Computer Graphics and Animation – a Critical history

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- Notes
- Gain an understanding of the evolution of our discipline and to gain a respect for the key developments that have brought us to where we are

- To learn from the past

- Sylvan Chasen (1981) characterized the evolution of the graphics discipline in a fashion similar to human existence. He placed "conception to birth", or the gestational period, as 1950-1963; childhood from 1964 to 1970; adolescence from 1970 to 1981, adulthood from 1981.

Introduction **From:**
Interactive Computer Graphics
Herbert Freeman
IEEE Computer Society Press ©1980

Covers the first two decades of the development of the CGI discipline

A history that involves the following four eras, which are very much linked and related:
pioneers - include artists and researchers

innovators - housed in universities and research labs

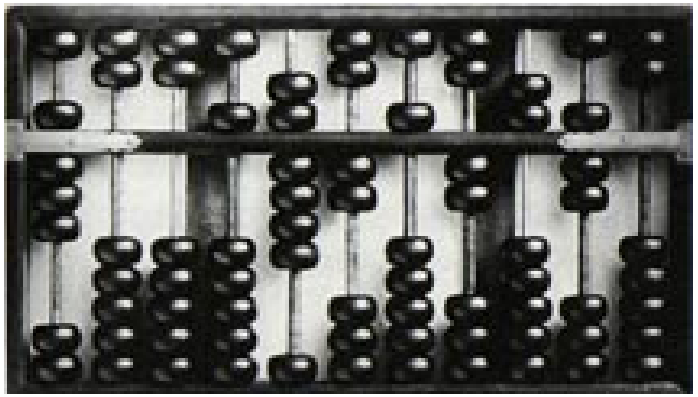
adapters – (1) pioneering CGI production facilities, artists, researchers, and research labs and industries (2) special effects production companies, equipment and software developers, universities, motion picture companies, etc.

followers - effects production companies, universities and companies and research labs.

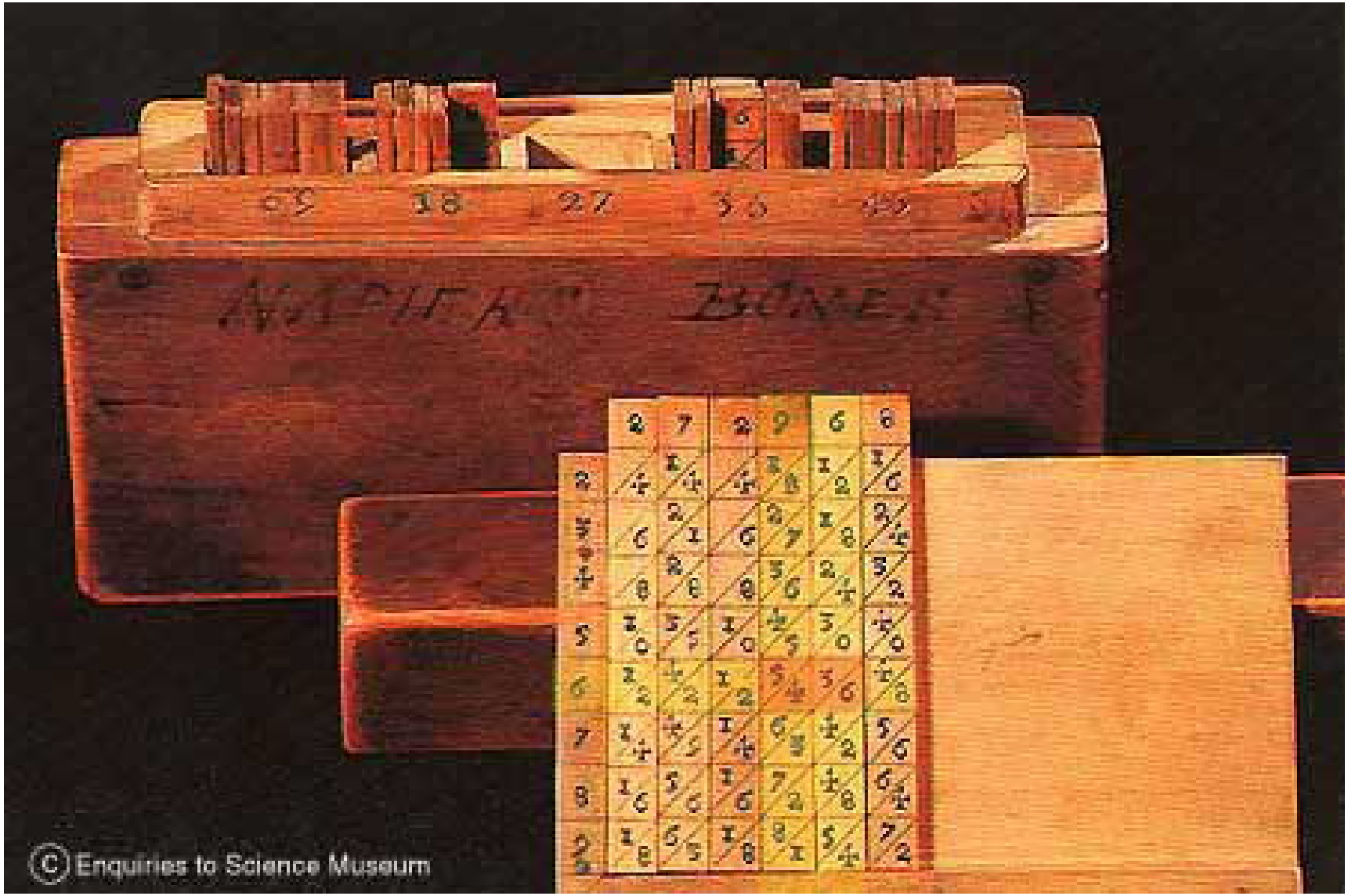
Timeline of Computer History

Abacus

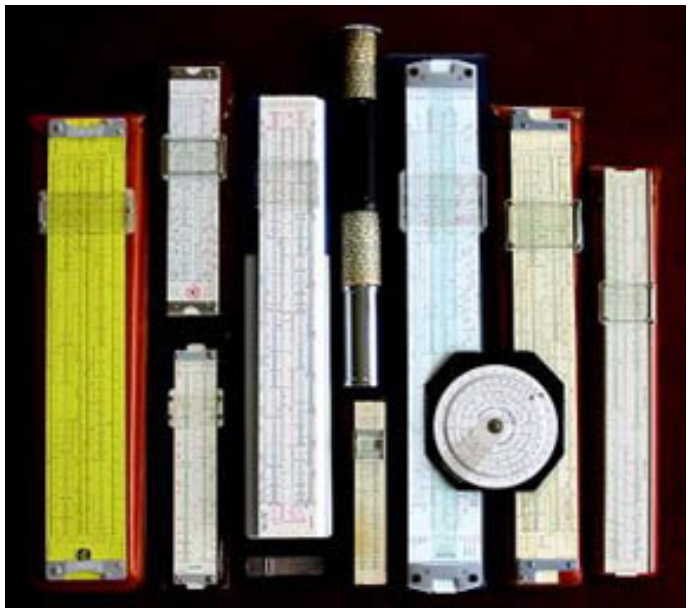
Computing or calculating instruments date back to the abacus, used by early man to represent a positional counting notation that was used in counting tables, called abaci. They were really not calculators per se, but provided a technique to keep track of sums and carries in addition. Although the abacus existed as far back as 5 A.D. the abacus as we know it was attributed to the Chinese in 1200 AD.



Napier (1617)



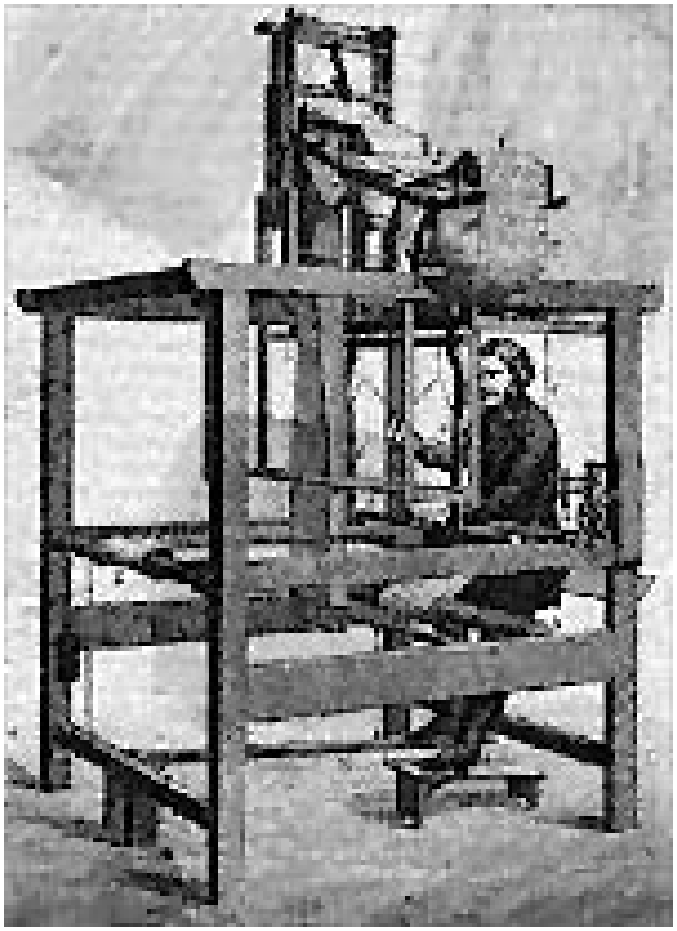
- Napier also invented the logarithm, which was used in the first slide rule introduced in approximately 1622.
- http://www.sliderule.ca/intro.htm



Pascalene adder (1600s)

Jacquard (1801)

A variation on the original punched-card design of Jacques de Vaucanson (1745) who was a toy maker (most famous for a mechanical duck) - The Jacquard loom was developed by Joseph-Marie Jacquard of France who used a punched card to control the weaving actions of a loom, which introduced much more intricate patterns in woven cloth.



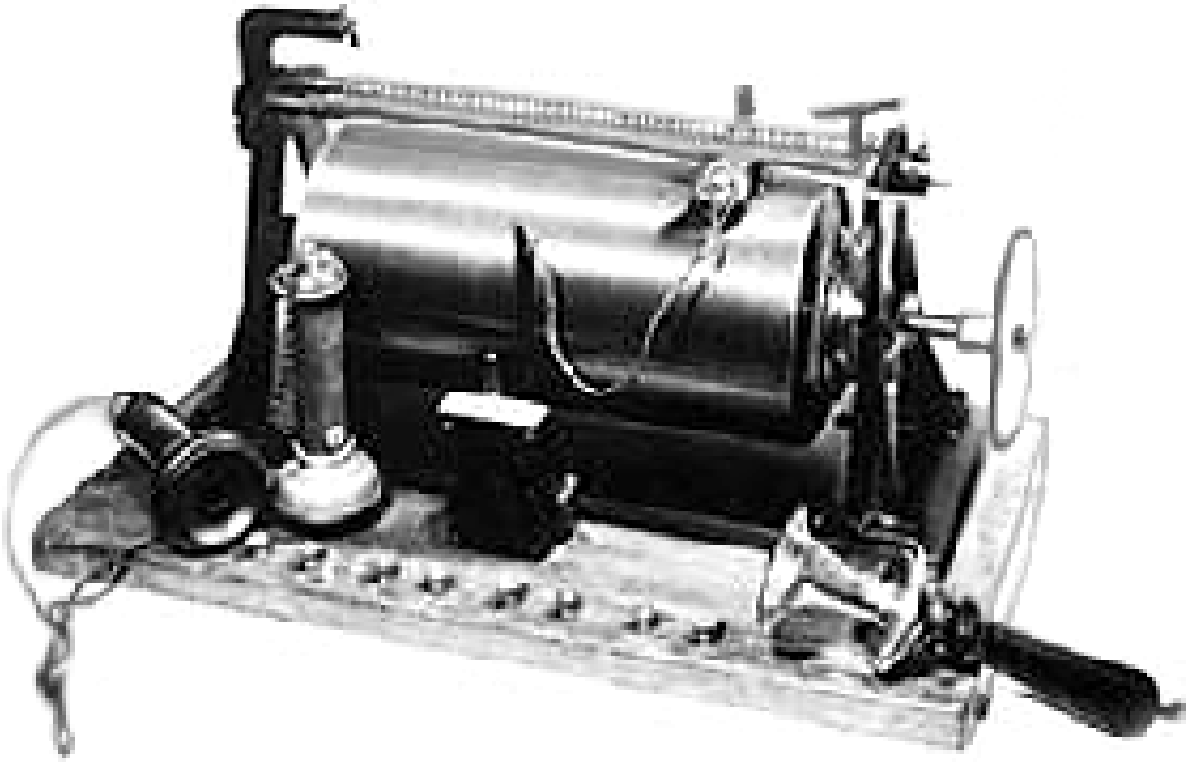
Punched-card

- Charles Babbage (1830) Analytical Engine
- Herman Hollerith for tabulating the 1890 census
- Augusta Ada Lovelace - the first computer programmer
  - http://www.agnesscott.edu/lriddle/women/love.htm

Analog - Digital

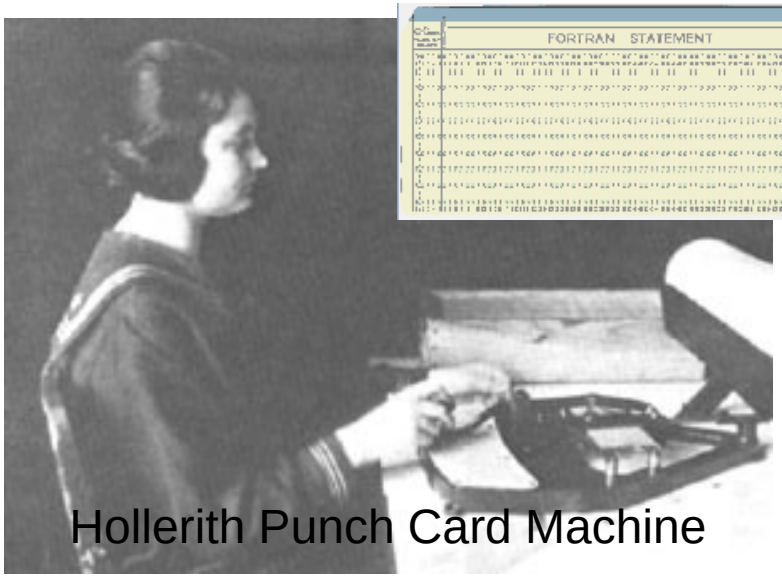
- **Analog**: relating to, or being a device in which data are represented by *continuously* variable, measurable, physical quantities, such as length, width, voltage, or pressure; a device having an output that is proportional to the input.
- **Digital:** A description of data which is stored or transmitted as a sequence of *discrete* symbols from a finite set, most commonly this means binary data represented using electronic or electromagnetic signals.
    - *Ref: dictionary.com*

Telegraphone

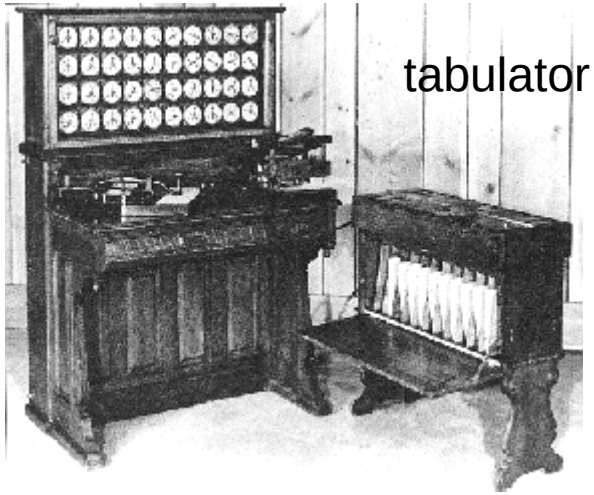


The U.S. Census Bureau - tabulating the 1890 census

Sci Amer Vol 63, No 9: the 1890 census



Hollerith Punch Card Machine



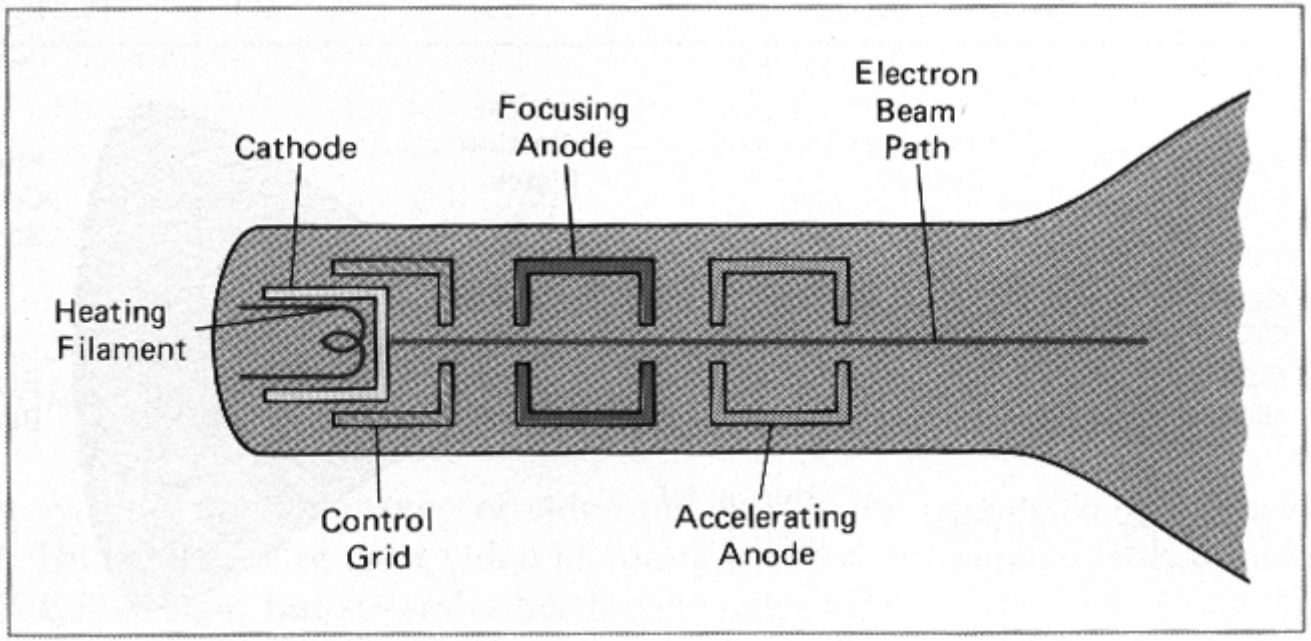
tabulator

Vacuum tube, Lee de Forest (1906)

Vacuum tube & Transistor

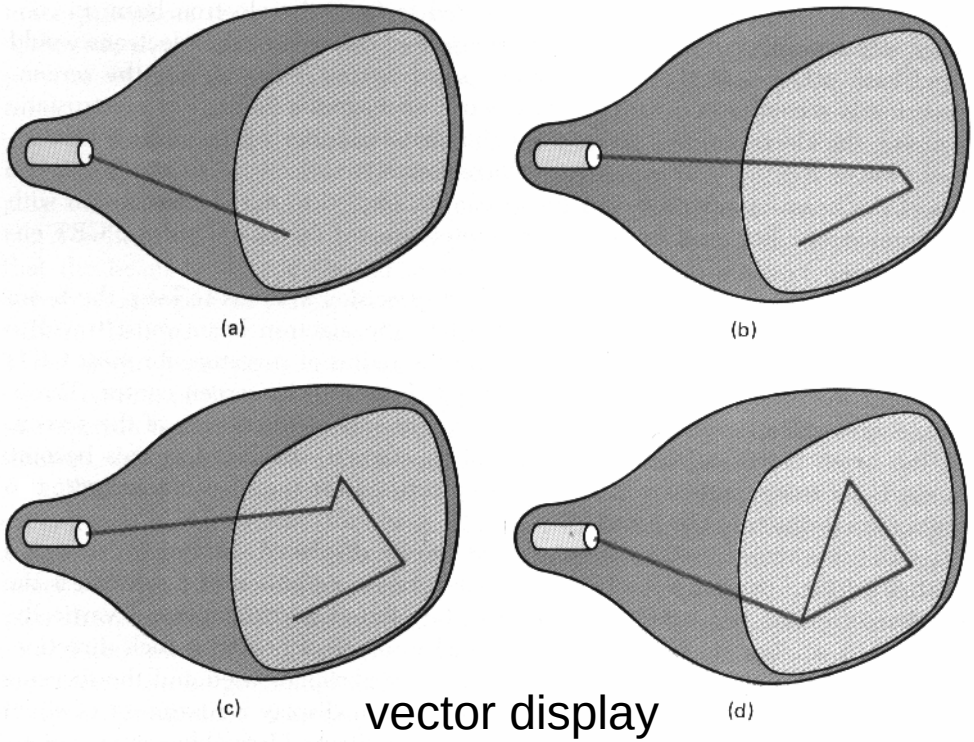
Open MONKEY video file

Cathode Ray Tube (CRT), (1885)

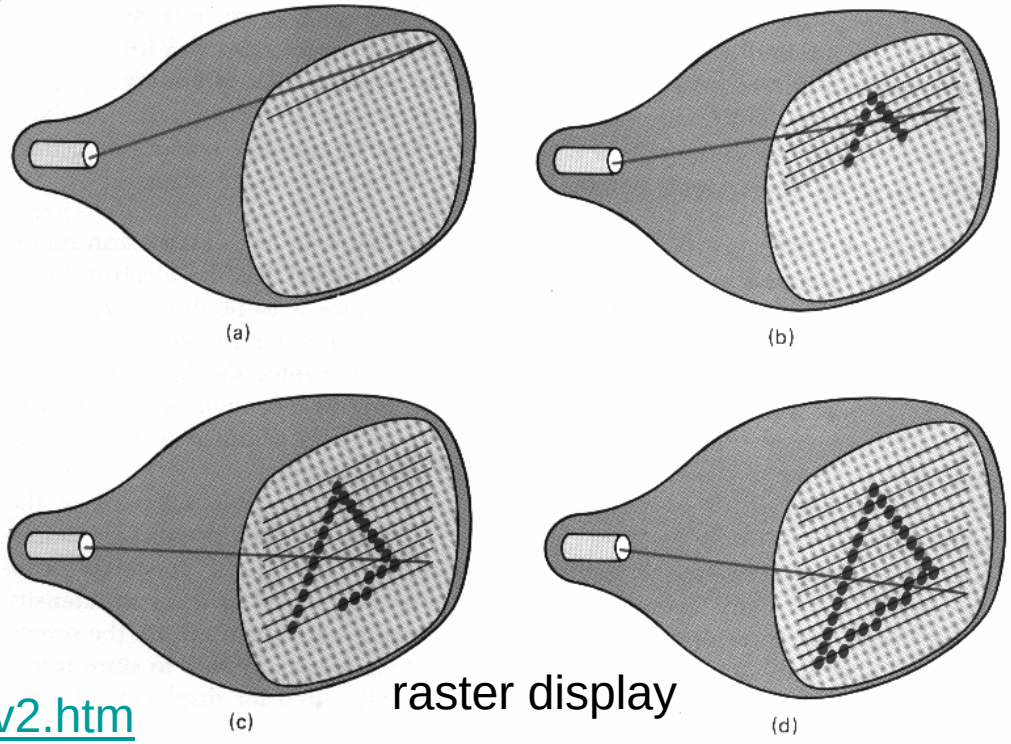


Philo Farnsworth (1927) vs RCA (Radio Corporation of America)

CRT variations



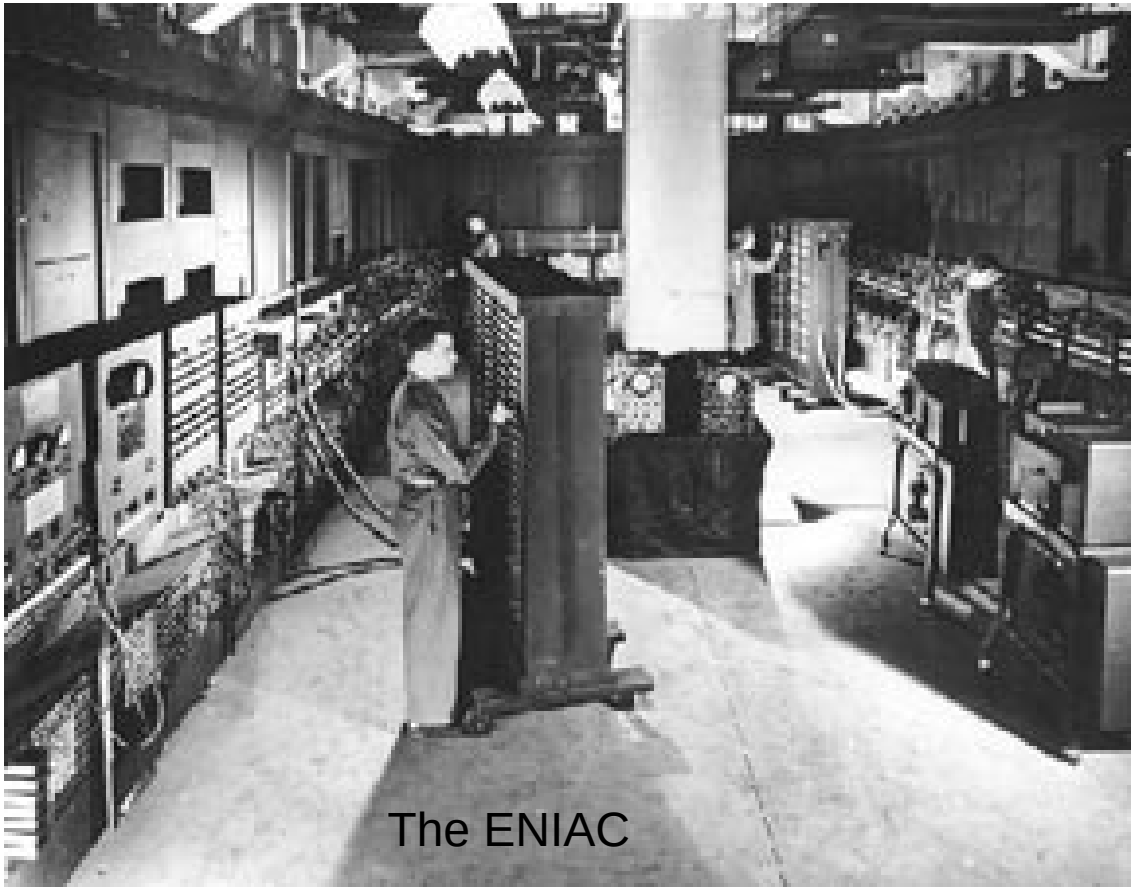
vector display



raster display

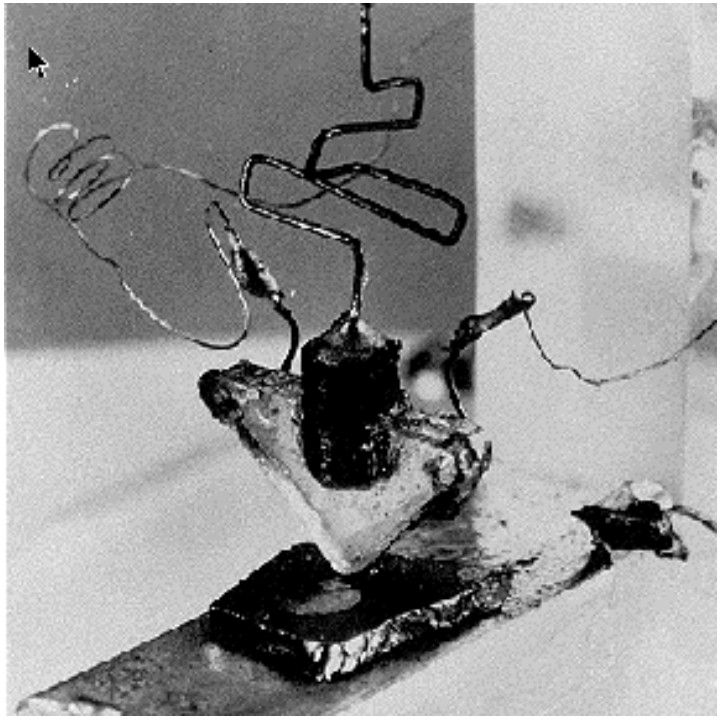
http://entertainment.howstuffworks.com/tv2.htm

The ENIAC



John W. Mauchly and J. Presper Eckert (1947)

the tube's successful replacement



The earliest transistor (source: Bell Labs)

http://www.bellsystemmemorial.com/belllabs_transistor.html

A photo of the first integrated circuit can be found at
http://www.computer-museum.org/collection/ti-icphoto.html

- ”Since all media are fragments of ourselves extended into the public domain, the action upon us of any one medium tends to bring the other senses into play in a new relation. As we read, we provide a sound track for the printed word; as we listen to the radio, we provide a visual accompaniment. Why can we not visualize while telephoning? /.../ The telephone demands complete participation, unlike the written and printed page.” (McLuhan, 1964, p. 291.)

- From **extension** to **integration** of senses
- From the telephone to the ”theater of totality”
- From McLuhan to Wagner and Lázlo Moholy-Nagy

Richard Wagner

- The artwork of the future
  - A rejection of the traditional (superficial) lyric opera
  - The future lies in the the embrace of the ”collective art-work” – a fusion of the arts
  - The Gesamtkunstwerk – the total art-work
  - The drama is the medium – using a fusion of music, architecture, painting, poetry, and dance
  - Scenic painting, lighting effects, and acoustical design
  - The Festspielhaus Theatre
    - Darkening of the house
    - Surround-sound
    - Revitalization of the Greek amphitheatrical seating focusing the audience attention onto the stage

Lázlo Moholy-Nagy

- ”The Theater of Totality with its multifarious complexities of light, space, plane, form, motion, sound, man – and with all the possibilities for varying and combining these elements – must be ORGANISM.”

(Lázlo Moholy-Nagy, 1924 in Packer and Jordan, 2001, p. 16)

Lázlo Moholy-Nagy

- From Bauhaus school
- Aesthetic investigations instead of industrial design focus
- Examined formal principles of abstraction in painting, photography, sculpture, the influence of technology
- Developed together with Oskar Schlemmer a theatre based on these principles – an attempt to synthesize space, composition, motion, sound, movement, and light – into a fully integrated, abstract form of artistic expression
- A re-interpretation of Wagner's Theater of Totality
- Reduced the presence of the actor – who was placed on an equal level with stage design, lighting, music, and visual composition
- Challenged the relationship between the spectator and the performance by calling for techniques that altered the theatrical space

Multisensory Spaces Raewyn Turner, Tony Brooks

- **The Four Senses performances with a symphony orchestra were a translation of sound into light, colour, and smell.**
  - To engage and reframe perception of music and to play with subjective experiences and simulated synesthesia.
  - Each sensory element was constructed from information relating to the other elements.
  - Tony Brooks utilised sensors, software and projectors to create an interactive system capturing movement from the orchestra and translating it into painting with coloured light. In this way the orchestra conductor was able to “paint” the scene through his gestures within an interactive space.
  - Raewyn Turner interpreted the sound to colour and smell using the correspondences that she made between sound/silence and light/dark. The translations involved intuitive drawing, charts, measurements, referral to the seasonal time of harvest of aromatic plants, and an equation which produces a selection of plants from which to choose smell pitch.
  - The performances were an improvisation and a real - time translation of sound and the gestures of making that sound, into light and colour, and multiple layers of smell.