CET246 Electronic Design Automation

A Brief History of Circuit Fabrication

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Introduction

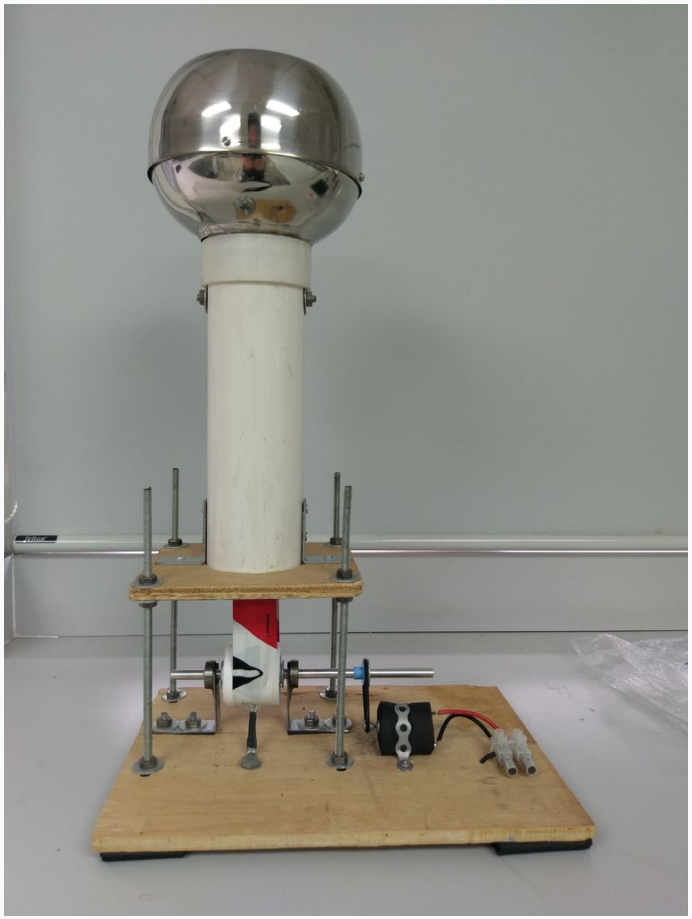
Advances in the fabrication of electric circuits has followed the advance of electricity and electronics.

Electricity: a form of energy resulting from the existence of charged particles (such as electrons or protons), either statically as an accumulation of charge or dynamically as a current. Google Dictionary

Electronics: the branch of physics and technology concerned with the design of circuits using transistors and microchips, and with the behavior and movement of electrons in a semiconductor, conductor, vacuum, or gas. Google Dictionary

Static Electricity

Static Electricity



- William Gilbert (1600)
- Van de Graaff Generator (1929)

Static Electricity

Static Electricity

Static Electricity

"Electric charge is more useful (and interesting) when it moves."

-David J. Broderick, Ph.D.

Volta's Battery

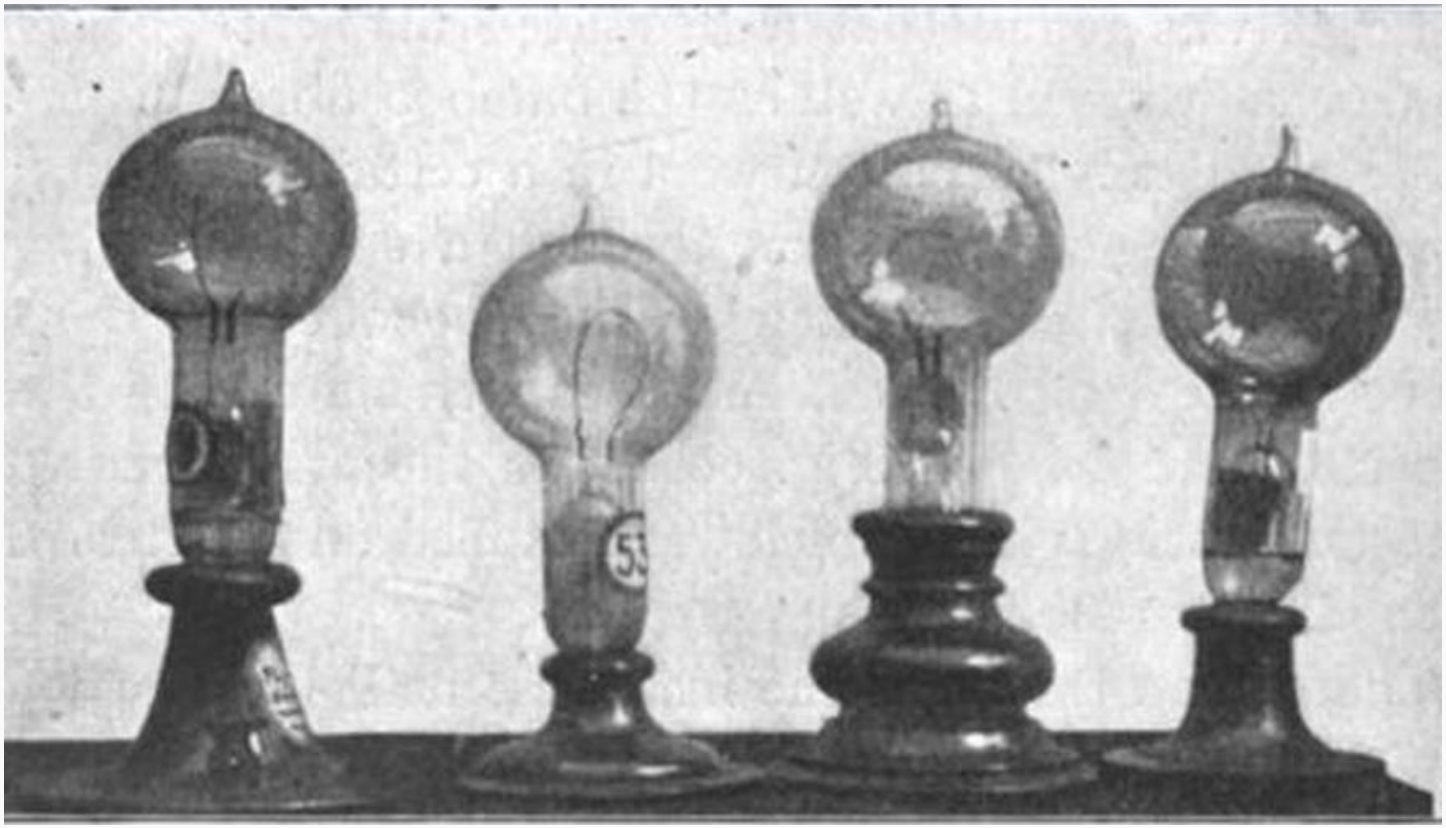
The First Battery

- Alessandro Volta (1800)

The First Battery

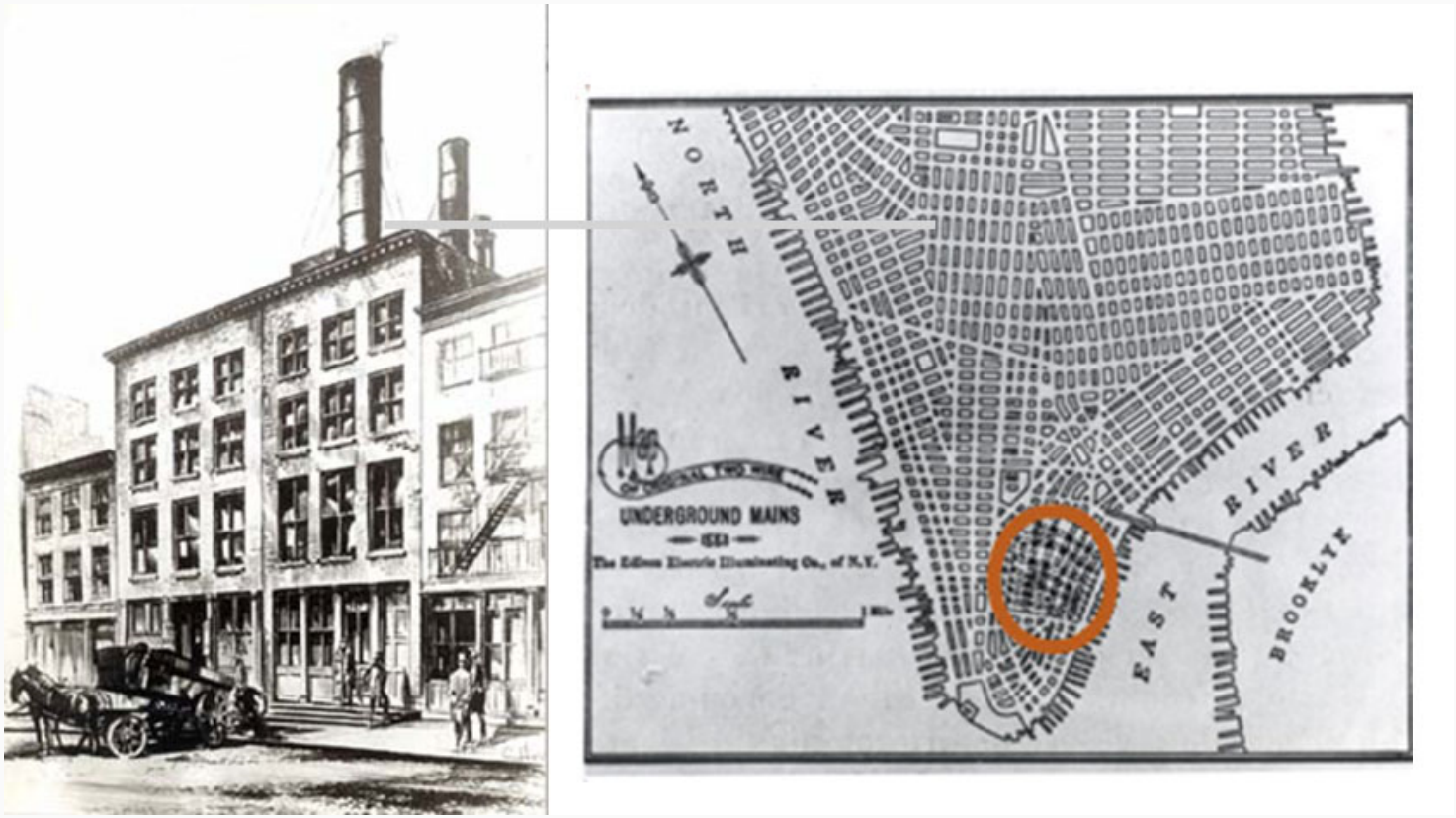
Edison's Light Bulb

Electric Light



- Thomas Edison (1878)

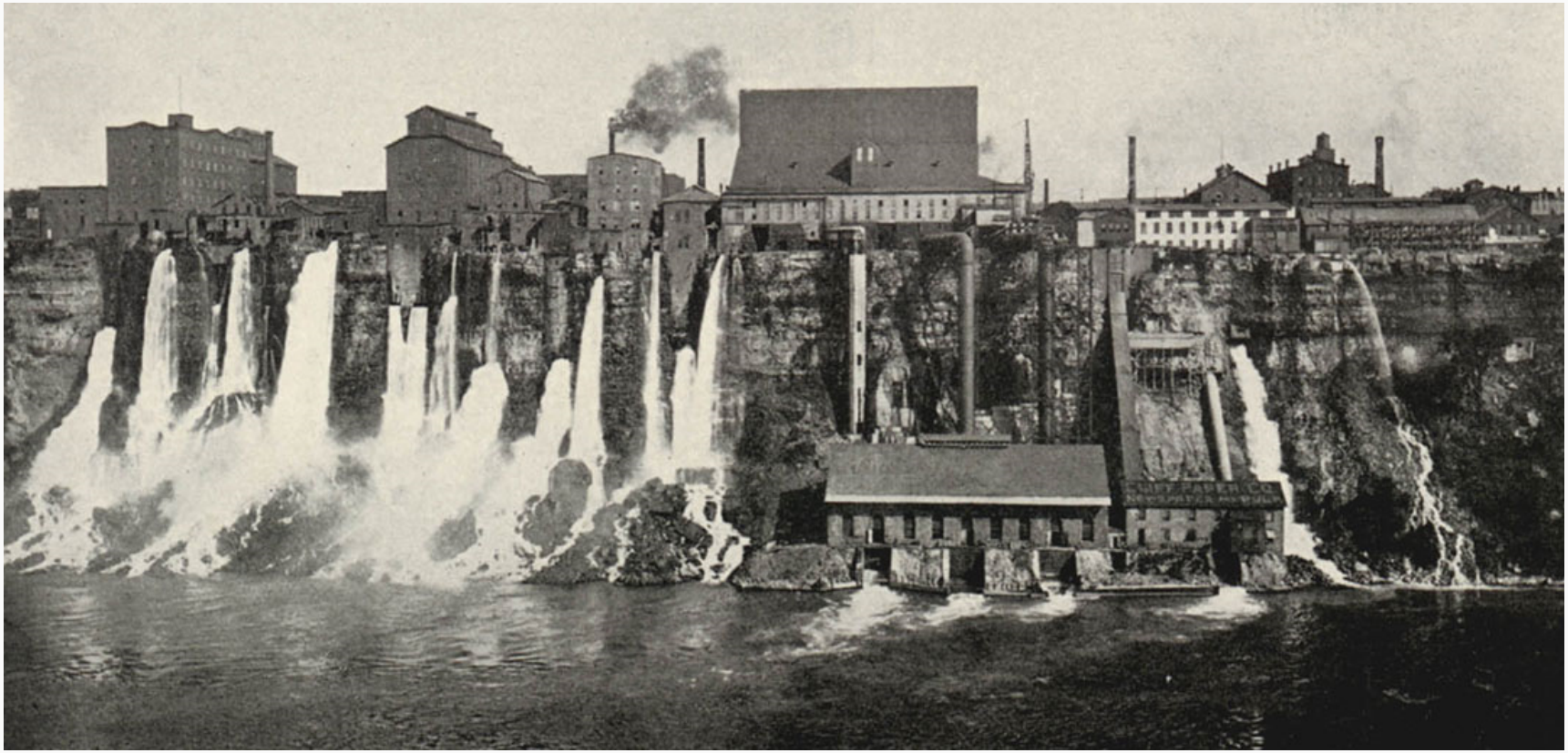
Electric Light



- Edison's Pearl Street Station (1882)

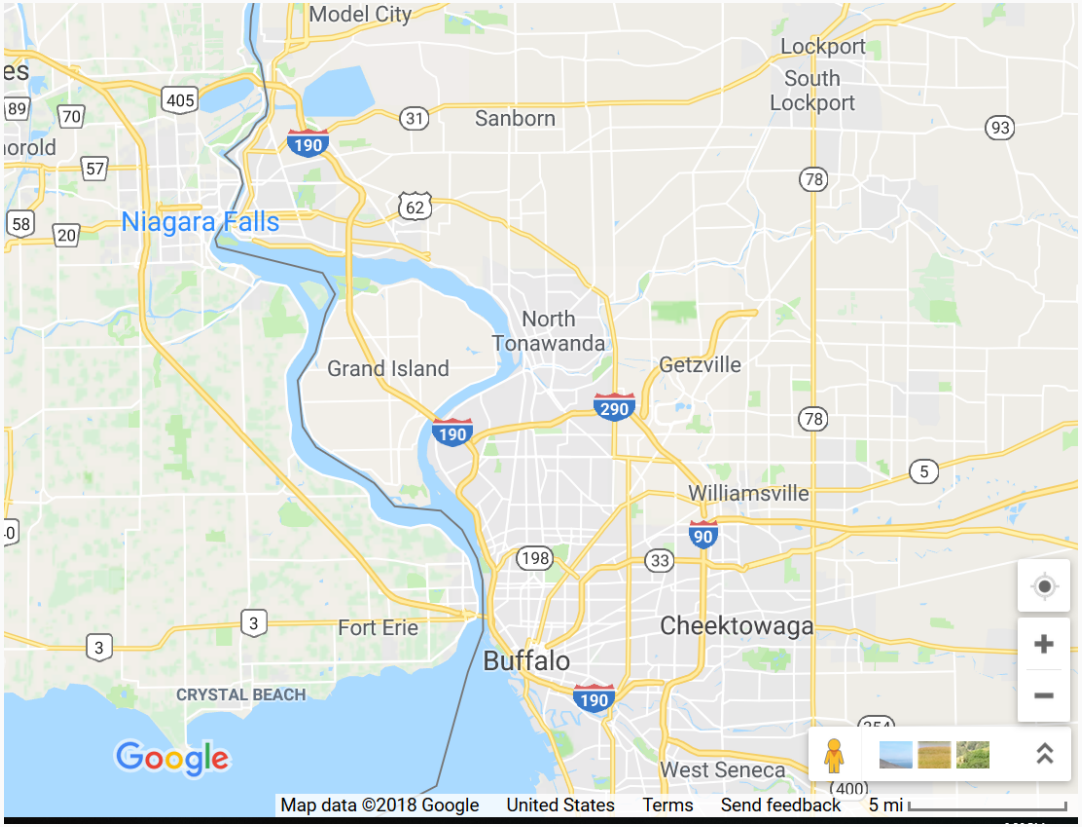
Tesla's Vision

Alternating Current



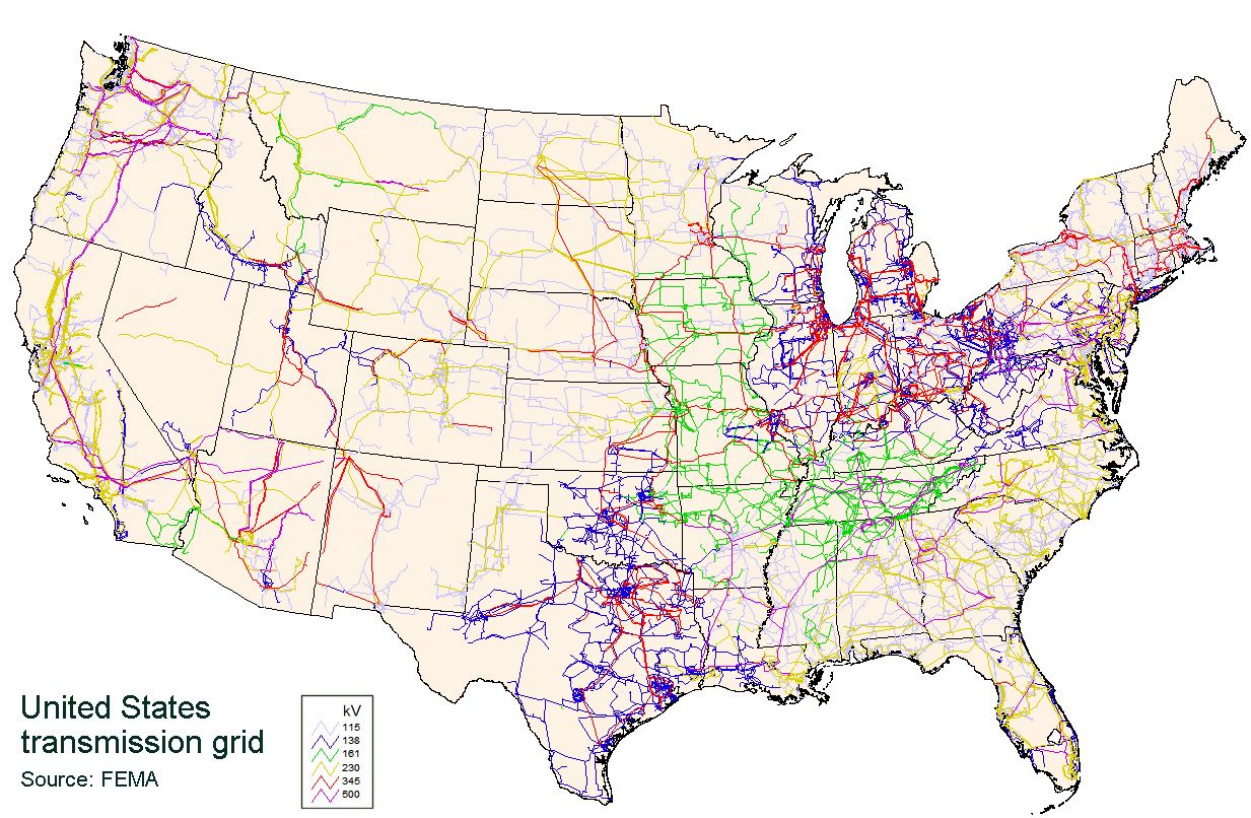
- Niagara Falls Hydro Plant (1895)

Alternating Current



- Generated at Niagara Falls
- Consumed in Buffalo, NY

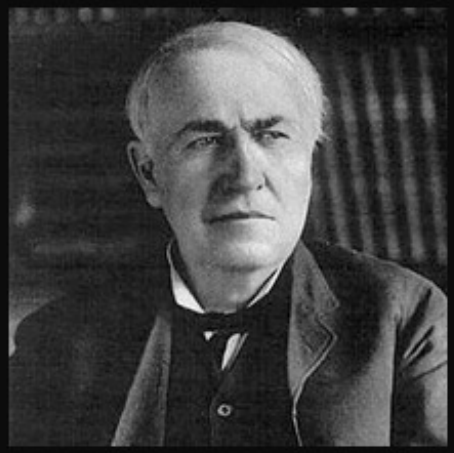
Alternating Current



- Edison: 3000 feet
- Tesla: 16 miles
- Present Day: 300+ miles

Propaganda War

Thomas A. Edison

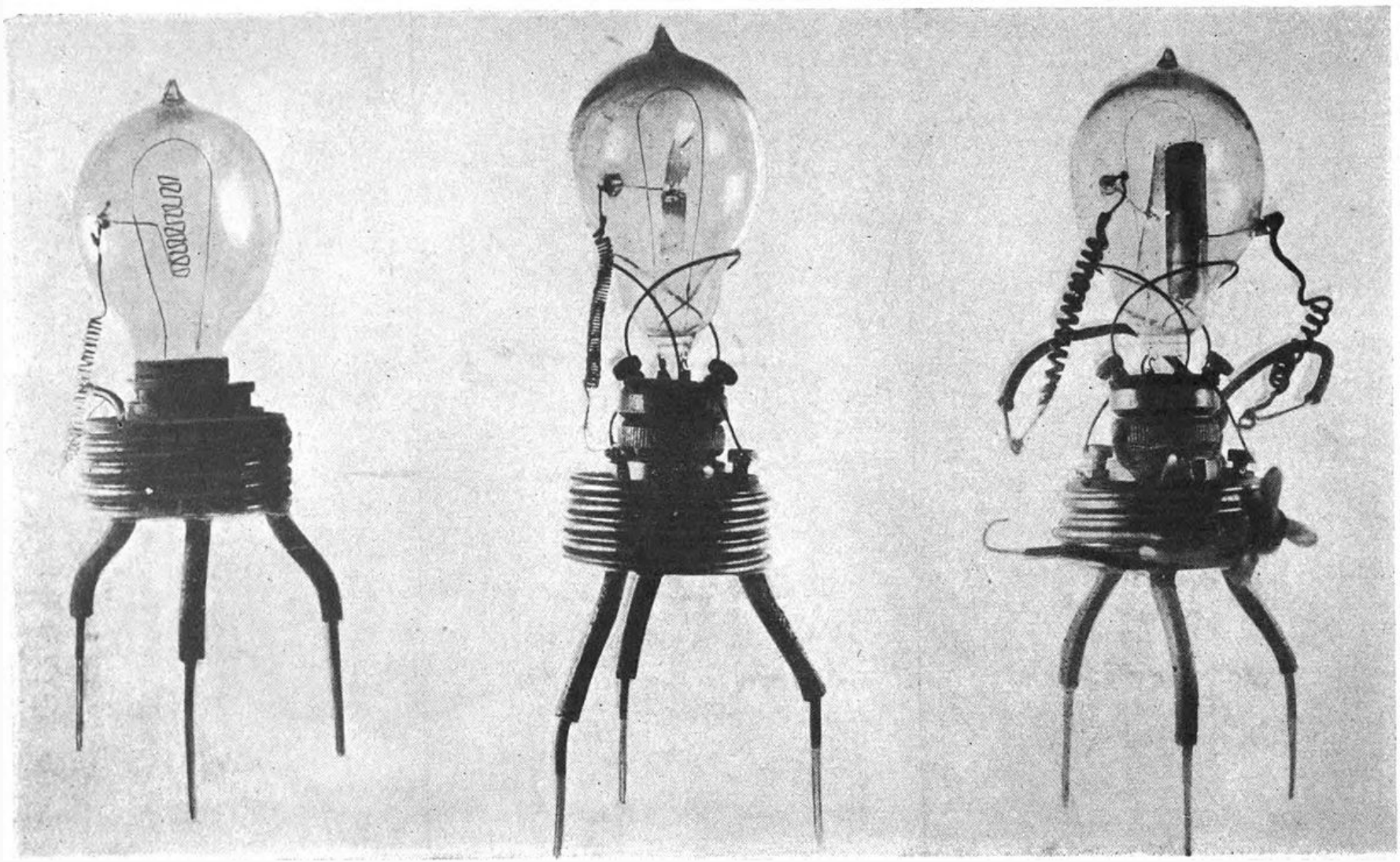


Fooling around with alternating currents is just a waste of time. Nobody will use it, ever. It's too dangerous... it could kill a man as quick as a bolt of lightning. Direct current is safe.

Propaganda War

Fleming's Valve

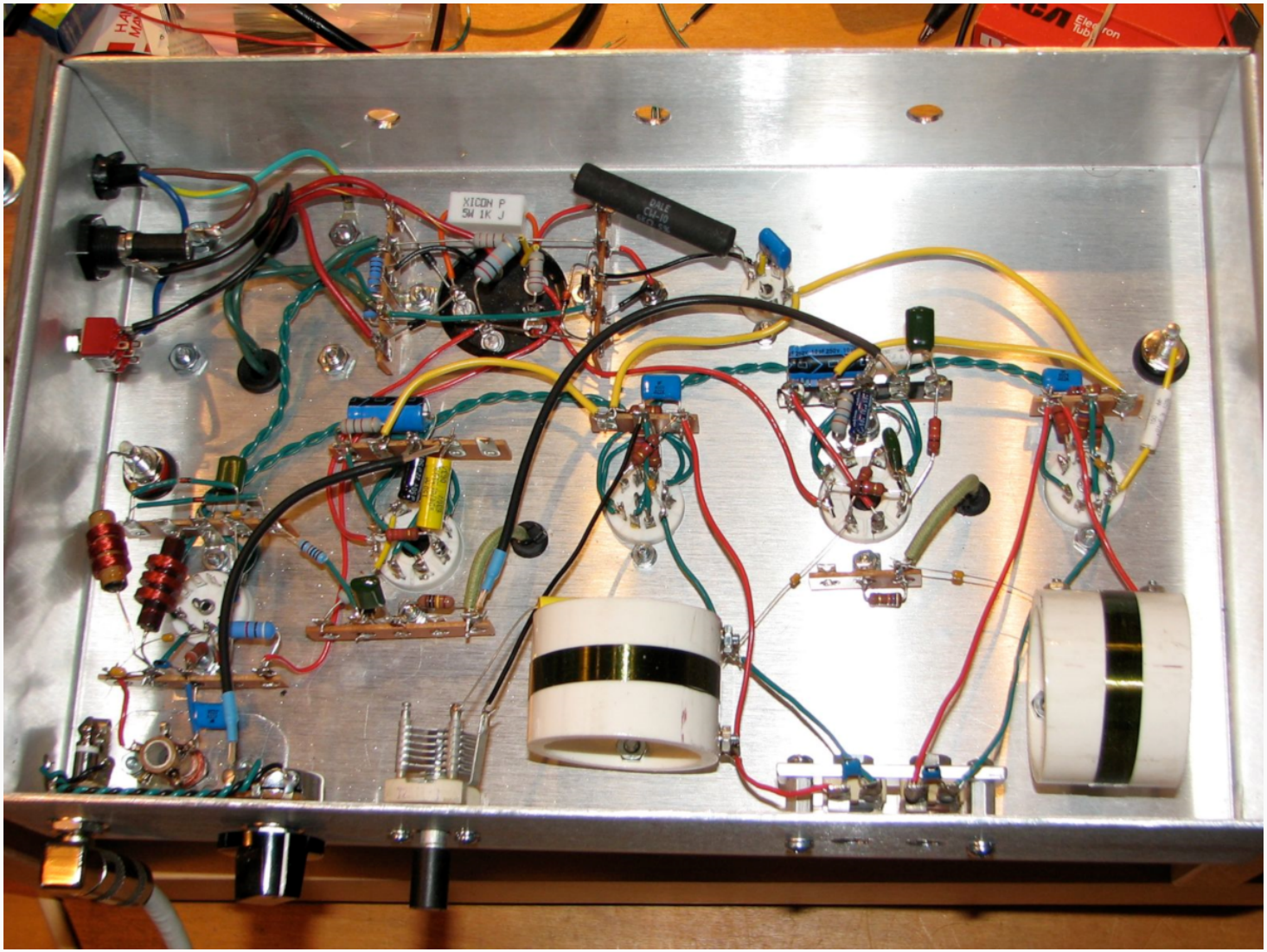
The Dawn of Electronics



The Dawn of Electronics

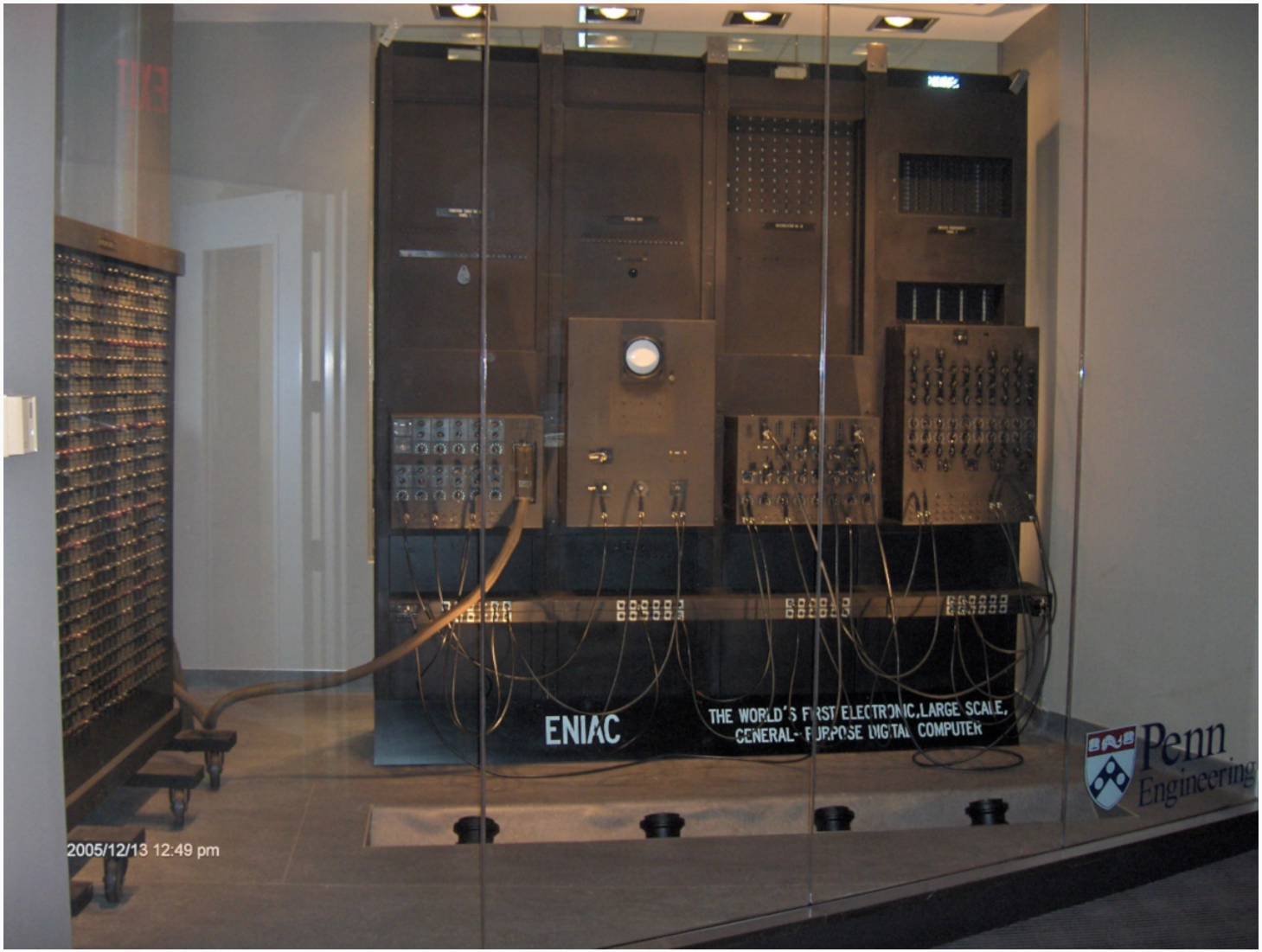
- Sir John Ambrose Fleming (1904)

The Dawn of Electronics



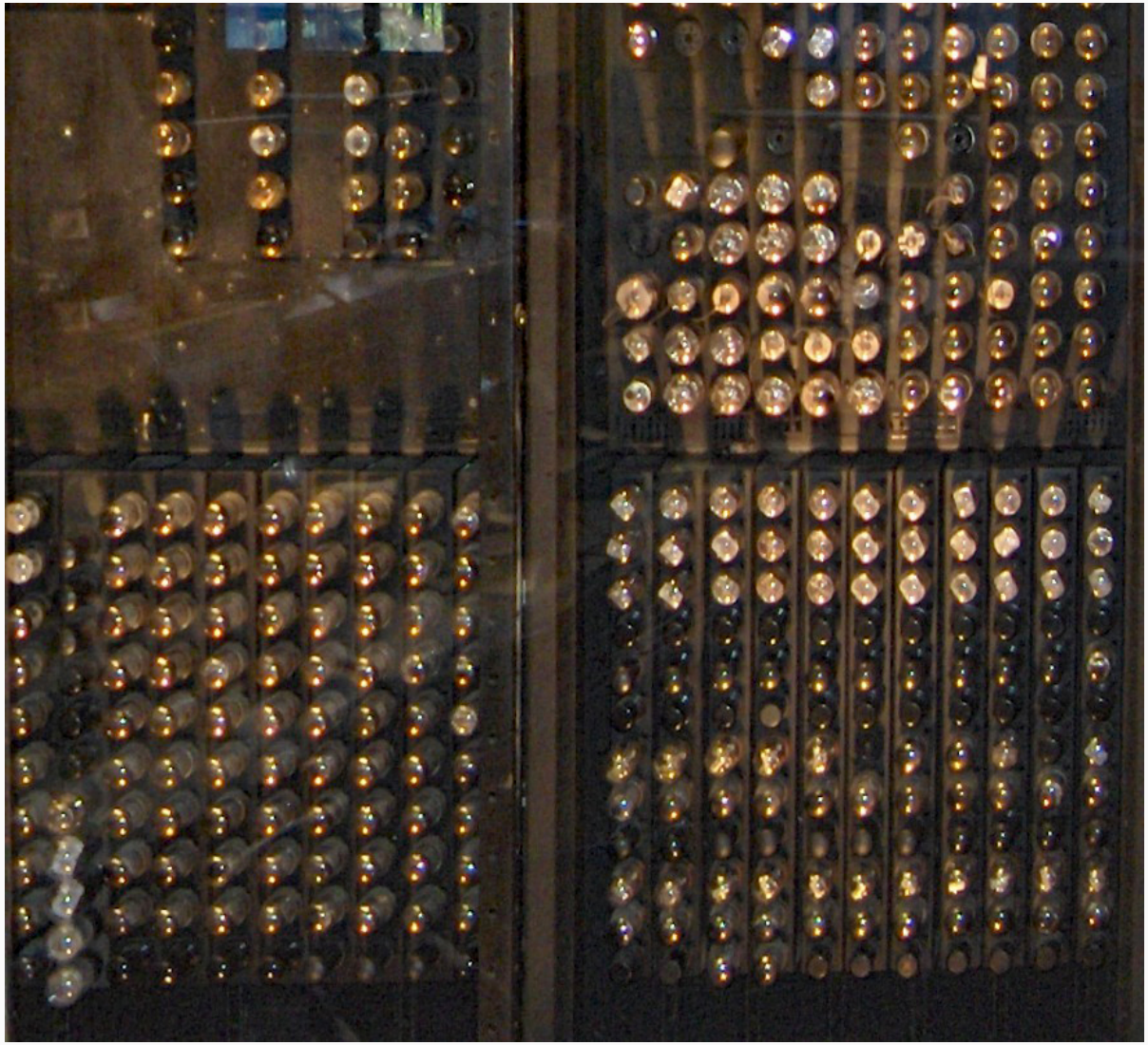
- A modern day tube amplifier

The Dawn of Electronics



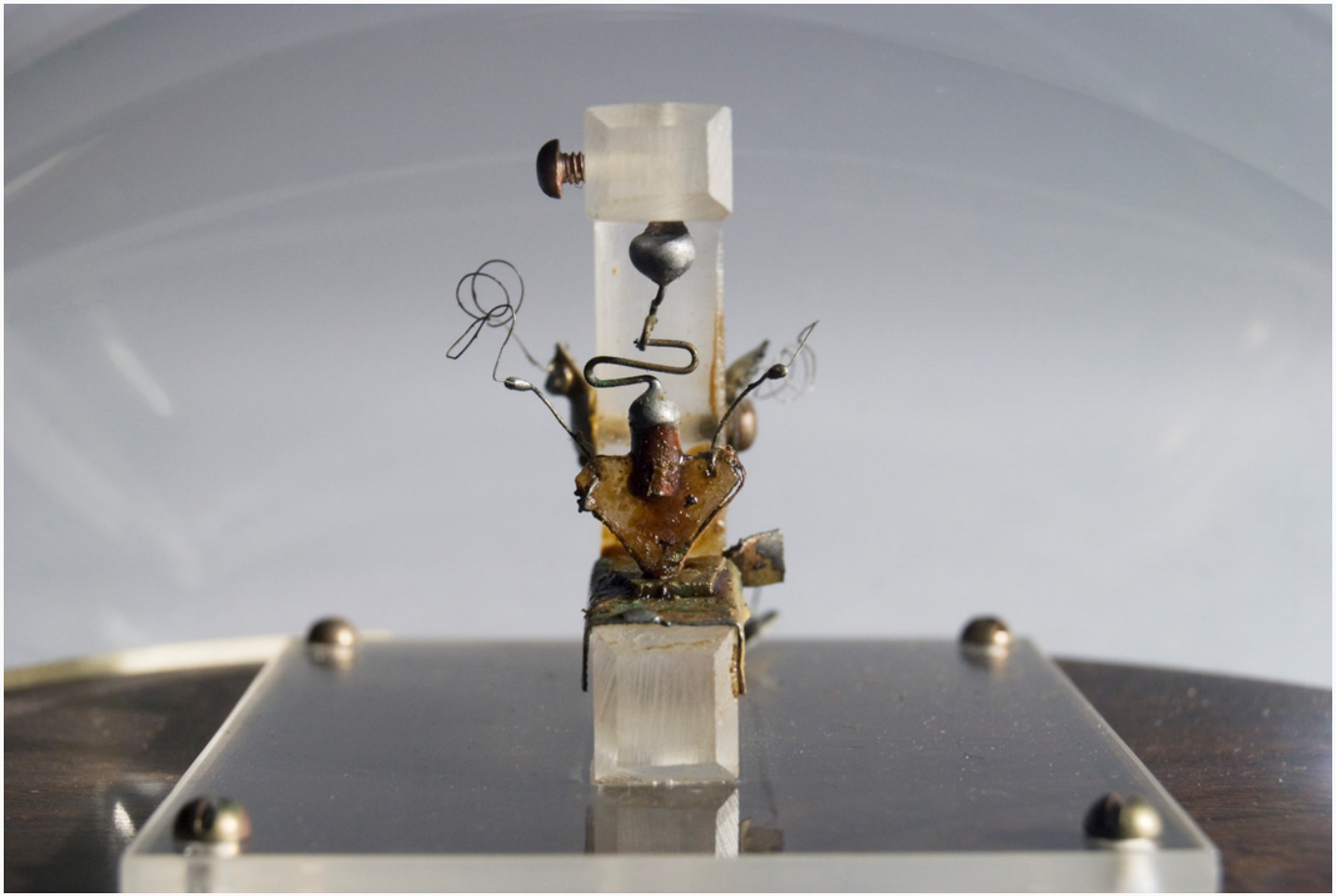
- ENIAC (1945)

The Dawn of Electronics



Shockley, Bardeen, and Brattain

Semiconductors



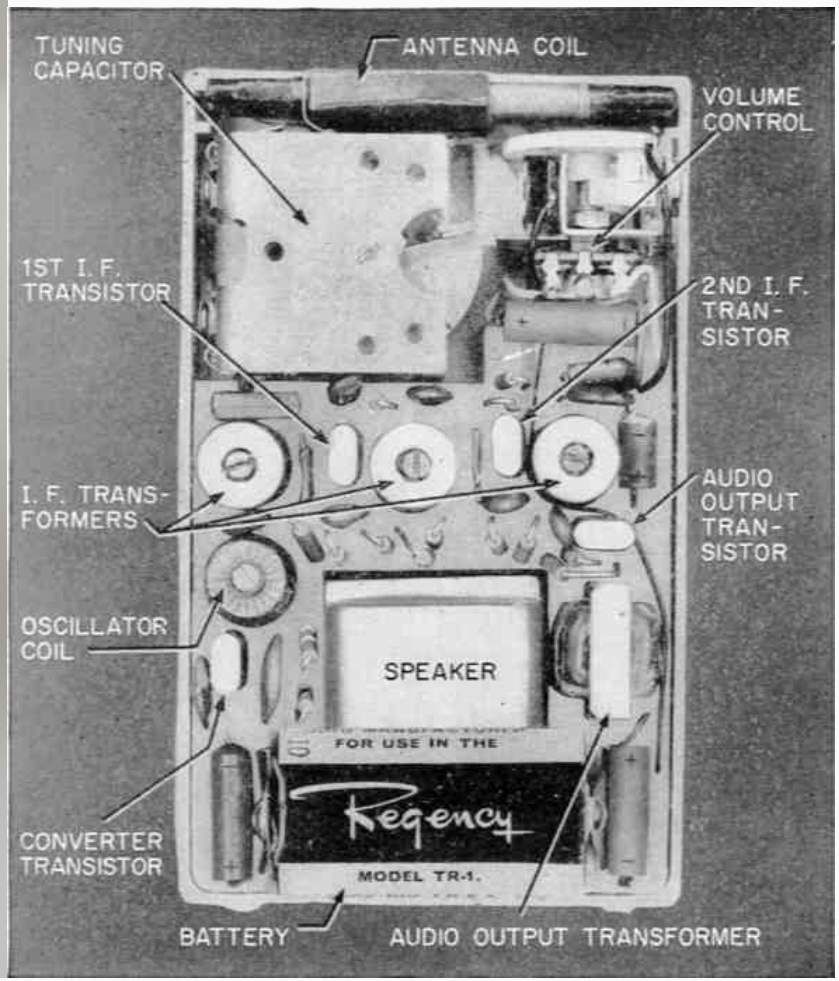
- Shockley, Bardeen, and Brattain (1947)

TI's Transistor Radio

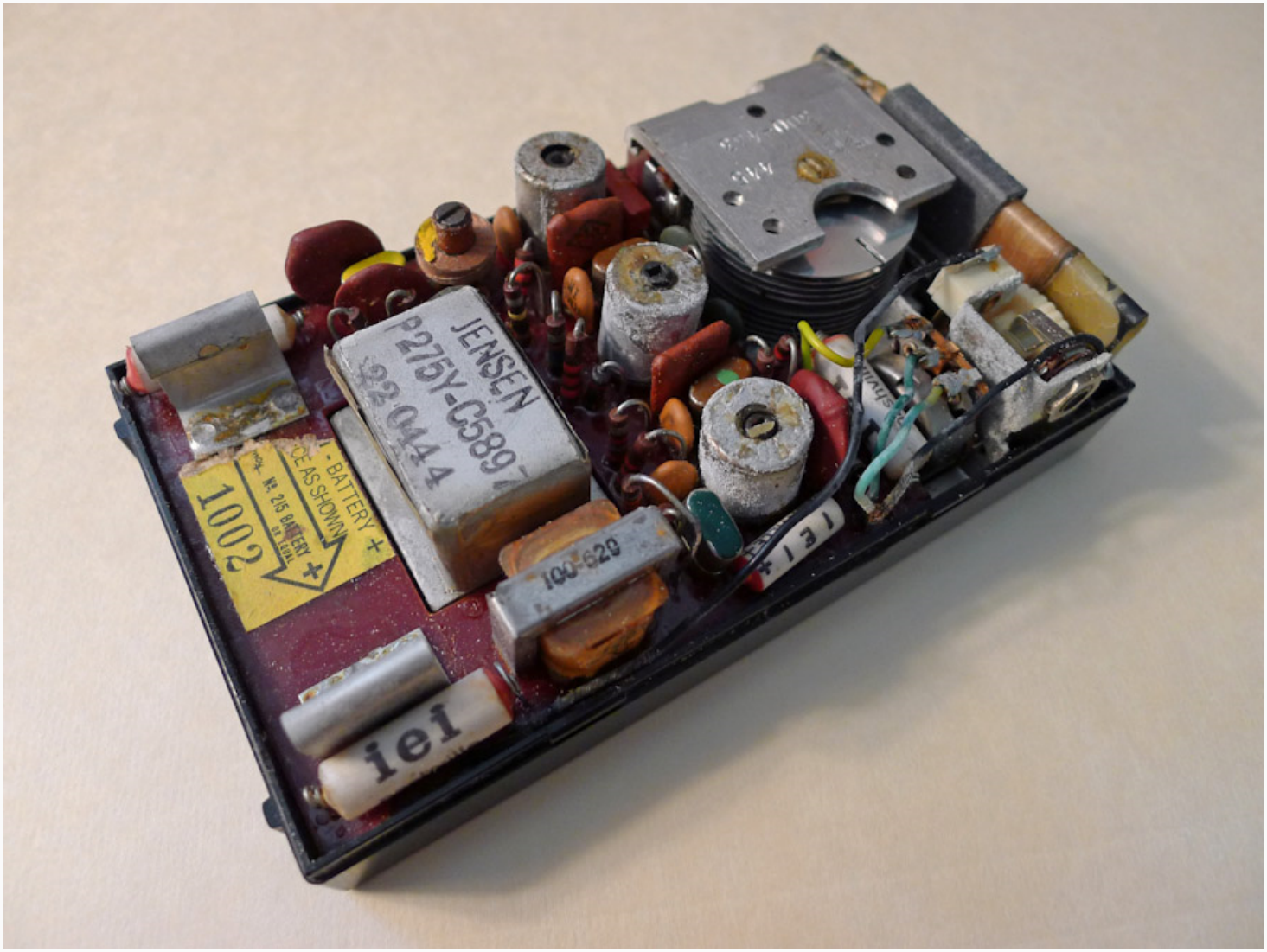
Commercialization

- Table-top tube radios

Commercialization



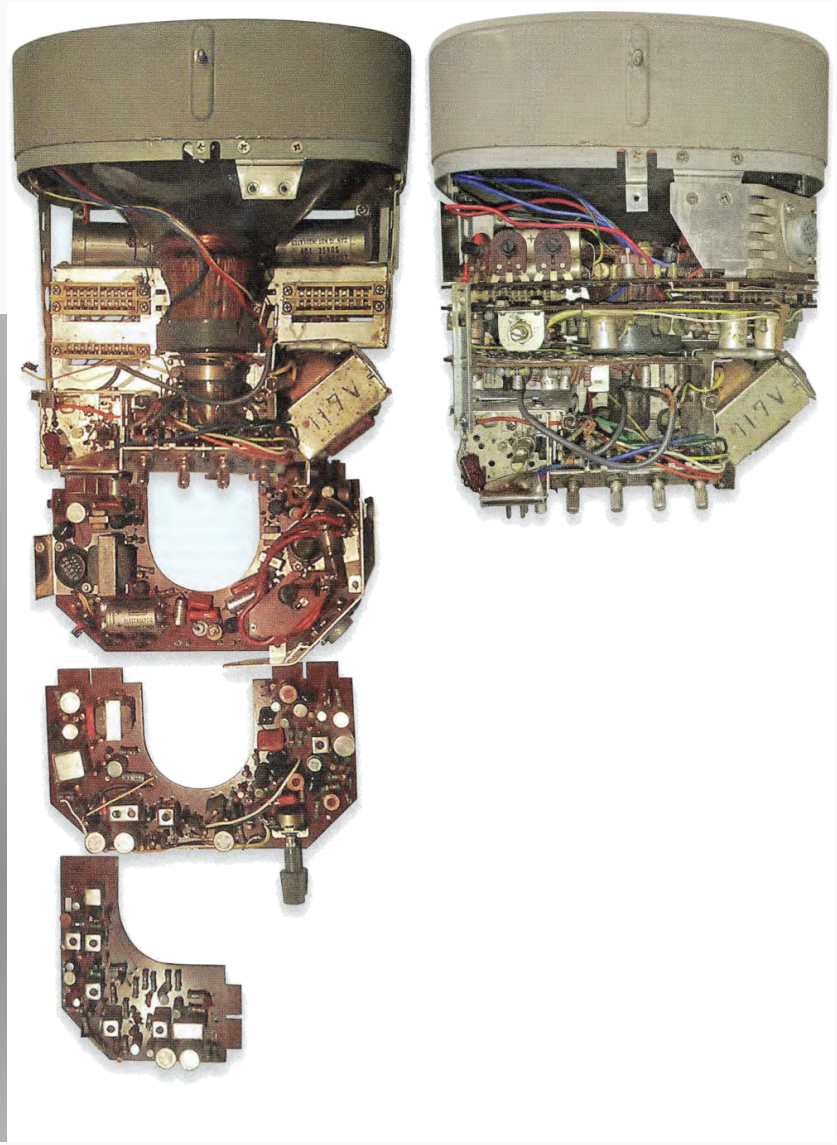
Commercialization



Assembly Video

Sony's "Portable" Television

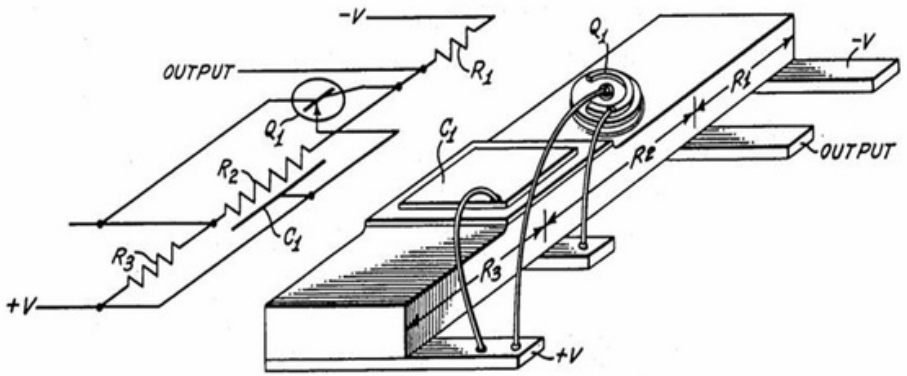
Commercialization

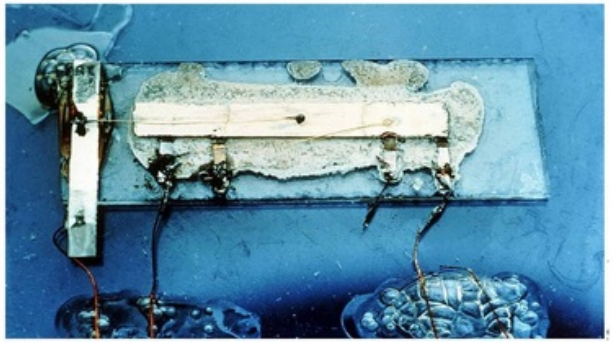


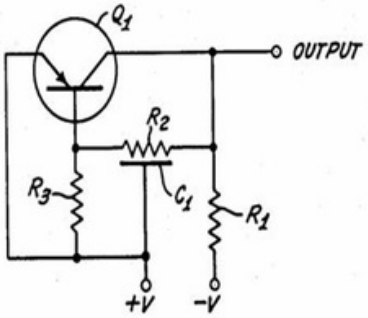
- Sony TV8-301 (1960)

Kilby's Integrated Circuit

Miniaturization



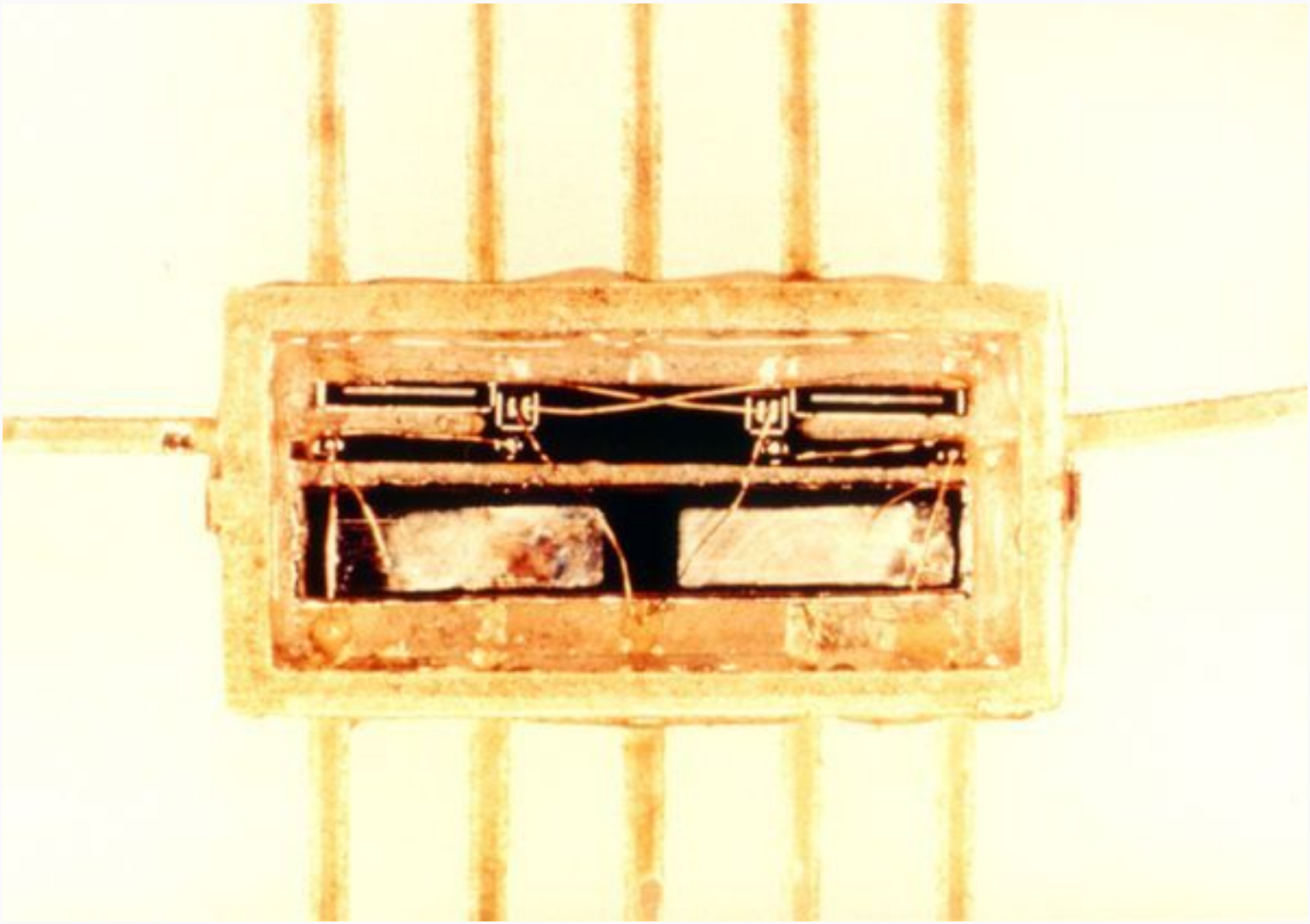




- Jack Kilby (1958)

TI's Multivibrator

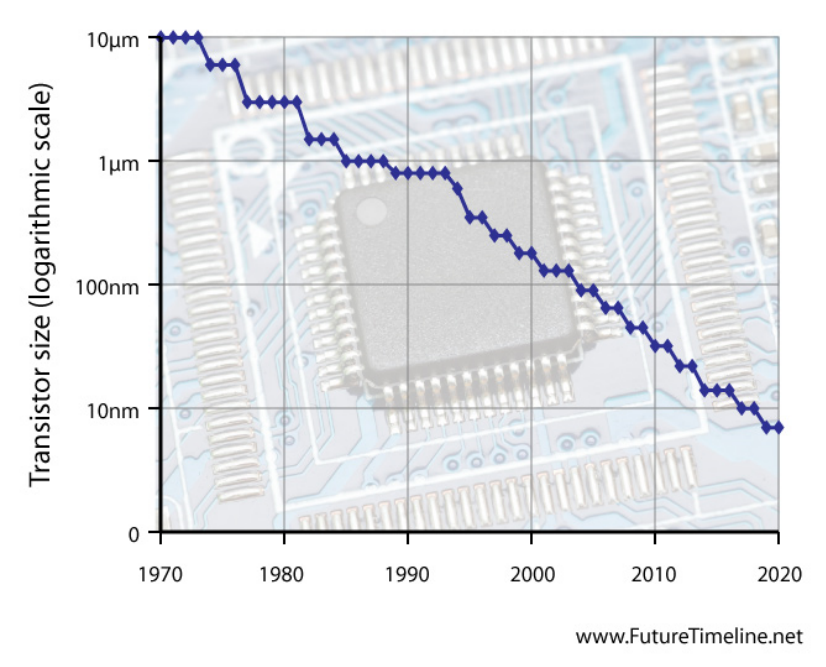
Commercialization

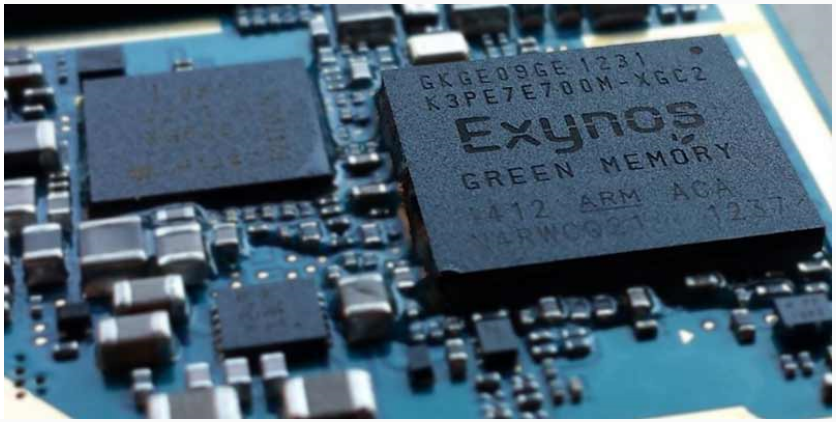


- Texas Instruments multivibrator #502 (1960)

The Rest is History

Miniaturization Continues





- Decreasing transistor size

Common Themes

Commercialization

- Size and physical form of parts
- How are parts connected together?
- How are parts placed for mechanical assembly?
- How is soldering performed?
- How is testing performed?
- How durable/reliable are components?
- Environmental concerns