Computing:
A Brave New World?

January 8, 2013
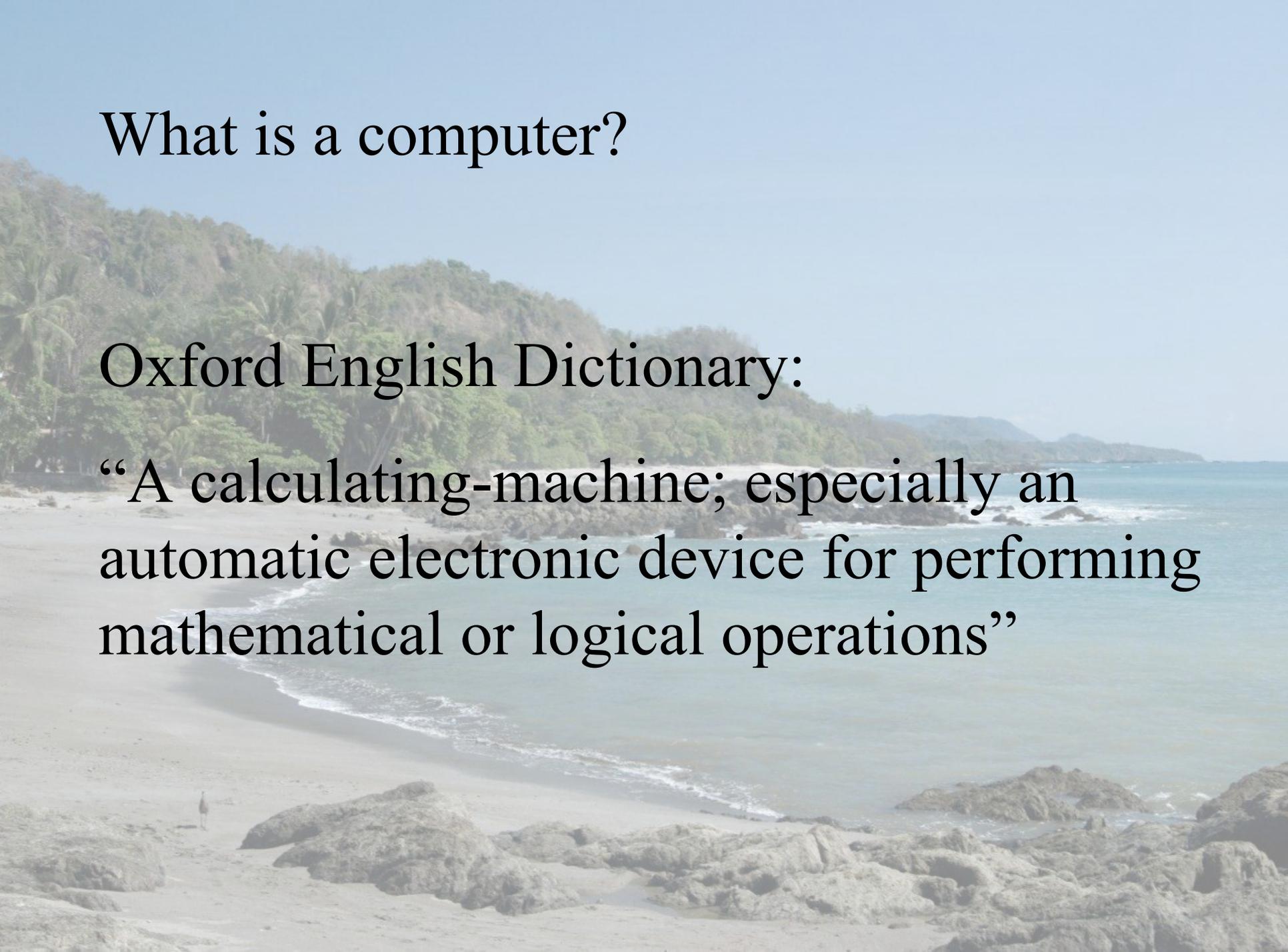
What is a computer?

Oxford English Dictionary:

"A calculating-machine; especially an automatic electronic device for performing mathematical or logical operations"
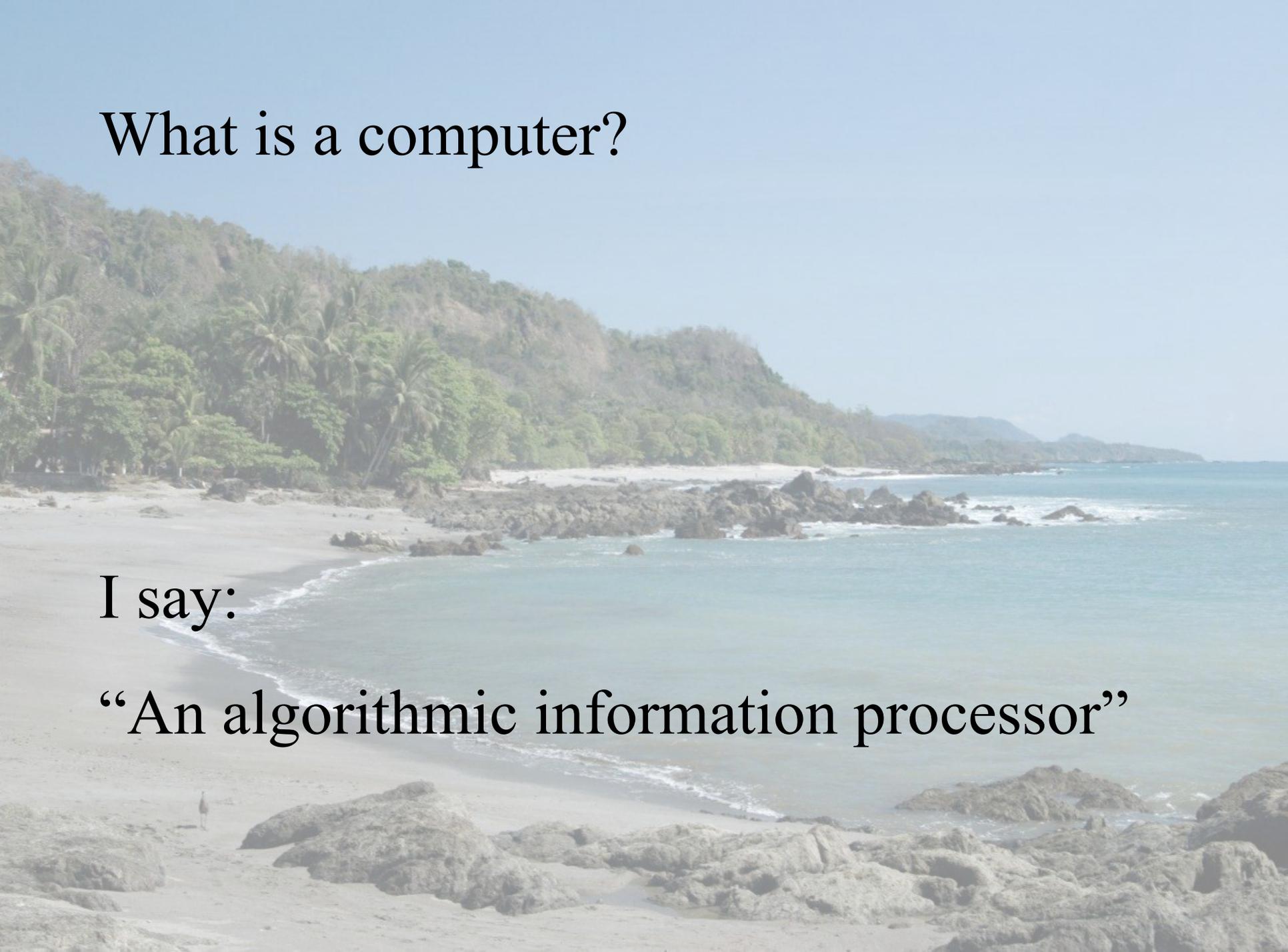
What is a computer?

I say:

"An algorithmic information processor"
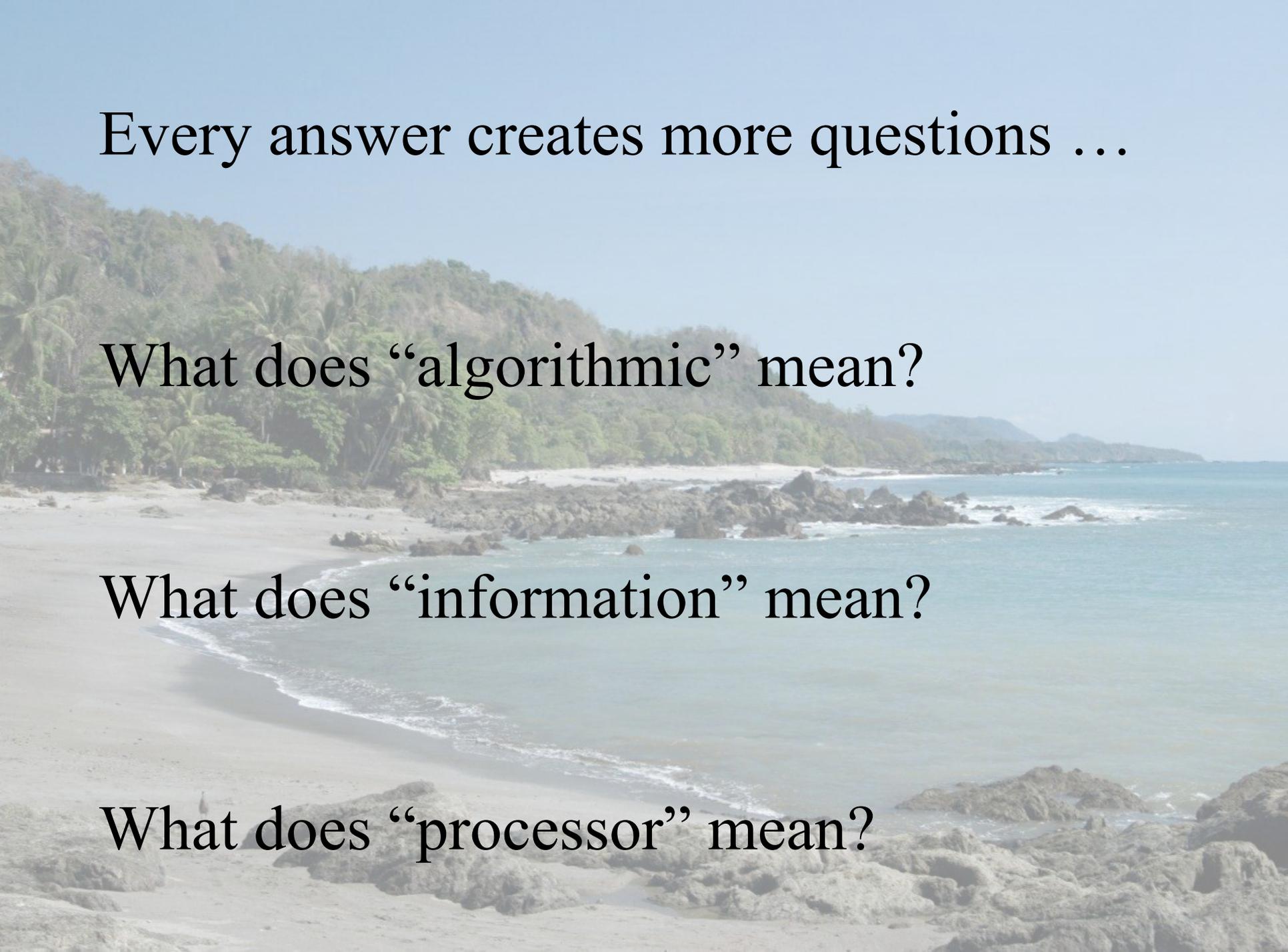
Every answer creates more questions …

What does "algorithmic" mean?

What does "information" mean?

What does "processor" mean?

Let's go back to the beginning … the very beginning ...

23,000 BC - The Bone of Ishango

Figure 2.1 The Ishango Bone (Courtesy of Dr J. de Heinzelin).
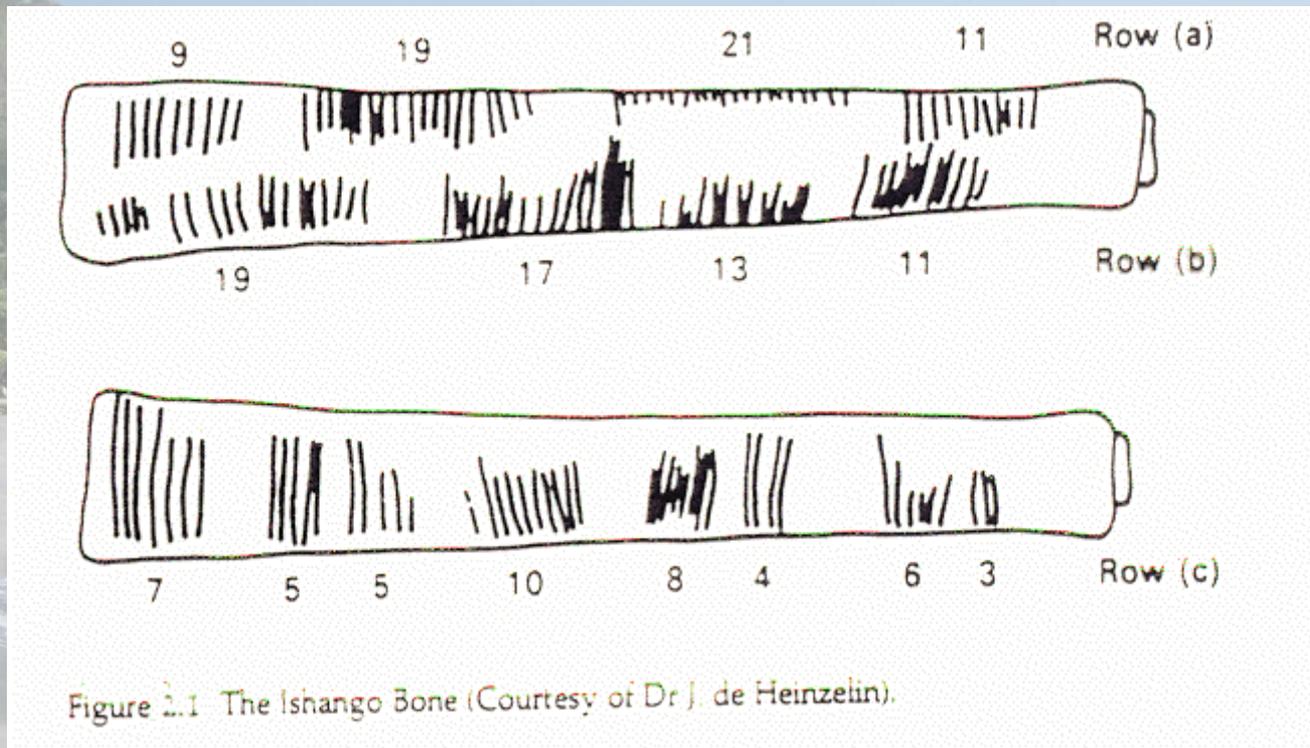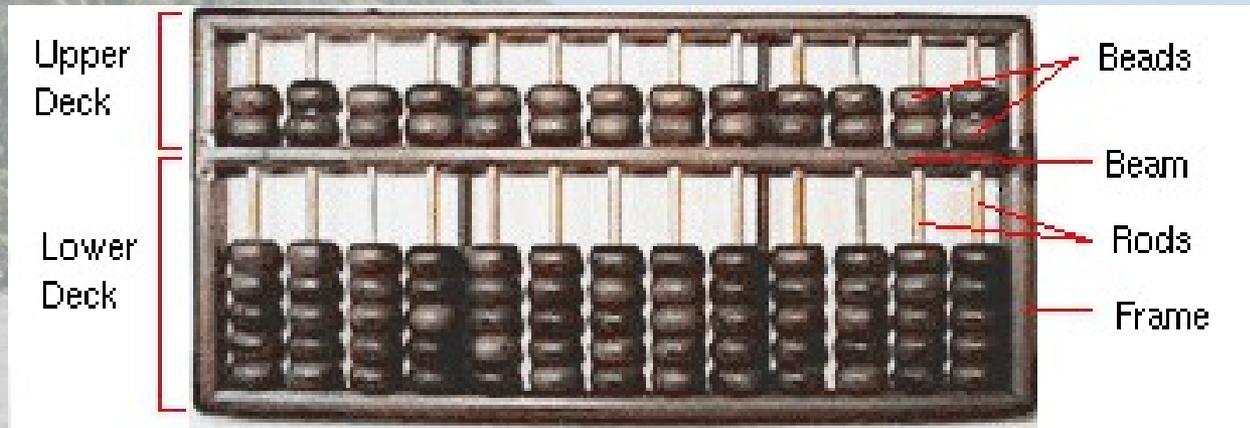
5000 BC - The Abacus

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… still widely used

800 AD - Al-Khwarizmi (c. 780 - c. 850)

wrote books about astronomy, geography, algebra

"algorithm" is derived from his name
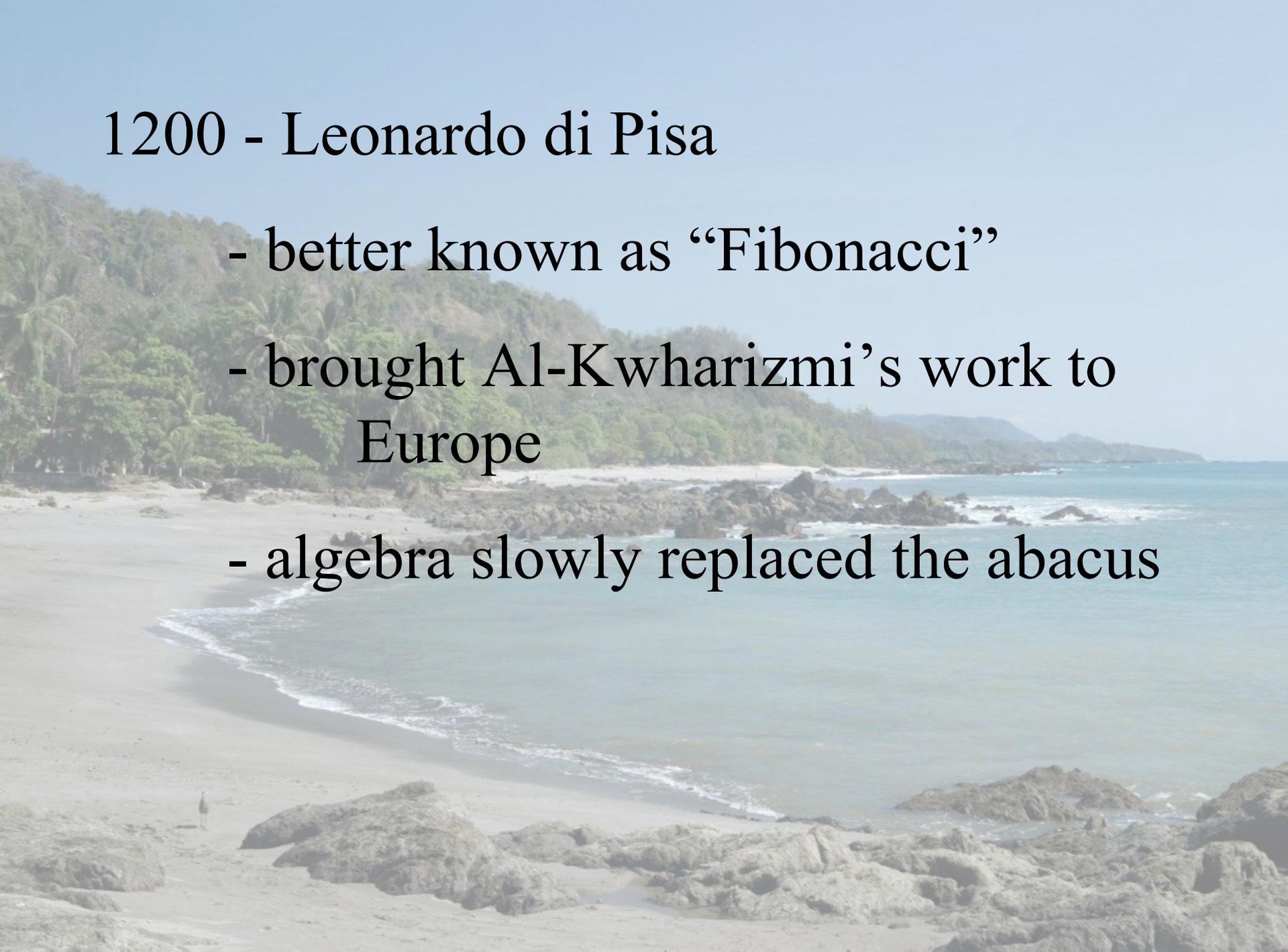
1200 - Leonardo di Pisa

     - better known as "Fibonacci"

     - brought Al-Kwharizmi's work to
       Europe

     - algebra slowly replaced the abacus
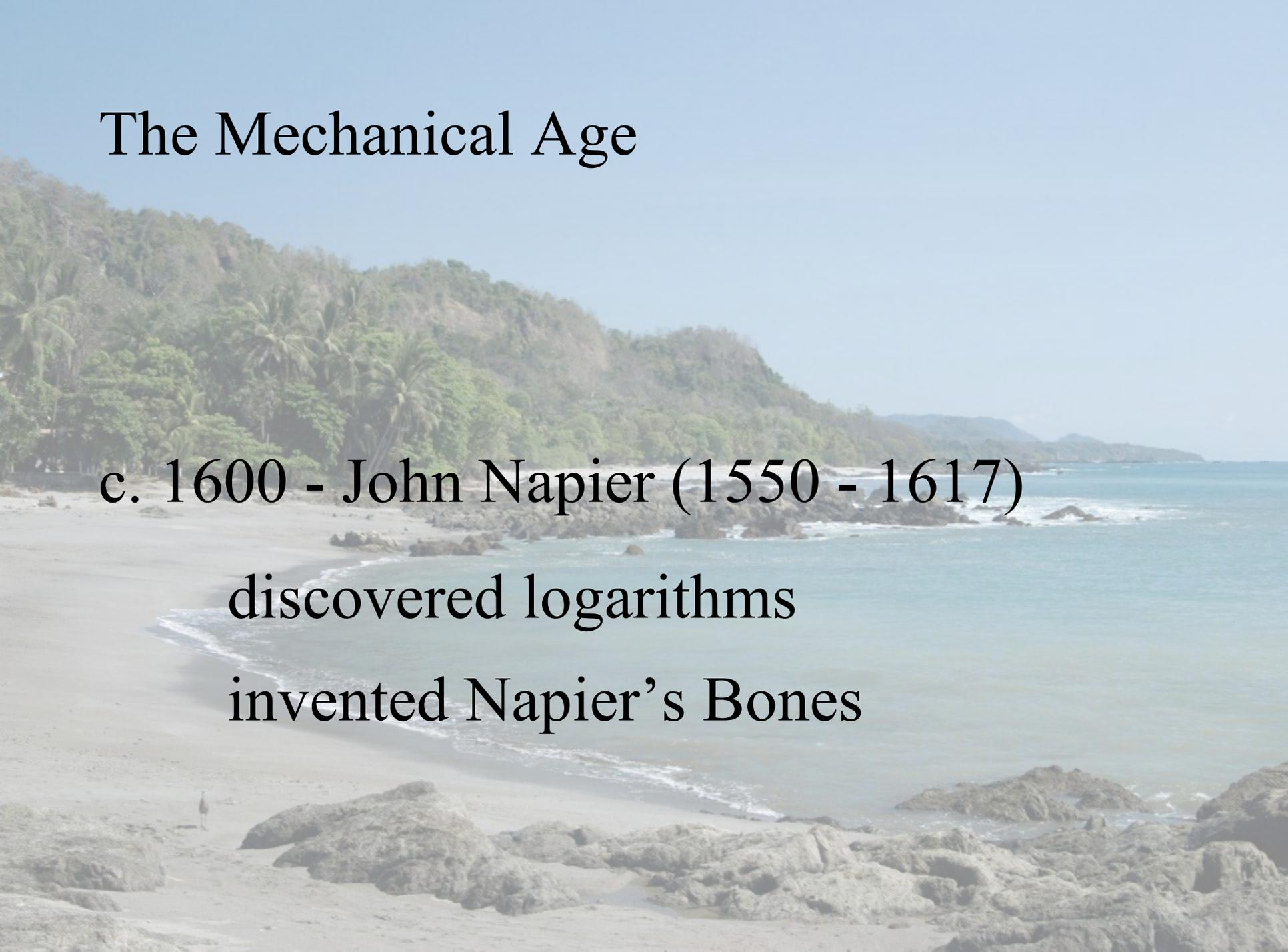
The Mechanical Age

c. 1600 - John Napier (1550 - 1617)

discovered logarithms

invented Napier's Bones

1621 - The Slide Rule

- invented

by William Oughtred

- thrived until 1970, when electronic calculators were first sold

1642 - The Pascaline

- invented by Blaise Pascal

- basically a clockwork adding machine
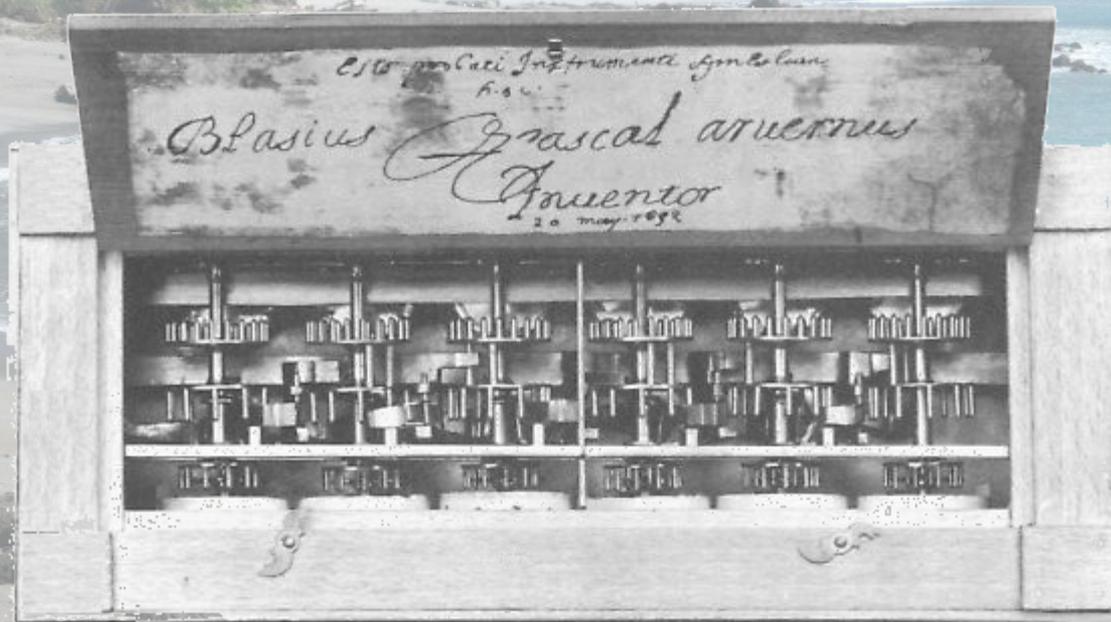
1642 - The Pascaline

- about 50 were built, only 8 survive

- they tended to break down all the time
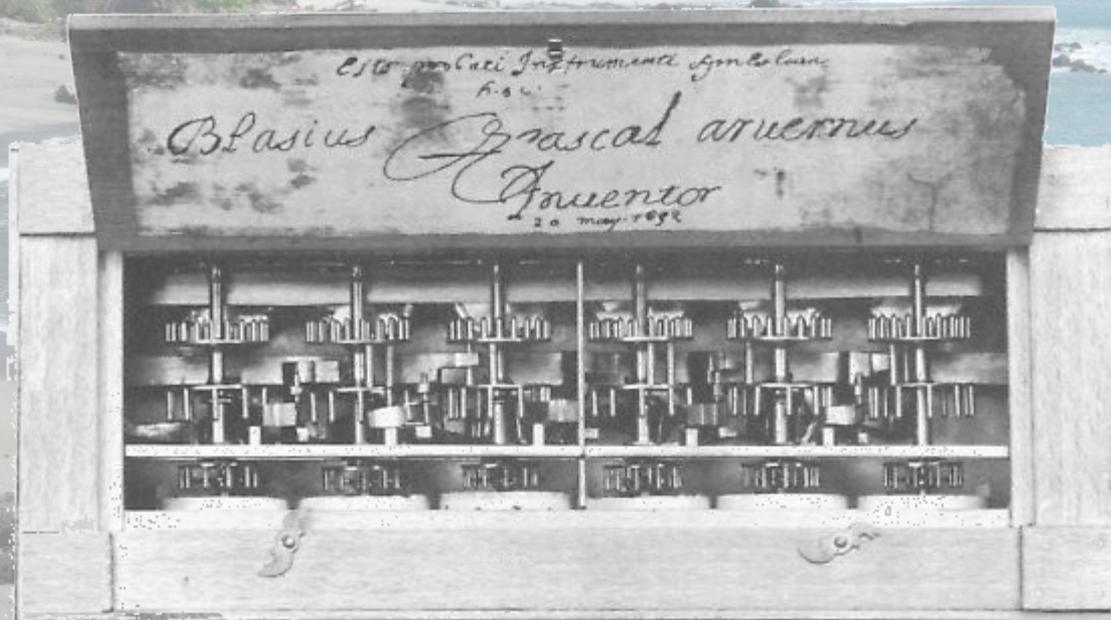
1673 - The Multiplier

- invented by Leibniz

- improved on Pascal's design ...

- but they tended to break down all the time

1804 - Programmable Loom

- invented by Jacquard

- used punched cards to raise and
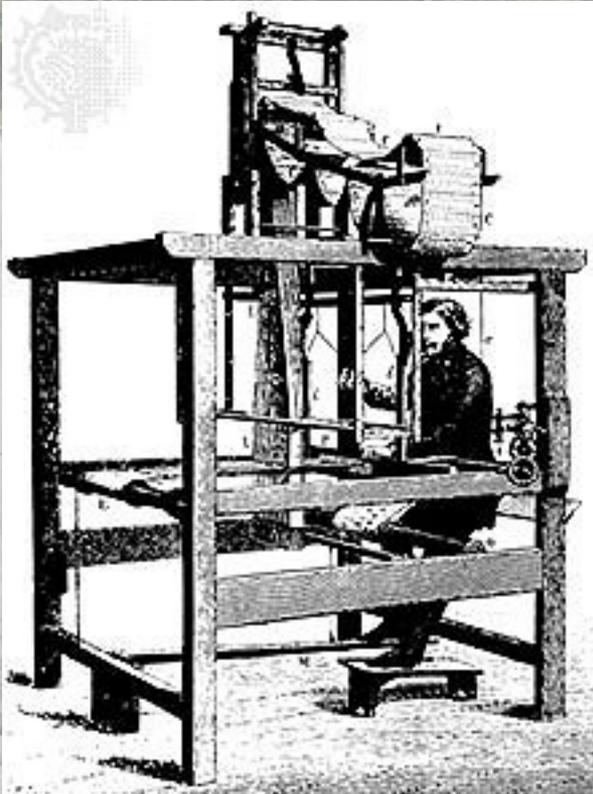
lower the threads on the loom

- worked quite well!

1822 - Difference Engine

- invented by Babbage
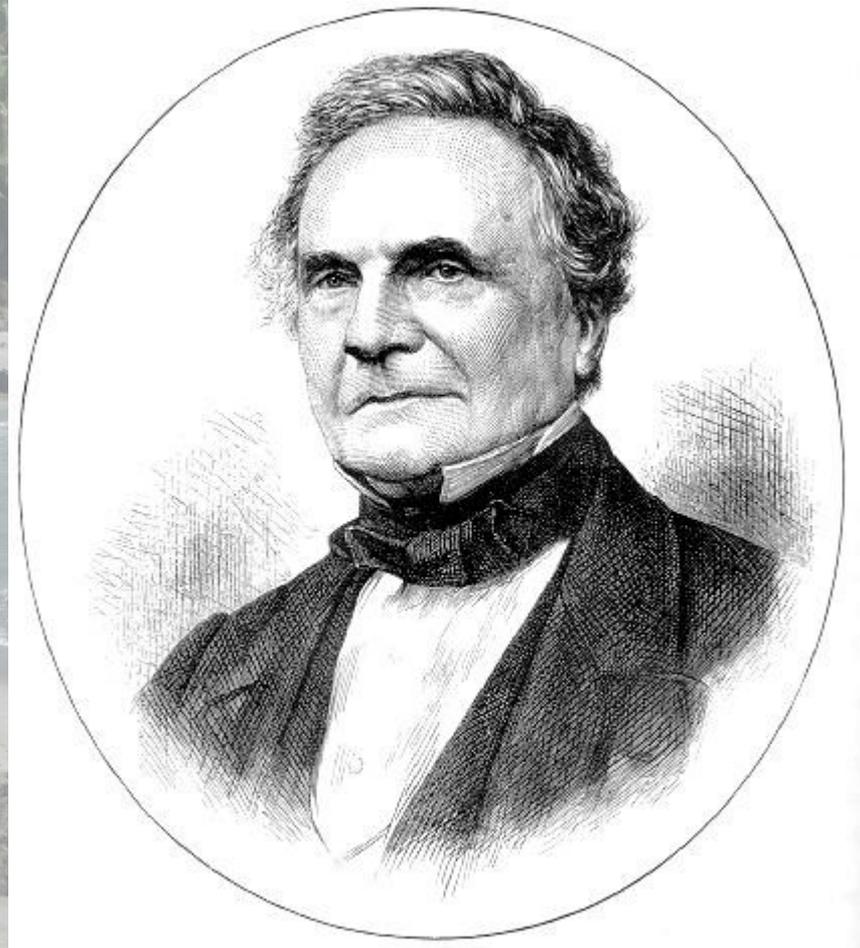
1822 - Difference Engine

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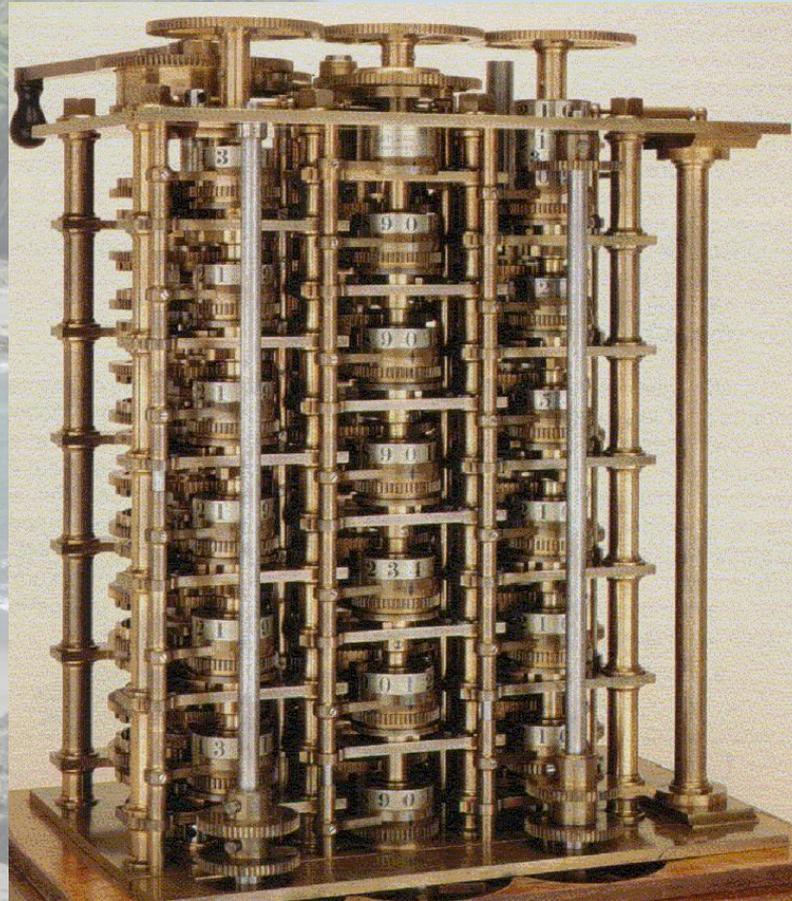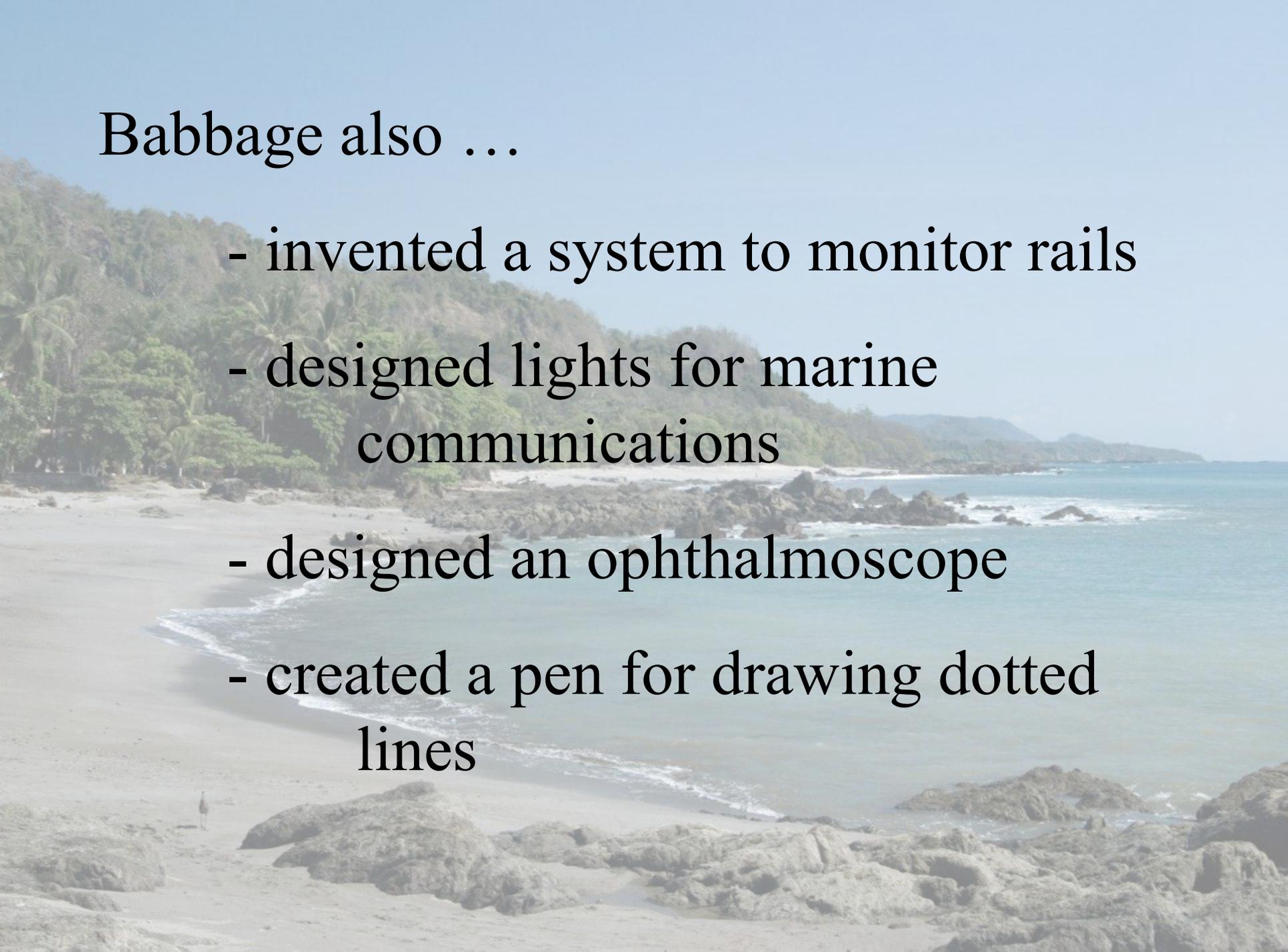
Babbage also …

- invented a system to monitor rails

- designed lights for marine communications

- designed an ophthalmoscope

- created a pen for drawing dotted lines
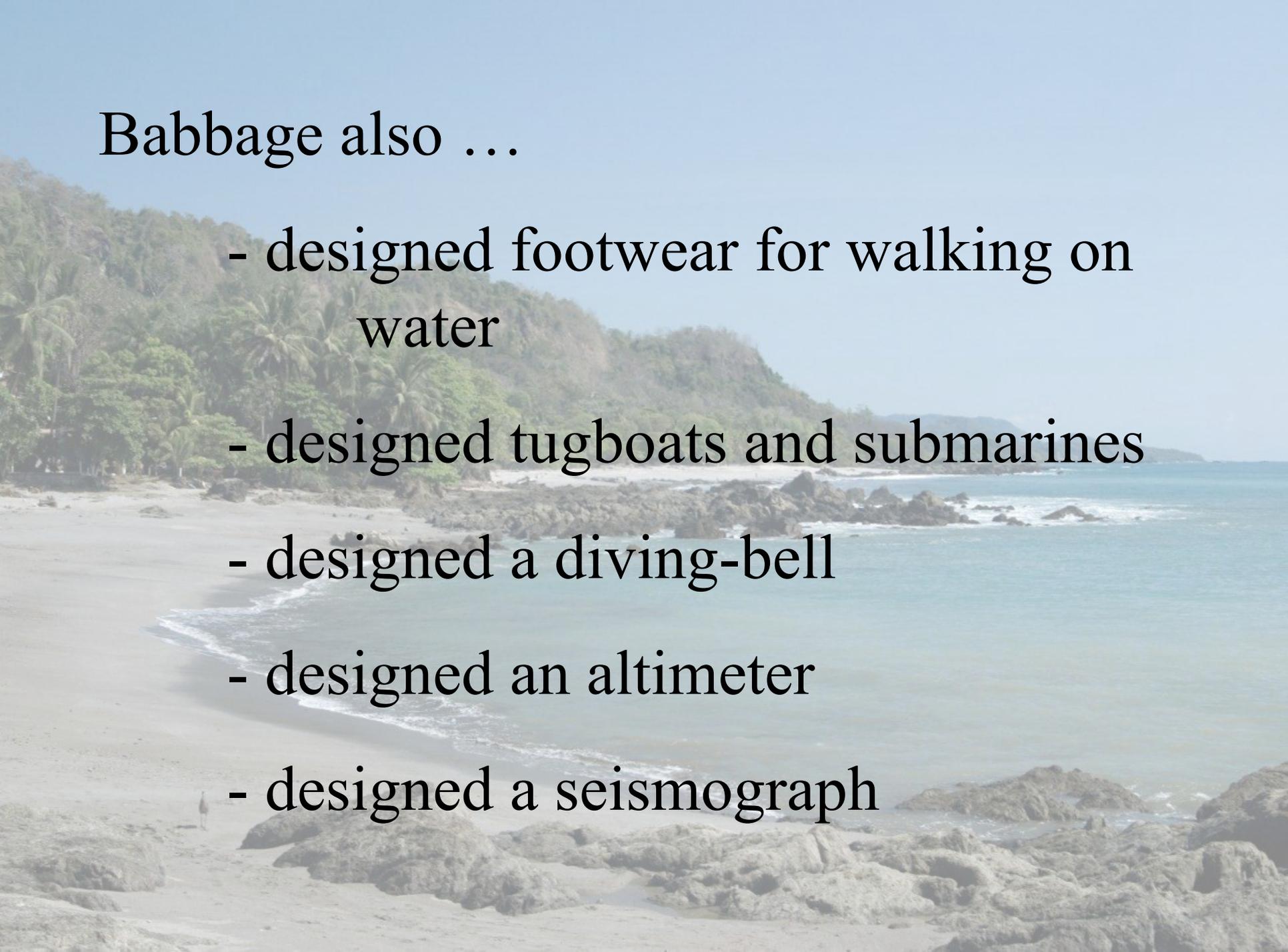
Babbage also …

- designed footwear for walking on water

- designed tugboats and submarines

- designed a diving-bell

- designed an altimeter

- designed a seismograph

Babbage also …

- designed a hydrofoil

- designed a railway decoupler

- designed inter-city speaking tubes

- designed cow-catchers for trains

1887 - Census Machine

- invented by Herman Hollerith

- used punched cards *and electricity*

- Hollerith founded the company that became IBM in 1924

Electronic Computing

1906 - De Forest invents the vacuum tube

1937 - Turing defines mathematical theory of computing
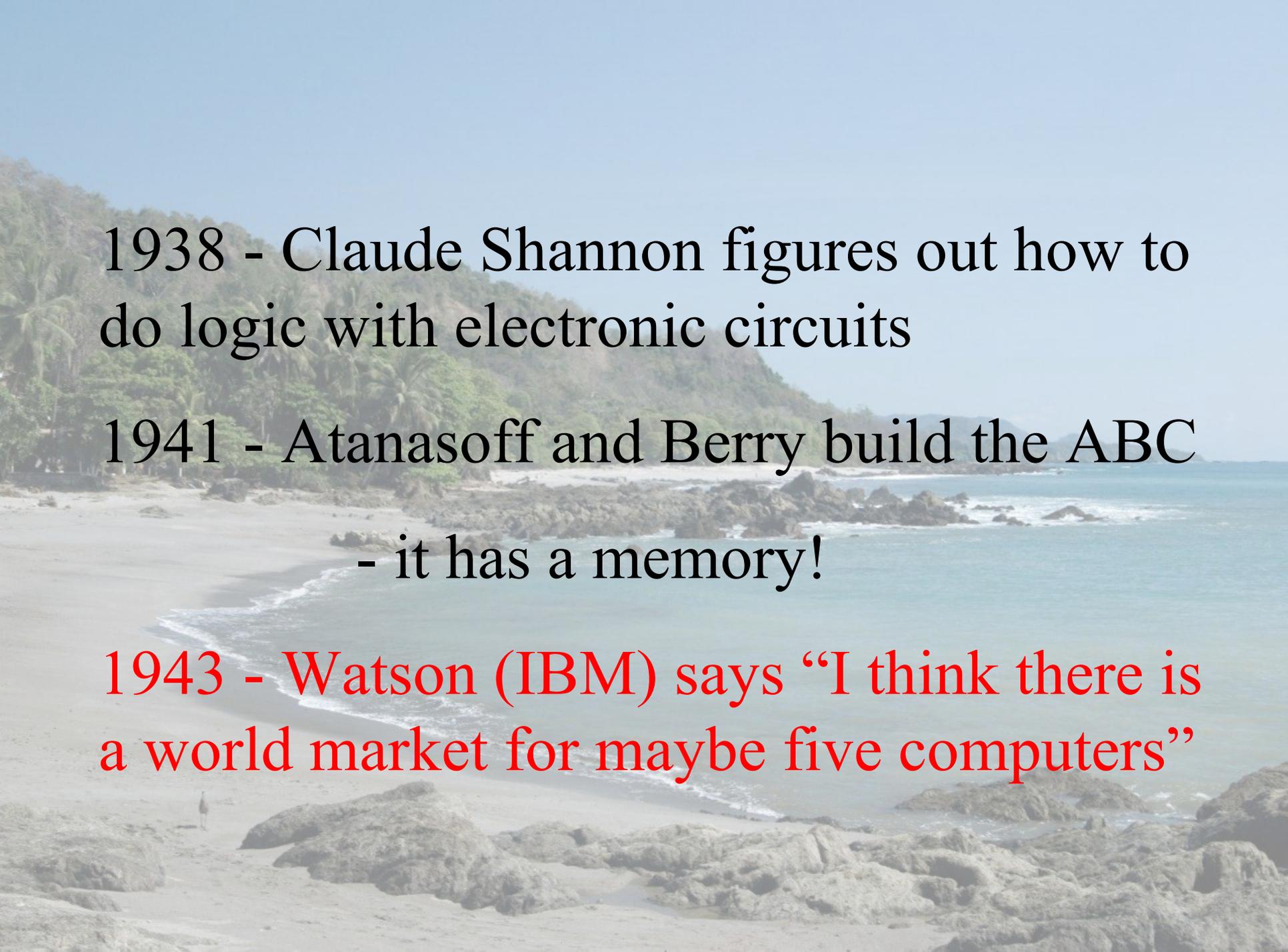
1938 - Claude Shannon figures out how to do logic with electronic circuits

1941 - Atanasoff and Berry build the ABC

- it has a memory!

1943 - Watson (IBM) says "I think there is a world market for maybe five computers"
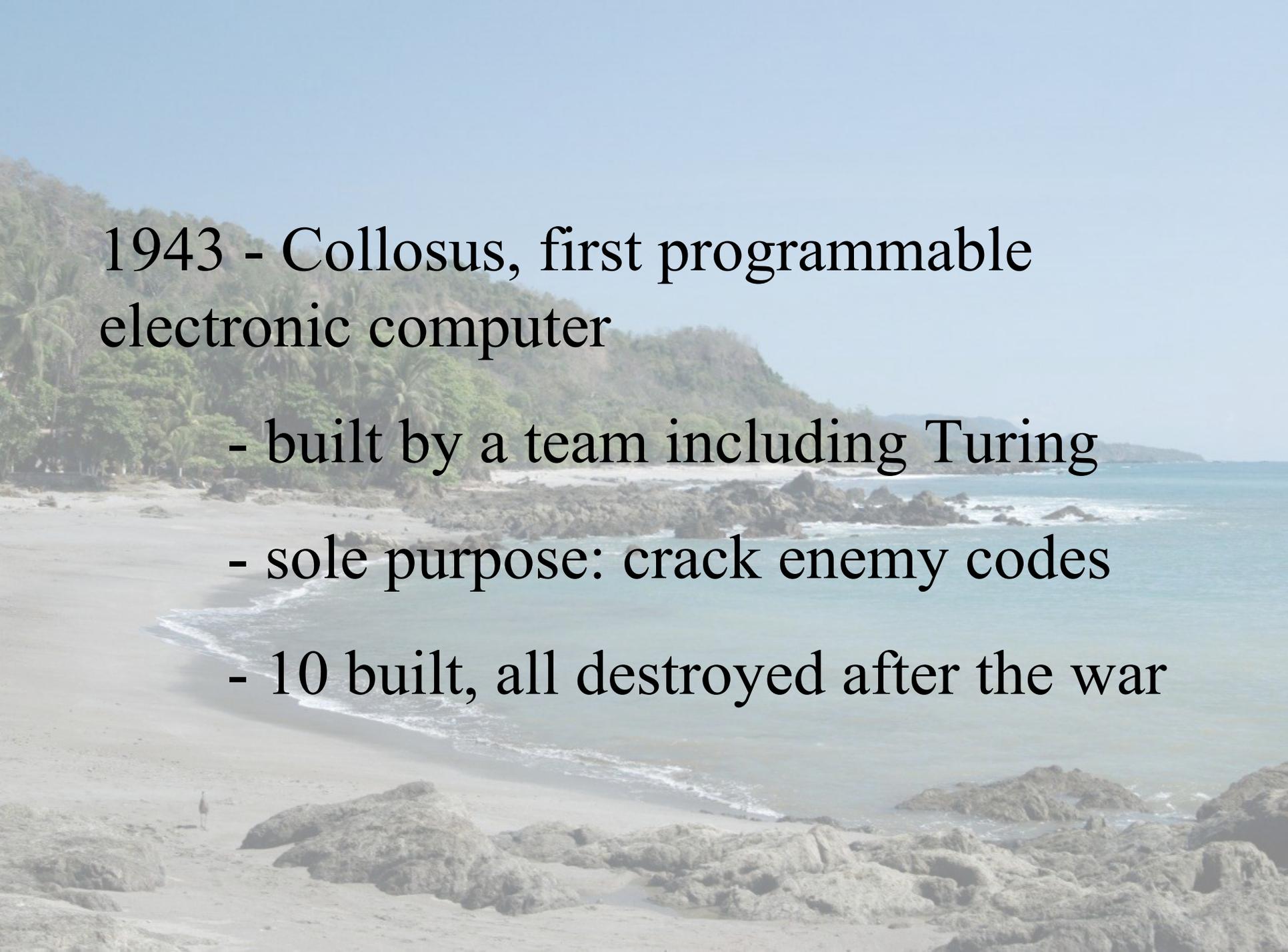
1943 - Collosus, first programmable
electronic computer

- built by a team including Turing

- sole purpose: crack enemy codes

- 10 built, all destroyed after the war
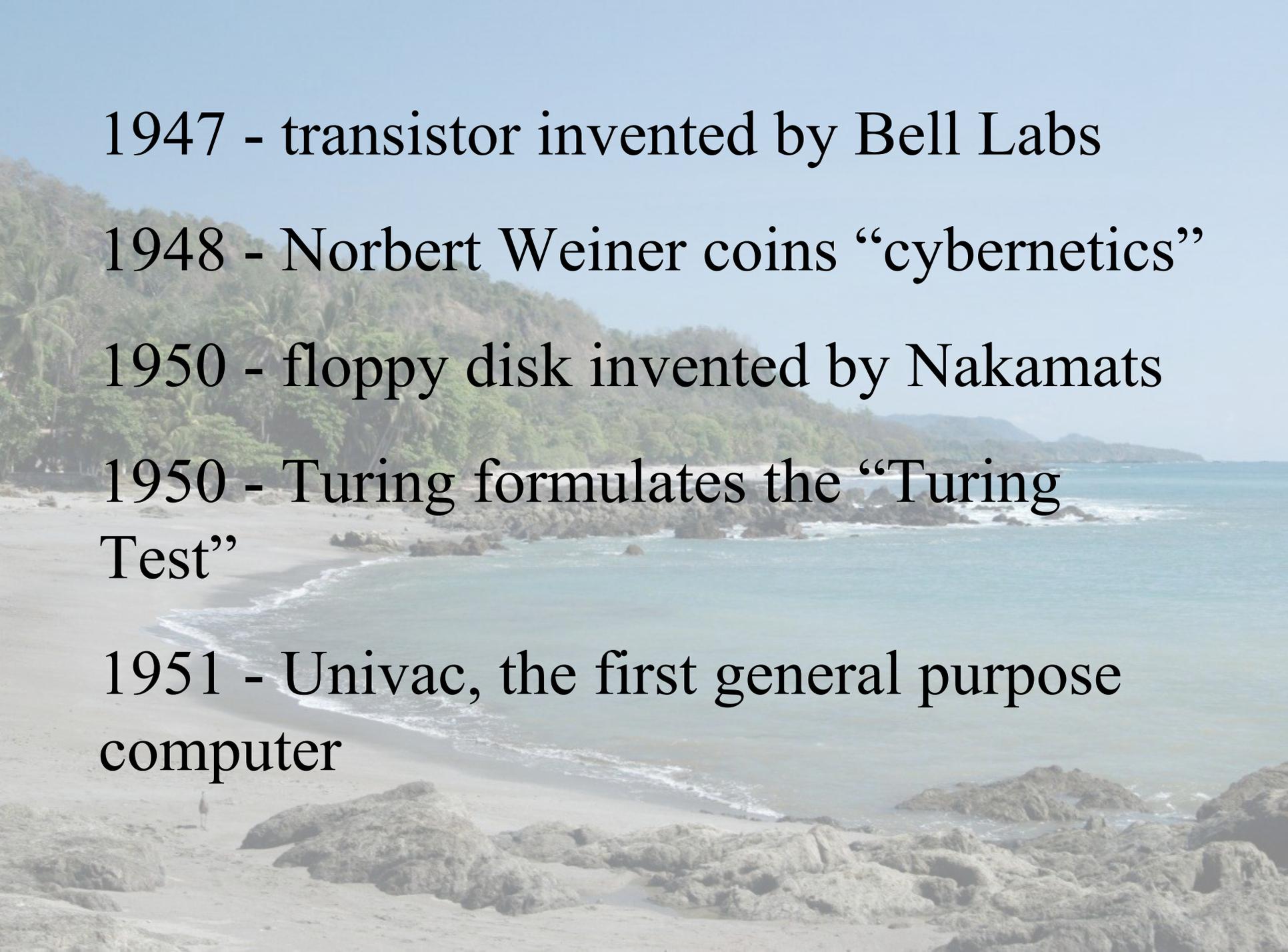
1947 - transistor invented by Bell Labs

1948 - Norbert Weiner coins "cybernetics"

1950 - floppy disk invented by Nakamats

1950 - Turing formulates the "Turing Test"

1951 - Univac, the first general purpose computer
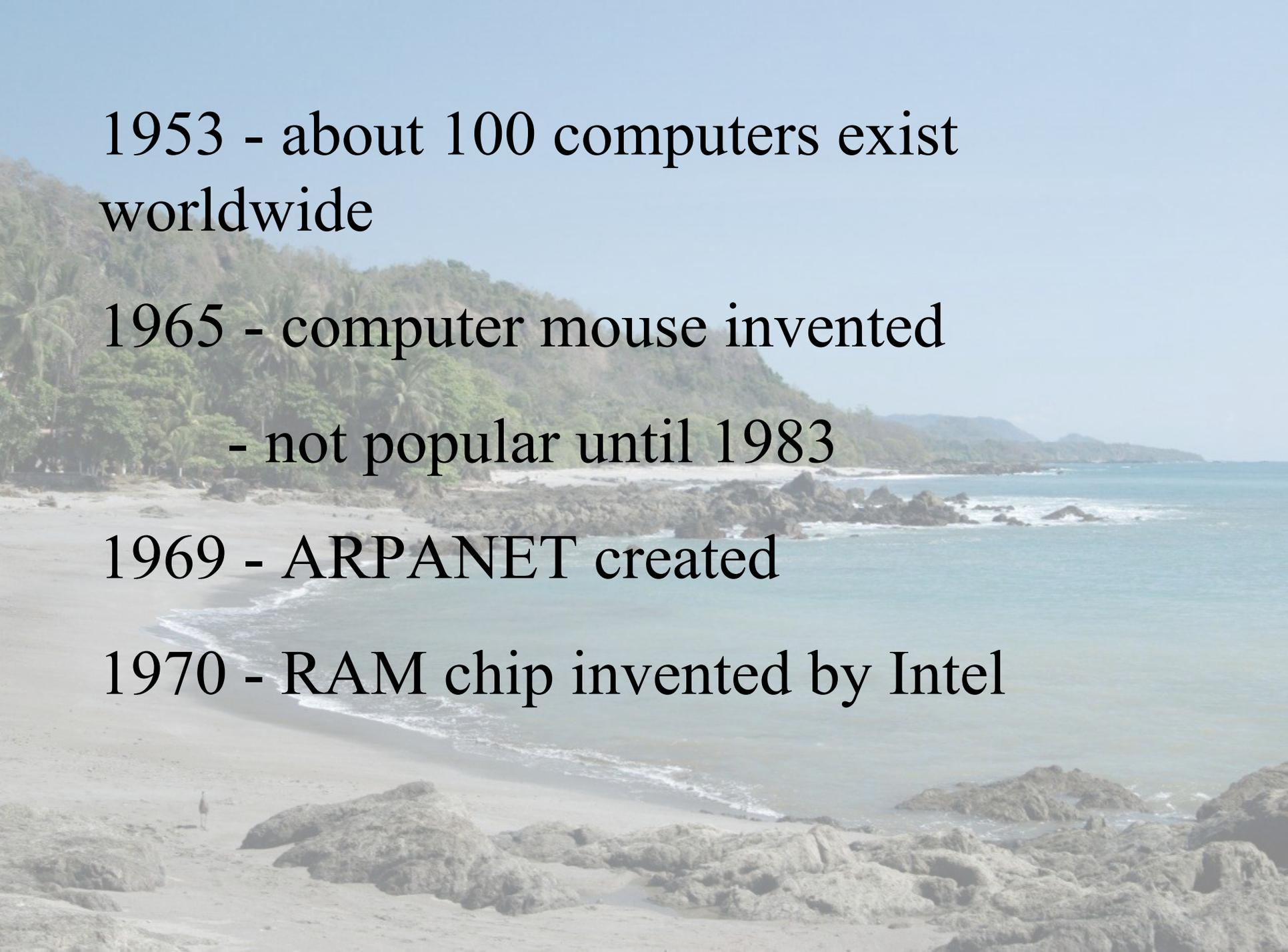
1953 - about 100 computers exist worldwide

1965 - computer mouse invented

   - not popular until 1983

1969 - ARPANET created

1970 - RAM chip invented by Intel

1971 - Microprocessor invented, Intel

1975 - Microsoft founded

1977 - "There is no reason anyone would want a computer in their home" - founder of Digital Electronics Corporation
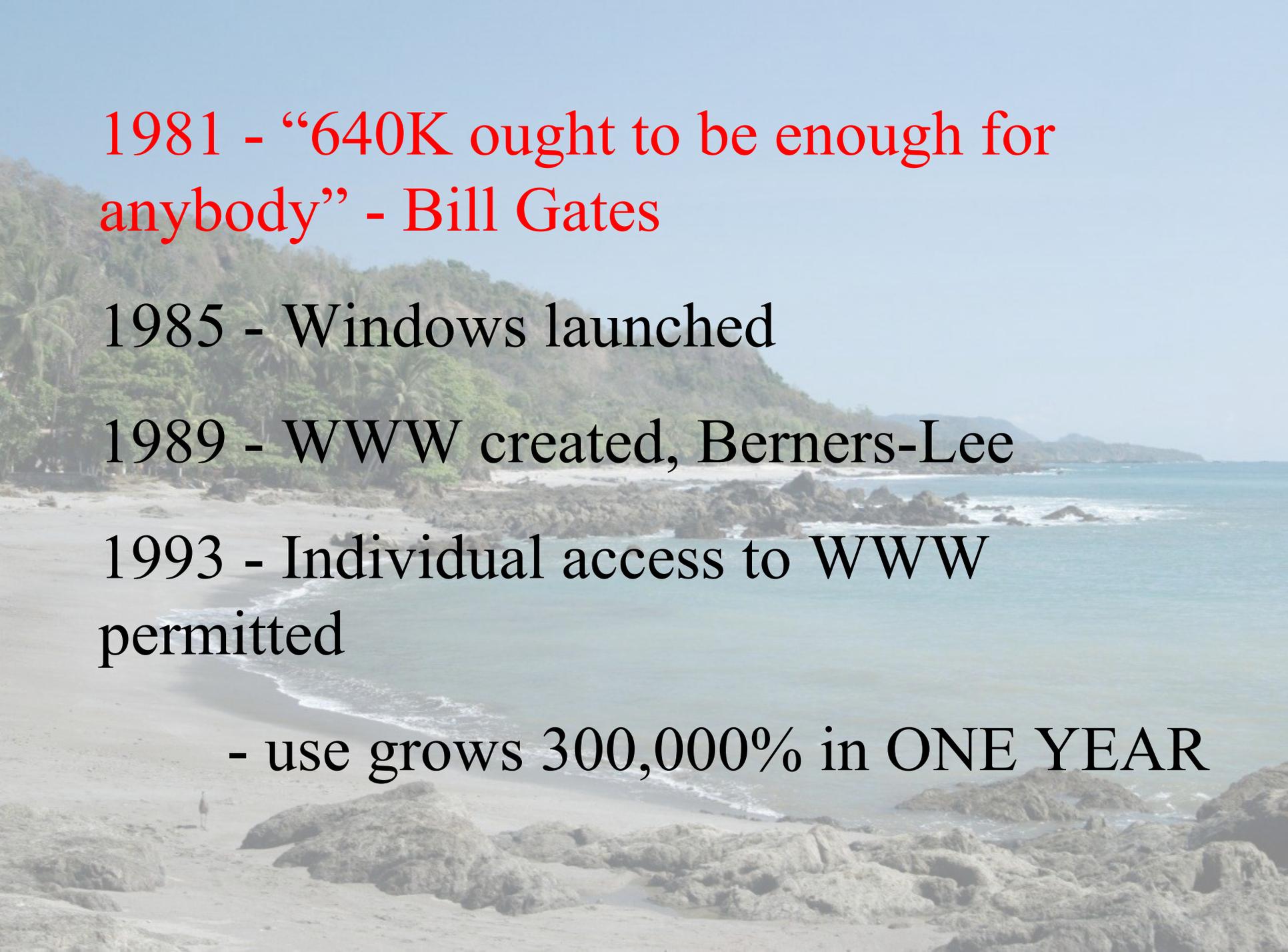
1981 - "640K ought to be enough for anybody" - Bill Gates

1985 - Windows launched

1989 - WWW created, Berners-Lee

1993 - Individual access to WWW permitted

 - use grows 300,000% in ONE YEAR

1994 - Netscape released

1997 - Deep Blue beats Kasparov

2000 - Unbreakable cryptography becomes public

2013 - At least 1,000,000,000 personal computers in use