History of the Telephone

“If The Phone Doesn’t Ring, It’s Me”

-Song Title by Jimmy Buffet

The telephone today is a ubiquitous tool of communication and information exchange. When it appeared in the nineteenth century, however, the new tool provided a radical way for individuals to talk to each other, person to person, in real time. Neither the postal system nor the telegraph could provide large-scale, everyday information as people created it, and deliver it immediately to someone else. The power of the telephone can be seen in its immediate spread across the country.

The term “telephone” was first used to describe any apparatus for conveying sound to a distant point. The word was applied as early as 1796 to a megaphone, and not long afterward to a speaking tube. Alexander Graham Bell was granted a patent in March 1876 for a device that transmitted voice electronically.
Commercialization began early in 1877. Within a very short time, telephone was a sophisticated system, capable of connecting moderately large number of users over relatively short distances. Expansion of its uses was rapid, as much a testimony to the energy of the system’s promoters as it is to its mechanical and electrical completeness.

The telephone, through history, was not always well received. In its early days, voices over the phone were almost inaudible. Long distance rates in the early part of the century were too expensive for most people. A three-minute telephone call between New York and London in 1930 would have cost more than a hundred times as much as it does today. However, telephone service continued to advance and improve, and it is now so much a part of daily living that it seems almost unnecessary to note its importance.

We have come to rely on it without thinking. When we need to contact someone over distance, we pick up the phone and dial, and if that person is not available, most often, we simply leave a voice message. The decline in costs is likely to accelerate over the next decade, thanks to huge technical advances, a massive increase in transmission capacity and increased competition. Some predict that the marginal costs of telecommunications will plummet to somewhere near zero for international as well as for local calls.

Telephones revolutionized communication, allowing business to be conducted more efficiently and providing a vital link between family and friends. They became even more important in people’s daily lives with the rise of cellular and mobile technology in the late 20th century.

Watson, come here, I want you!! (first example of phone sex)

“Words from the past: It’s a clever idea Mr. Bell but don’t wire us, we’ll wire you.”

-Robert Brault (American writer)

By the second half of the 19th Century, inventors, telegraphers and engineers in the US and Europe were experimenting with gadgets capable of transmitting voice sounds over a distance. The first telephones were a purely scientific endeavor, with little thought to aesthetics. The entire focus of these first creations was to come up with a replacement for the primitive telegraph.

While it was Alexander Graham Bell who filed the first patent, debate continues over who deserves credit for coming up with the earliest working telephone, Bell, or another inventor, Elisha Gray, who came up with a model using similar technology. The first call was made from Bell to an assistant sitting 15 feet away, on March 10, 1876, when Bell said, “Watson, come here, I want you.”
Bell was nearly beaten to the patent office by Elisha Gray, who had independently developed a very similar invention. Gray arrived just hours after Bell at the Patent Office, filing a 'caveat' a confidential report of an invention that was not yet perfected. Western Electric, co-founded by Gray, became one of the Bell Systems' major competitors.

Thomas Edison and others continued to improve on the device, and by 1880, close to 30,000 telephones were in use in the United States alone.

The first telephones in the 1870s were rented in pairs which could only talk to each other, but the example of a central exchange was soon found to be even more advantageous than in telegraphy. Small towns typically had the switchboard installed in the operator's home so that she could answer calls on a 24 hour basis. In 1894, New England Telephone and Telegraph installed the first battery-operated switchboard on January 9 in Lexington, Massachusetts.

When telephones first hit the market they were as elite as a new technology can be. The first phonebook was a single sheet that didn’t even list the participant’s phone numbers. These early phonebooks are incredibly sought after collector’s items, an ironic change considering the much maligned yellow phone book of today.

Early telephones were for the upper class, and were so uncommon that they came in widely varying designs, nearly all ostentatious and Victorian in appearance. A two handed design was the first attempt at a handset, and not the one handed design we’re now used to.

Western Union was another major competitor, already having established itself as a communications provider with the telegraph system. Thomas Edison took advantage of Bell's failure to secure a patent in Britain for the Bell receiver, and received a patent for a new receiver, the 'electro-motograph', which required continuous cranking, else the conversation would end. However, by 1880, the Bell transmitter and the Edison receiver were combined and used throughout Britain.

The first permanent outdoor telephone wire, strung in 1877, covered a distance of three miles. Bell could be credited with the anticipation of fiber optics - he worked on a 'photophone', which could actually transmit sound for a short distance over a beam of light. Commercial telephone service began in the United States in 1877. The workable exchange, developed in 1877, enabled calls to be switched among any number of subscribers rather than requiring direct lines.

**Hello, Operator?**

“We’re the phone company. We don’t care. We don’t have to!”

-Lily Tomlin (as Ernestine the Operator)

The first telephone exchange system was installed in Hartford, Connecticut in 1877, and the first exchange linking two major cities was established between New York and Boston in 1883. The first exchange outside the United States was built in London in 1879. The exchange involved a group of operators working at a large switchboard. The operators would answer an incoming telephone call and connect it manually to the party being called. The first automatic telephone
exchange was patented by Almon Strowger of Kansas City in 1891 and installed in 1892, but manual switchboards remained in common use until the middle of the twentieth century.

In 1879, telephone subscribers began to be designated by numbers rather than names, as a result of an epidemic of measles. A Lowell, Massachusetts doctor, concerned about the inability of replacement exchange operators to put calls through because they would not be familiar with the names associated with all the jacks on the switch boards, suggested the alpha-numeric system of identifying customers by a two-letter and five-digit system.

For much of the 20th century, women played an important role in the telecommunications system. As telephone operators, they helped customers make long distance calls, provided information, and made sure the whole system worked smoothly. Although remembered primarily as a female profession, the first telephone operators who worked for the Bell Telephone Company (later known as American Telephone and Telegraph Company or AT&T) in the 1870s were teenage boys. Unfortunately the boys frequently proved rude and unruly, so young women, believed to be naturally more polite, were hired instead. The first female telephone operator was Emma McNutt, who was hired in New York City by a manager who happened to be a neighbor and who thought Emma was a “nice girl.” Little is known about Emma’s career, although she was in the vanguard of women who established telephone operator work as an almost exclusively female job.

In the 1880s and 1890s women telephone operators often served the same small group of customers every day. This created an intimacy between client and customer as customers grew to recognize operators’ voices and know them as people. In many areas, operators could be counted on to have all sorts of information at hand, such as the names and addresses of local customers, the latest news, weather, and sports results, the correct time of day, and even gossip.

Operators working in small, remote offices also had to take on most of the technical work, because there was no one else to do it. They did just about every kind of telephone work except climbing a pole. They would test trunk lines, and report them for repair. Going up into a cupola to splice a cable or adjust a lightning arrester was part of the day’s work.

The typical operator earned about $7 per week a small salary even in 1900. She worked ten or eleven hours a day, six days a week. If necessary, she also worked nights and holidays. An operator who got married was forced to leave her job. To many early telephone users -- most of whom were wealthy -- the telephone operator was just another household servant.

Still, the operator was the heart of the telephone system. She watched over a switchboard containing up to 200 phone lines, listening in with her clunky metal headset. Her main job was to plug callers' phone lines into the phone lines of the people they wanted to speak to.

In 1900, the life of the rural operator was very different from her peers in the city. The telephone was a big hit with the farm families who could afford one. But there were rarely enough calls to tie a rural operator to her switchboard. To help pass the time, some women attached long cords to
their headsets. That way, they could walk around their homes doing chores while they waited for the phone to ring. Rural operators enjoyed a lot of independence.

City operators, on the other hand, handled up to 600 calls an hour. To increase efficiency, telephone companies hired scientific management teams. These teams created rules for everything the operator did, from how she should sit to how long she should take to answer a call -- which was four seconds. They were forbidden to have conversations with customers. Supervisors watched over operators constantly, even secretly listening in on their conversations. Like school children, city operators had to ask permission to go to the bathroom or to get a drink of water. Supervisors punished them for even the smallest break in the rules. For arriving a minute late to work, an operator was sometimes sent to sit in a punishment room a humiliating experience for a grown woman.

In terms of job demands, as long as the total number of telephone subscribers remained quite low, the work was fairly easy. But as more and more customers signed up, being a telephone operator became a much more hectic job. In large cities by about 1910, calls were coming in so rapidly that the operators could hardly take their eyes off the switchboards for a second. The telephone company, now known as AT&T, decided to take action by installing more and more automatic switching equipment. These automatic switches allowed customers with dial telephones (early telephones had no dials) to make connections themselves without operator assistance. Gradually, the need for operators was eliminated for all calls except long distance and collect calls.

At the peak in the late 1940s, there were more than 350,000 operators working for AT&T, and 98% were women. But afterward, the introduction of increasingly sophisticated automatic switching devices reduced the need for operators. Unions argued that AT&T had intentionally created “technological unemployment” on a mass scale, although the company argued that most of the “lost” jobs could be accounted for by normal job turnover and retirement, where workers who left their jobs were simply not replaced.

The career of a telephone operator was one of the few technically oriented jobs available to women in the early 20th century, but it was not open to all women. The telephone company decided that because operators were their direct link to the public, they had to project a positive image. Women with “foreign” accents, for example, were not employed. Even native English speakers were usually given elocution training to make sure their speech matched the image the company wanted to project. Height was also an issue. Because operators had to sit at the company’s equipment for long periods of time, women were selected whose height and weight fit within certain narrow boundaries. Most women under five feet tall, for example, were considered too short to be operators in the early 1900s. As time progressed the company began setting strict rules about what operators could and could not say to customers. This meant the end to their roles as centers of information.

The life of the early telephone operators who followed Emma Nutt was not an easy one. But these women were true American pioneers. They proved that women could handle a tough job
with skill and confidence. They opened doors for women who wanted to work outside the home. And they helped make the telephone business a giant success.

**The Board**

“*Switchboard Susan won’t you give me a line?*”

-Nick Lowe (Singer/Songwriter)

Think back to a time when a human being worked in a town's central office. The phone company would build the central office in the middle of town, and then run a pair of copper wires to every home. The operator would work in the central office. She would sit in front of a switchboard, and on this switchboard would be a collection of sockets -- one socket for each of the phones in town. When you wanted to place a call:

You would pick up your phone.
A light above your phone's socket would turn on.
The operator would plug a jack into your socket and ask you who you would like to talk to.
She would then plug her jack into the receiving party's socket, send a ring signal down the line, and talk to the person who answered.
The operator would then plug in a wire between your jack and the receiving party's jack to connect the two of you together.
When she saw the lights go out above your jacks, she would remove the wire connecting the two sockets.

Obviously, an incredibly simple system.

To allow long-distance calls in this simple system, the local phone company would add a line (or multiple lines) to connect to a long-distance office. To make a long-distance call to your friend in this system, you would pick up your phone and tell the operator the long-distance number for your friend. Then:
The operator would connect to one of the lines going to the long-distance office.
She would speak to the operator in the long-distance office.
The long-distance operator would connect her to another long-distance office -- the office for the area code of your friend.
She would tell the long-distance operator the number, and she would connect to another office. Eventually, your operator would be able to talk to the operator in the central office for the town that your friend lives in.
That operator would make a connection to your friend.
Then your operator would connect you to the long-distance line, and you would be able to have your conversation.

This system is still remarkably simple. Your call was patched together with direct, physical wires going from one office to the next. The long distance operator kept track of the length of your call and created a billing record.
In large exchanges in cities, the same process occurred...just a lot faster and a lot more often.

The first act of automation was to replace the local operator with a mechanical switch. When you placed a local call, the switch would connect you. To make a long-distance call, you would dial "O" to speak to a human being, and the human being would connect the call through the long-distance offices as before.

Computers allowed for the replacement of the long-distance operators with computerized switches. The computers could create the connections and the billing records just like a human operator. Physical wires still connected you to the receiving party on each call, but the computer connected them together at each office. If, from Moncton, for example, you dialed 1-212-555-1234 -- a New York number -- the 1 identified it as a long-distance call, telling the local switch to connect to a long-distance switch. The 212 told the long-distance switch which long-distance line to grab. The 555 told the long-distance office in New York which local office to connect to. Then the local office would connect you to your friend. The computers in each office would pass the number along as digital data via data lines connected between the switches.

In today's world, there are two things that make the system more interesting:

Physical wires no longer connect the offices together for each phone call. That system was incredibly expensive. Instead, a fiber-optic line carries a digitized version of your voice. Your voice (along with thousands of others) becomes a stream of bytes flowing on a fiber-optic line between offices. The difference in cost between a pair of copper wires carrying a single conversation and a single fiber carrying thousands and thousands of conversations is phenomenal.

The phone company is no longer a monopoly. Instead, there are many different long-distance and local carriers.

Today, when you place a long-distance call, the switch in the local office accesses a database that contains a record for each phone number connected to the switch. The database contains what's called a PIC code (Primary Interchange Carrier code), which indicates which long-distance carrier you have chosen. (When you switch long-distance carriers, this PIC code is what changes.) The switch looks up the PIC code for your number and then connects to a long-distance switch for your long-distance carrier. Your long-distance carrier's switches route the call to the local carrier for your friend, and the local carrier completes the call to your friend. This entire amazing and complicated transaction happens using billions of dollars worth of computers, switches, wire and fiber-optic cable, all in a blink of an eye.
Monopoly Money
“Communism is like one big phone company”
- Lenny Bruce (Comedian)

Because of the largely monopolistic power of the American Bell Company, profits were held high, reaching levels of $1 million in revenue while paying out $600,000 in dividends in 1882. Competition remained a major threat, as the Bell, Western Union, and Western Electric systems were incompatible and not connected. As many as three or more independent telephone companies battled in a given area for customers.

Problems with the telephone occurred when other applications of electricity flourished, particularly trolley cars and street lamps. Natural electricity also interfered with the system, as lightning wreaked havoc on the lines.

Long-distance service was established and grew in the 1880s using metallic circuits. The common-battery system, developed by Hammond V. Hayes in 1888, permitted a central battery to supply all telephones on an exchange with power, rather than relying upon each unit's own troublesome battery.

The first automatic dialing system was patented in 1891 by a Kansas City undertaker who believed that crooked operators were sending his business elsewhere, with his main objective being to eliminate the operators. The first coin telephone was installed in Hartford, Connecticut in 1900. Party lines were soon developed to lower the cost of the telephone for individual families, especially those in rural locations.

The first rotary dial telephone was developed in 1923 by Antoine Barnay in France. The mobile telephone was invented by Bell Telephone Company and introduced into New York City police cars in 1924. Although the first commercial mobile telephone service became available in St. Louis, Missouri in 1946, the mobile telephone would not become common for another four decades.

A young inventor, Lee De Forest, began work in 1906 on applying what was known as an 'audion', a three-element vacuum tube, which could amplify radio waves. He recognized the potential for installing audions or repeaters on telephone lines to amplify the sound waves at mid-points along the wires. The Bell System bought the rights to De Forest's patents in 1913.
Long-distance telephone service was constructed on the New York to San Francisco circuit using loading coils and repeaters.

American Telephone and Telegraph (AT&T) took control of Western Union telegraph Company in a 'hostile takeover', in 1911, having purchased the Western Union stocks through a subsidiary. The two eventually merged, sharing financial data and telephone lines. In 1918, ten million Bell System telephones were in service.

Theodore Vail, president of the Bell System from 1885 to 1887 and 1907 to 1919, (and son of Samuel Morse's partner Alfred Vail) faced the challenge of making a large private corporation adopt a policy of subordinating the maximization of profit to the provision of service to its customers. The political and business environment in the United States following the First World War was strongly 'anti-monopolistic'. Yet, advantages to single-company service or limiting service in a given area to few competitors had its advantages.

Under Vail's leadership, automatic switching of large numbers of calls was made possible in 1921, using 'phantom circuits', which allowed three telephone conversations to be conducted on two pairs of wires. The 'French' phone, with the transmitter and receiver in a single handset, was developed by the Bell System around 1904, but was not released on a widespread basis because it cost more than the desk sets. They ultimately became available to subscribers in 1927.

The first transatlantic service, from New York to London, became operational in 1927, and was transmitted by radio waves. Research in electronic telephone exchanges began in 1936 in Bell Labs, and was ultimately perfected in the 1960s with its Electronic Switching System (ESS). Bell benefited greatly from US defense spending during World War II in its laboratories.

After the 1930s, the base of the telephone also enclosed its bell and induction coil, doing away with the old separate ringer box. Power was supplied to each subscriber line by central office batteries instead of the user's local battery which required periodic service. For the next half century, the network behind the telephone grew progressively larger and much more efficient, and after the rotary dial was added the instrument itself changed little until touch-tone signaling started replacing the rotary dial in the 1960s.

The first touch-tone system - which used tones in the voice frequency range rather than pulses generated by rotary dials - was installed in Baltimore, MD, in 1941. Operators in a central switching office pushed the buttons; it was much too expensive for general use. However, the Bell System was intrigued by touch-tone because it increased the speed of dialing.

The mobile phone can be traced back to two-way radios permanently installed in vehicles such as taxicabs, police cruisers, railroad trains, and the like. Later versions such as the so-called transportables or "bag phones" were equipped with a cigarette lighter plug so that they could also be carried, and thus could be used as either mobile two-way radios or as portable phones by being patched into the telephone network.
In December 1947, Bell Labs engineers Douglas H. Ring and W. Rae Young proposed hexagonal cell transmissions for mobile phones. Philip T. Porter, also of Bell Labs, proposed that the cell towers be at the corners of the hexagons rather than the centers and have directional antennas that would transmit/receive in 3 directions into 3 adjacent hexagon cells. The technology did not exist then and the radio frequencies had not yet been allocated. Cellular technology was undeveloped until the 1960s, when Richard H. Frenkiel and Joel S. Engel of Bell Labs developed the electronics.

The Post-War Boom

A girl in a convertible is worth five in the phone book.”

-Mae West (Actress)

War-time experiments, innovations, and inventions brought Bell to the forefront of telecommunications in the post-war era. The first commercial mobile telephone service was put in service in 1946, linking moving vehicles to telephone networks by radio. The same year brought transmission via coaxial cables, resulting in a major improvement in service as they were less likely to be interrupted by other electrical interference.

Microwave radio transmission was used for long-distance telephony in 1947. The transistor, a key to modern electronics, was invented at Bell Labs in 1947. A team consisting of William Schockley, Walter Brattain, and John Bardeen demonstrated the 'transistor effect', using a germanium crystal that they had set up in contact with two wires two-thousandths of an inch apart.

Changes were underway in the 1950s. Consumers initially objected to all-numeral telephone numbers (All Number Calling, or ANC) that were introduced in the latter half of the decade. Consumer demand for telephones had outstripped the ability of the telephone system to supply all of the required numbers, which were restricted by the alpha-numeric combinations in place for decades.

The 1956 inauguration of the TAT-1 cable and later international direct dialing were important steps in knitting together the various continental telephone networks into a global network.

Picturephones & Video Phones
The first Picturephone test system, built in 1956, was crude—it transmitted an image only once every two seconds. But by 1964 a complete experimental system, the "Mod 1," had been developed. To test it, the public was invited to place calls between special exhibits at Disneyland and the New York World’s Fair. In both locations, visitors were carefully interviewed afterward by a market research agency.

People, it turned out, didn’t like Picturephone. The equipment was too bulky, the controls too unfriendly, and the picture too small. But the Bell System was convinced that Picturephone was viable. Trials went on for six more years. In 1970, commercial Picturephone service debuted in downtown Pittsburgh and AT&T executives confidently predicted that a million Picturephone sets would be in use by 1980.

What happened? Despite its improvements, Picturephone was still big, expensive, and uncomfortably intrusive. It was only two decades later, with improvements in speed, resolution, miniaturization, and the incorporation of Picturephone into another piece of desktop equipment, the computer, that the promise of a personal video communication system was realized.

Videophones, developed in the mid-1960s, were becoming more affordable and practical with the combination of devices that eased the transmission and reception of both audio and video signals over telephone lines. Fiber optic cables (or ‘fiber optics’), developed in the early 1980s, offered the potential to carry greater volumes of calls than satellite or microwave links. Electrical telephone signals are fed into tiny semiconductor lasers, which produce pulses of light in response to incoming signals and are bounced down the inside of extremely thin glass fibers.

**Long Distance, Information**

“The telephone is a good way to talk to people without having to offer them a drink.”

-Fran Lebowitz (Author)
The laying of transatlantic telephone cables began in 1955. Care was taken to ensure that the submarine repeaters would be of the highest quality, guaranteed to last at least twenty years before replacement would be required. Telstar, the world's first international communications satellite, was rocketed into orbit on July 10, 1962, with a collaboration between NASA and the Bell System. Satellites in geosynchronous orbit are used mostly for long-distance service.

By the early 1960s, low-cost transistors and associated circuit components made the introduction of touch-tone into home telephones possible. Extensive human factors tests determined the position of the buttons to limit errors and increase dialing speed even further. The first commercial touch-tone phones were a big hit in their preview at the 1962 Seattle World's Fair.

In 1978, American Telephone and Telegraph’s (AT&T) Bell Laboratories began testing a mobile telephone system based on hexagonal geographical regions called cells. As the caller’s vehicle passed from one cell to another, an automatic switching system would transfer the telephone call to another cell without interruption. The cellular telephone system began nationwide usage in the United States in 1983. Today's cellular mobile telephones rely upon a series of 'cells', each with its own central radio transmitter and receiver. Each cellular telephone unit also has its own central transmitter-receiver, permitting it to receive seamless transmission as they enter and exit from a cell.

April 3, 2013 will mark the 40th anniversary of the first public telephone call placed on a portable cellular phone. Martin Cooper (now chairman, CEO, and co-founder of ArrayComm Inc) placed that call on April 3, 1973, while general manager of Motorola's Communications Systems Division. It was the incarnation of his vision for personal wireless communications, distinct from cellular car phones. That first call, placed to Cooper's rival at AT&T's Bell Labs from the streets of New York City, caused a fundamental technology and communications market shift away from the place and toward the person.

The development of the mobile phone has seen a tremendous number of changes since the first cell phones were introduced. It was only at the beginning of the 1980s when mobile phone technology started to be deployed commercially. Since then there have been many new cell phone or mobile phone systems introduced, and many improvements have been made in this form of radio communications technology. The mobile phones themselves as well as the associated equipment including base stations and the other network equipment and cellular technology has become much cheaper and far smaller. Mobile phone history is often divided into generations (first, second, third and so on) to mark significant step changes in capabilities as the technology improved.

One of the major changes is the level of market penetration that has been achieved. Cellular technology has enabled many people to have phones where it would not otherwise be possible. In many countries there are more mobile phone accounts than people, i.e. many people have more than one account, possibly one for private use and one for work. In this way cellular technology has enabled market penetration to become more than 100%.

No contemporary cultural artifact embodies the genius and excess of capitalism as clearly as the cell phone. Ever-present in most developed societies in Europe, the Americas and Asia, the cell
The cell phone has become a technological object and a cultural form whose uses and meaning are increasingly various.

Future Phones

"The human voice carries too far as it is.. and now you fellows come along and seek to complicate matters..."

-Mark Twain (on the invention of the telephone)

At the 1964 World's Fair in New York AT&T unveiled the Picturephone. In the future, the world's biggest telecoms firm pronounced, people would communicate via round, black-and-white screens that plugged into the wall. That prediction, like so many others about the future of communications, was wrong. The majority of today's phones are mobile handsets, not fixed-line ones, and although the technology for video-calling is widely deployed, hardly anyone uses it.

And yet, speculation about the future of phones persists. The telephone has changed beyond recognition since its invention in 1876, and is now the most personal, most social and most rapidly evolving technological device. So to imagine the phone of the future is also to imagine the future of consumer technology, and its personal and social impact. What mobile phones will look like in a year or two is easy to guess: they will be slimmer and probably will let you watch television on the move. But what about 10 or 15 years from now? Will they be the remote control for life?
Chances are that phones will not only look very different—they may not even be seen. They may be hidden in jewelry or accessories, or even embedded in the body. They will undoubtedly have a host of additional features and novel uses, and users will probably interact with them in new ways, too. And even if they are still called “phones”—a word derived from the Greek word for voice—making voice calls may no longer be their primary function.

One thing that is clear is that phones will pack a lot more computing power in future, and will be able to do more and more of the things that PCs are used for today—and more besides. The processing power of mobile phones lags behind that of laptop computers by around five years. In a decade's time a typical phone will have enough storage capacity to be able to video its user's entire life; such “life recorders” will be used for everything from security to settling accident claims with insurance firms.

Researchers are looking into the use of brainwaves to interface directly with machines. One technique, developed by Cyberkinetics Neurotechnology Systems, involves implanting a chip in the brain which allows paralyzed people to move a computer cursor by thinking in a certain way. A less invasive approach relies on electrodes on the scalp to pick up brain activity. Stuart Wolf, a physics professor at the University of Virginia and a researcher for the American military, suggests that within 20 years people will use their thoughts to communicate not only with machines, but also with each other—doing away with talking into phones entirely. Telephony could give way to telepathy.

No doubt much of this speculation about the future of the phone will prove to be as misguided as AT&T’s vision of the Picturephone back in 1964. Indeed, it may be that the whole idea of a telephone comes to be seen as an anachronism, as personal digital devices take on a bewildering range of new functions. Already, researchers at Motorola like to talk about “the device formerly known as the cellphone”. What it will be called in future, and what it will do, remain fascinating questions.

Social Impact of the Telephone

"Who could have foreseen what the telephone bells have done to ring out the old ways and to ring in the new; to ring out delay and isolation and to ring in the efficiency and friendliness of a truly united people"

- Herbert Casson (Author)

The impact of the telephone has been described as both positive and negative. On the negative side, wars are waged more easily, the scope of human conflict has been extended along telephone lines, the multi-generational household has been broken-up as living alone is no longer an experiment in isolation, and the time-space continuum seems to be compressed faster than previously thought possible.

On the other hand, the invention of the telephone has resulted in the rapid and diffuse dissemination of technical and scientific information, saved lives through links to emergency services, made possible the modern city through telephonic connections, increased the speed and ease with which information changes place, and accelerated the rate of scientific and technological change and growth in industry.
Just as the benefits of a new technology can be hard to predict, so too are its unexpected drawbacks. Concerns over privacy and security could derail plans to turn phones into electronic wallets or universal key chains, for example. Phones that know more about their owners could do all kinds of new things, but could also raise new concerns. There will certainly need to be powerful authentication techniques to ensure that phones can only be used by their legitimate owners. Already, some phones have built-in finger scanners for just this purpose.

Mobile phones have already changed social practices among their users, and seem likely to do so even more in future. The ability to superimpose images and sound upon reality means that future phones will “create layers on our world”, says Pierre de Vries of the Annenberg Centre for Communication at the University of Southern California. Users will always be connected, he says, but in concentric circles of conversations and interactions that range from people right next to them to those far away.

The telephone is an all-purpose tool. It is used in the home, business and in education. It is a source of entertainment and a vital resource to the illiterate as well as the academic elite. When the telephone was first introduced it could only be afforded by the rich as the materials needed for connection were very expensive. Alexander Graham's wish was to reduce the expense of materials so that the poorest man cannot afford to be without his telephone.

The telephone was promoted on the grounds that it would increase wealth, employment and improved means of communication. The invention of the telephone lead to development of city centers, office buildings and the concept of an urban worker society. It has led to the creation and destruction of jobs. The need for positions such as messenger boys, telegraphers and, ironically, operators, became virtually unnecessary. It has changed the pace of business and made the world smaller and more accessible to all.

The telephone has provided security and helped in emergency situations. The telephone is both a conqueror and promoter of crime. Suspicious looking strangers are scared away from houses who display telephone based alarm systems and people who need help could call fire trucks, doctors or police. Conversely fraudsters could reach into our houses and pick our pockets via the phone system. The telephone also changed the way social relationship and social interaction take place. Communication over the telephone broadened the range of people one could interact with. Long distance relationships became possible. The telephone helps keep close bond with families and communities.

The telephone has made communication more efficient and faster since it was first developed. There is no doubt that it has made a dramatic impact on writing and teaching. In some respects it has moved us back to the oral culture that we originated from and in other respects it has aided in the proliferation of the written text. The telephone has transformed societies social behavior by changing the way we communicate with each other.

The telephone has fostered a whole host of new inventions - both the cellular phone and the internet are a result of the telephone system. We can now read up on an obscure subject over the internet and then phone a friend immediately to discuss it. Technology is more than the sum of its wheels, gears, transmitters. It is a system that involves organization, procedures, symbols, new words, equations and most of all, a mindset. The telephone is prime example of just that.
Just as writing changed our thought processes the telephone has also changed our mindset to a more complex way of thinking and continues to impact us as we move into the twenty-first century.

No wonder Alexander Graham Bell’s patent from the United States Patent Office, #174-465, is often acknowledged as the most important patent ever issued.