History of Communications Media

Class 4

Telegraph

- Theoretically, Telegraphy became possible when Stephen Gray of England in 1729 discovered that electric current could be conveyed along a wire and activate some sort of receptacle at the other end
  - Variation in the number or duration of the impulses could signal different letters or numbers which could be strung together to form a message
- Practically, creating a telegraph system proved possible only when reasonably reliable and economical batteries became available

Telegraph

- 1800 – Alessandro Volta invented the battery
- 1825 – British inventor William Sturgeon invented the electromagnet
- 1830 – Joseph Henry used the electromagnet to send a current over one mile of wire to activate another electromagnet to cause a bell to ring
- 1837 – British physicists William Cooke and Charles Wheatstone patented the Cooke and Wheatstone telegraph using the principle of electromagnetism

Telegraph

- What Samuel F.B. Morse and Theodore Vail accomplished was:
  - A telegraphic system that used Morse Code
  - A telegraphic receiver that could both mark the dots and dashes onto a moving strip of paper and emit sounds that an experienced telegrapher could decipher at speeds up to 40-50 words a minute

Telegraph

- Some Notes About the Telegraph
  - Before the telegraph, the speed of information was tied to the speed of transportation. The telegraph broke that link and made possible the almost instantaneous communication of information
    - This revolutionized information-intensive industries and activities
      - News could now be reported as it occurred and instantly disseminated across a fairly wide region
      - Facilitated the operation and coordination of the railroads
      - Business transactions between merchants in different cities that formerly took days or weeks now took only minutes or hours

Telegraph

- Some Notes About the Telegraph – 2
  - It created a lot of technological hype and technological utopianism
    - The notion that new technology equals progress and that technological innovation can solve our socio-economic-political problems largely gets its start with the telegraph and the railroad.
  - It made possible the future creation of large-scale corporate entities

Telegraph

- Some Other Consequences
  - The combined desire for speed and the increasing costs involved in using the telegraph to get news led New York City newspapers in 1848 to create the first news wire service, the Associated Press
  - The unreliability of early telegraph lines (especially in wartime) led reporters to develop the 'inverted pyramid' style of news writing
    - The concern with essential facts led to a differentiation between news and opinion – with the latter being segregated into an editorial section or caged in quotation marks

Telegraph

- Some Other Consequences – 2
  - To economists, it is axiomatic that markets are limited to the area in which communications is effectively instant
    - Thus, before telegraphy, markets were inherently local. After telegraphy, they became regional and then national.
      - One effect was to concentrate the trading of items such as gold, stock, bonds, and commodities in the place where most of their related financial transactions took place:
        - » New York became a center of stock and bond trading
        - » Chicago became a center of commodities trading

Telegraph

- Some Other Consequences – 3
  - Created the first network-effect technology – the value and use of telegraphy increased as more nodes were added to the system
  - Made Western Union a major corporate entity
  - Along with the railroad, it facilitated travel and the holding of professional and business conventions
    - Telegraph allowed people to make hotel reservations
    - Allowed convention planners to coordinate convention planning with the hotels where the convention was to take place

Telegraph

- Some Other Consequences – 4
  - Paved the way for such future wire-related information technologies as the telephone, the teletype machine, the stock ticker, and the fax machine
  - Along with the railroad, the telegraph made modern sports and touring theatrical companies and their related stars possible by permitting long-distance transportation of teams, troupes, and fans (and the necessarily-related coordination) and the electrical transmission of sports news and theatrical publicity to city newspapers and mass-distribution magazines

Telegraph

- Historical Notes – 1
  - 1851 – Fire alarm telegraph
  - 1858 – Wheatstone Automatic Telegraph Sender that could transmit up to 400 words a minute from pre-punched tape
    - Used for news transmission
  - 1871 – Western Union begins money transfers
  - 1871 – Signal telegraph
    - Allowed a customer to signal a central police station, firehouse, or messenger service
  - 1872 – Duplex Telegraph
  - 1884 – Quadraplex Telegraph

Telegraph

- Historical Notes – 2
  - 1884 – Western Union is one of the original 11 stocks included in the first Dow Jones Average
  - 1900 – Fredrick Creed invents a way to convert Morse Code to text
  - 1913 – Western Union develops Multiplexing
  - 1914 – Western Union introduces the first charge card
  - 1920s-1930s – Telegrams experience peak popularity
  - 1925 – Teleprinter machines

Telegraph

- Historical Notes – 3
  - 1933 – Western Union introduces singing telegrams
  - 1936 – Varioplex Telegraph
  - 1938 – Facsimile
  - 1959 – TELEX
  - Jan 27, 2006 – Western Union delivers the last telegram

Telephone

- Alexander Graham Bell
  - Son of a professor of elocution in London & Edinburgh who emigrated to Canada
  - Taught deaf mutes in Boston. There
    - Met Gardiner G. Hubbard, an affluent businessman and philanthropist
    - Married Hubbard's deaf daughter, Mabel
    - Became professor of vocal physiology and elocution in 1873
    - Conceived of the telephone in July 1874

Telephone

- Origins of the Telephone
  - Invention of the duplex and quadraplex telegraph showed:
    - A telegraph wire could be made to carry the traffic of first two and then four wires
  - Concept of the harmonic telegraph
    - Bell's experience with a stuck reed led to the realization that a wire could also transmit a voice message
  - Bell obtained a patent for the telephone on March 7, 1876

Telephone

- How the Telephone Worked
  - Caller would talk into vibrating plates or reeds
    - This would induce a continuous fluctuating current
    - Current would carry the exact amplitude and voice frequency along a wire
    - An electromagnet at the receiver would transform the current into pulses of magnetic force
    - These pulses would act on another set of tuned reeds to reproduce the original sound

Telephone

- Creation of the Bell Telephone system
  - Hubbard was excited by Bell's invention
    - Opposed Western Union because it was a monopoly & favored a U.S. Postal Telegraph Company
    - Organized the Bell Telephone Company in July 1878
    - Persuaded Theodore N. Vail to run the company
  - Bell Telephone won a suit against a Western Union-sponsored competitor

Telephone

- Notes about the Bell Telephone System
  - Bell Telephone would manufacture the phones & license them to local phone companies
  - This meant that Bell:
    - Could for its first 16 years dictate, via its license agreements, both common technologies and the cost of local phone service
    - Due to its technical standardization, could begin long-distance phone service
  - Bell created Bell Labs to solve the technical problems that beset long-distance service

Telephone

- Early leaders of Bell saw the telephone as simply a “talking telegraph”
  - Assumed the telephone would be used just like the telegraph and by the same types of users
- This had three effects
  - Led independent phone companies to take advantage by providing services that Bell didn’t
  - Slowed down the pace of telephone adoption
  - Brought Bell to near bankruptcy, leading to its takeover in 1907 by Morgan banking interests and the stabilization of AT&T under Theodore Vail

Telephone

- Bell/ATT Timeline - 1
  - 1878 - First commercial switchboard established in New Haven, CT
  - 1880 – Local telephone companies reorganized as the American Bell Telephone Company
  - 1880 – First telephone numbers
  - 1880 – First pay telephone
  - 1885 – Name changed to American Telephone & Telegraph Company
  - 1893 – With the expiration of Bell's patents, independent phone companies enter the business
    - By 1902, there were 9,000 such companies

Telephone

- Bell/ATT Timeline -– 2
  - 1915 – First transcontinental telephone call
  - 1919 – First rotary dial telephone
  - 1922 - AT&T opens WEAF, the first commercial radio station in New York.
  - 1925 - AT&T establishes Bell Telephone Laboratories Inc. as its research and development subsidiary.
  - 1927 - AT&T begins transatlantic telephone service
  - 1934 – AT&T inaugurates trans-pacific phone service

Telephone

- Bell/ATT Timeline -– 3
  - 1941 – First non-experimental laying of coaxial cable
  - 1946 – Beginning of mobile phone service
  - 1947 - Bell Labs invents the transistor
  - 1951 - First customer dialing of long-distance calls
  - 1956 - First transatlantic telephone cable
  - 1962 - First telephone satellite - Telstar

Telephone

- Bell/ATT Timeline -– 4
  - 1963 – First touchtone phone
  - 1968 - AT&T introduces 911 as a nationwide emergency number
  - 1970 - First customer dialing of international telephone calls
  - 1971 - Researchers at Bell Labs create the Unix computer operating system
  - 1977 – Installation of the first fiber optic cable

Telephone

- Bell/ATT Timeline -– 5
  - 1983 – AT&T opens the first commercial cellular telephone service in Chicago
  - 1984 - Dissolution of AT&T and creation of the Baby Bells
  - 1988 - First transatlantic fiber optic cable
  - 1996 - Telecommunications Act of 1996

Telephone

- Telephone vs Telegraph
  - Telephone permitted voice communication as opposed to Morse Code
  - Telephone communication was synchronous and dialogic whereas the telegraph was asynchronous
  - Telegraph left a written record – the telegram – whereas the telephone did not
  - Telegraph required an intermediary – the telegraph operator – while the telephone within a local exchange did not

Telephone

- Effects of the Telephone
  - It replaced the telegraph in the performance of many of its functions, particular its coordination and communication functions
  - Its technical problems led to the creation of Bell Labs – from which many innovations and discoveries flowed
  - Its linking of different exchanges created the first virtually universal network
    - A network that no longer required people to be at a fixed point to access the communication system

Telephone

- Effects of the Telephone – 2
  - Telephone poles and wires changed the suburban and rural landscape
  - Made obsolete the Victorian practice of card leaving
    - Led to people calling before coming over for a visit
  - Led to large-scale solicitation by businesses and charities who started calling people at home

Telephone

- Effects of the Telephone - 3
  - Sped the commercial adoption of the typewriter
    - The need to create memos or records of phone conversations helped increase the need for typists
  - Fosters sociable conversation, gossip, and chit-chat
    - Thus teen-age girls are the biggest users of the phone
  - Fostered the development of subsequent communication technologies

Photography – Definition

- **Photography** is the process, activity and art of creating still pictures by recording radiation (normally visible light) on a sensitive medium, such as a film, or an electronic sensor. Light patterns reflected or emitted from objects activate a sensitive chemical or electronic sensor during a timed exposure, usually through a photographic lens in a device known as a camera that also stores the resulting information chemically or electronically.

Photography

- Photography is based to some extent on an optical illusion
  - The human eye sees a vast range of greys and colors but if the individual items of grey or color are small enough, it blends the distinct elements into a continuous tone
  - At the microscopic level, developed black & white film consists of either black or white film grains (or pixels in the case of digital photographs) but they are so small that the eye sees them as a continuous tone

Photography

– At the microscopic level, developed color film consists of the black or white film grains, but they are within three different dye layers – normally cyan, magenta, and yellow. When white light is reflected off or passed through the film, each layer subtracts from the white light to produce what we see as continuous tone colors

Photography – Origins

- Camera obscura
- Johann Schultz - discovered that a silver and chalk mixture darkens under exposure to light (1724).
- Thomas Wedgwood - first recorded images (1800)
- Joseph Nicephore Niepce –first photograph (1825)
  - Used bitumen and required an 8-hour exposure
  - Invented photoengraving
  - Partner of Louis Daguerre

Photography - Origins

- Louis Daguerre – invented daguerreotype
  - Daguerre was a panorama painter and theatrical designer
  - Announced the daguerreotype system in 1839
- Daguerreotype – a photograph in which the image is exposed onto a silver mirror coated with silver halide particles
  - The first commercially practical photographic process
    - Exposures of 15 minutes
  - The polaroid of its day – capable of only a single image

Photography – Origins

- William Henry Fox Talbot – invented the calotype or talbotype
  - Calotype was a photographic system that:
    - Used salted paper coated with silver iodide or silver chloride that was developed with gallic acid and fixed with potassium bromide
    - Produced both a photographic negative and any desired number of positive prints

Photography – Origins

- Wet Collodion Process - 1
  - Invented in 1850 by Frederick Scott Archer and Gustave Le Grey
  - Wet plate process that required the photographer to coat the glass plate, expose it, and develop it within 10 minutes
  - Required a portable photographic studio
  - Created a glass negative from which any number of positive paper prints could be made

Photography – Origins

- Wet Collodion Process -2
  - It was a relatively inexpensive process in comparison with the daguerreotype
  - Produced better positive prints than Talbot's paper calotype negatives
  - Reduced exposure time to seconds
  - Matthew Brady used this process
  - Dominated photography until the invention of dry photographic plates and roll film

Photography – Origins

- The wet collodion process was used with other supports as well as glass plates
  - Tintypes used metal
  - Ambrotypes used glass plates coated with a black varnish on one side to produce a positive photographic image
    - Wet collodion version of the daguerreotype

Photography

- George Eastman
  - Developed a practical photographic process that used dry plates coated with a gelatin emulsion that contained silver bromide
  - Developed a coating machine to produce uniform quality gelatin emulsion dry plates
  - Invented photographic roll film
  - Invented a camera that used the roll film he developed
  - Introduced the Kodak Brownie camera for $1

Photography

- Effects of Eastman's Innovations
  - Changed photography from an endeavor practiced by a few professional photographers to an endeavor practiced by nearly everyone
  - Gelatin emulsions made possible shutter speeds as fast as 1/50th of a second
    - Made possible the news photographer and the war photographer who could now photograph people without requiring them to pose
  - Roll film made possible the development of motion pictures

Photography – Some Notes

- The photograph freezes an image of reality in time
  - While people age and things change, the photographic image does not age or change
  - Thus the photograph did for visual information and space what the manuscript and printed text did for verbal information and time
- “A picture shows us something about the world. A story tells us something about the world.”

Photography – Some Notes

- The visual image depicts and organizes objects in space
- Verbal information in the form of a Narrative or Story places and organizes people and objects in time
  - This is especially true in the genres of the novel, the history, and the movie which all have a beginning or starting point, a middle, and an end
- Describing space –whether it be a landscape, a street scene, or a person's features – takes a considerable amount of words, but only one picture

Photography – Some Notes

- Photographs imply transparency – that they don't lie, that they are a window on a part of the world
  - One reason is that the photographer does not impose himself between us and the content in the way that the artist does in a painting
- Photographs (along with MOPIC film and video) focus attention on a subject or event
  - What is photographed or recorded is seen to exist
  - What is NOT photographed or recorded is often not noticed
- Photographs, like art, however, are composed
  - What is shown in the photograph depends on several factors
  - What is not shown often can affect the context in which the photograph is interpreted
  - The caption affects perception of the content and provides vital contextual information

Photography – Some Notes

- Caption - short text message that appears with the image and clarifies its import.
  - Identifies the subject(s) of the photograph
    - Who and/or What
  - Add vital context to a photograph
    - Who took the photo
    - When, Where, and sometimes How and Why
    - If relevant, what happened before and after the photo was shot and/or what is not in the picture
  - Can draw attention to something in the image that is not obvious, such as the presence of someone or something in the background that gives the photograph added meaning or relevance
  - Permits or facilitates retrieval of individual photographs from a large collection of photographs

Photography – Some Notes

- Photography has a whole host of different genres
  - Examples
    - Snapshot
    - News photograph
    - Advertisement

Photography - Newspapers

- Newspaper Photography and Photojournalism
  - In the early-1890s, it became commercially feasible to incorporate photographs in large newspaper editions. This was because of Halftone printing.
  - Halftone printing uses dots that vary in either size or spacing to create the optical illusion of a smooth tone photograph
    - Thus the halftone print of a black & white photograph that we see as containing a range of continuous tone shades of grey will consist of black and white dots that are so small that we perceive them as a continuous tone

Photography – Newspapers

- Before half-tone printing, photographs had to be transcribed into line engravings
  - This meant that newspapers and magazines had very few illustrations and virtually no photographs
- Half-tone printing led to a new brand of newspapers using halftone illustrations based on photographs in place of woodcuts based on drawings
  - Newspapers begin to employ photographers as well as (and often instead of) artists
  - Newspaper and magazine began to contain pictures and photographs

Photography – Effects

- Effects of Photography:
  - Along with color lithography and halftone printing, it allowed the cheap reproduction of all kinds of images
    - Any photograph or any painting could now be readily converted into an attractive half-tone illustration. This was a boon to advertisers, businesses, and home decorators
  - Changed the concept of what constituted Art
    - Art was no longer an imitation of external objects; it was now the external manifestation of the artist's self-expressive creativity

Photography – Effects

- Effects of Photography – 2
  - Pushed pictorial art into depictions that were impressionistic, abstract, and non-representational
  - Created a new art form – the photograph
  - Along with offset color lithography, helped make artist-signed lithographic copies of his original work a major element in both the art market and the modern art museum

Photography – Effects

- Effects of Photography – 3
  - Became a major tool of news reporting (including war reporting), crime investigation, and scientific research
  - Led to the tabloid newspaper
  - Along with the telegraph and the railroad, the photograph created the ‘star’ and the celebrity
  - Turned the world into a “museum of known objects”

Typewriter

- Invented by Christopher Sholes
  - Christopher Sholes:
    - Developed a workable typewriter in 1867,
    - Drew in some co-inventors to improve the device
    - Found a manufacturer in small-arms maker Remington
  - 1874 – First Remington typewriter
  - 1876 - Exhibited at the 1876 Centennial Exposition in Philadelphia
  - 1878 - Remington Model 2 typewriter – the manual typewriter as we remember it

Typewriter

- Initially marketed to authors, lawyers, clergymen, and court reporters
  - Court reporters were the first major adopters of the typewriter
- Businessmen saw its commercial potential to speed up correspondence
  - The typewriter found large-scale popularity in the business office, then spread to government, and finally to individual authors and students

Typewriter

- Effects of the Typewriter
  - Created a demand for typists and stenographers
    - Feminized the clerical work force
      - Impacted upon female fashion
      - This opened up a new niche for women, but also confined them to a subservient status
  - Led people to start composing documents on the typewriter
  - Led to the photographic print with typed caption
    - Affected how photographs were stored and indexed

Typewriter

- Effects of the Typewriter – 2
  - Revolutionized the Office
    - Produced text that was more legible than handwriting
    - With carbon paper, produced multiple copies of the same document
      - Revolutionized office filing
      - Multiplied the quantity of office records
      - Created the typewritten form
    - Changed the furniture of the office
    - Divided correspondence into official (typed) and personal (handwritten)