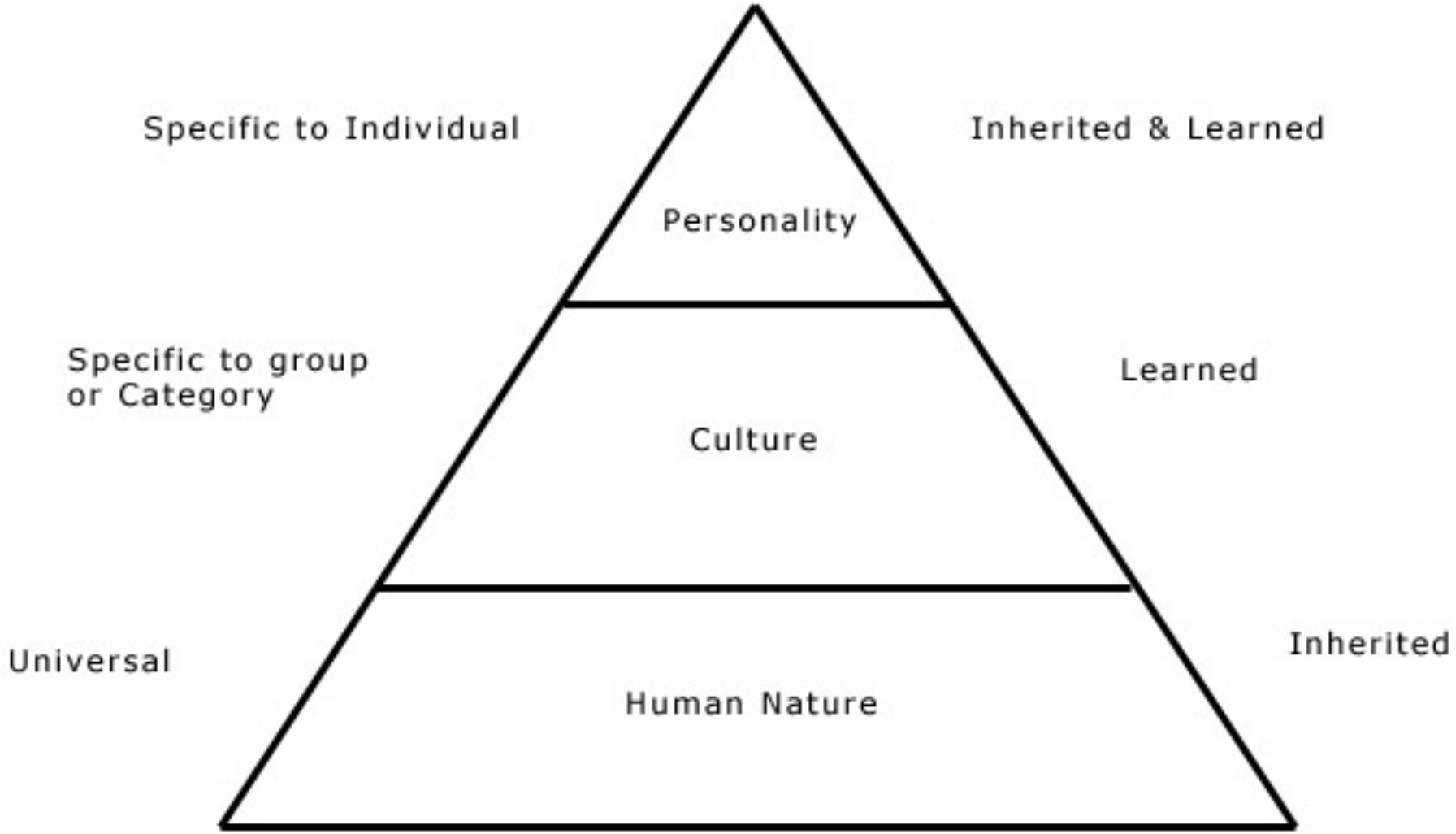
What is “socio-technical analysis?”

- An evaluation of the intersection of man and machine
  - The individual
  - The group
  - Society
  - Culture
  - Government
  - World

What is “socio-technical analysis?”

- What is culture?
  - Collective
  - Part of the ‘Human Nature – Culture – Personality’ pyramid

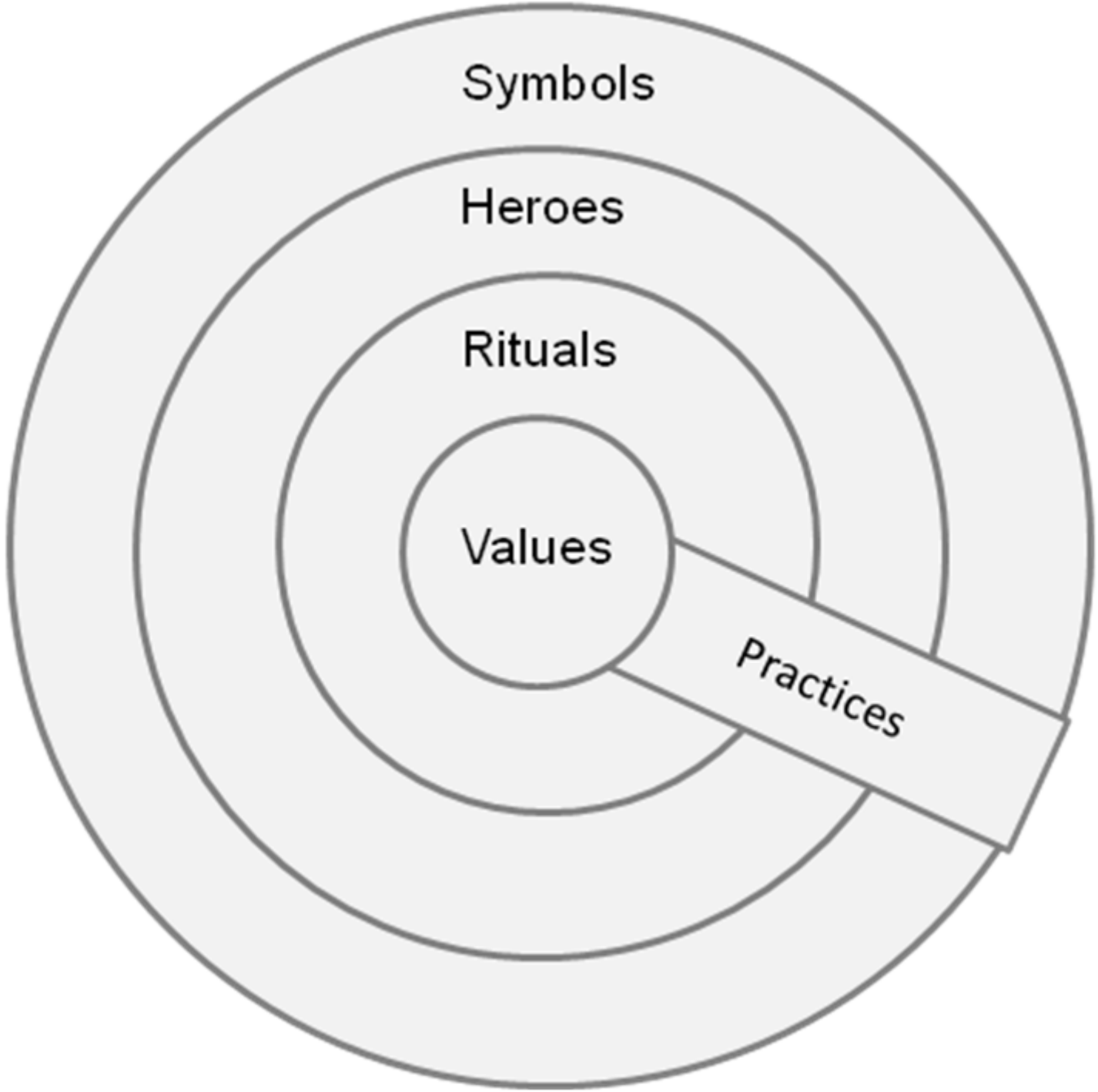

Specific to Individual
Inherited & Learned
Personality
Specific to group
or Category
Learned
Culture
Universal
Inherited
Human Nature

What is “socio-technical analysis?”

- What is culture?
  - Collective
  - Dimensions of Culture
    - Power Distance Index (PDI)
    - Individualism Index
    - Masculinity Index
    - Uncertainty Index
    - Orientation Index
    - Indulgence Index

What is “socio-technical analysis?”

- What is culture?
  - Collective
  - Onion Model


Symbols
Heroes
Rituals
Values
Practices

What is “socio-technical analysis?”

- Music (Not so much songs)
  - Classical music
  - Beatles / Elvis Presley
  - Vietnam / Woodstock
  - Disco / Gospel / Country / Rap / Heavy Metal
  - The tritone
  - Accusations of delinquency

What is “socio-technical analysis?”

- Music
  - Some songs are notable
    - National anthems
    - Toccata en Fugue
    - 1812 overture
    - Rock and Roll All Night
    - Thriller
    - Tubular Bells

What is “socio-technical analysis?”

- Movies
  - Can reflect or impact society
    - To Kill a Mockingbird / Gone With the Wind / Birth of A Nation
    - Apocalypse Now / Night of the Living Dead
    - Them! / Godzilla
    - Psycho
    - The Exorcist
    - Citizen Kane

What is “socio-technical analysis?”

- Vast, and overarching
- Covers many topics and ideas
- Especially important today
- Technology impacts all of us at both micro and macro levels
- What are the consequences of technology at these levels?

What is “socio-technical analysis?”

- What are the consequences of technology at these levels?
  - Economic
  - Cultural
  - Political
  - Technological

What is “socio-technical analysis?”

- PEST Analysis
  - Political
  - Economic
  - Social
  - Technical
- Organizationally, and with other tools, very effective
- Socially, more complex

A Brief History of Technology

- What does the word technology mean?
- Where did the word originate?
- When did it come in to common use?
- An examination of technology through the ages.

A Brief History of Technology

- We don’t mean digital technology, at least not yet
- Even so, the evolution of digital technology can seem like a lifetime when early and current technology is compared side by side
- For example:

A Brief History of Technology

A Brief History of Technology

Intro, and A Brief History

- “Technology” comes from the Greek words “Techne” and “-logia”
  - Techne: Art, Craft, Skill
  - -logia: The study of
- Also need to consider Episteme
  - “Knowledge”
  - Can’t have “Techne” without “Episteme”
- Now, we even have knowledge workers
- Implicit v. Explicit knowledge

Intro, and A Brief History

- Some additional important terms
  - Data
  - Information
  - Computer system
  - Information system
  - User

A Brief History of Technology

- Technology has always impacted society in significant ways.
- Generally used to automate, improve, inform, or destroy (Can be combinations).
- These causes have pushed technological innovation from prehistoric times until now.
- There have always been benefits and consequences.
- The pace of, and impact of, technological change has become almost instantaneous.

A Brief History of Technology

- Three main time periods
  - Stone age
  - Bronze age
  - Iron age
- What age are we in now?

A Brief History of Technology

- Stone age (early man)
  - Oldowan
  - Acheulean
  - Tool creation and use by these groups

Oldowan tool creation and use

Olduwan chopper

Source: University of Missouri Museum of Anthropology

Oldowan tool creation and use

Olduwan chopper

Source: University of California, San Diego, David K. Jordan, Professor Emeritus

Acheulean tool creation and use

Acheulean hand axe

Source: Bradshaw Foundation

Acheulean tool creation and use

Acheulean hand axe

A Brief History of Technology

- Bronze age (Smelting)
  - Most technology was outside the metals
    - Early writing
    - Basic government
    - Trade
    - Agriculture and ox-plows
    - The wheel
    - The Loom
    - Bronze (Not so much for weapons / armor)

Bronze age tool creation and use

Bronze hand axe

Source: BBC

Bronze age tool creation and use

Various bronze items

Source: Scottish Heritage Hub

A Brief History of Technology

- Iron age
  - Much better for weapons and armor
    - Very abundant, and inexpensive
    - Allowed for more permanent settlement
    - Better militaries
    - However, also put weapons in the hands of the populace for the first time

Iron age tool creation and use
(Actually, steel is better)

Source: Some guy that drew it

Iron age tool creation and use

Also, irons

A Brief History of Technology

- Industrial Revolution (@1750 – 1850)
  - England
  - Large-scale automation comes into being
  - Factories and mass-production processes
  - Increased use of steel
  - Advancements in transportation

A Brief History of Technology

- Information age?
  - Information is the most important commodity
  - With it, everything else falls in to place
  - Information helps you make decisions
  - Information for decisions is the prime use of technology

A Brief History of Technology

Some early technologies, and their impact

- Writing
  - Bronze age development
  - Not a full writing system
    - Hieroglyphics (Egypt)
    - Cuneiform (Mesoptamian cultures)
  - Pictorial, specific
  - Very few could write
  - Now, information can be expressed in a myriad of ways

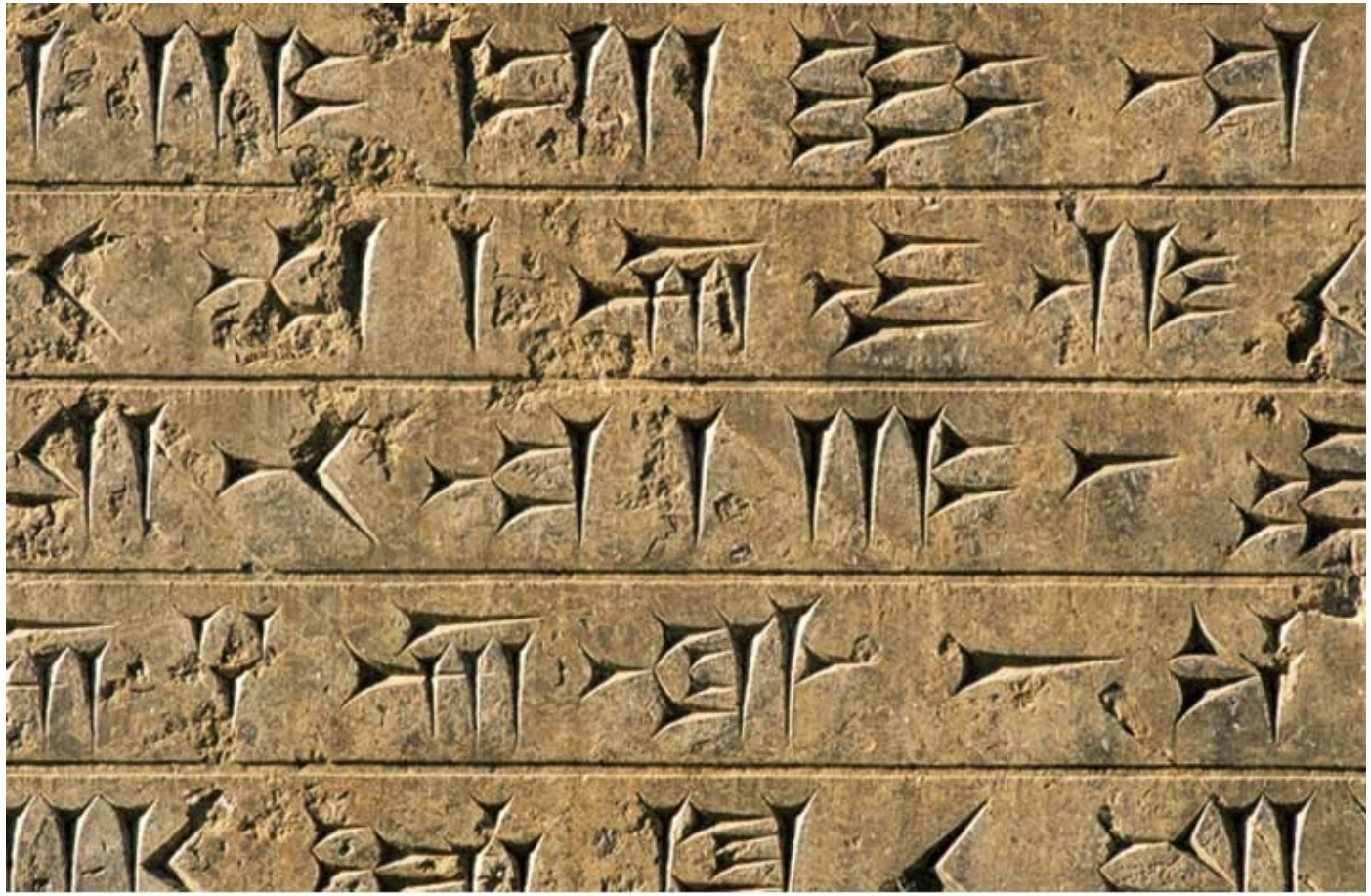
Early writing

Hieroglyphics

Source: Ancien-Egypt.org

Early writing

Cuneiform



Early writing

Information representation

Early writing

Information representation

Early writing

Information representation

A Brief History of Technology

Some early technologies, and their impact

- Abacus
  - Used in many early cultures, still used today
  - China, Japan, Russia, Rome, Greece
  - Uses beads to represent numbers
  - Lack of paper and writing implements, as well as need to work with large numbers
  - Allowed for large trades, accurate calculations, negotiations

Abacus

Source: computer-history.org

A Brief History of Technology

Some early technologies, and their impact

- Water wheel
  - Can automate many process already known
  - Water has been used for millenia
  - Grinding, crushing, weighing
  - Frees up and is more efficient than human labor
  - Abundant and inexpensive
  - Starting to see more rapid technological improvement

A Brief History of Technology

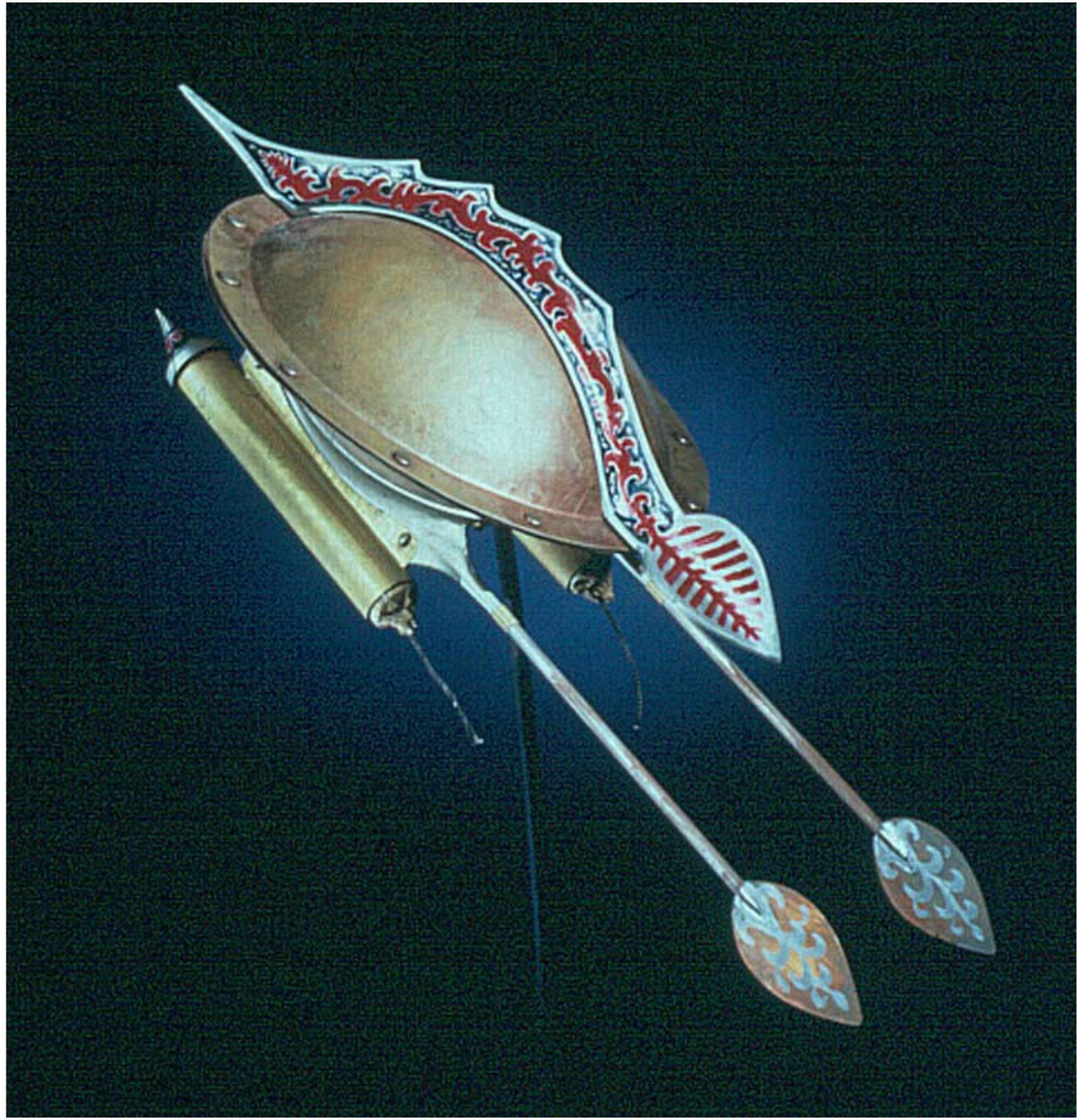
Some early technologies, and their impact

- Many ancient cultures contributed significant technologies
  - China
    - Paper
    - Moveable-type printing
    - Gunpowder (and rockets / fireworks)
    - Crossbow
    - Seed planters and crop planting in rows
    - Compass
    - Wheelbarrow

A Brief History of Technology

Some early technologies, and their impact

- Many ancient cultures contributed significant technologies
  - Islamic world
    - Coffee
    - Pin-hole camera (and the word ‘camera’)
    - The first parachute
    - Many medical devices and discoveries
    - Military gunpowder
    - Torpedo



A Brief History of Technology

Some early technologies, and their impact

- Actually, many ancient cultures contributed significant technologies
  - Egypt / Mesopotamia
    - Writing
    - Calendar (close to the 365-day)
    - Targeted irrigation
    - Mathematics
    - Bowling
    - Toothpaste

A Brief History of Technology

Some early technologies, and their impact

- Actually, many ancient cultures contributed significant technologies
  - Rome and Greece
    - Many technologies, including medicine, cryptography, warfare, infrastructure, communication, and material

A Brief History of Technology

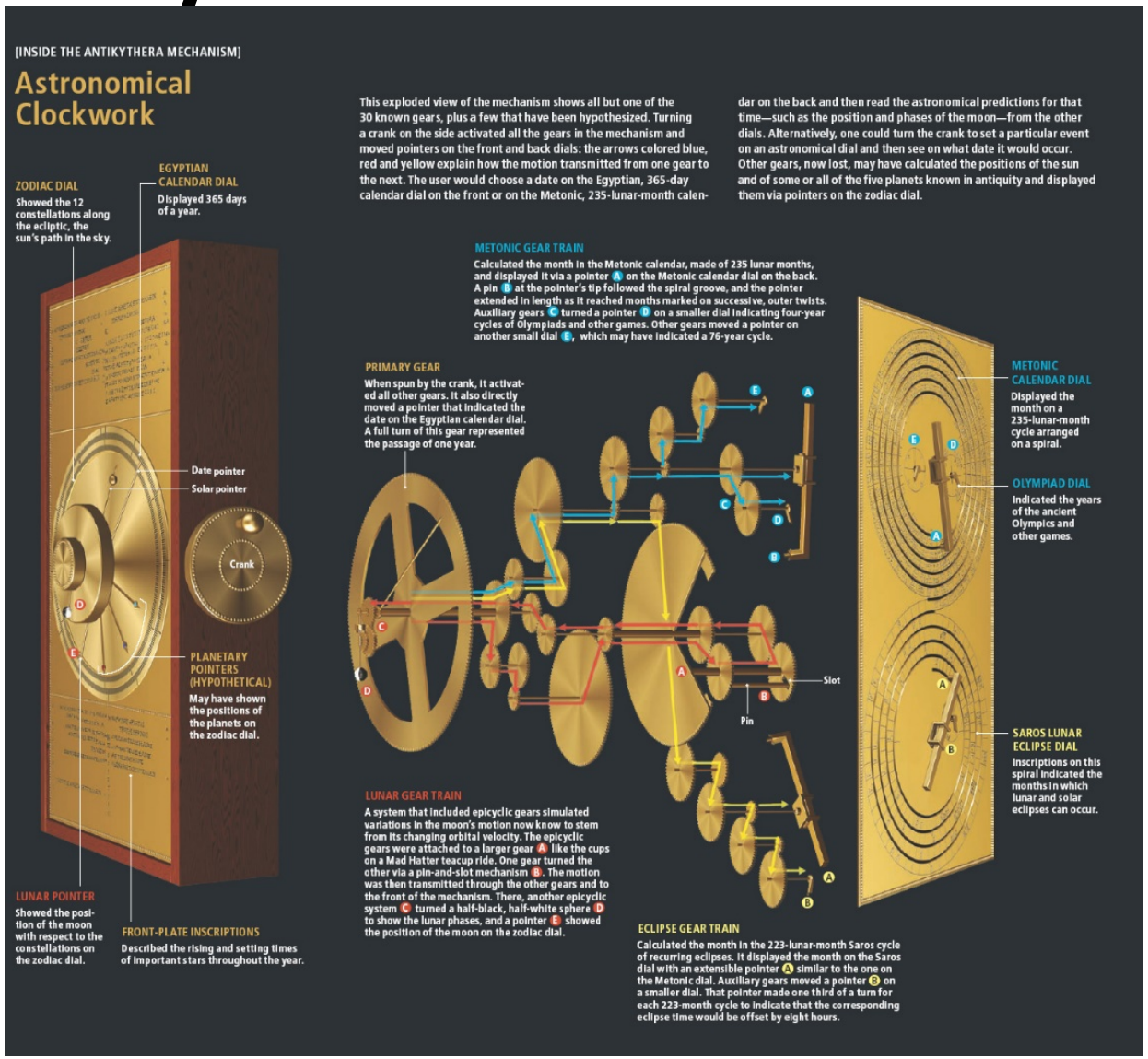
Some early technologies, and their impact

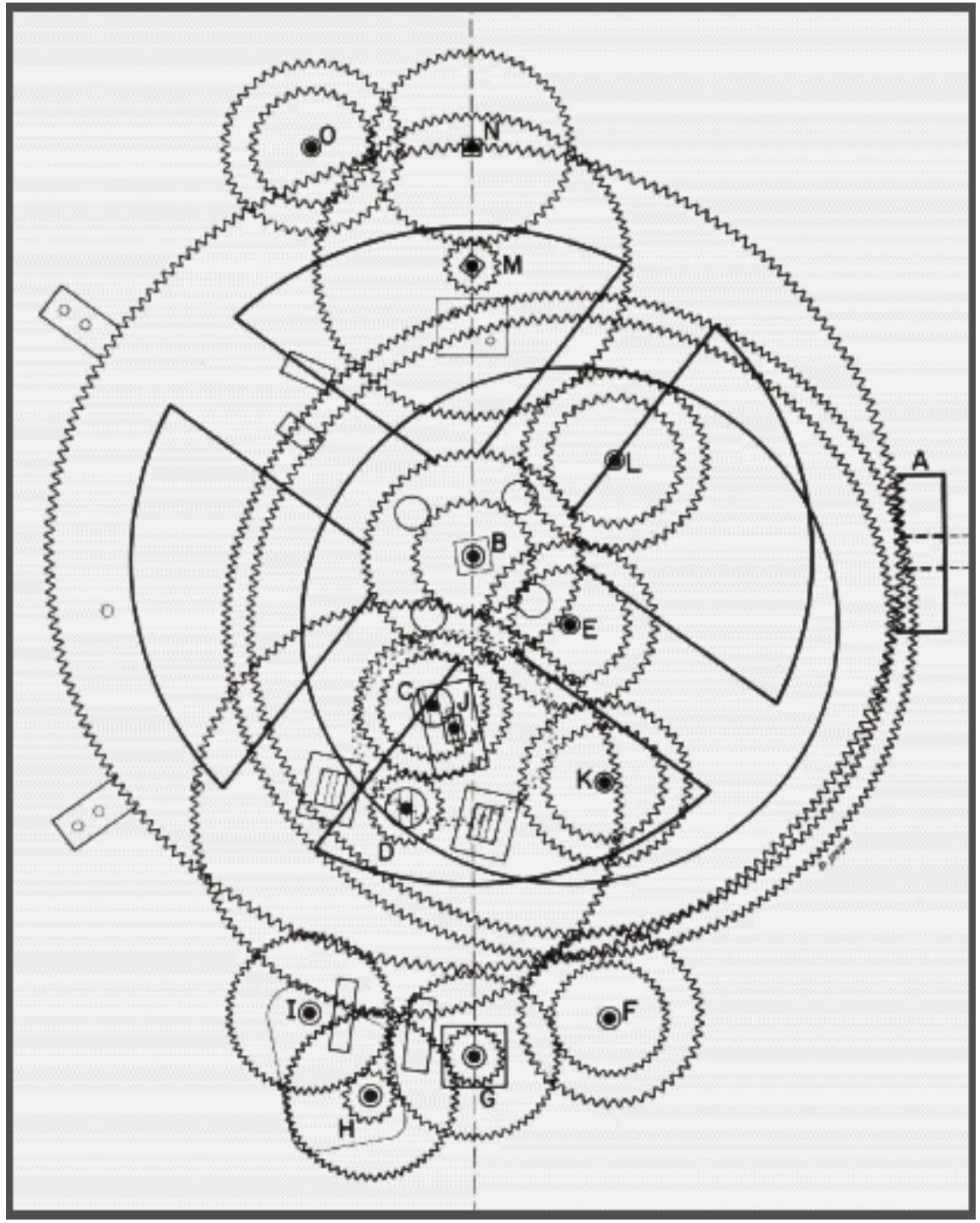
- Antikythera mechanism
  - Discovered in 1900 off the coast of Antikythera, Greece
  - Believed to be 2,000 years old
  - Contains ~30 gears, 2,000 inscriptions
  - Predates anything similar by 1,000 years
  - Took 120 years to solve

Antikythera Mechanism

Source: techtimes.com

Antikythera Mechanism

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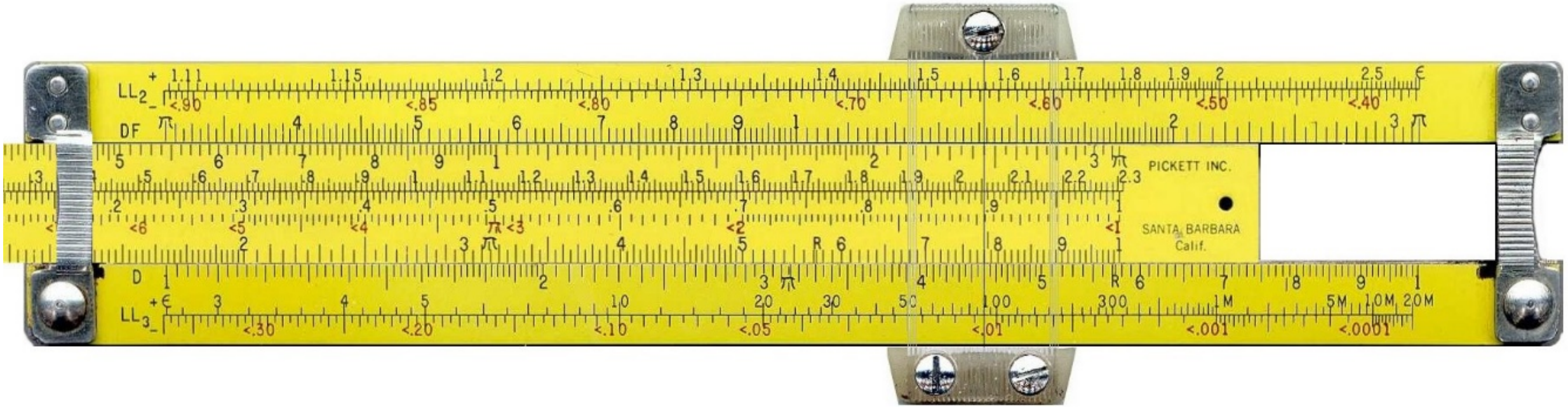
A Brief History of Technology

Some early technologies, and their impact

- Slide rule



A Brief History of Technology

More modern technologies, and their impact

- Telegraph / Telephone
  - Long-distance communication previously done by runners, drums, smoke, even water
  - 1843 / 1876
  - Allowed for very fast communication and dissemination of information
  - The impacts of information could now be felt much more rapidly
  - Phone based on telegraph

A Brief History of Technology

More modern technologies, and their impact

- Radio
  - 1921
  - Marconi, Tesla, Bose, Stubblefield
  - Very fast mass-transmission of information
  - Could impact and influence large groups of people at once
  - Radio reporters and entertainment
  - War of the Worlds

Radio

A Brief History of Technology

More modern technologies, and their impact

- Television
  - 1939, RCA, New York World's Fair
  - Speech by Roosevelt
  - College baseball game
  - Like radio:
    - Very fast mass-transmission of information
    - Could impact and influence large groups of people at once
  - Election of John F. Kennedy

Television

TRK-5, RCA, 1939, $295

A Brief History of Technology

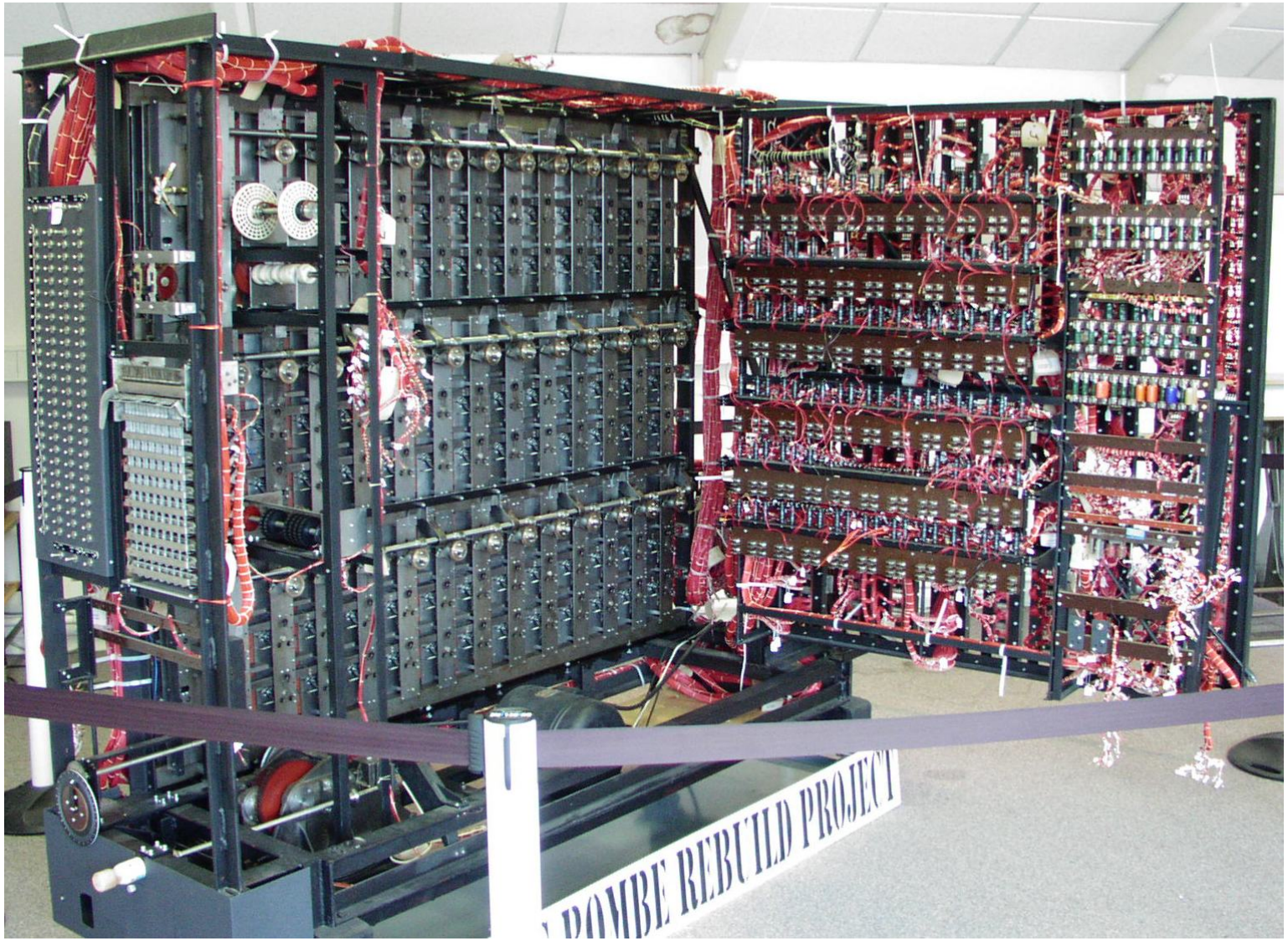
More modern technologies, and their impact

- The Enigma Machine / Le Bombe
  - The future of humanity rode on these
  - If the Enigma code couldn’t be broken, the Nazis could have won the war
  - Their true importance wasn’t known until later
  - Both devices were mechanical, not digital
  - Not the first use of cyphertext, however

Enigma machine

Source: ilord.com

Le Bombe

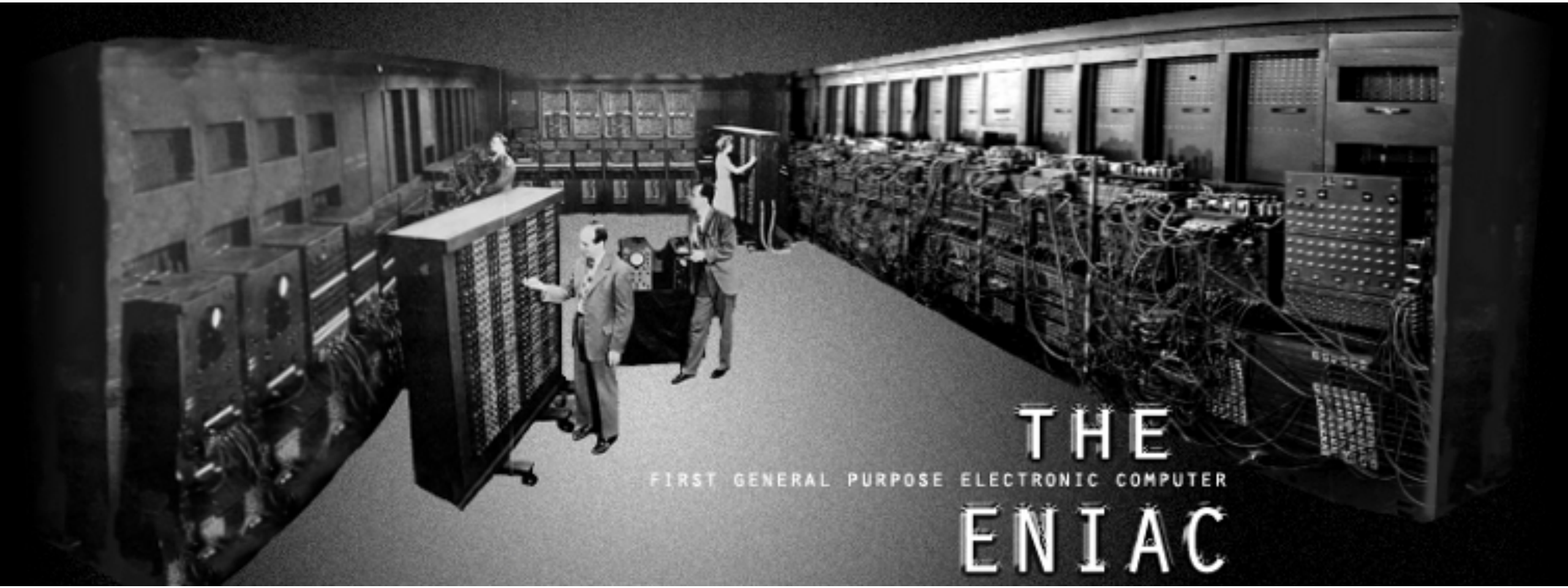


A Brief History of Technology

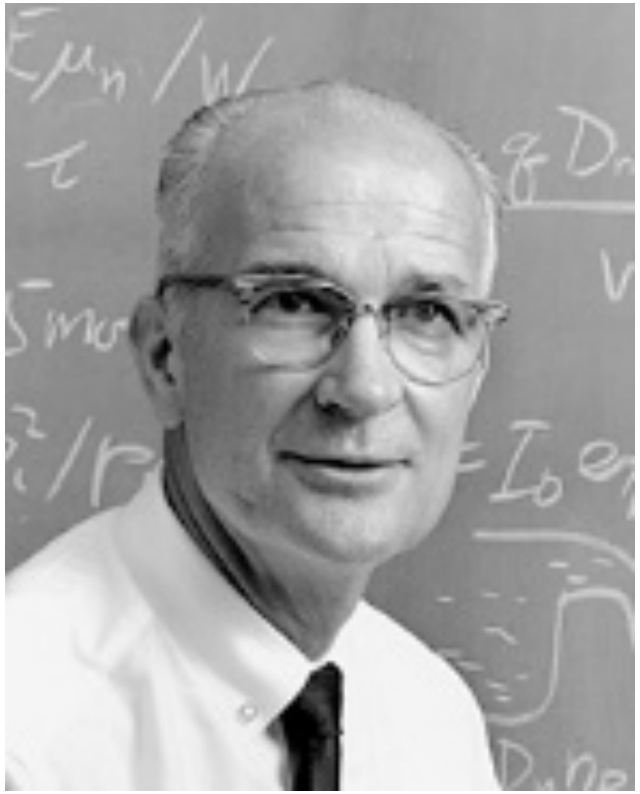
More modern technologies, and their impact

- ENIAC / Transistor / Integrated circuit
  - ENIAC used tubes, and was built around them (bug)
  - Bell labs (Shockley, Bardeen and Brattain) developed the transistor in 1948
  - In 1958, Texas Instruments and Fairchild Semiconductor (Noyce) developed the Integrated Circuit
  - That led to replacement of the vacuum tube, miniaturization, and PC development

EZ80
MADE IN HOLLAND


THE
FIRST GENERAL PURPOSE ELECTRONIC COMPUTER
ENIAC

Shockley and Noyce



William Shockley

Robert Noyce

A Brief History of Technology

More modern technologies, and their impact

- The PC
  - CPM (Gary Kildall)
  - QDOS
  - IBM
  - Bill Gates / Paul Allen (Microsoft)
  - Steve Wozniak / Steve Jobs (Apple)
  - The ‘killer app’
  - Spawned everything else

A Brief History of Technology

More modern technologies, and their impact

- A final note:
  - What does the future look like?
  - How do we interpret technology and society of the future?
  - Often discussed through the lens of pop culture (movies, music, books, television, games)
  - Are utopian, or dystopian

A Brief History of Technology

More modern technologies, and their impact

- A final note:
  - What does the future look like?
  - How do we interpret technology and society of the future?
  - Often discussed through the lens of pop culture (movies, music, books, television)
  - Are utopian, or dystopian
  - How could technology help or hinder this progress?
  - Depictions often dependent on our current technology