

The History Of Computers: **Part I**

**You will learn about early computers
and computational devices as well as
some of the people behind the
technology**

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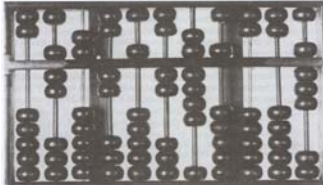
The Abacus

- **Not just a child's toy!**
 - A skilled abacus operator can be faster than the operator of a mechanical calculating machine.
- **Origins forgotten over time**

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Abacuses/Abaci Around The World

Chinese Seun Poon



Japanese Soroban



Greek Abacus



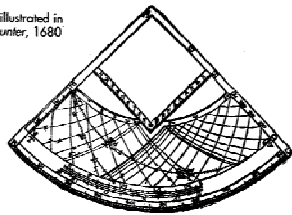
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Gunter's Quadrant

- Devised by Dr. Edmund Gunter in the 16th century

Figure 2-14
A. Gunter's quadrant, as illustrated in
The Works of Edmund Gunter, 1680
edition.



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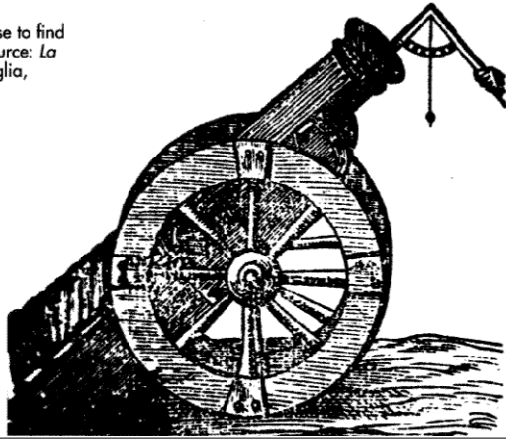
- Used calculation, navigation and sun dialling.

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The Sector

- Developed in the 17th century
- Used by artillerists to operate and fire cannons

Figure 2-20
The gunner's compass in use to find the elevation of a gun. (Source: *La Nova Scientia* by N. Tartaglia, 1537.)



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Napier's Bones



- Used to perform various mathematical functions (multiplication, square and cube roots)
- Also known as numbering rods, multiplying rulers, speaking rods

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | $\sqrt{\quad}$ | $\sqrt[3]{\quad}$ |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----------------|-------------------|
| 0/0 | 0/1 | 0/2 | 0/3 | 0/4 | 0/5 | 0/6 | 0/7 | 0/8 | 0/9 | 0 1 2 1 | 0 0 1 1 1 |
| 0/0 | 0/2 | 0/4 | 0/6 | 0/8 | 1/0 | 1/2 | 1/4 | 1/6 | 1/8 | 0 4 4 2 | 0 0 8 4 2 |
| 0/0 | 0/3 | 0/6 | 0/9 | 1/2 | 1/5 | 1/8 | 2/1 | 2/4 | 2/7 | 0 9 6 3 | 0 2 7 9 3 |
| 0/0 | 0/4 | 0/8 | 1/2 | 1/6 | 2/0 | 2/4 | 2/8 | 3/2 | 3/6 | 1 6 8 4 | 0 6 4 16 4 |
| 0/0 | 0/5 | 1/0 | 1/5 | 2/0 | 2/5 | 3/0 | 3/5 | 4/0 | 4/5 | 2 5 10 5 | 1 2 5 25 5 |
| 0/0 | 0/6 | 1/2 | 1/6 | 2/4 | 3/0 | 3/6 | 4/2 | 4/8 | 5/4 | 3 6 12 6 | 2 1 6 36 6 |
| 0/0 | 0/7 | 1/4 | 2/1 | 2/8 | 3/5 | 4/2 | 4/9 | 5/6 | 6/3 | 4 9 14 7 | 3 4 3 49 7 |
| 0/0 | 0/8 | 1/6 | 2/4 | 3/2 | 4/0 | 4/8 | 5/6 | 6/4 | 7/2 | 6 4 16 8 | 5 1 2 64 8 |
| 0/9 | 0/9 | 1/8 | 2/7 | 3/6 | 4/5 | 5/4 | 6/3 | 7/2 | 8/1 | 8 1 18 9 | 7 2 9 81 9 |

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Napier's Bones: Multiplication

| 4 | 5 | 6 | |
|-----|-----|-----|---|
| 0/4 | 0/5 | 0/8 | 1 |
| 0/8 | 1/0 | 1/2 | 2 |
| ⋮ | ⋮ | ⋮ | |
| 3/2 | 4/0 | 4/8 | 8 |

James Tam

Blasé Pascal



- Pascal lived in the 17th century in Clermont, France
- He was a mathematician and philosopher



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Blasé Pascal (2)



-Eventually his father relented and encouraged Pascal's interest in Mathematics.



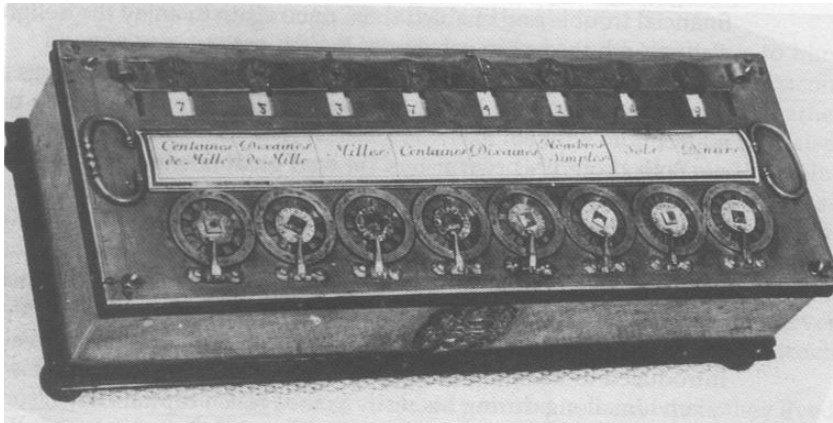
Woohoo!



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Pascal's Calculating Machines

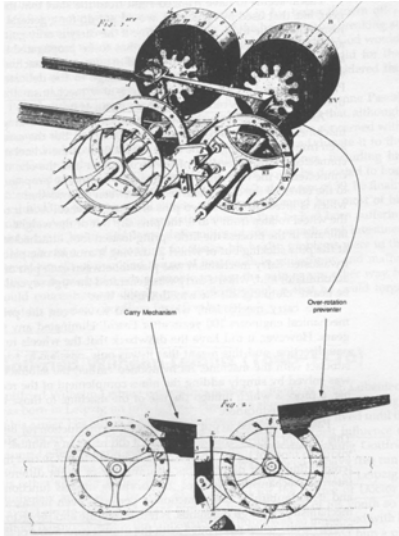
•Developed almost 50 different calculating machines



Picture from the History of Computing Technology by Michael R. Williams

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Internal Workings Of Pascal's Machine



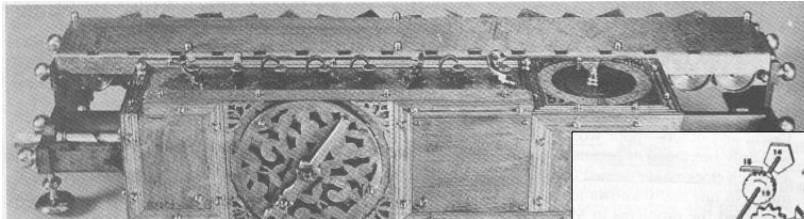
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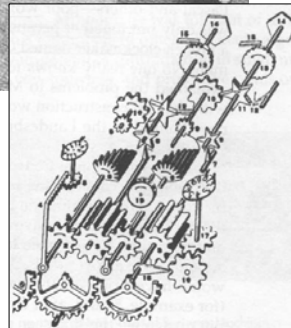
Gottfried Wilhelm Leibniz



- He expanded the original concepts in Pascal's calculating machine (multiplication)



Leibniz's machine



Inner workings

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Charles Babbage



- 1791 – 1871
- Initially started out as a self-taught mathematician



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Charles Babbage (2)



- Turned into an absolutely brilliant mathematician at Cambridge.
- Member/founding member of many social clubs:
 - Cambridge Ghost club
 - 'The Extractors'

The 4 basic rules of the extractors:

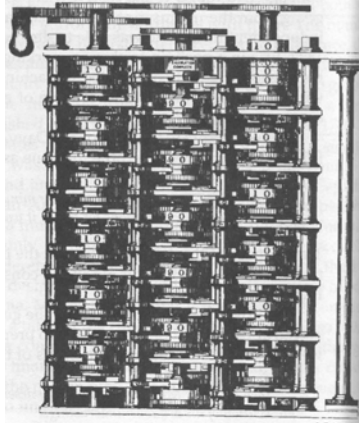
1. Every member must communicate his address to the Secretary at least once every six months.
2. If this communication was delayed beyond 12 months, it would be taken for granted that his relatives had shut him up as insane.
3. Every effort legal and illegal shall be made to get him out of the madhouse (hence the term "extractors").
4. Every candidate for admission shall produce six certificates to be kept on file – three that he is sane and three that he is not.

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Charles Babbage (3)



- Often considered to be the grandfather of the computer age.
 - His resources were limited and crude
 - But his ideas were so revolutionary that they were comparable to the technology in the computers in the first half the 20th century)



Picture from the History of Computing Technology by Michael R. Williams

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You Should Now Know

- What are the characteristics of some early computing devices and the people behind those devices:
 - The abacus
 - Gunter's quadrant
 - The Sector
 - Napier and his bones
 - Pascal's calculating machines
 - Leibniz's multiplying machine
 - Babbage's Difference Engine

James Tam