

# On the pre-history of information technology

Stephen Robertson

# Book

## BC, Before Computers:

On Information Technology from Writing to the Age of Digital Data

Stephen Robertson

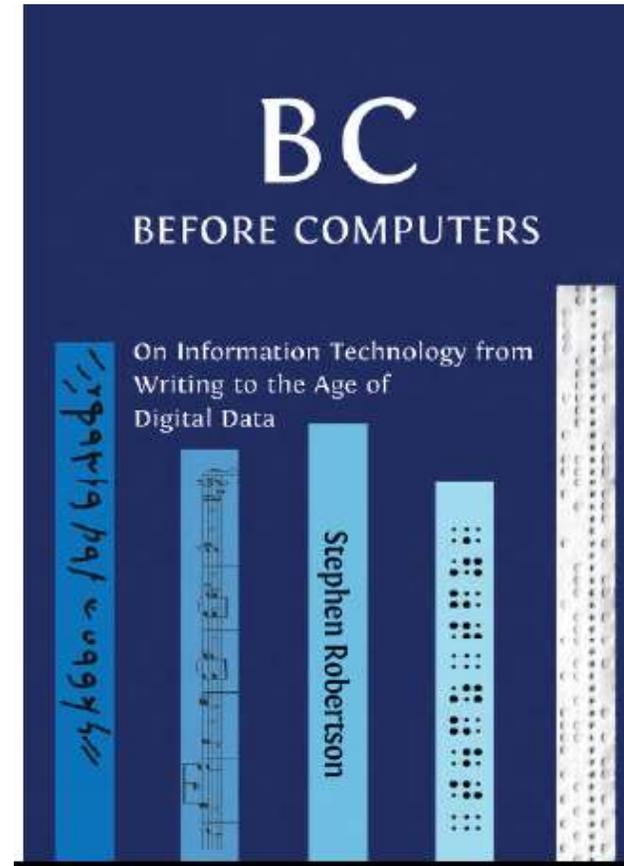
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# Some themes of the book

- Writing systems, the alphabet
- Communication
  - point-to-point
  - broadcast
- Organising information
- Non-textual information – pictures and sound
- Calculation
- Data processing
- Cryptography

# Writing as data

We have come to think of written language (text) as data  
– which can be processed by machinery

This is a strange idea

which would have made little sense to anyone living at any time between  
the invention of writing and the early twentieth century

And yet...

in early C21, we have come to expect data-processing machines to answer  
human questions

# Spaces between words

Early alphabetic scripts did not space words

Greek was often written “boustrophedon”

(as the ox ploughs) – one line left to right, the next right to left

The Romans sometimes placed a mark between words, but not always

Functions of written text

—> Seventh century monasteries

Preservation of learning and books in Europe

All writing is in Latin

Monks practice silent reading

Irish and English monks start using spaces

# Spaces between words

## Alcuin

C9 monk from York, celebrated educator

–> court of Charlemagne, to educate his sons

Wrote many works, including a manual of writing style

– spacing, paragraphs, punctuation, initial capitalisation

Charlemagne becomes emperor of a large part of western Europe

– so the cultural ideas of his court are spread far and wide

Almost all alphabetic scripts use the space idea

– but with variations (consider German and Finnish)

# Skip a few centuries...

*including:*

*Printing (C15)*

*Braille (C19)*

*Morse, the telegraph (C19)*

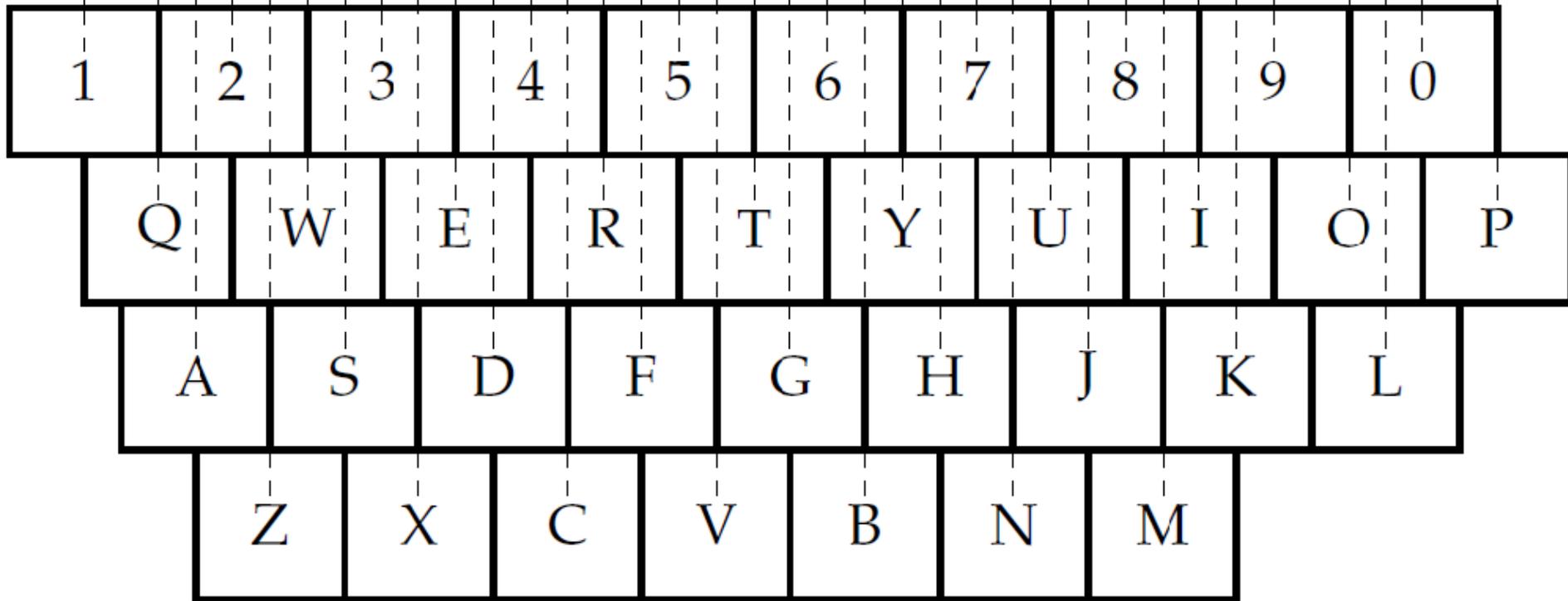
*The Latin Verse machine (C19)*

*The verses created by the Eureka were gloomy and oracular hexameters, created to a single format, which allowed for many combinations, all metrically sound and (more or less) meaningful.*

**Quiz question:**

Which 19<sup>th</sup> century invention directly influenced the design of your laptop?

1 QA 2 ZWS 3 XED 4 CRF 5 VTG 6 BYH 7 NUJ 8 MIK 9 OL 0 P



# Coding and the typewriter

## The typewriter

A keyboard!

- the Sholes QWERTY keyboard of the 1870s became the standard

Fixed width characters

case shift

spacebar

digits, punctuation, special characters

lever for new line

special functions (e.g. tab key; backspace key)

Electric typewriter

new-line lever replaced by “return” key

# Data Processing

## Punched cards

Started by Hollerith (analysis of US census 1890)

Became a substantial industry in the first half of C20

Gradually evolved

- Encoding of digits or printable characters

- or even end-of-line

- using a typewriter-like keyboard by the 1930s

# Coding and the typewriter

## ASCII (1963)

American Standard Code for Information Interchange

7-bit (128 characters)

96 “printable” characters

Alphabetic sequence of the letters

– but one bit for case (separate sequences)

Space!

Digits, punctuation, special characters

32 “control” characters

– e.g. NL, CR, tab, backspace

## Unicode

# Some complexities of character coding

- Case
- Accents, diacritics
- Ligatures
- CR, LF, whitespace etc.
  - and that's just for English!

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# Nevertheless...

At the dawn of the digital age, we have succeeded in turning language/writing/text into something *machinable*

(along with numbers, sound, images, and moving images)

and we have spent the ensuing  $\frac{3}{4}$  of a century exploring the consequences of this transformation.

Thank you.