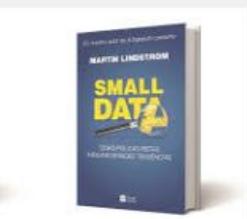
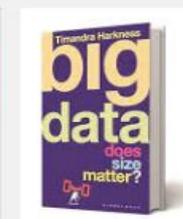
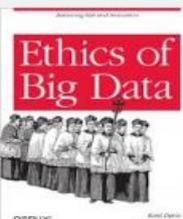
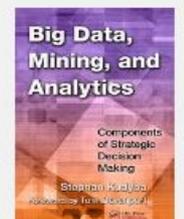
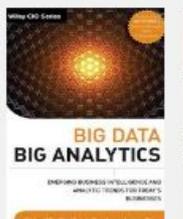
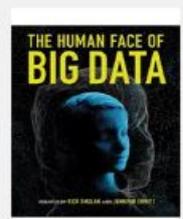
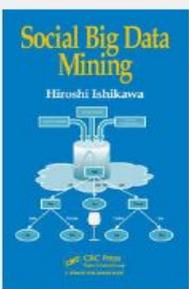
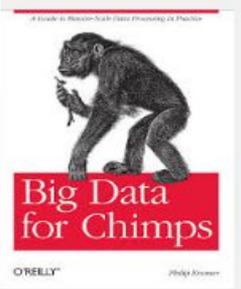
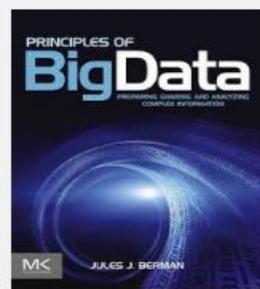


# Big Data



- 1990's *“Big Data”*  
— John Mashey, Silicon Graphics



- 1990's

*Where is the wisdom we have lost in knowledge?*

- 1924

*Where is the knowledge we have lost in information?*

— T.S. Eliot



• 1990's

• 1924

• 1621

*A vast confusion of of vows, wishes, actions, edicts, petitions, lawsuits, pleas, laws, proclamations, complaints, grievances are daily brought to our ears. New books every day, pamphlets, currantoes, stories, whole catalogues and volumes of all sorts, new paradoxes, opinions, schisms, heresies, controversies in philosophy, religion, etc.*

— Robert Burton



- 1990's

- 1924

*Even if all knowledge could be found in books...it would take longer to read those books than we have to live in this life and more effort to select the useful things than to find them oneself*

— René Descarte

- 1621

- 1600

- 
- 1990's
  - 1924
  - 1621
  - 1600
  - 400 B.C.
- Ars longa, vita brevis.*  
*(Life is short; art is long)*  
— Hippocrates

- 2009
- 1924
- 1621
- 1600
- 400 B.C.

*Ars longa, vita brevis.*  
*(Life is short; art is long)*  
— Hippocrates

Long Data

Data Has  
Always  
Been Big

*Kyle Erf*

History?

History gives us a place.

History gives us a place.

**History shows us patterns.**

History gives us a place.

History shows us patterns.

History shows us our situation is  
*not* inevitable, we have many more  
options than we realize.

Information has *always* outpaced  
our means of comprehending it.  
Comprehending it *always* creates  
more information.



# The Beginning

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## 2.5 Million BC



2.5 Million BC



70,000 B.C.



Too many people to know!

# Myths

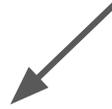
**Trust**

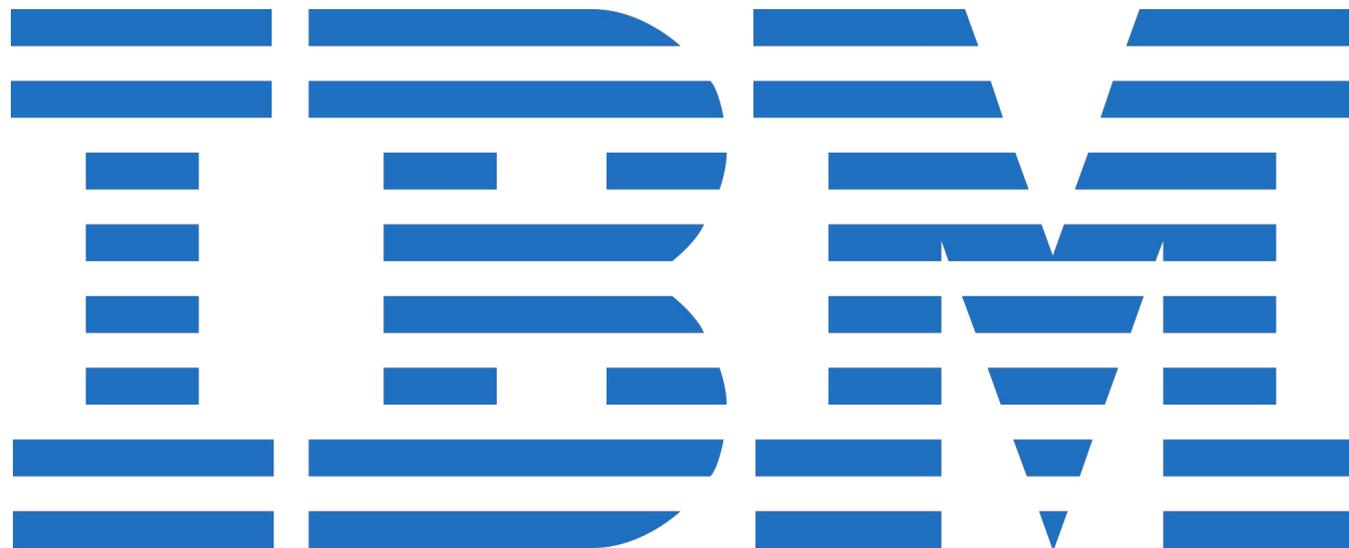
**Society**

**Myths**

**Coordination**

**Trade**





Certificate of Incorporation  
of  
INTERNATIONAL BUSINESS MACHINES CORPORATION

**ONE:** The name of the corporation (hereinafter called "the Corporation") is International Business Machines Corporation.

**TWO:** The purpose of the Corporation is to engage in any lawful act or activity for which corporations may be organized and to exercise powers granted under the Business Corporation Law of the State of New York, provided that the Corporation shall not engage in any act or activity requiring the consent or approval of any state official, department, board, agency, or other body without such consent or approval first being obtained.

**THREE:** The aggregate number of shares that the Corporation shall have authority to issue is 4,837,500,000 shares, consisting of 4,687,500,000 shares of the par value of \$0.20 per share, which shall be designated "capital stock," and 150,000,000 shares of the par value of \$.01 per share, which shall be designated "preferred stock."

**FOUR:** (1) Subject to the provisions of the By-laws, as from time to time amended, with respect to the closing of the transfer books and the fixing of a record date, each share of the capital stock of the Corporation shall be entitled to

---

2.5 Million B.C.

70,000 B.C. ↑  
10,000 B.C.



---

2.5 Million B.C.



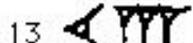
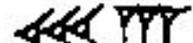
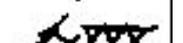
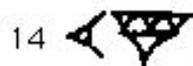
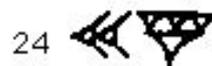
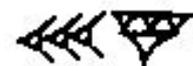
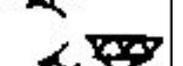
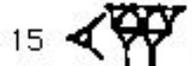
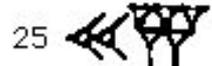
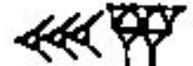
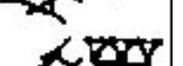
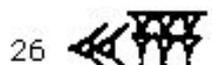
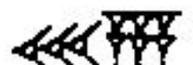
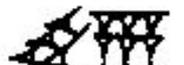
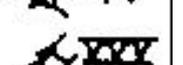
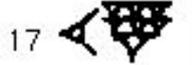
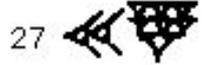
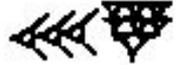
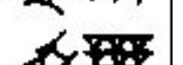
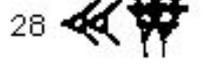
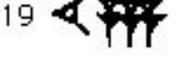
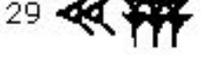
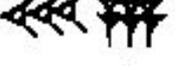
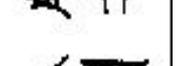
70,000 B.C. |  
10,000 B.C.

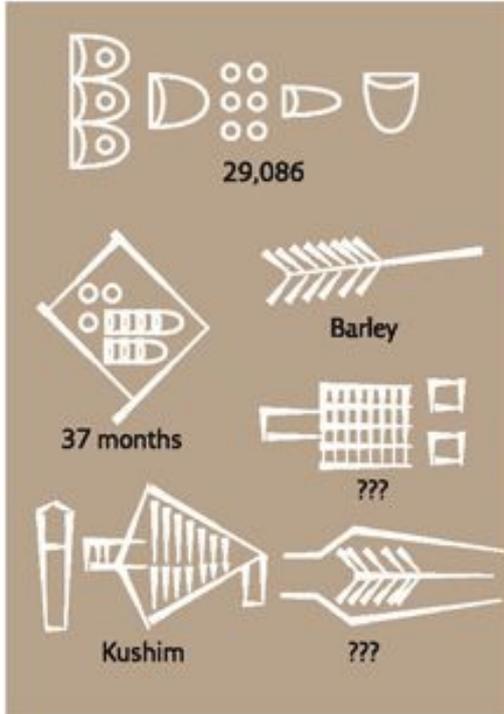


Too many amounts to  
keep in our heads!

Writing



1		11		21		31		41		51	
2		12		22		32		42		52	
3		13		23		33		43		53	
4		14		24		34		44		54	
5		15		25		35		45		55	
6		16		26		36		46		56	
7		17		27		37		47		57	
8		18		28		38		48		58	
9		19		29		39		49		59	
10		20		30		40		50			



**3000 B.C.**





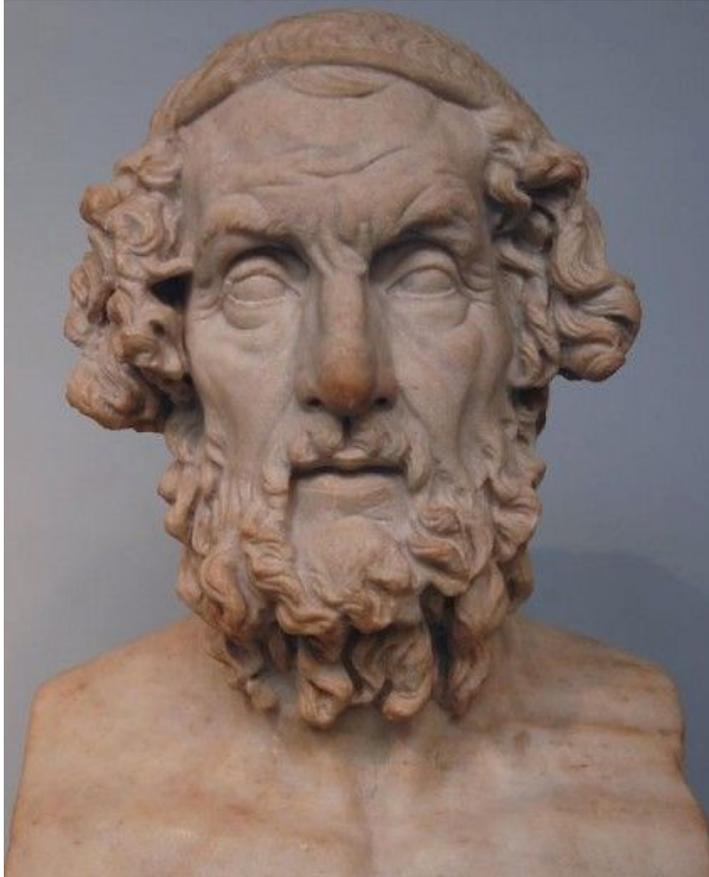
	'ālep	šādeh	dālet	nūn	ḥē	yōd	rēš	wāw	ḥet	sāmek	zāyin	ḥē
Aramaic	Ⲁ	Ⲇ	ⲁ	Ⲏ	ⲇ	ⲃ	Ⲁ	Ⲇ	ⲇ	Ⲁ	Ⲇ	Ⲁ
	Ⲇ	Ⲇ	Ⲇ	Ⲇ	Ⲇ	Ⲇ	Ⲇ	Ⲇ	Ⲇ	Ⲇ	Ⲇ	Ⲇ
	Ⲇ	-	Ⲇ	Ⲇ	Ⲇ	Ⲇ	Ⲇ	Ⲇ	Ⲇ	Ⲇ	Ⲇ	Ⲇ
Kharoṣṭhī	a	ca	da	na	ba	ya	ra	va	śa	sa	za	ha
	Ⲁ	Ⲇ	ⲁ	Ⲏ	ⲇ	ⲃ	Ⲁ	Ⲇ	ⲇ	Ⲁ	Ⲇ	Ⲁ

	kaṣ	qōṣ	gīmel	tāw	pēh		mēm	lāmed	šīn
Aramaic	Ⲁ	Ⲇ	Ⲁ	Ⲁ	Ⲁ	Aramaic	Ⲁ	Ⲁ	Ⲁ
	Ⲁ	Ⲁ	Ⲁ	Ⲁ	Ⲁ		Ⲁ	Ⲁ	Ⲁ
	Ⲁ	Ⲁ	Ⲁ	Ⲁ	Ⲁ		Ⲁ	Ⲁ	Ⲁ
Kharoṣṭhī	ka	kha	ga	ta	pa	Kharoṣṭhī	ma	la	śa
	Ⲁ	Ⲇ	Ⲁ	Ⲁ	Ⲁ		Ⲁ	Ⲁ	Ⲁ

ga	ca	na	da	pa	ta	ba	ja
Ⲁ	Ⲇ	Ⲏ	ⲁ	Ⲁ	Ⲁ	ⲇ	Ⲇ
gha	cha	ṇa	dha	pha	tha	bha	ña
Ⲁ	Ⲇ	Ⲏ	ⲁ	Ⲁ	Ⲁ	ⲇ	Ⲇ

ta	ṭha	ḍa	ḍha
Ⲁ	Ⲁ	Ⲁ	Ⲁ

The case *against*  
writing

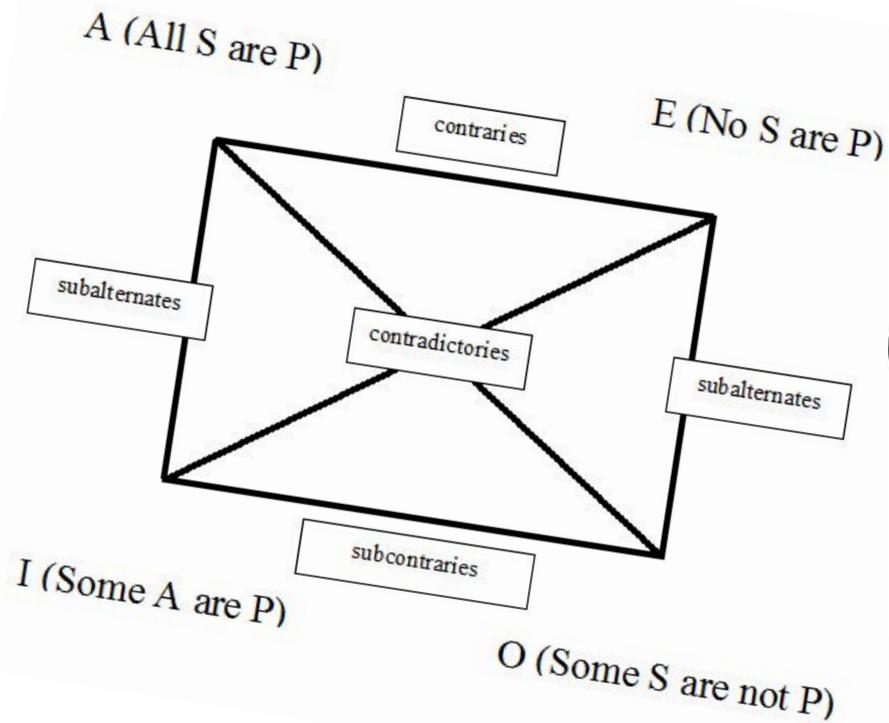


*“[Writing] will produce forgetfulness in the minds of those who learn to use it, because they will not practice their memory...You have invented an elixir not of memory, but of reminding; and you offer your pupils the appearance of wisdom, not true wisdom, for they will read many things without instruction and will therefore seem to know many things, when they are for the most part ignorant and hard to get along with.”*

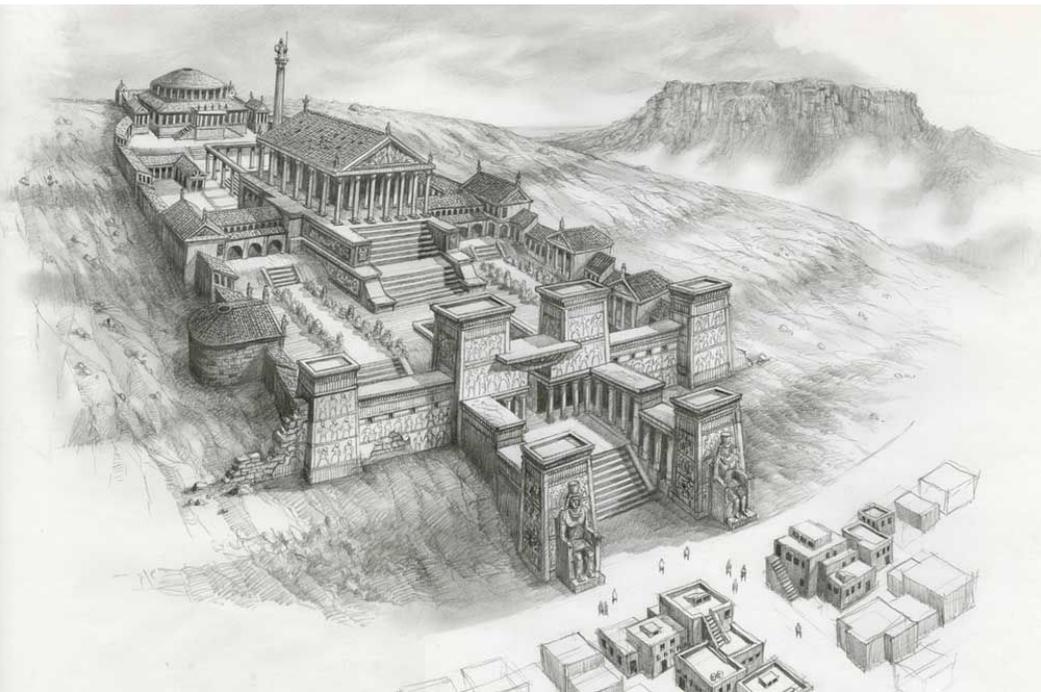
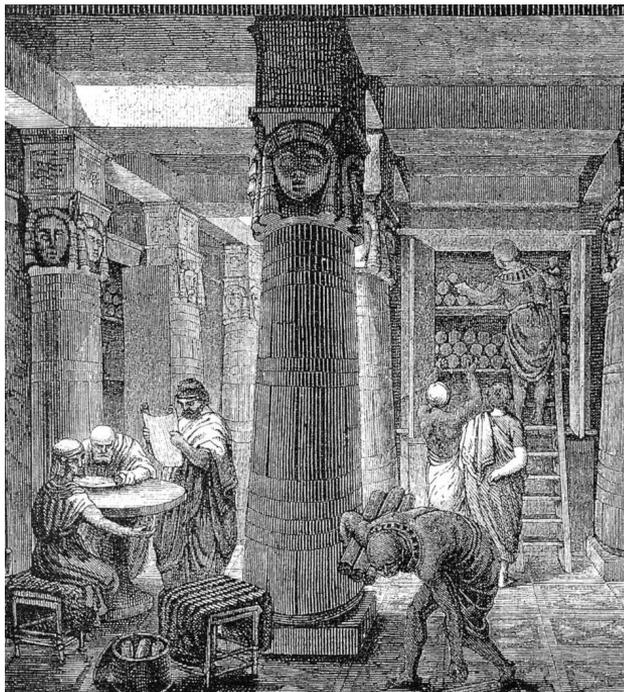
— Socrates

*“sloppy learning”* — Zhu Xi

# The side-effects of writing







# The Dark Ages?



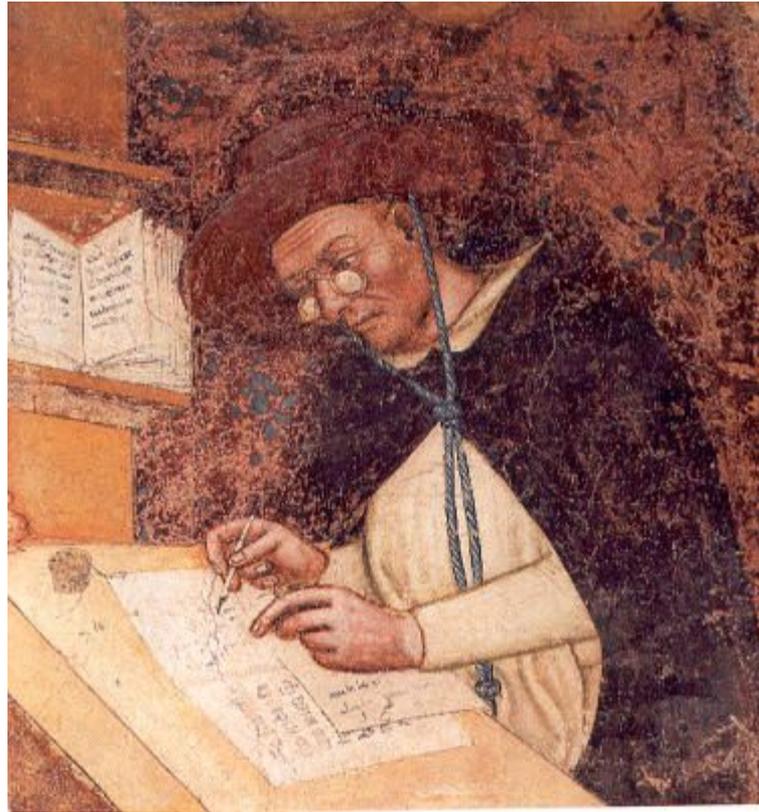
Nope, there's still too  
much data!

世傳富春山居圖為黃子久  
畫卷之冠昨午得其所為  
山居圖者有董香光鑒跋  
題寄意後於沈德潛文中  
知其流落人間庶幾一遇為  
快丙寅冬或以書畫求售多

世傳富春山居圖為黃子久  
畫卷之冠昨午得其所為  
山居圖者有董香光鑒跋  
題寄意後於沈德潛文中  
知其流落人間庶幾一遇為  
快丙寅冬或以書畫求售多











# TAB IV

The table is organized into several vertical sections:

- Section A:** Columns A through E, containing a grid of numbers with diagonal hatching.
- Section F:** Column F, containing vertical text.
- Section G:** Column G, containing vertical text.
- Section H:** Column H, containing vertical text.
- Section I:** Column I, containing vertical text.
- Section J:** Column J, containing vertical text.
- Section K:** Column K, containing vertical text.
- Section L:** Column L, containing vertical text.
- Section M:** Column M, containing vertical text.
- Section N:** Columns N through Q, containing numerical data in a grid format.
- Section O:** Columns R through S, containing numerical data in a grid format.
- Section P:** Columns T through V, containing numerical data in a grid format.
- Section Q:** Columns W through X, containing numerical data in a grid format.
- Section R:** Columns Y through Z, containing numerical data in a grid format.

The table is mounted on a base with drawers, each with a circular handle.

Math is tedious!

# Logarithms

## COMMON LOGARITHMS

 $\log_{10} x$ 

x	0	1	2	3	4	5	6	7	8	9	$\Delta_m$	1	2	3
												+		
50	.6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	9	1	2	3
51	.7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	8	1	2	2
52	.7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	8	1	2	2
53	.7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	8	1	2	2
54	.7324	7332	7340	7348	7356	7364	7372	7380	7388	7396	8	1	2	2
55	.7404	7412	7419	7427	7435	7443	7451	7459	7466	7474	8	1	2	2
56	.7482	7490	7497	7505	7513	7520	7528	7536	7543	7551	8	1	2	2
57	.7559	7566	7574	7582	7589	7597	7604	7612	7619	7627	8	1	2	2
58	.7634	7642	7649	7657	7664	7672	7679	7686	7694	7701	8	1	2	2
59	.7709	7716	7723	7731	7738	7745	7752	7760	7767	7774	7	1	1	2

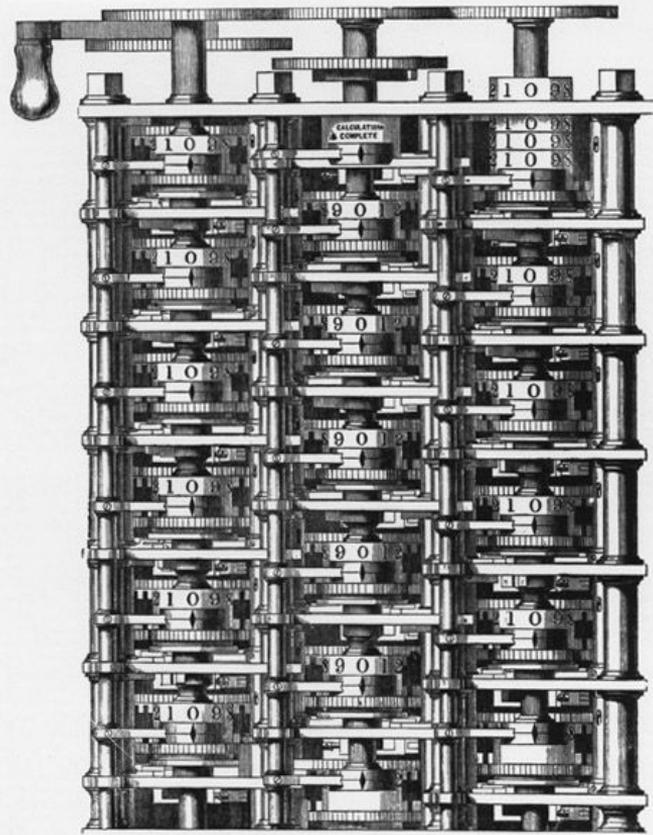
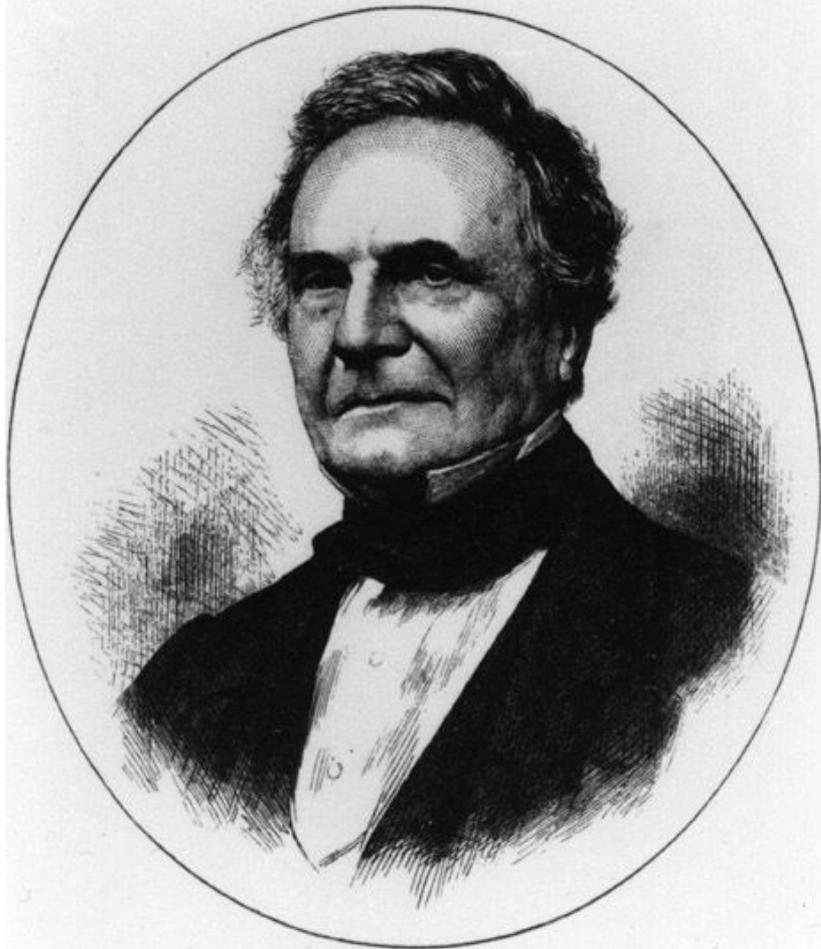
$$5231 * 6772$$

$$10^{3.718584720} * 10^{3.8307169}$$

$$10^{(3.718584720 + 3.830716949)}$$

$$10^{7.5493016}$$

$$35,424,332$$



*B. H. Babbage, del.*

Impression from a woodcut of a small portion of Mr. Babbage's Difference Engine No. 1, the property of Government, at present deposited in the Museum at South Kensington.

It was commenced 1823.

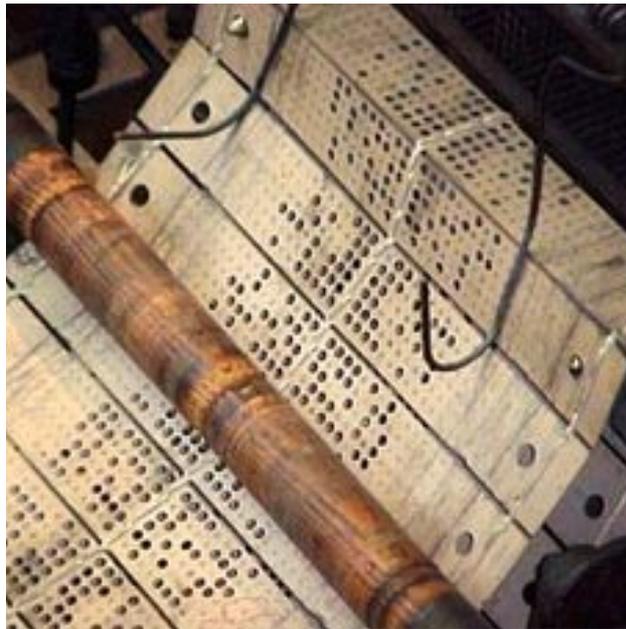
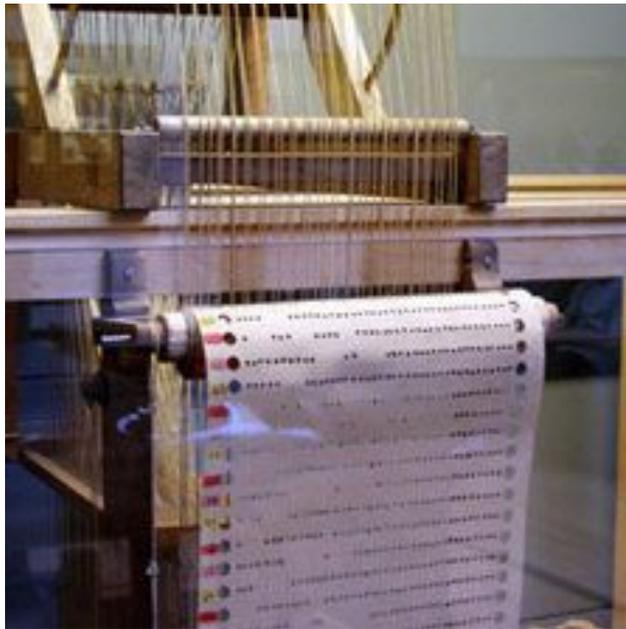
This portion put together 1833.

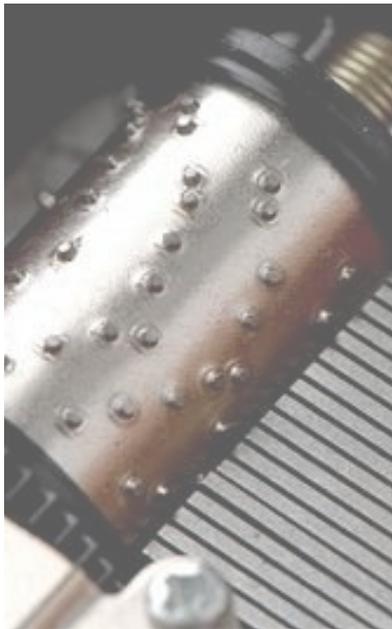
The construction abandoned 1842.

This plate was printed June, 1853.

This portion was in the Exhibition 1862.







1890 Census!

Too many people to know!

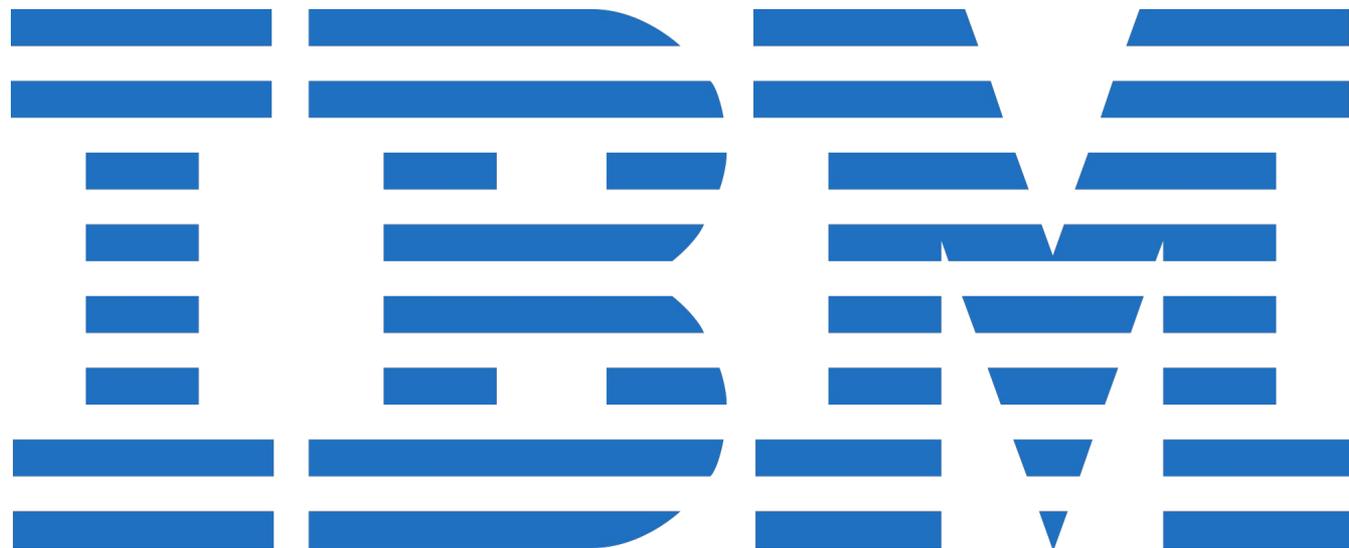


2 2 4 1 3		E 15		Off		A C E a o e		S Y		C h S y U Sh Hk Dr Rm	
3	0	0	0	W	20	0	0	0	0	0	0
A	1	1	1	1	0	25	A	1	1	1	1
B	2	2	2	2	5	30	B	2	2	2	2
C	3	3	3	3	0	3	C	3	3	3	3
D	4	4	4	4	1	4	D	4	4	4	4
E	5	5	5	5	2	5	E	5	5	5	5
F	6	6	6	6	3	6	F	6	6	6	6
G	7	7	7	7	4	7	G	7	7	7	7
H	8	8	8	8	5	8	H	8	8	8	8
I	9	9	9	9	6	9	I	9	9	9	9



**BUSINESS**  
**INTERNATIONAL**  
**MACHINES**

The logo is a black and white graphic consisting of a 3D cylindrical shape. The word "BUSINESS" is written in a bold, sans-serif font along the top curved edge of the cylinder. The word "INTERNATIONAL" is written in a similar bold, sans-serif font along the middle horizontal band of the cylinder. The word "MACHINES" is written in the same bold, sans-serif font along the bottom curved edge of the cylinder. The overall effect is that of a three-dimensional object, possibly a canister or a component of a machine, with the text integrated into its structure.



The cycle continues...

# Further Reading

James Gleick - *The Information*

Ann Blair - *Too Much To Know*

James Burke - *Connections*