usage; with the switch hook in the handset, there wasn't a need to return to the base when making multiple calls, etc. The set at rest, or "on hook", presented an easily cleanable surface with all the dust-sensitive components and openings protected.

This dial-in-handset concept, while new to the consumer market, had actually been in use internally by the Bell System since 1939 as a lineman's test set. With one piece of equipment the lineman was able to attach leads to a line, dial through on one side of the instrument, and then turn it over to use the transmitter and receiver. This set did not look too different from a standard handset except that a miniature dial was positioned atop the handset behind the receiver. This lineman's handset was a simple and direct solution to a compact communications device for field use, and had been worked on by the Dreyfuss office in the 30's. However, when the same problem was given over for development as a consumer product, it went through all kinds of convoluted shapes before reaching its final, functionally expedient and sculptural form.
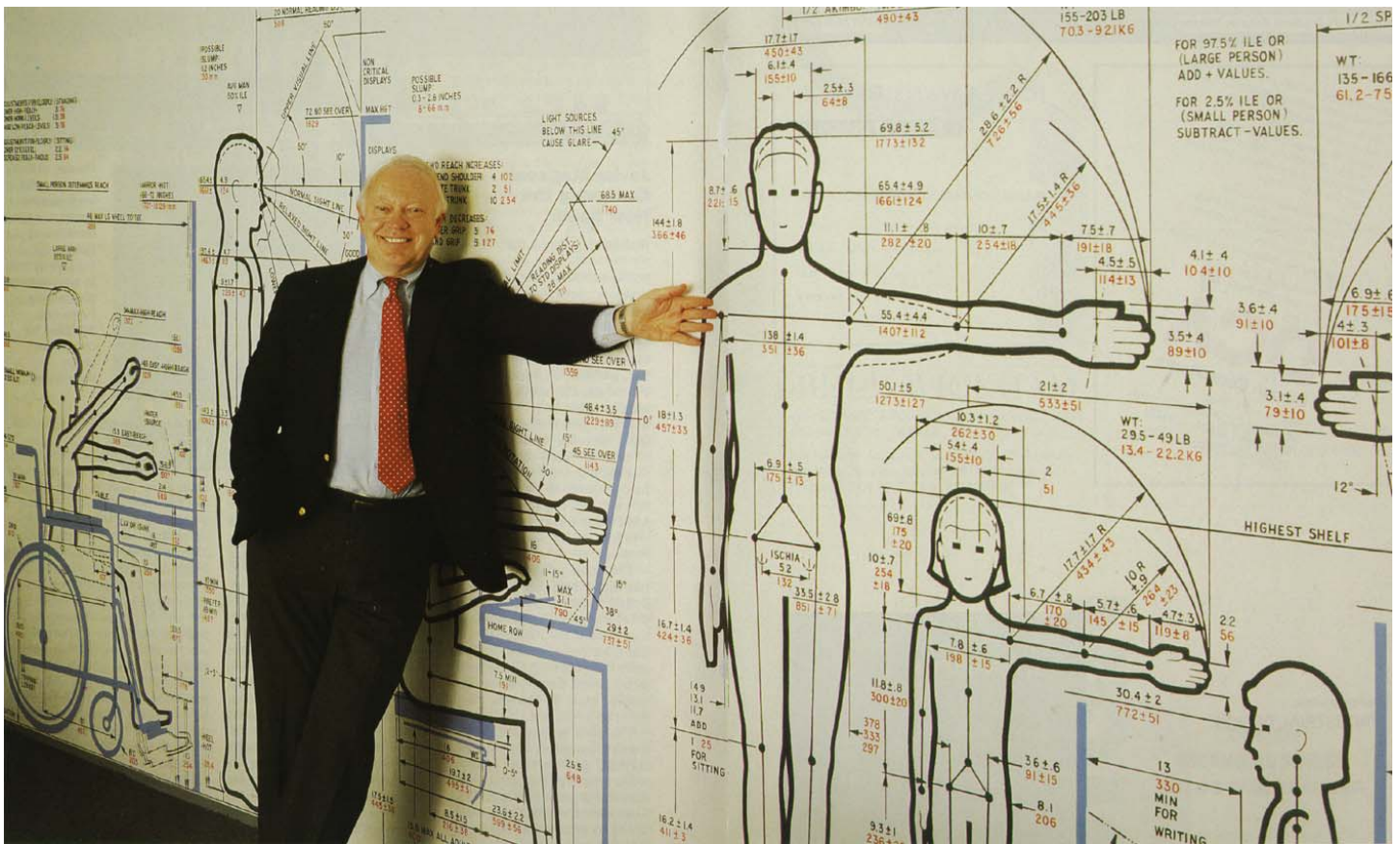
Two different, but related conceptual design ideas were explored as possible solutions. The first was the concept of a one-piece instrument without a base, which would sit or lie on a flat surface; the second, and one ultimately leading to the Trimline as it was marked, was the concept of a handset with a base. Many of the early efforts, in both directions, were unsuccessful mostly because they attempted to combine existing components in ways they were never intended to be used. Such a concept as a dial-in-handset demanded a completely new approach, free of existing preconceptions, technologies and components.

The Trimline began to emerge after thousands of rough sketches followed by clay models and then plaster to allow detail refinements of the design and offer a more substantial surface for the evaluation of tactile qualities, handset-to-base cradling, etc. Throughout this work, human factor (ergonomic) requirements were investigated using the anthropometric techniques the Dreyfuss office originated to establish cheek clearance, modal angle, and distance between receiver and transmitter, button spacing, etc. At each stage there was close collaboration with Bell Labs engineers as they were developing new components. Breakthroughs in many areas had very positive effects, e.g., a flexible printed circuit "board", moving finger stop for the rotary dial to reduce the dial's diameter without seriously reducing finger hole dimensions, and the downsizing of numerous components. Both a desk and a wall base were designed, optimizing the best solution for both. Designs for both a rotary and touchtone version were pursued with as much appearance commonality as possible. One wonders how much condensing of the design program could have been accomplished in today's design environment what with CAD/CAM [computer aided design/computer aided manufacturing], etc., but then would the results be the same or would that version be missing the subtleties of surface manipulation and attention to detail that were only brought on by hands-on design environment?

JDF: **What was it like working with Western Electric/Bell Labs? Can you share with me anything of the challenges of working with electrical engineers and the technical side of things?**
DMG: Most, if not all, of the early Trimline development was with Bell Labs engineers at Holmdel, NJ who had recently moved from their Murray Hill, NJ location. As the design program began to approach the working prototype stage, the small contingent of Bell Labs engineers at Western Electric's Indianapolis plant became involved to carry out value engineering and ready things for a preproduction run. Western Electric engineers were introduced to the development as questions of manufacturability arose.

I've had the rare privilege of working with some of the world's greatest engineers. They seldom said "no" to an idea

but rather were stimulated by the seemingly impossible and welcomed a challenge. Most successful designs are the product of collaboration between many team members and would never see the light of day were it not for their contributions.

JDF: Were you involved in the redesign of the Trimline – the second generation model with square buttons, lit by LED's?

DMG: I was involved in various generations of Trimlines. Some were improvements, such as the square button dial. Unknown to many casual observers, the original round button dial had keys of varying heights to conform to the curve of the inner plane of the handset. The square button dial rose from a flat plane with all the buttons the same height.

Some were questionable improvements, such as the "universal base" which came later. This cost saving approach of having the same set serve both desk and wall situations did have a drawback on the Trimline's appearance in the desk mode. Not having the base "roll under" as it came down to the desk top but simply cut off as most product housings do, it took something away from the sculptural quality of the overall design. The old base came at a price, for as well as not being wall/desk compatible, it required "compression molding" (longer molding cycle) because of the varying wall thickness and slides in the tool to accomplish the reverse taper on the bases side walls.

Therefore, the Trimline with square buttons and original desk base represents the high water mark in its design development.

JDF: **"What has it been like for you to see the Trimline become the single most copied telephone ever made? Billions of them are out there – most are junk – does it bother you?"**

DMG: It's been said that imitation is the sincerest form of flattery. This is perhaps true if the imitation is true to the original but if it isn't, it constitutes a denigration of the original work and should be condemned. This unfortunately happens all too often. A case in point is the Eames Lounge Chair, manufactured by Herman Miller.

There have been many "knockoffs" of this design but none come
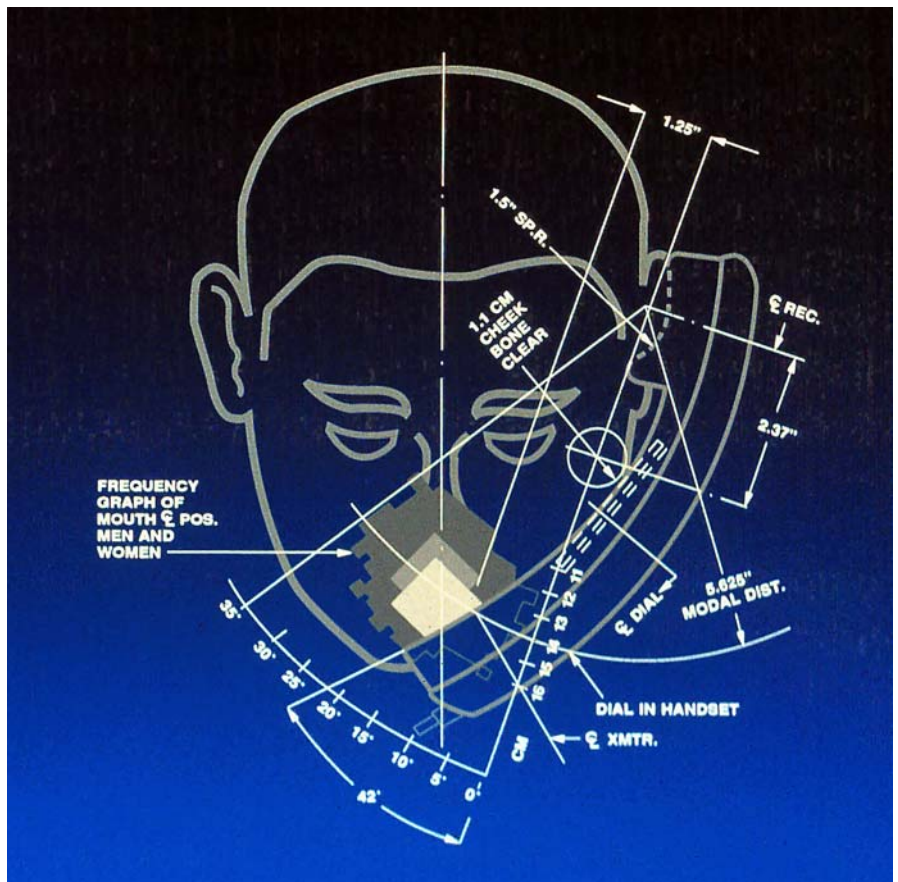
near to the engineering, materials, construction and sheer beauty of this classic. Some are outright atrocious. Of late design patent protection has become a weapon to fight these plagiarists.

Not so the case with many of the Bell System's designs. Design patents were gotten but protecting against copies wasn't pursued. All those Western Electric look-alikes from Automatic Electric, Kellogg… the Trendline, Slenderet, and Styleline phones run the gamut of faithful reproduction to missing or poorly reproduced detail.

The Trimline, I'm pleased to say, became the seminal design for today's varied communications products. But I guess I'm showing my age when I take a close look at today's instruments… especially the vaunted cell phone. I think back to how we at Dreyfuss and the Bell Labs had certain incontrovertible requirements in the design of telephones, e.g. ear seal, modal angle and distance, button spacing and travel, comfortable grip, etc., etc. These tenets of comfort and optimized connection have given way to what seems almost

absurd when people hold those flat, toy-sized phones hard against their temples with the mic pickup halfway to their ear. And then there is the incoming ring everyone nearby must suffer. I suspect things have been altered irrevocably in the name of progress… But then I can remember some old timers at AT&T who thought the 500 set was the epitome of telephone design and this Trimline that their consultant Dreyfuss and Bell Labs had dreamed up would never amount to anything.

I will have more to share of Mr. Genaro's insights into the modern telephones, and on the design of the touchtone keypad, and more next month. I am grateful to Mr. Genaro for taking the time out to answer my questions for this column and to Henry Dreyfuss Associates for permission to print the image of Trimline human factors that accompanies this article. In a future column I will profile Mr. Genaro's mentor, Henry Dreyfuss, more fully. ∎

40 YEARS AGO...
1964/1965 New York World's Fair

WORLD'S FAIR PHONE BOOTHS FEATURE PUSH-BUTTON CALLING

More than 1,400 modernistic telephone booths with new Touch-Tone (push-button) telephones make it easy for visitors at the New York World's Fair to call friends and family anywhere in the nation.

A new style open air booth — one of several advanced designs being unveiled at the Fair — consists of units of three to five blue and white booths located at convenient spots around the fairgrounds. The Bell System calls them "serpentine" booths because of their swirling line design.

Another even more elaborate booth is the family booth which seats a group of people in an air-conditioned bubble that looks like a space helmet. The booth has no telephone receiver inside. Instead, it is equipped with hidden speaker and microphone so callers may talk and listen "hands-free".

To conserve space, many of the indoor public telephones in fair buildings are compact cartridge phones that are either mounted on walls or built into them.

All public telephones at the Fair are the new Touch-Tone push-button models, which are being introduced in some parts of the nation this year.

The push buttons replace the familiar dial, making calling faster and more convenient. Combined with this is a new service that enables callers to dial all their long distance calls, including person-to-person, collect and credit card calls, directly to points throughout the country.

New York Telephone constructed a new switching center in nearby Corona to serve the public telephones at the Fair, as well as the 5,000 other phones used by exhibitors and Fair offices. This modern central office, which also handles calls from surrounding communities, was just one phase of the huge undertaking to provide modern communications far from the city within a city.

More than 500 million conductor feet of telephone cable was installed in an underground conduit system at the Fair. Facilities for radio, data transmission and teletypewriters are also provided. A 140-foot microwave tower standing in front of the Bell System Exhibit is used to relay television signals to and from the Fair. In addition to commercial telecasting facilities, terminals and lines have been installed to operate at the Fair, the largest closed-circuit color television system in the world.

Some Interesting Facts about the Bell System's Presence at the Fair:

■ Yachtsmen at the New York World's Fair Marina in Flushing Bay can make phone calls without leaving their vessels through a unique "ship-to-shore" telephone service.

The Serpentine booth is one of the Bell System innovations at the New York Worlds Fair. It features a Touch-Tone phone in each wavy coil [booth]. The model is Bell System Hostess Joan Solimine.

■ The typical hostess at the Bell System Exhibit at the World's Fair is five feet five inches tall, weighs 120 pounds, is 25 years old and has worked for the Bell System for five years.

■ Television programs to and from the New York World's Fair will be relayed through a 140-foot high microwave tower that is a working part of the Bell System Exhibit.

■ All public telephones at the New York World's Fair are equipped with push-buttons for Touch-Tone calling.

■ More than 175,000 telephone calls a day are being made to and from the 6,500 telephones at the New York World's Fair.

■ Some telephone booths at the New York World's Fair are large enough to hold an entire family.

- A feature of the Bell System Exhibit at the New York World's Fair is a 17-minute ride past a series of dramatic scenes which trace the development of communications from smoke signals to satellites.

- The 400-foot long Bell System Building at the New York World's Fair appears to be a floating wing.

- Bell Telephone Laboratories is conducting a research project at the New York World's Fair on the experimental Picturephone, which enables callers to see each other as they talk on the phone.

- An actual Telstar communications satellite is on display at the Bell System Exhibit at the New York World's Fair.

Source:

Bell System press release. This article represents only a small fraction of the entire press release. To access the entire press release on the Internet, go to:
http://www.bellsystemmemorial.com/miscellaneous.html.

Central California Show
Saturday, November 13, 2004

When:
Saturday, November 13th, 2004
8 AM to 1 PM
Location of Show:
St Francis Episcopal Church
1205 Pine Ave (corner of Pine and Newport)
San Jose, CA

Admission $2   Tables $10.00 each

Bay Area Show Gary Goff and Hal Belden are putting on.

For more info visit website at:
http://www.vintagephone.com/SJShow.htm
or call Hal Belden at 408-377-5864

Southeast Regional Show
Saturday, January 15, 2005

Maitland (Orlando area), Florida

The show is at the Maitland Civic Center in Maitland, Florida (Three miles north of Orlando.)

The show hours are from 8:00 AM to 4:00 PM.

Ring, Talk and Listen

James William Diffey January 2003
Member Word Weavers/Myth Makers of Vacaville

Lumbering wagons pulled by mules
Carry Eighteen nineties high tech tools
Delivering the voice America hears
Leading the way for over one hundred years

There's a phone on the table, a pole in the street
Cables and wire leads that all go to meet
In today's high tech office with digital gear
Coming together just so we can hear

Working on Ma Bells' phone pole
I sense what's now in my soul,
Climbers, wrenches, hammers and pliers
A cold north wind, and the hum of the wires

Shovel the dirt and tamp it tight
Everything's "spec" they did it just right
Hang those cross arms straight and true
Cause' doing it right is what Linemen do

"D" ring, three bolt, lashing wire "bug"
Tighten the through bolt just 'til it's snug
Step that pole double five and three
Then hang a load pot next to that tree

A ten-pin arm loaded with glass
A Lineman's test he must daily pass
Set your climbers pull hard on the rope
Today should be Friday that is our hope

Load the lasher and the cable reel
Hang the cables on bolts of steel
Looking down from high on the pole
I watch the cable quickly unroll

The dangerous work in the overhead's done
In the underground now more work is begun
Moving blowers and tools to the dank cable vault
Joining thousands of wires, and nowhere a fault

Inside the "C.O." they're waiting to go
Bays of equipment stand row after row
With dial tone, switches and cross connect frame
The job is complete from household to main

Crafted with skill that's admired the world wide
A system not equaled though many have tried
The wires still hum, the satellites glisten,
And telephones will always "Ring, Talk and Listen"

TCI Web-Site
http://www.telephonecollectors.org/

TCI Group Web Page ...
Open to the public, not just TCI members.
To subscribe, go to:
http://groups.yahoo.com/group/singingwires then follow the sign-up directions and soon you'll be part of 500+ online subscribers to the TCI Group.

Decisive Moments in Telecommunications History: The Bell System's First New Automatic Dial System
Part 2 of 2
Author: Roger Conklin

EDITOR'S NOTE: *Due to space limitations each month, this article had to be split into two parts. For best story continuity, please refer back to Part 1 of this article in the September issue of the Singing Wires before reading Part 2 below.*

But Cromwell's book does refer to "the need for a new building" for a new Norfolk exchange that grew out of "war conditions." On page 42 of his book there is a photograph of the old narrow 6-story telephone building on Plume Street which, in 1918 "formerly housed plant, traffic and commercial forces, and was (then) used exclusively as a central office building." The inference was that commercial and plant forces had been relocated elsewhere with expansion of the manual switchboards occupying perhaps all 6 floors of the building. The normal practice was for a manual switchboard to be housed in a single large room, so being spread over up to 6 different floors must have resulted in an operational nightmare.

It seems most likely that the U. S. Navy was the real driving force that compelled Bell's C&P Telephone Company of Virginia to "fix the problem" by replacing its far too small, inefficient and antiquated manual switchboard with a newest and latest automatic dial central office capable of meeting the Navy's requirements for communications with the outside world vital to support the war effort. It is also quite possible that the Navy Base system was as large as, or maybe even larger, than the C&P system serving the city of Norfolk. Website http://www.waltcummings.com/career/norfolk/nornavsta.htm discloses that today there are some 108,000 naval and marine personnel stationed at this navy base and that it employs 43,000 civilian workers. With the country at war and given the importance of the very best of communications to the success of the war effort, it is easy to understand why the Bell System would have yielded to government pressure to install a

totally new automatic telephone system to serve the city of Norfolk. Western Electric's order was placed on Automatic Electric very soon after the U. S. declared war in 1917. It was a one-time order to solve a specific problem, placed 2 years prior to the 1919 signing of the first of 3 five-year contracts by AT&T for major purchases from Automatic Electric. The latter contract had been triggered by the 1919 Boston operators' strike that almost totally shut down Bell's service in Massachusetts for several weeks. But the actual Norfolk cutover did not take place until 2 years after the equipment was ordered; a year after the end of the war. The delay was due to the wartime shortage of steel necessary to construct the new central office building.

Many of the mysteries about C&P's new Norfolk automatic system are cleared up by studying the C&P advertisement published in the Norfolk Ledger-Dispatch on November 10, 1918. This advertisement titled "Norfolk's Automatic Telephones are Now in Service," provided detailed instructions on how to use the new dial telephone. It is through the courtesy of fellow antique telephone collector Russ Cowell., who lives in nearby Williamsburg, VA and who located a microfilm record of this advertisement in the archives of this newspaper, that we now have answers to some of questions that have puzzled telephone historians for many years. Those interested in having a beautiful suitable-for-framing 11" x 14" copy of this advertisement are urged to contact Russ by e-mail at russ54@widowmaker.com, or by telephone at 757-258-2308.

This Norfolk installation was the very first public automatic exchange in the United States with dial tone. The instruction reads "Remove the receiver from the hook and listen to a steady humming sound, known as "Dial Tone." On all Strowger systems up until this time the subscriber, when he removed the receiver, simply started dialing. If the equipment was not

ready to receive dial pulses and the call did not go through he hung up, removed the receiver and dialed again. Dial tone was used on Western Electric's first European-made Type 7 Rotary Automatic system that had been installed 5 years earlier in 1914 in Darlington, England, but until Norfolk, dial tone had never been provided with Strowger systems the United States or elsewhere in the world.

Norfolk's new 5-digit telephone numbers began with either a 2 or 3 Special-service codes were: 0 for the Long Distance operator, 101 to report a fire, 102 for an emergency police call, 1101 for repair Service and 1202 for Information (Directory Assistance). Short haul calls to nearby exchanges were made through operators in those cities reached directly by dialing 6 for Buckley, 14 for Chestnut, 17 for Holley, 13 for Juniper, 7 for Portsmouth and 17 for Pig Point. The PBX operator for the government-owned system serving the Navy Base and Ocean View was reached by dialing 9.

Subscribers on party lines called their party-line neighbor by dialing 18817, hanging up and waiting for their bell to ring. Both phones rang. When the ringing stopped the other party had answered, so the caller took down his own receiver again to talk.

The sketches of telephone sets in the advertisement show clearly that they were Western Electric Type 51AL desk sets (candlesticks) and Type 653-G metal wall sets. These telephones are all shown equipped with Automatic Electric Mercedes-type dials.

One of the unanswered mysteries is why were these Western Electric telephones equipped with Automatic Electric rather than Western Electric dials? Starting in 1916 the Western Electric No.1 dial, made in limited quantities, was being supplied on telephones added to dial PBX systems taken over by various Bell companies from customers who had originally purchased them from Automatic Electric for internal calling, but later negotiated to sell them to the telephone company to have them connected to the Bell public network. It has also generally been assumed by some that Western Electric telephones made for and sold to Bell companies for use with earlier automatic

systems purchased from Independent telephone companies were equipped with No 1 dials, but the fact that the Norfolk telephones were provided with Automatic Electric dials raises doubts in this regard.

The other unsolved mystery is why did Western Electric purchase this new Norfolk automatic system from a competitor, Automatic Electric, rather than installing its own Western Electric Type 7 Rotary System? Western Electric Rotary had been developed to sell in Europe, it was cost-competitive with Step-by-Step and been performing superbly since 1914 for Western Electric's international customers in Europe. The 7A Rotary system would seemingly have been ideal for the Norfolk exchange. This is an especially pertinent question, since during this very same war-time period, new 7A Rotary automatic exchanges for Norway, Switzerland, Holland and New Zealand were being manufactured at Western Electric's Hawthorne plant in Chicago. The earliest Rotary systems were made by Western Electric's subsidiary Bell Telephone Manufacturing Company in Antwerp, Belgium. Manufacture and support of the 7A Rotary System was transferred from Antwerp to Chicago in 1914 when the German Army invaded and subsequently occupied Belgium, but only to fulfill contracts signed before the outbreak of World War I. There was no plan to deploy it in the Bell System. Manufacture resumed in Antwerp in 1921.

The only logical explanation for why the Bell System chose Automatic Electric's Strowger step-by-step system over its own 7A Rotary System for Norfolk (and subsequently for thousands of other small an medium-size American cities) appears to have its roots in personality conflicts.

Development of the Rotary System had started in Western Electric's laboratories at the Hawthorne Plant in Chicago shortly after the beginning of the 20th century. By 1910 the first field trial installation, the 400 line semi-automatic Rotary PBX, had been successfully placed in service at Western Electric's headquarters at 463 West Street in New York. But there was a conflict among the ranks at Western Electric between two of its top engineering vice presidents. The first was Frank McBerty, the father of the Rotary

System. The other was Dr. F. B. Jewett, who later was named the first president of Bell Labs, who favored abandoning McBerty's Rotary and dedicating all resources to developing his own idea of a Panel System, which he perceived would be superior for use in the very large U. S. cities like New York and Chicago. The decision made by J. J. Carty, AT&T's chief engineer, was that Frank McBerty would be transferred (some said "exiled") to Antwerp where development of the Rotary System would continue for Western Electric's European market, and that the Panel System would be developed in the U.S. as the future standard automatic switching system for the Bell System in the U.S. and Canada. Both systems used the same flat-type relays and were common-control systems with register-senders and translators. They both employed revertive, rather than the direct pulsing of the Strowger Step-by-step system. Rotary used single-motion motor-driven switches that rotated through 360 degrees (from which the system name was derived). Panel employed a motor-driven lateral-motion switching concept.

When the need for an automatic system for Norfolk arose because of the outbreak of WW I, development of the Panel System was still several years short of producing a viable product. Although Rotary development was ahead of Panel and several successful rotary installations were already in service, there is speculation that deploying Rotary for Norfolk would have been an admission of "error in judgment" on the Rotary vs. Panel decision. Therefore it was decided to save face and purchase Strowger Step-by Step from a competitor for Norfolk rather than to admit such a judgment error. At that time it was expected that Strowger Step-by-Step would be a one-time-only system for Bell, just for Norfolk, and that Panel would still become the standard switching system for the Bell System. As it turned out later, Panel was far too costly for all except the very largest U.S. cities and none were ever deployed in Canada. Rotary, on the other hand, was much more economical for a wide range of single exchange sizes from a few hundred lines up to multiple-exchange very-large cities. Ultimately it was deployed in Paris, Shanghai, Madrid, Budapest, Bucharest, Zurich, Mexico City. Lima and Rio de Janeiro.

Norfolk's

Automatic

Telephones

THE DESK TELEPHONE WITH DIAL

Are

Now In

Service

This Explanation Will Help You to Use the New Service to the Best Advantage!

THE satisfaction derived from the new system at the outset depends largely on the readiness with which our subscribers and the public generally operate the dials. To make it certain that every one understands how to use the Automatic System, we make the following explanation. Every telephone user should study it carefully.

READY TO DIAL "3," THE FIRST FIGURE OF THE NUMBER GIVEN AS AN EXAMPLE

How to Operate the Dial on Your Automatic Telephone after the New System is in Service

Consult The New Issue of the directory, now being distributed, and obtain the number to be called.

Remove The Receiver from the hook and listen for a steady, humming sound, known as the "dial tone." If you hear the dial tone, place your finger in the hole containing the first figure of the number to be called and pull the dial as far as it will go; then remove your finger and let the dial go back. Repeat this operation for each figure in the number. If you do not hear the dial tone hang the receiver on the hook and wait a few seconds before attempting to dial.

Example:

Suppose The Number To Be Called is Norfolk 30758. Remove the receiver and listen for the dial tone. Having heard it,

THE DIAL PULLED AROUND TO FINGER STOP

place your finger in the hole marked "3," pull the dial around to the finger stop and let go. When the dial comes to rest, place your finger in the hole marked "0" and operate as before. When the dial comes to rest again, place your finger in the hole marked "7" and operate as before. Repeat with the remaining figures in the same manner. Put the receiver to your ear and wait for the called party to answer. Before your party answers you will at intervals hear a "burr-r-ring" sound indicating that the bell is being rung at Norfolk 30758. You will continue to hear this sound until the called telephone answers or until you hang up the receiver.

Never Force The Dial back. Let it run back itself.

Don't "Jiggle" The Receiver Hook. Alway take your receiver off the hook without "jiggling" it. If you accidentally move the hook, put the receiver back for several seconds before starting again.

Always Hang Up the receiver to disconnect when through talking or in order to make a second call. Leave the receiver on the hook several seconds before making additional calls.

If The Line you are calling is in use, you will be informed of this fact by an intermittent buzzing sound in the receiver. This is called the "busy signal."

Should You By Accident fail to pull each figure to the finger stop in making a call, or make any other mistake, disconnect by replacing the receiver for several seconds. Then call the complete number again.

How to Call the Other Telephone on Your Own Line

If You Are a Party Line Subscriber, the number of the other subscriber on your line appears on the number plate attached to your transmitter. To call this subscriber, remove the receiver from the hook and dial "1817." Hang up your receiver and wait for your bell to ring. When your bell stops ringing the called party has answered; take off your receiver and proceed. To stop your bell ringing, in case the called party does not answer, lift your receiver for several seconds.

WALL TELEPHONE WITH DIAL

How to Call Long Distance — Dial "0"

This Connects You directly with Long Distance operator. Give your name and number and the details of the call in the usual manner.

How to Report a Fire — Dial "101"

This Connects You directly with a telephone for fire emergencies only.

How to Make an Emergency Police Call — Dial "102"

This Number should be called only for police emergencies, such as to call an officer.

How to Call Repair Department — Dial "1101"

Call This Number to report any trouble experienced with your telephone, using another telephone if necessary. Explain as clearly as possible what your trouble is; this will aid in having it promptly corrected.

How to Call Information — Dial "1202"

Call This Number to obtain the numbers of subscribers whose names do not appear in the latest directory. Give the name and address of the person desired.

How to Call Other Than "Norfolk" Numbers

To Call Other than "Norfolk" numbers, *dial only the code number* in the following table (it is printed also at the top of directory pages) and give the call to the operator who responds.

Berkley	6	Naval Base	9
Chestnut	16	Ocean View	9
Holly	17	Pig Point	17
Juniper	15	Portsmouth	7

Please Examine Your directory listings, and if there are any errors advise us promptly in writing.

The new telephone directory containing the new automatic numbers, dated October 6th, 1919, is now being distributed. If you have not received this directory by call the Business Office, "Norfolk 21311."

Save This Announcement. You will find it helpful in using the new system. We are publishing this advertisement, and asking your co-operation in order to make Norfolk's new telephone service a success from the start.

The Chesapeake & Potomac Telephone Co.
of Virginia

Rotary was eventually adopted as the national standard for France, Spain, Hungary, Rumania, New Zealand and other countries. (In 1925 AT&T sold its international operations, which included the Rotary switching system, to ITT which supplied Rotary in some 42 countries around the world from Argentina and Afghanistan to Uruguay and Venezuela.)

The preserved records do not disclose whether or not J. J. Carty, who remained as chief engineer of AT&T until his retirement in 1930, was present at the cutover from the manual system to the new Strowger automatic Steep-by-Step system in Norfolk, Virginia on November 8, 1919. Whether or not he was in attendance, he was probably hoping nobody remembered his anti-automatic discourse to the Europeans at the Paris conference 9 years earlier.

Sources:

1. The C&P Story, Service in Action – Virginia, Joseph H. Cromwell, Chesapeake and Potomac Telephone Co. of Virginia, 1981
2. The Electrical Review, & Western Electrician, Electrical Review Publishing Company, Chicago, Vol. 67 No. 1, page 794, Oct. 15, 1910
3. Telecom History, The Automatic Telephone – 1889-1918, Stan Swihart, Telephone History Institute, p. 14 & p. 87, 1995
4. Rehabilitation of the Antwerp Factory, J. S. Wright, Electrical Communications, International Western Electric Company, Vol. 1, No. 1, p. 32, August 1922
5. Telephone, The First Hundred Years, John Brooks, Harper & Row, 1975

Telephone Trivia

Among the hundreds of things invented by Thomas Edison, is the word "hello." Edison actually coined the word, derived from "holler" in 1889. Prior to that time the most common word used when answering the telephone was "yes."

Herbert Hoover was the first U. S. President to have a telephone on his desk at the White House. All previous Presidents kept the phone in an adjoining room.

The word "telephone" is derived from the Greek words "tele" meaning "far off" and "phonos" meaning "sound."

North of the Border Show Photos

Don Woodbury

The show was really well attended by the public. We had 35 tables with exhibitors from Ontario, Quebec, New Brunswick, Illinois, New York and Pennsylvania. We had a pre-show get-together at my house with lots of good company, and LOTS of phone talk! A good variety of product was available, and with the high public attendance, there was lots of buying and selling happening. From all reports, everyone thoroughly enjoyed the show.

We awarded prizes as follows:

Best Wallphone - Bob Lewis (Commerical Blake)
Best Deskset - Paul Simpson (Chisholm and Dunn Stick)
Most Unusual - Don Price (unusual display of wood wall phones)
Most Educational - Al Ferguson
Best Display - Don Woodbury
Best Overall - Art Hyde - (extensive collection of wood wall phones)

Lunch was provided to exhibitors by Rogers Wireless and Spotwave Wireless.

Next year's show will be held on Sept 24, 2005 in Kingston, Ontario.

Paul Simpson's Display

Paul Simpson - Best Deskset

Roger MacDonald and Paul Vaverchak

Don Woodbury's Display

Art and Ray Hyde

ITT

TELEPHONE INSTRUMENT MAINTENACE MANUAL CD Scanned from original paper copy published in 1968.

This manual goes beyond what you'll find in Bell System Practices. So even if you only collect Western Electric phones like me, you still need this manual full of schematics, diagrams, tables, descriptions and photos of Western Electric style telephones made by ITT under license from Western Electric such as the common 500 set to ITT's Princess look-alike model, Cinderella.

CD FEATURES AND CONTENTS:

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To order, please send $11 in cash, USA check or money order payable in US funds for the gold CD or $10 for the silver CD to:

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Cords: handset cords for Trimline, O.N.S. line cords,modular 7' 10 or more $0.75 each.
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Trim line line cord one side big plug the other spade lugs,white, 5 conductors N.O.S. $1.50 Each
Transmitters and Receivers (500 style) tested. W.E. $4.- each
For other parts contact us.

ITT Trendline desk phones - touch-tone,gold, N.O.S. round buttons not l.e.d. $28.- and rotary dial, white new in original boxes, $21.
Trim lines shells and deck trim line, gold, for touch tone style $3.- trim line, gold complete base include ringer,hook switch $10. N .O.S. Trim line, gold, housing with plunger and screws $2.50. Used housing for rotary dial and touch tone with plunger removed from service. W.E. and others assorted colors $3.- Handsets plastic with receiver and mouth piece cups W.E. and others $4.50 not including shipping.

**Wally Tubbs
E-mail : dt44829@alltel.net
Phone : 402.423.4716**

WANT TO PURCHASE

(1) Western Electric beveled edge transmitter, either a 7 digit or an *ABT* marked, nickel in good shape
(2) WE Long Pole receiver
(3) Western Electric type 22 Candlestick in Nickel (this is the one with the Hershey's kiss perch and the external screw in the lower side of the shaft to hold the internal contact board)

John Novack
304-274-9079
jnovack@stromberg-carlson.org

FOR SALE

Mounting cord, non modular, Ivory, rubber over rubber, 3 or 4 wire, fits early (1955) 500 set 1955 date preferred, to match the set.

WANT TO PURCHASE

Anyone have a MANUAL Contempra set for sale? Even a MANUAL handset? Saw some several years ago at a North of the Border show, and regret not buying one ever since.

Cook electric/Northern Telecom digital announcer MANUALS , for the 213 (300) series, and the NT7M 25AA and NT7M26AA. Scanned or original preferred, but good copy also acceptable.

I have the NT5 series manuals scanned, if anyone needs one.

Cliff Sullivan
4902 West Monte Cristo Ave.
Glendale, Az. 85306
602-978-3551
suclif@worldnet.att.net

FOR SALE   *(PLUS SHIPPING)*

• A/E mini-networks $6 each....10 or more $5each.
• A/E small ringers e/w capacitor....$3 each
• A/E Transmitters and Receivers ...6 of each...$9.99
• W.E. Brown Coiled Cloth Modular Handset Cords, Standard Size
  $5 each.....10 or more $3.50 each
• AT&T Windows & Instruction Cards for Single Slot Coin Phones
  (New-in-Package)............$5 each.
• W.E. NOS Rust Modular 25' Handset Cord....................$6

Gary Goff
714-528-3561
ggoff@telis.org

FOR SALE

Reproduced rubber bottom cover gaskets for AE round base, AE 34 and AE 40 desksets. I have sold hundreds of these replacement gaskets or seals and customers appear to be very happy with them judging by the return business. The cost is $10 each, to your door. Any over the first one are $9 each.

Bell Sytem tape measure, in MINT condition. Appears to be NOS. This is the small, round celluloid unit with cloth measuring tape. The Bell logo is on one side and a female telephone operator on the other. Cost is $75 plus shipping.

Automatic Electric Type 32 miniature subset. This is a rare item, not many around. It measures approx 4.5 x 2.5 x 2.5 and was made to be used as the "guts" for any AE wall or deskset that did not have internal induction coil. There is no ringer in this small bakelite box. Cost is $35 plus postage.

AE 40 "Butler's Handle," the "U" shaped handle that snaps into two holes in the plunger appliances in the cradle, under the handset. I had one dozen of these cast and plated. They are very nice. The cost is $35. each plus postage.

TRADE OR CASH

Bashlin Telephone Disinfector, NOS, in the original small box, complete with original disinfectant paper filters. This item is for TRADE for some other nice telephone attachment or special mouthpiece or device. Trade and cash works too!

WANT TO PURCHASE

Unique telephone attachments, such as a telephone dial locking device, the type that fits over the entire dial and not just into one finger hole. Western Electric OST or pony receivers. Original green W.E. receiver cords, pin ends. 1921 Bell Logo porcelain signs, 11x11 size, mint condition.