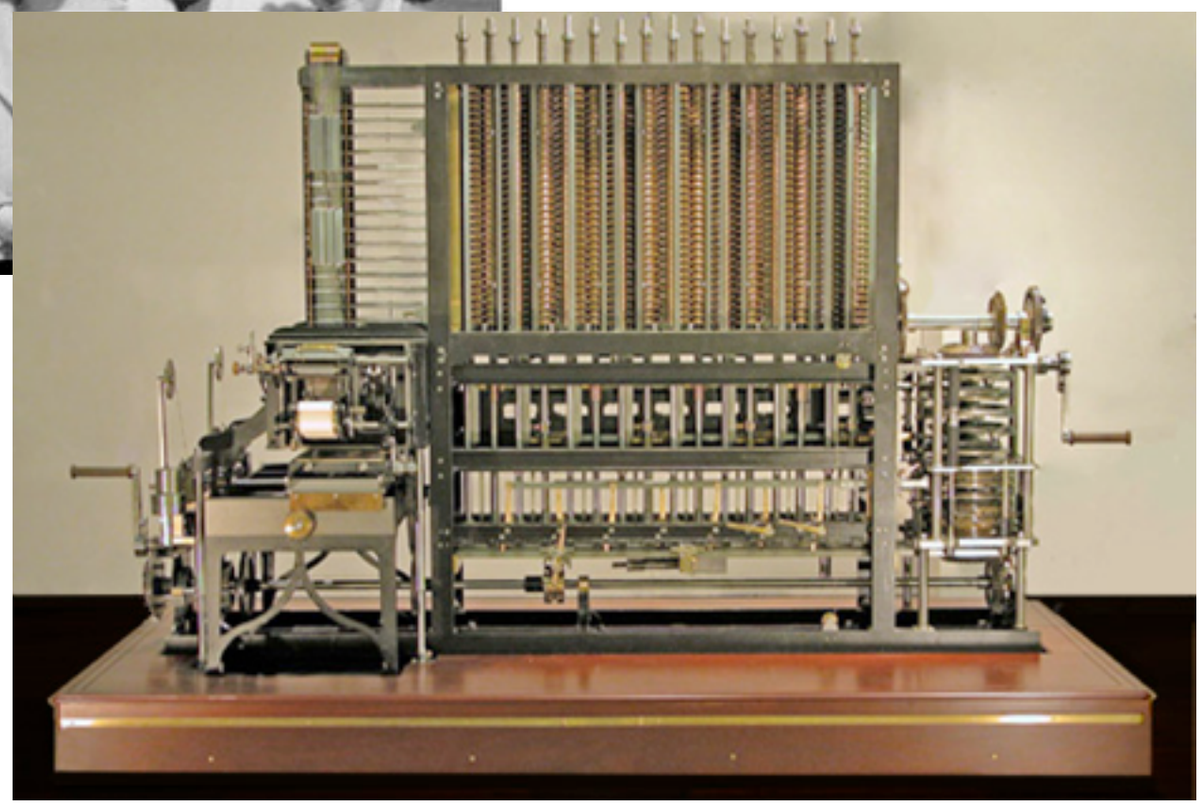
advent of the computer

History of Information

April 9, 2013



where are we?


year
2015
1980
1950
1900
1800
1700
1600
1200
600
400
0
500
3000
5000
30,000
50,000
week
1
2
3
4
5
6
7
8
10
11
12
13
14
15
week
finally!!
IBM
STOR
UDACITY
Cupertino
CA

automata

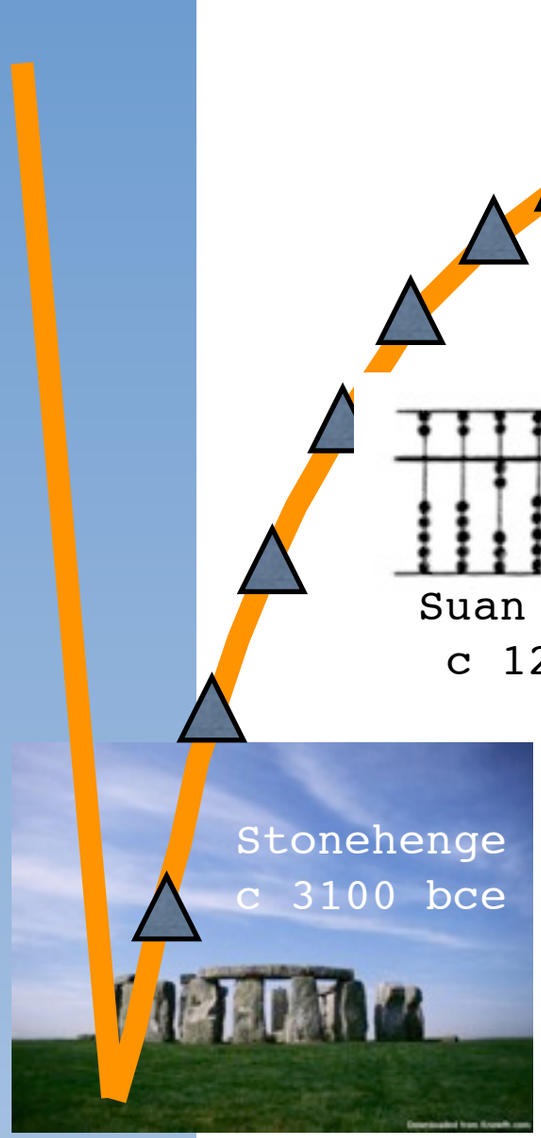
computus

feedback mechanisms

not so fast?

year

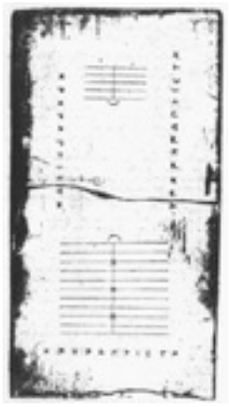
2010
1980
1950
1900
1800
1700
1600
1200
600
400
0
500
3000
5000
30,000
50,000

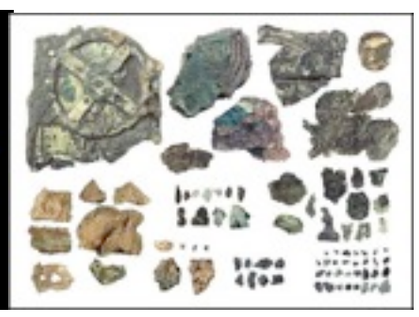


Babbage's dream

Suan Pan
c 1200

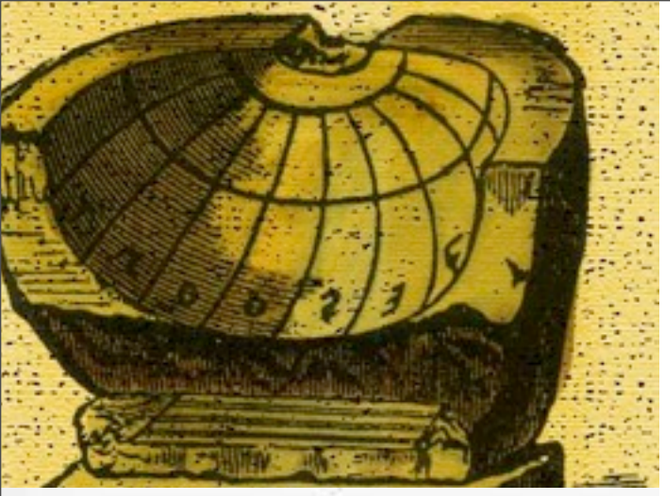
Salamis tablet
c 300 bce

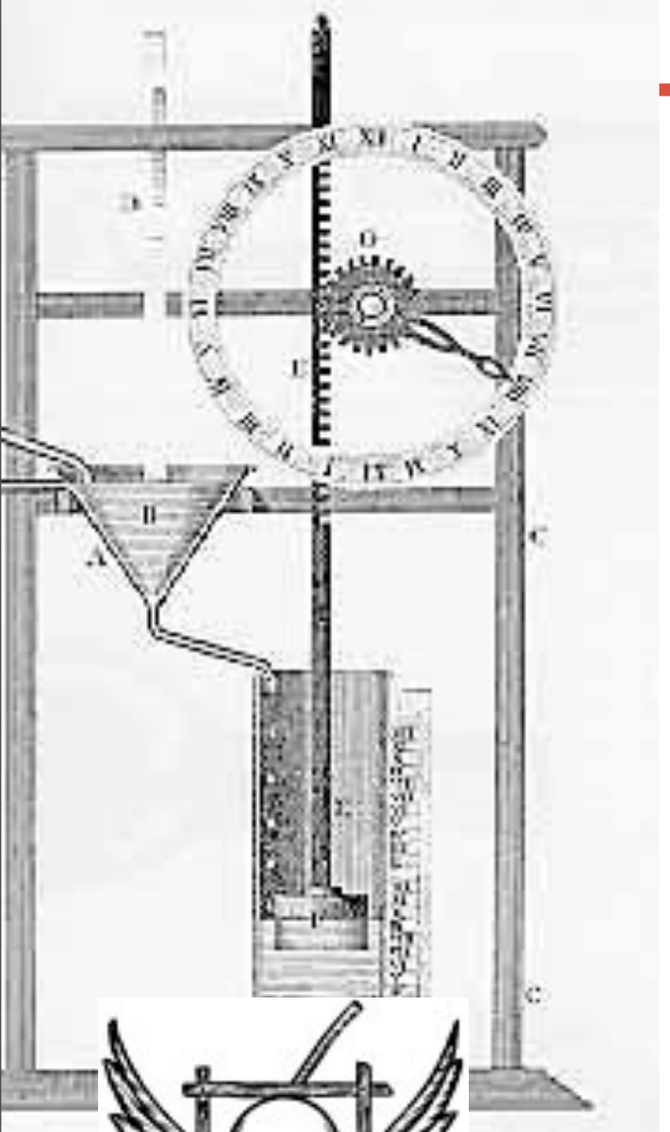




antikythera c 200 bce

week 1 2 3 4 5 6 7 8 10 11 12 13 14 15 week





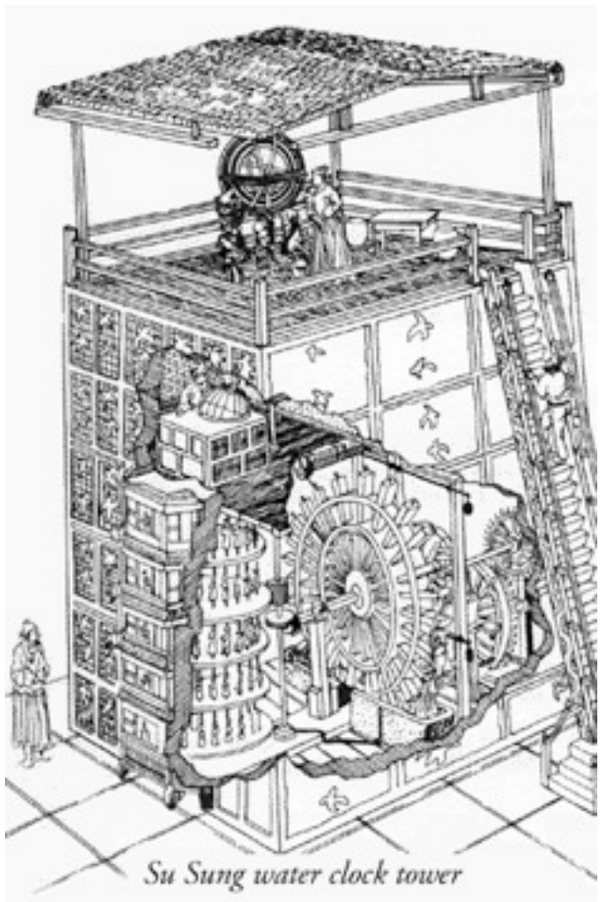
calculating?

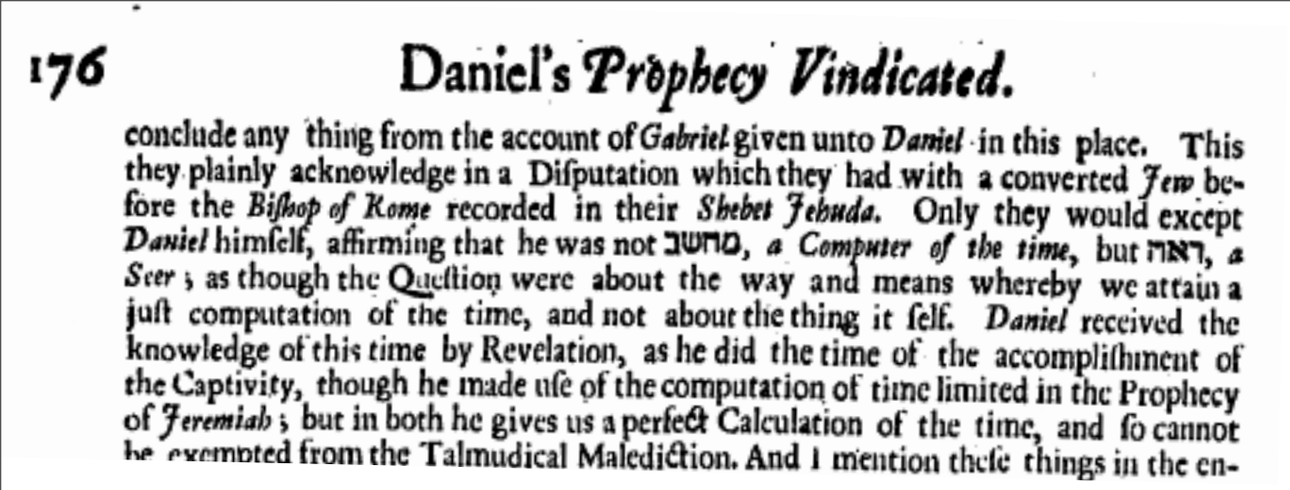
3500 bce: sundials

1400 bce: Egyptian water clocks

700 ce: hourglasses

1086: Su Sung's water tower




176 Daniel's Prophecy Vindicated.

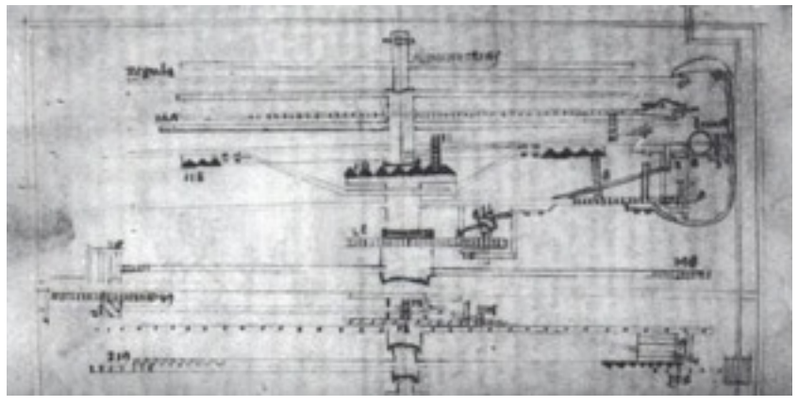
conclude any thing from the account of *Gabriel* given unto *Daniel* in this place. This they plainly acknowledge in a Diſputation which they had with a converted *Jew* before the *Biſhop of Rome* recorded in their *Shebet Jehuda*. Only they would except *Daniel* himſelf, affirming that he was not מחשב, *a Computer of the time*, but ראה, *a Seer*; as though the Queſtion were about the way and means whereby we attain a juſt computation of the time, and not about the thing it ſelf. *Daniel* received the knowledge of this time by Revelation, as he did the time of the accompliſhment of the Captivity, though he made uſe of the computation of time limited in the Prophecy of *Jeremiah*; but in both he gives us a perfect Calculation of the time, and ſo cannot be exempted from the Talmudical Maledi&tion. And I mention theſe things in the en-

computer

"I have read the truest computer of Times" --*The Young Man's Gleanings*, 1614

In the Talmud ... they have laid down this general Rule, Male pereant qui temporum articulos suppetunt quibus venturus est Messiah. Or as they express it by a solemn Curse in the name of Rabbi Jonathan, a great man among them, **let their bones rot who compute the times of the end. ... [Daniel] was not a Computer** of the time but a Seer as though the Question were about the way and means whereby we attain a just computation of the time, and not about the thing it self. Daniel received the knowledge of this time by Revelation, as he did the time of the accomplishment of the Captivity, though he made use of the computation of time limited in the Prophecy of Jeremiah; but in both he gives us a perfect Calculation of the time, and so cannot be exempted from the Talmudical Maledi&tion

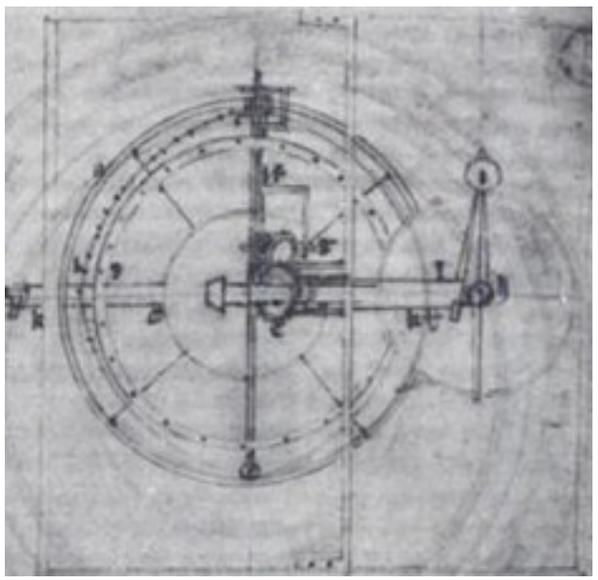
--John Owen, *Exercitations on the Epistle of the Hebrews*, 1688



automata

Richard of Wallingford
1292-1336

1300: mechanical clocks
Richard of Wallingford
celestial instruments & St Albans' clock



86 *The Antiquity* Chap. VI.

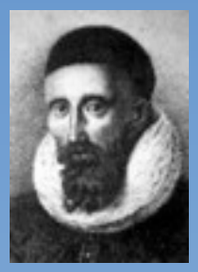
modum dentata, quæ una motione coacta, verſando faciunt effectus, varietateſque motionum: in quibus moventur Sigilla, vertuntur Metæ, calculi aut Tona projiciuntur,

Chap. VI. *of Clock-work.* 87

Clocks, and ſome other *Automata*, might have their beginning there; or that Clock-work (which had long been buried in oblivion) might be revived there. But

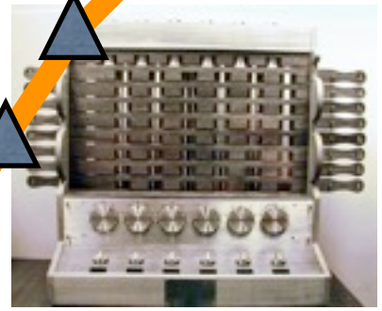
Derham, *The Artificial Clock Maker*, 1696

beyond time



Napier 1617

Schickard
1623



Pascal 1642

Leibniz 1671

year
2010
1980
1950
1900
1800
1700
1600
1200
600
400
0
500
3000
5000
30,000
50,000

week 1 2 3 4 5 6 7 8 10 11 12 13 14 15 week

17th century calculations

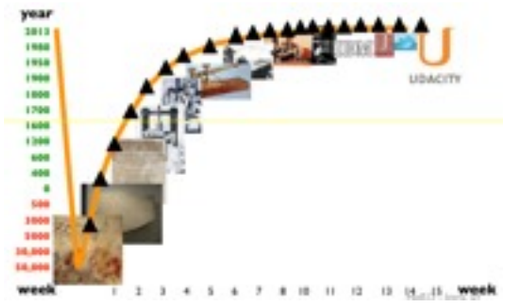
Napier's "bones"

Schickard's astronomical calculator

Pascal's calculator

Leibniz's binary calculator

overview



changing perceptions

changing business

the demand side

past & future

inventions

"attempts to locate causes of "technology revolutions" should consider the needs of society and its room for potential growth."

--Charlotte Banayan

Sammy Avila Munoz

Charlotte Banayan

Brian Freese

Keien Ohta

Ione Sterental

Sean Trott

Eilen Zeng

Sarah Zou

computer

technology and society

"The invention [of television] was no single event. ... a very complex interaction between new needs and new inventions ... military ... government ... corporate interests ... ."

-- Williams, *Technology and Cultural Form*, 1973

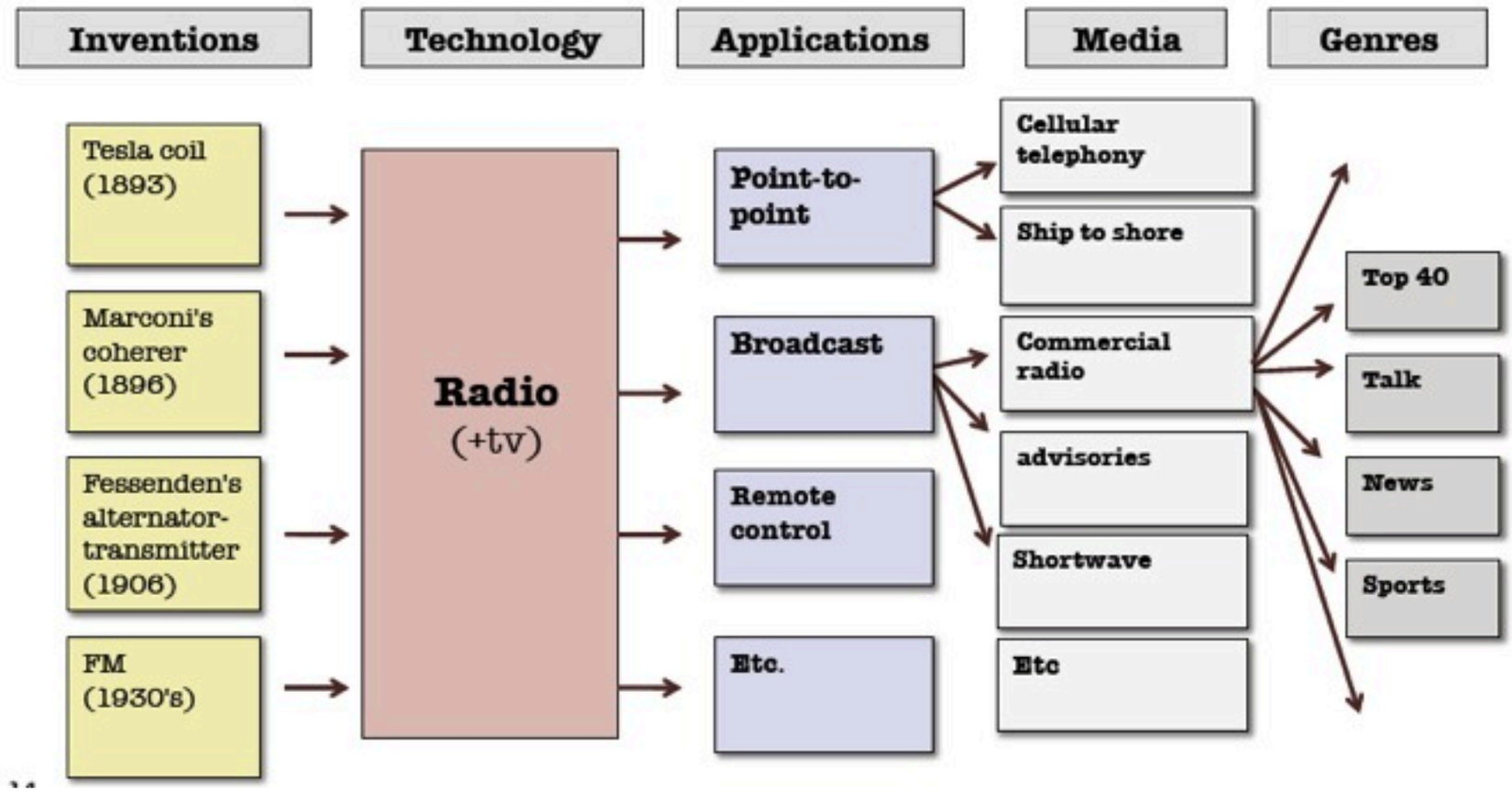
eye witness account

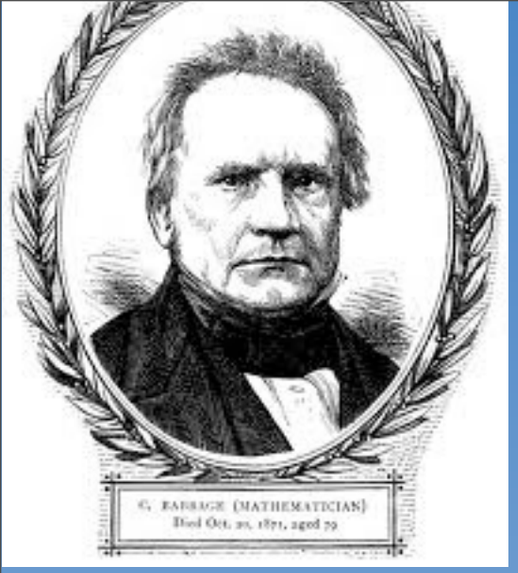
"What constitutes an invention?--Few simple mechanical contrivances are new; and most combinations may be viewed as a species, and classed under genera ... [and] pronounced old or new according to the mechanical knowledge of the person who gives his opinion."

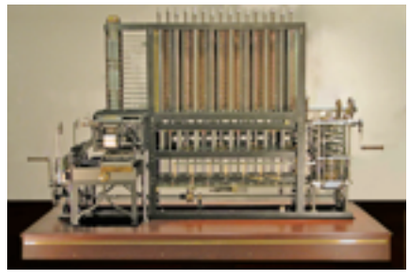
--Babbage, *On the Economy of Machinery*, ...1832

where's the invention?

Inventions, Technologies, Applications, Media







computer technology

Inventions	Technology	Applications	Media	Genres
clock		calculating	engines	logarithms
mill/store			mainframe	ballistics
logarithm	**computer**	recording	desktop	accounting
loom		sorting	cars ...	registration
governors			laptop	logistics
...		controlling	tablet	...
vacuum tube			the net	bbs
transistor		...	phones	email
chip		*commun-icating*	the web	social networks
disc			the cloud	

getting to (and beyond) the computer

individual inventors (and investors)

business / customers

government

military / intelligence

science / education

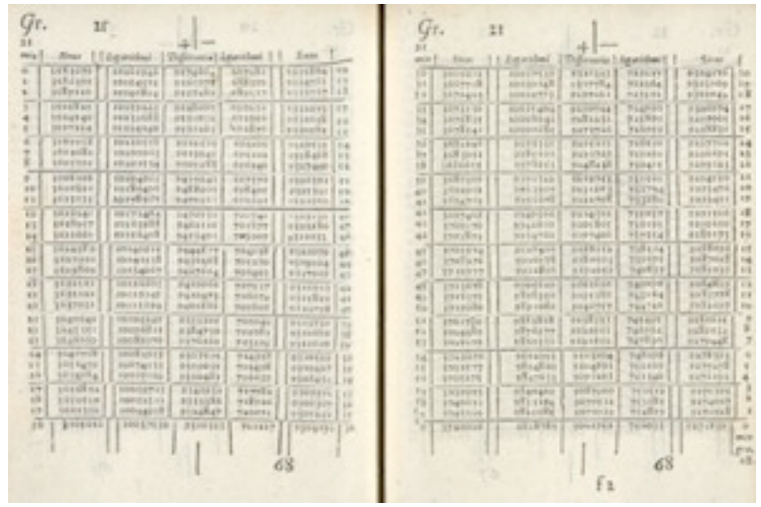
individual calculation

John Napier
1550-1617

Charles Babbage RS
1791-1871

John Napier
(a 'computer')

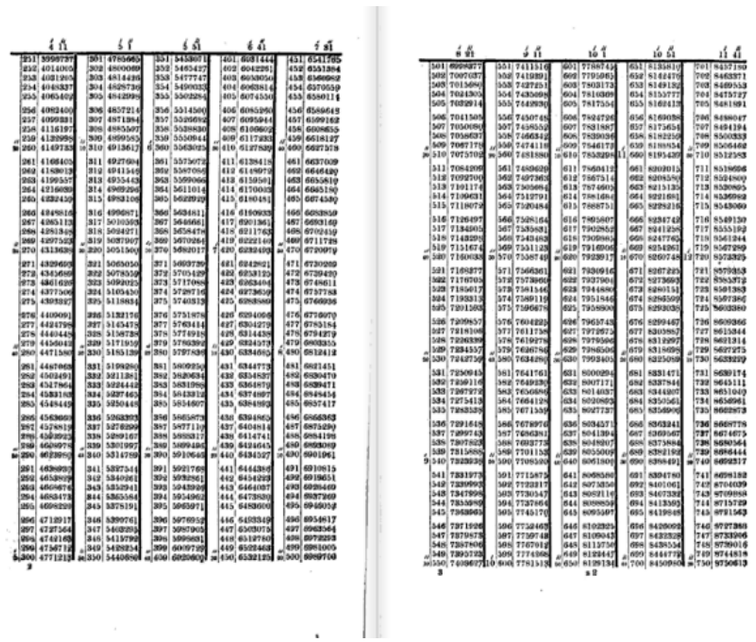
Mirifici Logarithmorum Canonis Descriptio,
1614

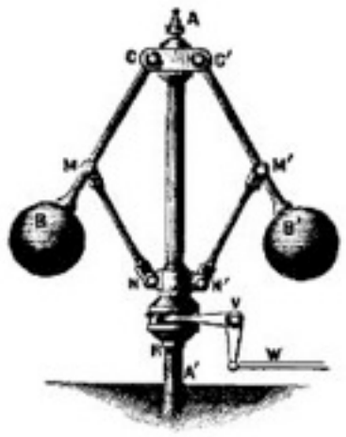


Charles Babbage

Table of Logarithms from 1 to 108000
1827

"I wish to God these calculations had been executed by steam" (1821)





on the economy of machinery and manufactures

chapters

1: Sources of the Advantages Arising from Machinery

2: Accumulating Power

3: Regulating Power

```
... that beautiful contrivance,
the steam governor ...
```

4: Increase and diminution of velocity

5: Extending the time of action of forces

```
... watches & clocks ..
automatons
```

6: Saving time in natural operations

7: Exerting Forces too great for human power; and executing operations too delicate for human touch

8: Registering Operations

9: Economy of the materials employed

10: Of the identity of the work when it is of the same kind, and its accuracy when of different kinds

11: Of copying

12: On the method of observing manufacturies

...

19: On the division of labor

20 On the mental division of labour

Adam Smith
1723-1890

Adam Ferguson
1723-1816

divisions and combinations

the division of labor

automata, computer, copying, registering

the "hands" --manual division of labor
pin-making

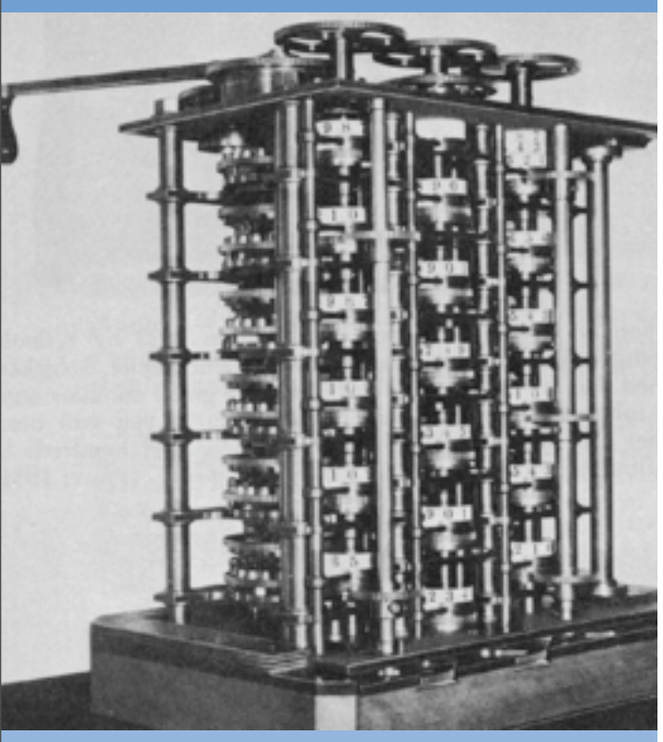
Adam Smith, *Wealth of Nations*, 1776

the "head" --mental division of labor

"And thinking itself, in this age of separations, may become a peculiar craft."

Adam Ferguson, *An Essay on the History of Civil Society*, 1767

difference engine

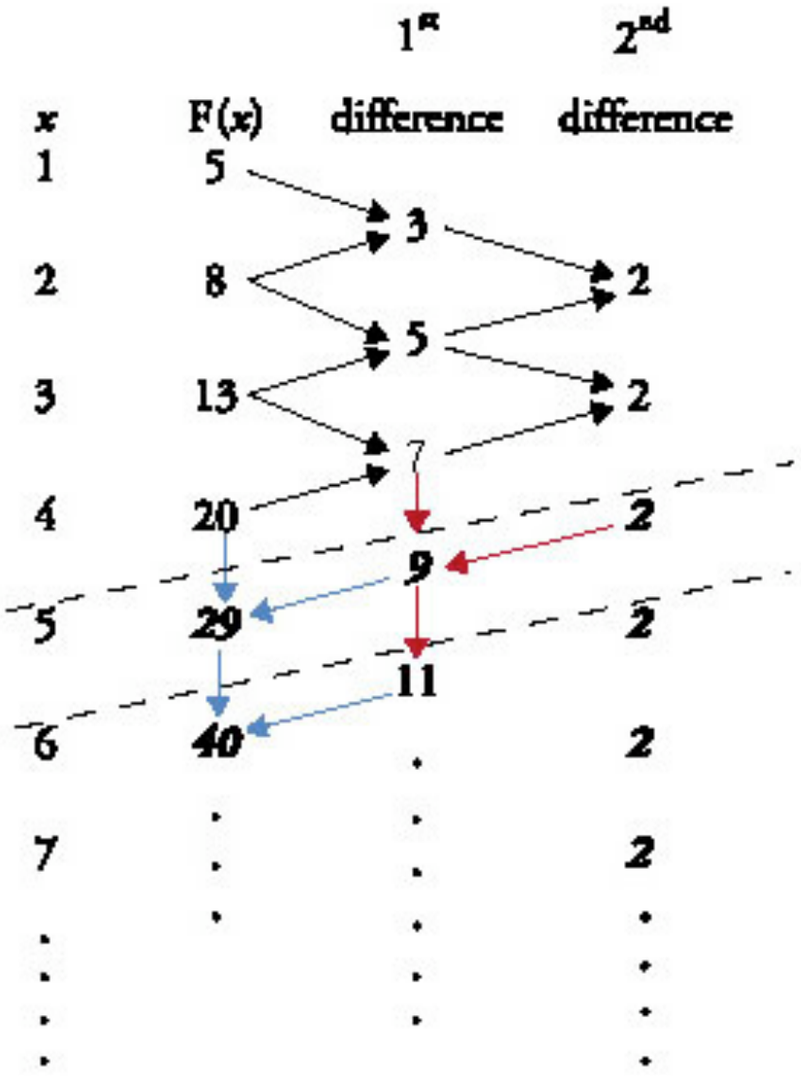


200 ON THE DIVISION OF MENTAL LABOUR.

TABLE.

Repetitions of Process.	Movements.	Clock A. — Hand set to I.	Clock B. — Hand set to III.	Clock C. — Hand set to II.
			First difference.	Second difference.
1	Pull A.	A. strikes 1	. . . . .	. . . .
	— B.	The hand is advanced (by B.) 3 divisions . .	B. strikes 3	. . . .
	— C.	. . . . .	The hand is advanced (by C.) 2 divisions . .	C. strikes 2
2	Pull A.	A. strikes 4	. . . . .	. . . .
	— B.	The hand is advanced (by B.) 5 divisions . .	B. strikes 5	. . . .
	— C.	. . . . .	The hand is advanced (by C.) 2 divisions . .	C. strikes 2
3	Pull A.	A. strikes 9	. . . . .	. . . .
	— B.	The hand is advanced (by B.) 7 divisions . .	B. strikes 7	. . . .
	— C.	. . . . .	The hand is advanced (by C.) 2 divisions . .	C. strikes 2
4	Pull A.	A. strikes 16	. . . . .	. . . .
	— B.	The hand is advanced (by B.) 9 divisions . .	B. strikes 9	. . . .
	— C.	.....	The hand is advanced (by C.) 2 divisions . .	C. strikes 2
5	Pull A.	A. strikes 25	. . . . .	. . . .
	— B.	The hand is advanced (by B.) 11 divisions .	B. strikes 11	. . . .
	— C.	. . . . .	The hand is advanced (by C.) 2 divisions . .	C. strikes 2
6	Pull A.	A. strikes 36	. . . . .	. . . .
	— B.	The hand is advanced (by B.) 13 divisions .	B. strikes 13	. . . .
	— C.	. . . . .	The hand is advanced (by C.) 2 divisions . .	C. strikes 2

$f(x) = x^2 + 4$



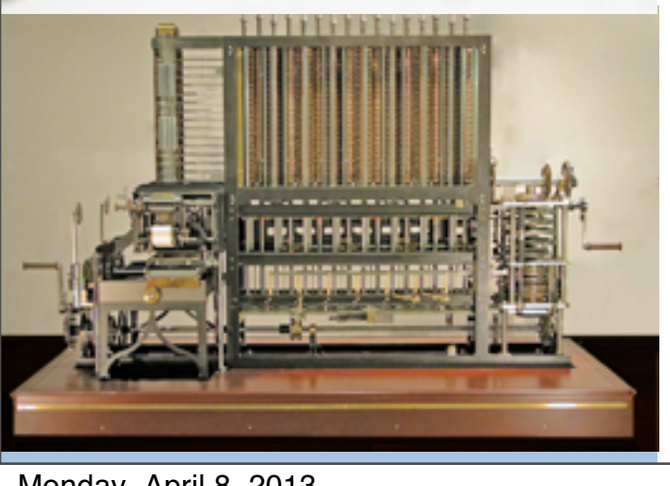
analytical engine

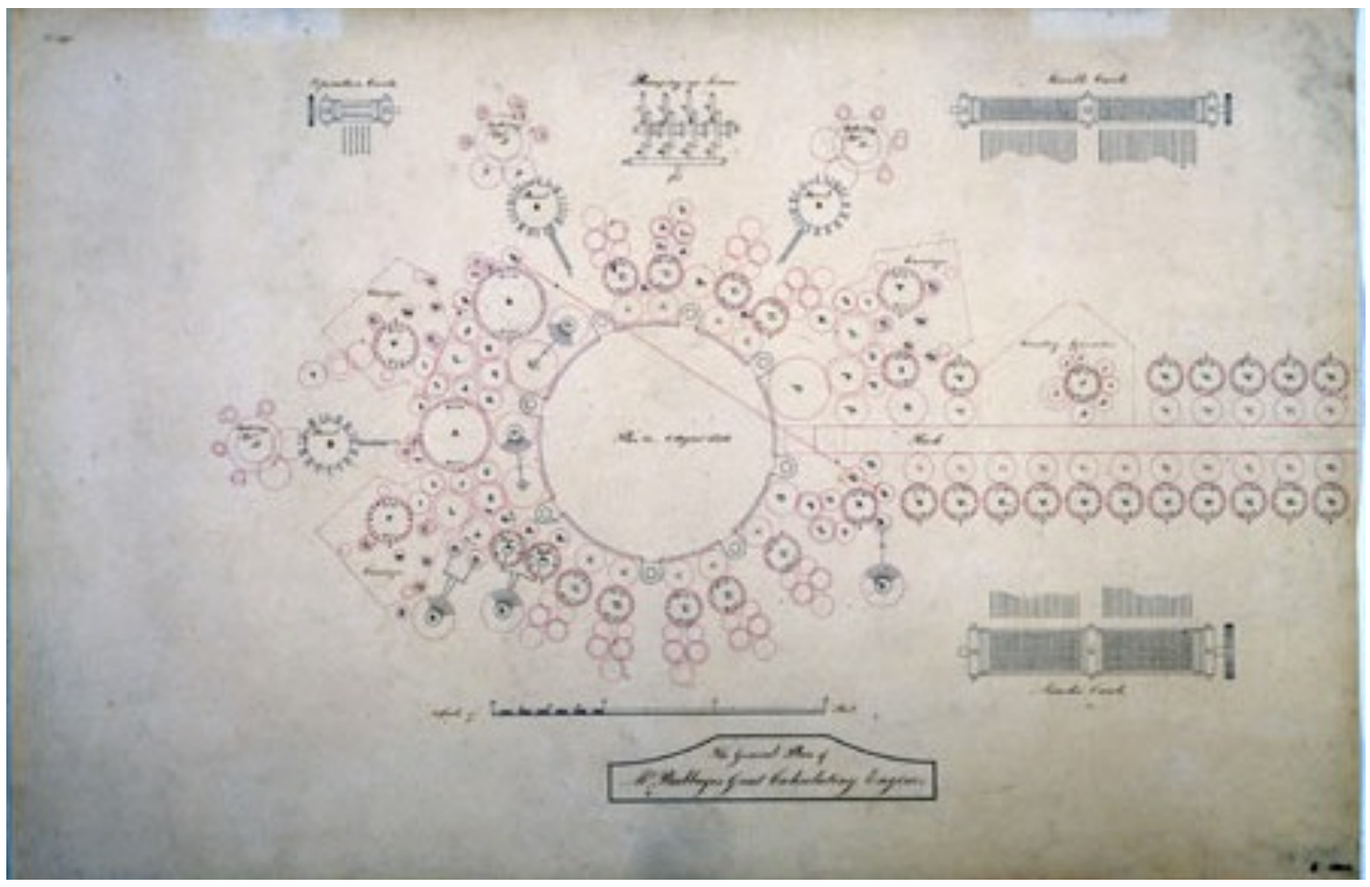
general purpose machine
programmable

storing

looping

branching





Ada Byron/Lovelace

Ada Lovelace
1815-1852

"a machine that not only would have foresight, but could act on that foresight"

"I want to put in something about Bernoulli's Number, in one of my notes, as an example of how an explicit function, may be worked out by the engine, without having been worked out by human head and hands first"

--Lovelace to Babbage, 1843

"Analytical Engine *weaves algebraical patterns* just as the Jacquard loom weaves flowers and leaves"

--Taylor's *Scientific Memoirs*, 1843

"the greatest ... "

[people tend to]

"first, overrate what we find to be … remarkable, and secondly, by a sort of natural reaction, to undervalue the true state of the case ... The Analytical Engine has no pretension whatever to originate anything"

--Ada Byron,

Taylor's *Scientific Memoirs*, 1843

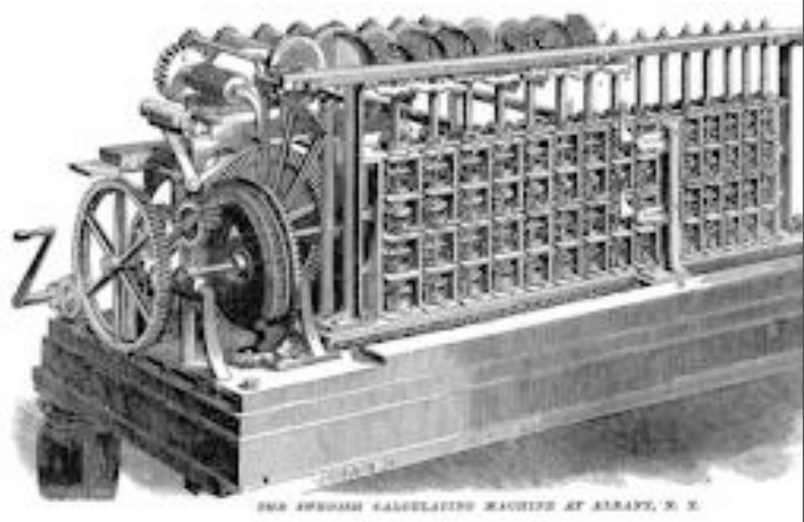
Georg Scheutz
1785-1873

Edvard Scheutz
1822-1881

difference engines

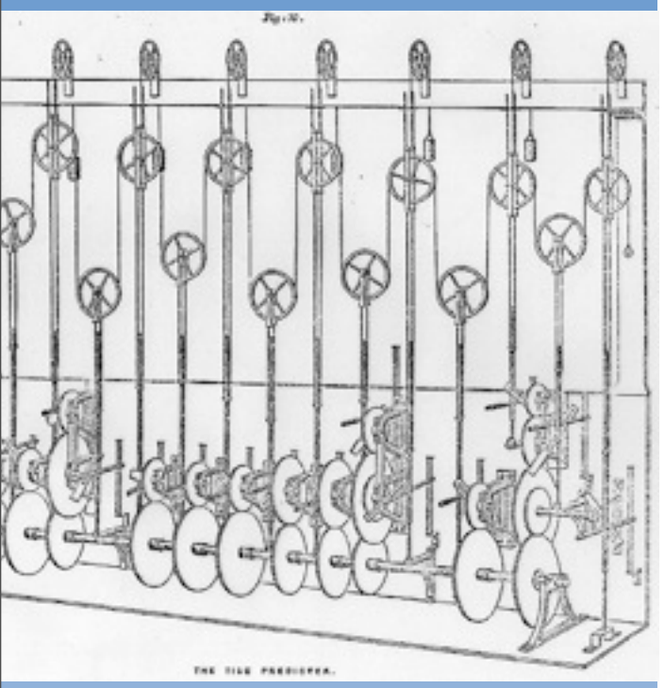
Georg & Edvard Scheutz

Scheutz Difference Engine, with printer c 1853



Dudley Observatory, Schenectady

British Government, actuarial calculations
"English Life Table" 1864



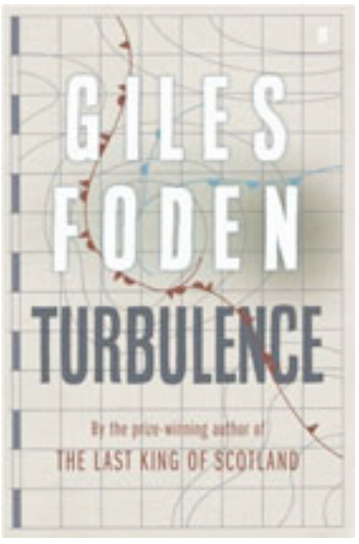
analog predictors

William Thomson, Lord Kelvin (1824-1907)

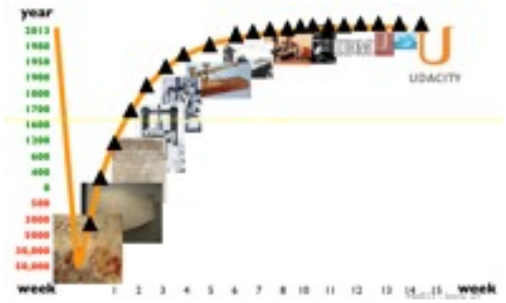
tide predictor, 1872

Lewis Fry Richardson (1881-1953)

Weather Predictions by Numerical Process,
1922 [1916]



overview



changing perceptions

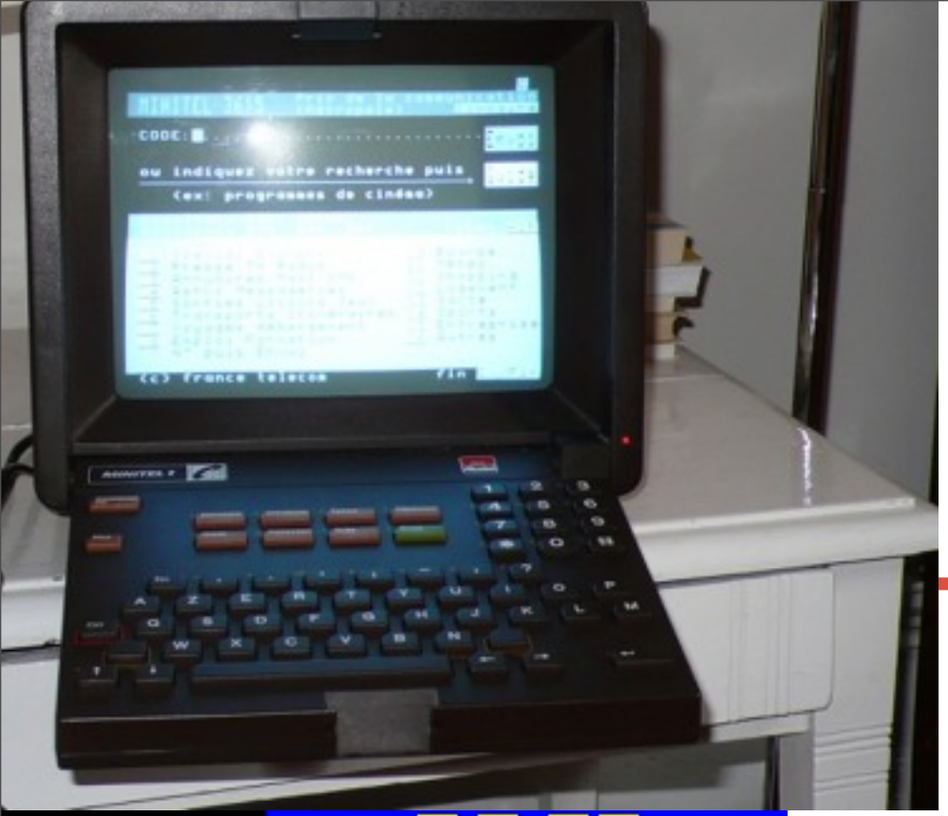
changing business

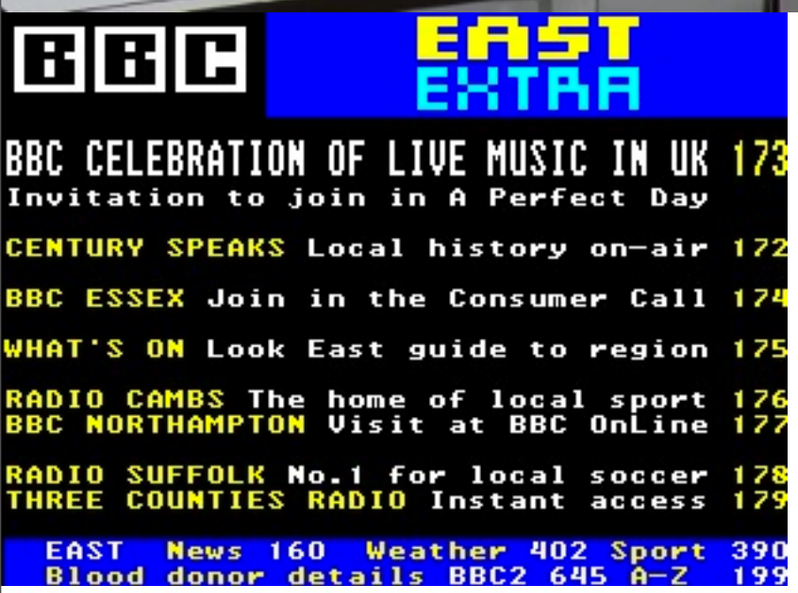
the demand side

past and future

inventions

computer





STUDY SAYS TECHNOLOGY COULD TRANSFORM SOCIETY

By ROBERT REINHOLD, Special to the New York Times
Published: June 14, 1982

WASHINGTON, June 13— A report commissioned by the National Science Foundation and made public today speculates that by the end of this century electronic information technology will have transformed American home, business, manufacturing, school, family and political life.

The report suggests that one-way and two-way home information systems, called teletext and videotex, will penetrate deeply into daily life, with an effect on society as profound as those of the automobile and commercial television earlier in this century.

It conjured a vision, at once appealing and threatening, of a style of life defined and controlled by videotex terminals throughout the house.

FACEBOOK
TWITTER
GOOGLE+
E-MAIL
SHARE
PRINT
REPRINTS

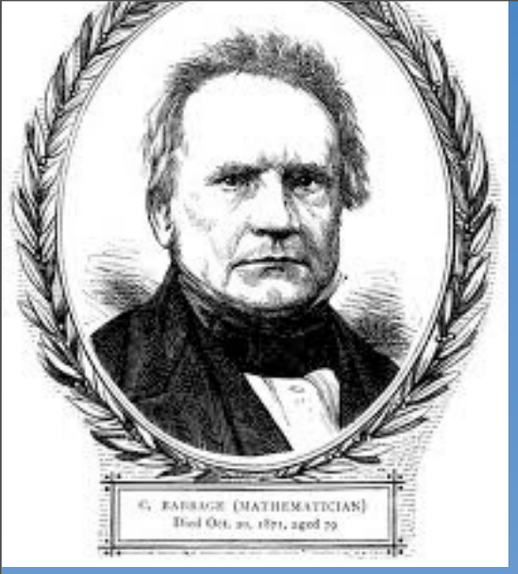
2012

end of an era

Minitel (1978-2012) CEEFAX (1974-2012)

"Reinhold, on the other hand, had a vision of teletext and videotext. I would argue that those things actually do exist. For instance, skype is videotexting. People use it to stay in contact with friends and family as well as with work and interviews. Moreover 'Individuals may be able to use videotext systems to create their own newspapers, design their own curricula, compile their own consumer guides.' We can do that now with computers in our own homes. The fact that people had thought about this concept 30 years ago shows how things can transform and progress through the years to mold with current society and develop in parallel fashion."

--Sarah Zou



concepts & abilities

Inventions	Technology	Applications	Media	Genres
clock	computer	calculating		
mill/store		recording		
logarithm		sorting		
loom		controlling		
governors		...		
...		**commun-icating**		
vacuum tube				
transistor				
chip				
disc				

"It is the concept of the ability to communicate quickly through information technology that was transformative, not the actual systems of videotext and teletext. In both cases, it is the ideas that the machines and systems represent that are transformative, not necessarily that specific device itself. "

--Eilan Zeng

ideas and imagination

"Their role of fine-tuning and making practical this art goes largely unnoticed though, despite these steps forward being necessary for a more complex fully general computer. Babbage himself epitomizes the difficulty in untangling the braid of people and ideas leading to a technological revolution. His Analytical Engine was only made possible by his reappropriation of Jacquard's loom technology, and once he had modeled the idea, he was so sure it would change the world forever, he was blind to the fact that the government at the time was as interested."

--Brian Freese

"The fact that neither the analytical engine nor videotex exists today, yet the imagined social consequences of their eventual widespread adoption rings an eerily familiar bell to us, says that it really does not matter what form the technology takes, because, going back to Williams, technology is driven by human intentions, and human intentions never change. There has not been “technology revolutions” in the past - not in the completely-societal-overhaul sense that it is usually meant, anyway - and it is unlikely that there will be one in the future, as long as humans are humans."

--Keien Ohta

ideology

Projecting an idea into the future is not very different from digging into the past and projecting it onto the present. Both Campbell-Kelly and Reinhold see information technology as more than just a physical presence. It has an ideological presence that stretches simultaneously into the past and future. Technology revolutions can take root in the vast space of ideas even if those ideas are never fully developed into tangible information technologies.

--Sammy Avila Munoz

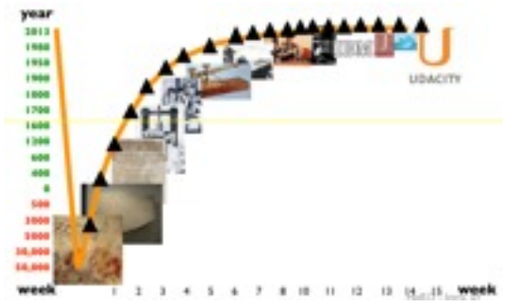
society's role

"[I]n this argument of technological determinism; we can agree that a successful technology *does* impact society, but as illustrated by the fact that these the videotext and teletext are now obsolete, it seems indisputable that multiple factors extraneous to the technology itself—social or timing factors, etc.—are necessary for its success and widespread adoption and effects."

--Ione Sterental

"The flaw in all of these predictions is that they rely on a certain stasis in technological and social goals and needs. Society, of course, is constantly evolving, and this change is reflected in the development of certain technology. Reinhold's "teletext" and "videotext" systems were never carried to fruition, but parallels can be seen in modern information distribution systems like computers or televisions."

overview



changing perceptions

changing business

the demand side

past & future

inventions

computer

on the demand side

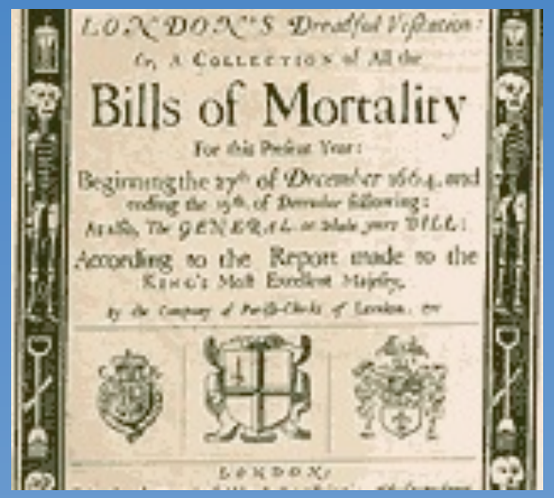
[just one]
"would suffice
the needs of the
whole world"

- Georg Scheutz

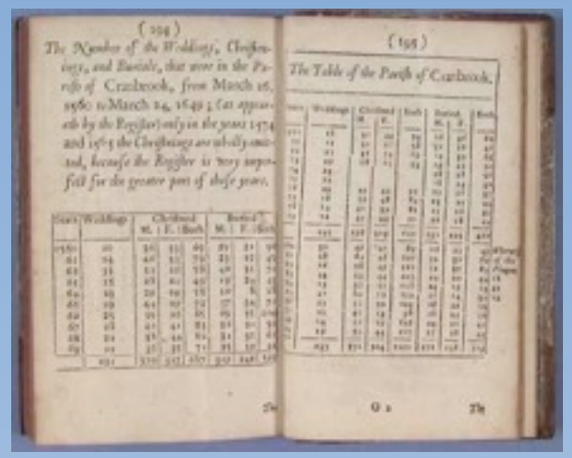
who might want these machines?

why?

what would they want?


LONDON'S Dreadful Visitation:
Or, A COLLECTION of All the
Bills of Mortality
For this Present Year:
Beginning the 27th of December 1664, and ending the 19th of December following:
Wherein, The GENERAL or Whole years BILL:
According to the Report made to the KING's Most Excellent Majesty,
by the Company of Parish-Clerks of London, &c
LONDON:


A generall Bill for this present year, ending the 19 of December 1665. according to the Report made to the KINGS most Excellent Majest.
By the Company of Parish Clerks of London, &c.
The Diseases and Casualties this year.
Abortive and Stillborne 617 Executed 21 Palsie 30
Aged 1545 Flox and Small Pox 655 Plague 68596
Ague and Feaver 5257 Found dead in Streets, fields, &c. 23 Planets 6
Appoplex and Suddenly 116 French Pox 86 Plurisie 19
Bedrid 12 Frighted 25 Poysoned 2
Blasted 5 Gout and Sciatica 27 Quinsie 35
Bleeding 16 Grief 46 Rickets 157
Bloody Flux, Scowring & Flux 185 Griping in the Guts 1288 Rising of the Lights 197
Burnt and Scalded 8 Hang'd & made away themselves 7 Rupture 34
Calenture 2 Headmould-shot & Mastiff 14 Scurvy 17
Cancer, Gangrene and Fistula 56 Jaundice 120 Slunges and Swine pox 2
Canker, and Thrush 111 Impostume 225 Stone, Ulcers, broken and bruised
Childbed 622 Kill'd by severall accidents 46 Limbs 53
Chrisomes and Infants 1258 Kings Evill 86 Spleen 14
Cold and Cough 62 Leprosie 2 Spotted Feaver and Purples 1929
Collick and Winde 134 Lethargy 14 Stopping of the Stomach 348
Consumption and Tisick 4808 Livergrown 21 Stone and Strangury 58
Convulsion and Mother 1036 Meagrom and Headach 12 Surfet 2353
Distracted 5 Measles 7 Teeth and Worms 2614
Dropsie and Tympany 1478 Murthered and Shot 9 Vomiting 51
Drowned 53 Overlaid & Starved 45 Worms 7
Males 5114 Males 48568 Of the Plague 68596
Christened Females 4853 Buried Females 48737
In all 9967 In all 97305
Increased in the Burials in the 130 Parishes and at the Pest-houses this year 79059
Increased of the Plague in the 130 Parishes and at the Pest-houses this year 68590


(154)
The Number of the Weddings, Christenings, and Burials, that were in the Parish of Cranbrook, from March 26. 1560. to March 24. 1649. (as appeareth by the Register) only in the years 1574 and 1583 the Christenings are wholly omitted, because the Register is very imperfect for the greater part of those years.
(155)
The Table of the Parish of Cranbrook.

government information

registration

bills of mortality

births & marriages

parish members

population

"And it came to pass in those days, that there went out a decree from Caesar Augustus that all the world should be taxed. ... And Joseph also went up from Galilee, out of the City of Nazareth, into Judaea, unto the City of David, which is called Bethlehem; (because he was of the house of David:) to be taxed with his espoused wife, being great with child."

government records

taxpayers

military eligible

aliens

racial groups

the poor

professions

midwives

prostitutes

cars

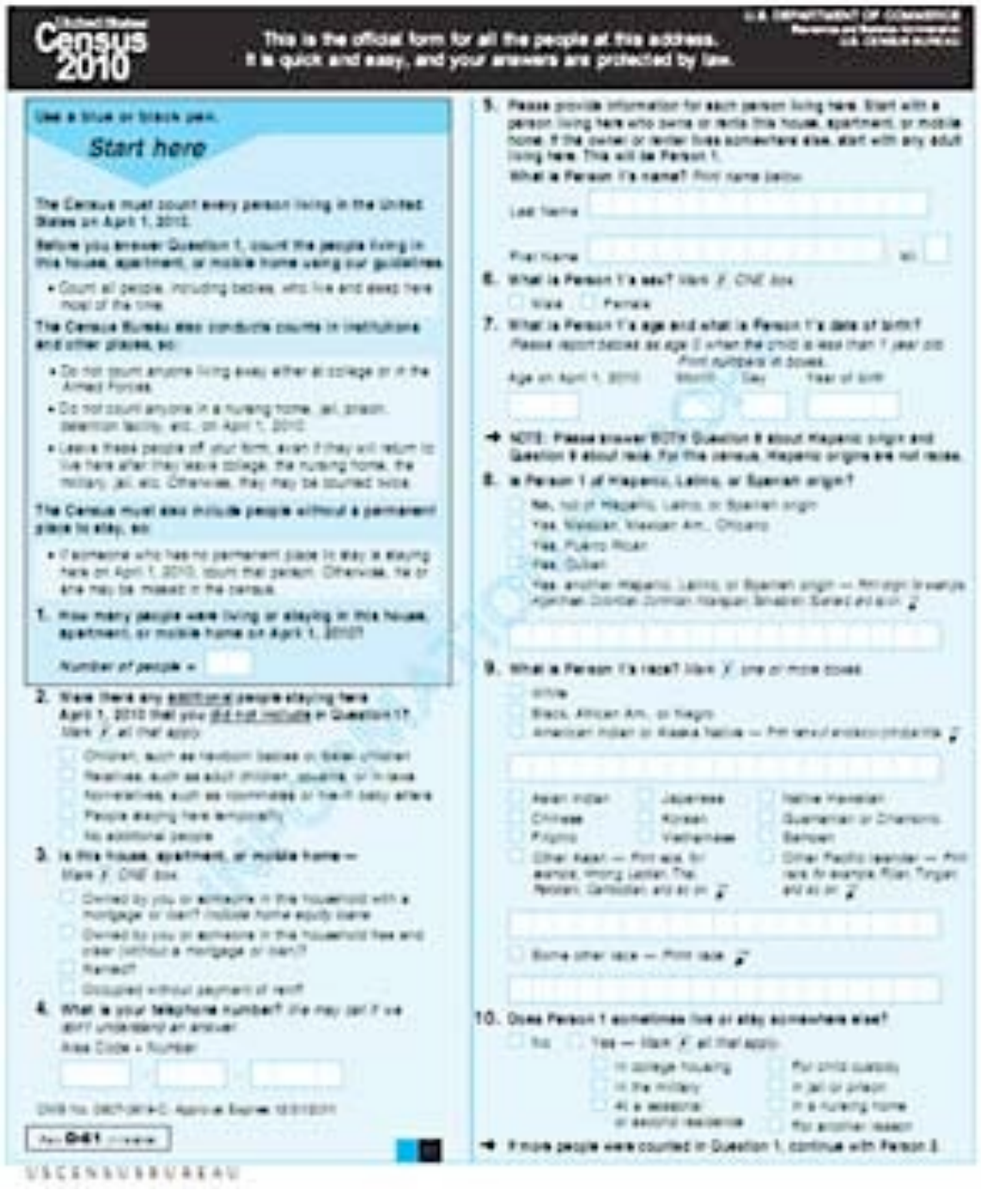
'National Insurance'

social security

counting

CENSUS OF 1850.

STATES AND TERRITORIES.	Whites.	Free colored.	Slaves.	Total.
Maine	581,813	1,356	.....	583,169
New Hampshire	317,456	520	.....	317,976
Massachusetts	985,450	9,064	.....	994,514
Rhode Island	143,875	3,670	.....	147,545
Connecticut	363,099	7,693	.....	370,792
Vermont	313,402	718	.....	314,120
New York	3,048,325	49,069	.....	3,097,394
New Jersey	465,509	23,810	226	489,555
Pennsylvania	2,258,160	53,626	.....	2,311,786
Delaware	71,169	18,073	2,290	91,532
Maryland	417,943	74,723	90,368	583,034
Virginia	894,800	54,333	473,528	1,421,661
North Carolina	553,028	27,463	288,548	869,039
South Carolina	274,563	8,960	384,984	668,507
Georgia	521,572	2,931	381,682	906,185
Kentucky	761,413	10,011	210,981	982,405
Tennessee	756,836	6,422	239,459	1,002,717
Ohio	1,955,050	25,279	.....	1,980,329
Indiana	977,154	11,262	.....	988,416
Mississippi	295,718	930	309,878	606,526
District of Columbia	37,941	10,059	3,687	51,687
Illinois	846,034	5,436	.....	851,470
Michigan	395,071	2,583	.....	397,654
Louisiana	255,491	17,462	244,809	517,762
Missouri	592,004	2,618	87,422	682,044
Alabama	426,514	2,265	342,844	771,623
Arkansas	162,189	608	47,100	209,897
Florida	47,203	932	39,310	87,445
Wisconsin	304,756	635	.....	305,391
Iowa	191,881	303	.....	192,214
Texas	154,034	397	58,161	212,592
California	91,635	962	.....	92,597
Minnesota Territory	6,038	39	.....	6,077
New Mexico Territory	61,525	22	.....	61,547
Oregon Territory	13,087	207	.....	13,294
Utah Territory	11,330	24	26	11,380
Aggregate	19,553,068	434,495	3,204,313	23,191,876



"Statistics should reveal the quantum of happiness in a population [and] the means of further improvement."

John Sinclair

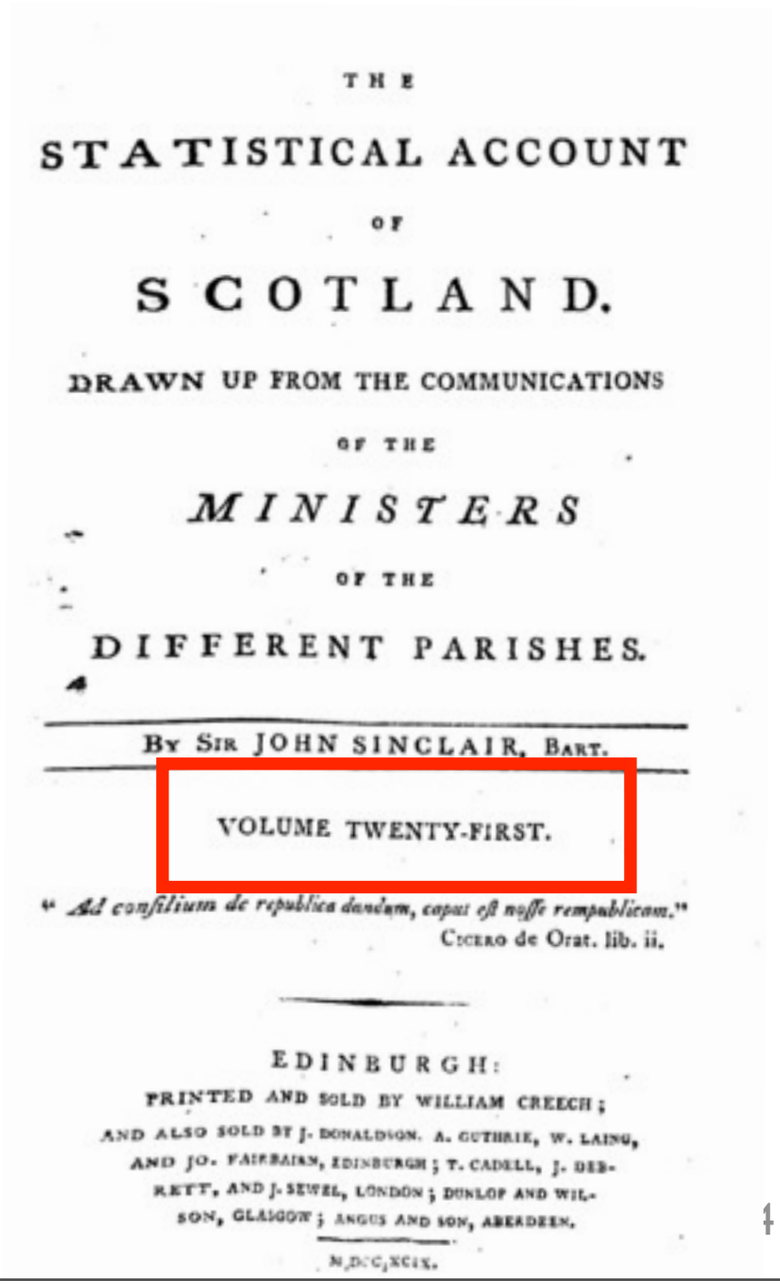
statistics and the state

Statistics: a word lately introduced to express a view or survey of any kingdom, country, or parish

Encyclopaedia Britannica, 1797

John Sinclair, 1754-1835

John Sinclair 1754-1835



THE

STATISTICAL ACCOUNT

OF

SCOTLAND.

DRAWN UP FROM THE COMMUNICATIONS

OF THE

MINISTERS

OF THE

DIFFERENT PARISHES.

BY SIR JOHN SINCLAIR, BART.

VOLUME TWENTY-FIRST.

"*Ad consilium de republica dandum, capax est nosse rempublicam.*"

CICERO de Orat. lib. ii.

EDINBURGH:

PRINTED AND SOLD BY WILLIAM CREECH;

AND ALSO SOLD BY J. DONALDSON, A. GUTHRIE, W. LAING, AND JO. FAIRBAIRN, EDINBURGH; T. CADELL, J. DEBRETT, AND J. SEWEL, LONDON; DUNLOP AND WILSON, GLASGOW; ANGUS AND SON, ABERDEEN.

M,DCC,XCIX.


STATUTES OF CALIFORNIA.

FIRST SESSION

OF THE

LEGISLATURE

BEGUN THE 15th DAY OF DEC. 1849, AND ENDED THE 22d DAY OF APRIL, 1850, AT THE CITY OF PUEBLO DE SAN JOSÉ.

WITH AN APPENDIX AND INDEX.

SAN JOSÉ.
J. WINCHESTER, STATE PRINTER.
1850.

making states

An act concerning...

1. public archive
2. state printer
3. pilots for SF
4. comptroller
5. treasurer
6. sec. of state
8. translator
11. AG
14. Supreme Court
30. incorporation of cities
36. commissioner of deeds
41. notaries
49. lawful fences
48. incorporation of towns
53. weights & measures
55. limited partners
59. recorder's office
64. officers of health
67. surveyors
69. librarian
72. register of wills
89. marks & brands
90. reporter
93. conveyances
95. common law
117. incorp. of colleges
123. assayer

Statutes of California, 1849-50

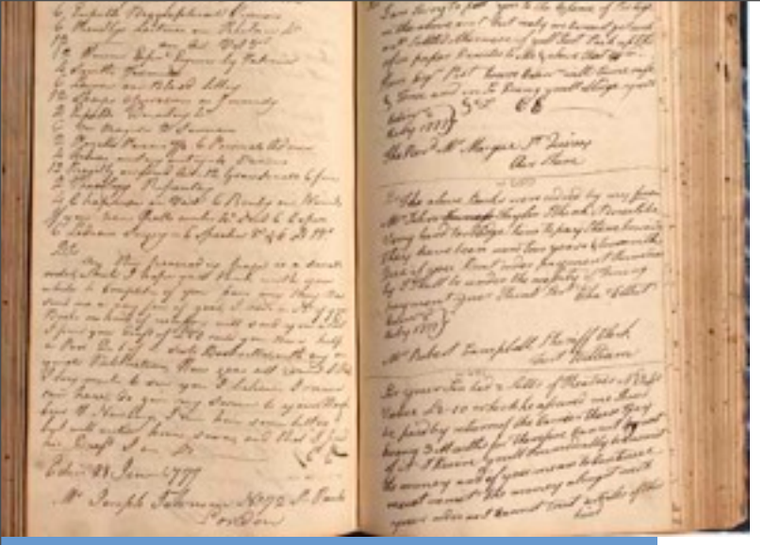
business interests

sorting operation: the clearing house

"In a large room in Lombard-street, about thirty clerks from the several London bankers take their stations ... at desks placed around the room. ... From time to time other clerks from every house enter the room, and passing along, drop into the box the checks due by that firm to the house from which this distributor is sent. ... The whole of these payments are made by a double system of balance, a very small amount of bank notes passing from hand to hand. --Babbage, *On the Economy*, 1835

"[1839] £954 million was cleared--$250 billion in today's money."

--Campbell-Kelly & Aspray



information technology

carbon paper
Wedgewood, 1806

typewriter
Remington, 1874

calculator
Burroughs, 1892

cash register
mechanical register, 1884

"No simple economic explanation
... America was gadget happy"
--Campbell-Kelly and Aspray, *Computer*, 1996

the office

clerks (UK)
1871: 262,100
1891: 534,622
1911: 918,186

female clerks
1891: 17,859
1911: 117,057

1921, women 46% of all clerks

typewriter girls
1931, 212,296 female typists
5,155 male typists

information technology

"In his office in San Francisco, seated before a massive desk of polished redwood, very ornate, Lyman Derrick sat dictating letters to his typewriter."

-- Frank Norris, *The Octopus*, 1902

"Una had not realized how many tools she had to know ... Desks, filing-cabinets, mimeographs, adding-machines, card indexes, desk calendars, telephone-extensions, adjustable desk-lights. Wire correspondence-baskets, erasers, carbon paper, type-brushes, dust-rags, waste-baskets. Pencils hard and soft, black and blue and red. Pens, pen-points, backing-sheets, note-books, paper-clips. Mucilage paste, stationery; the half-dozen sorts of envelopes and letter-heads ... the rhapsodic advertisements of filing-cabinets that are built like battle-ships; of carbon-paper that is magic-inked and satin-smooth."

--Sinclair Lewis, *The Job*, 1917

"[An] Enumeration shall be made within three Years after the first Meeting of the Congress of the United States, and within every subsequent Term of ten Years, in such Manner as they shall by Law direct."

back to government

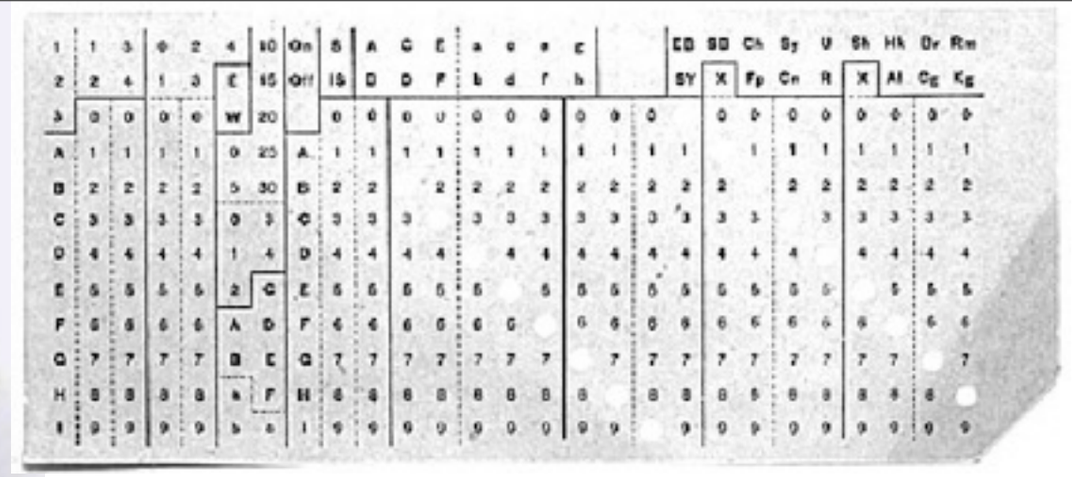
Year	Population	Gain		Clerks
1900	76,212,168	13,232,402	21.0	
1890	62,979,766	12,790,557	25.5	
1880	50,189,209	11,630,838	30.2	2000
1870	38,558,371	7,115,050	22.6	1495
1860	31,443,321	8,251,445	35.6	483
1850	23,191,876	6,128,523	35.9	
1840	17,063,353	4,202,651	32.7	28
1830	12,860,702	3,222,249	33.4	
1820	9,638,453	2,298,572	33.1	
1810	7,239,881	1,931,398	36.4	
1800	5,308,483	1,379,269	35.1	
1790	3,929,214	-	-	

Spain: 1787

US: 1790

UK: 1801

Herman Hollerith
1860-1929



tabulating

Hollerith

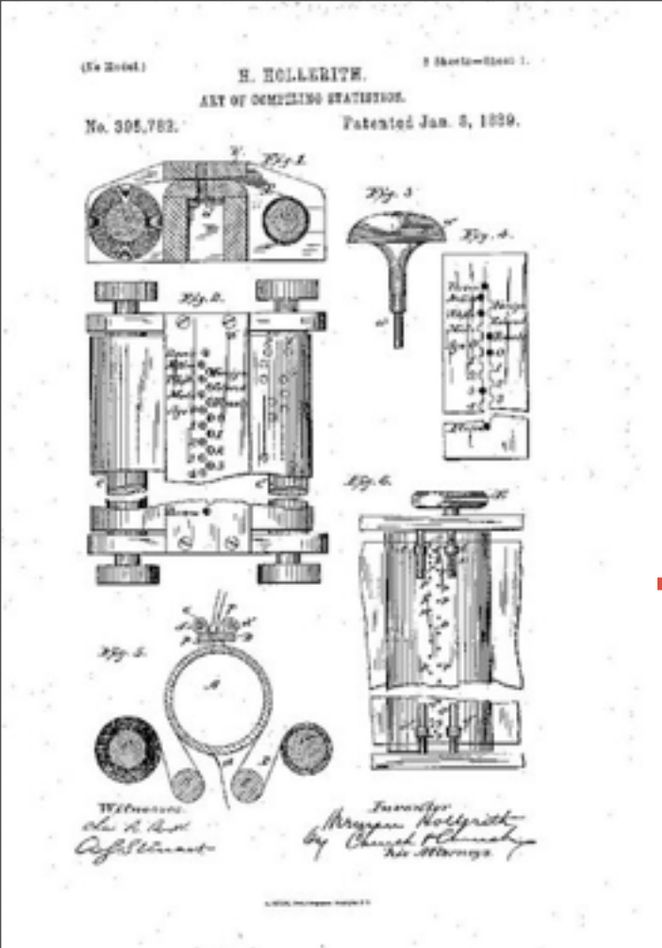
Electronic Tabulating Machine

1890 Census

"This apparatus works unerringly as the mills of the gods, but beats them hollow as to speed."

—*The Electrical Engineer*, 11 Nov 1891

the punch card



"Hollerith, then IBM, managed to maintain a near monopoly by periodically filing for new key patents or by acquiring those of unsuccessful rivals."

-- Mounier-Kuhn,2012

government & business

Hollerith

Tabulating Machine Company

CTR:
Computing-Tabulating-Recording Company

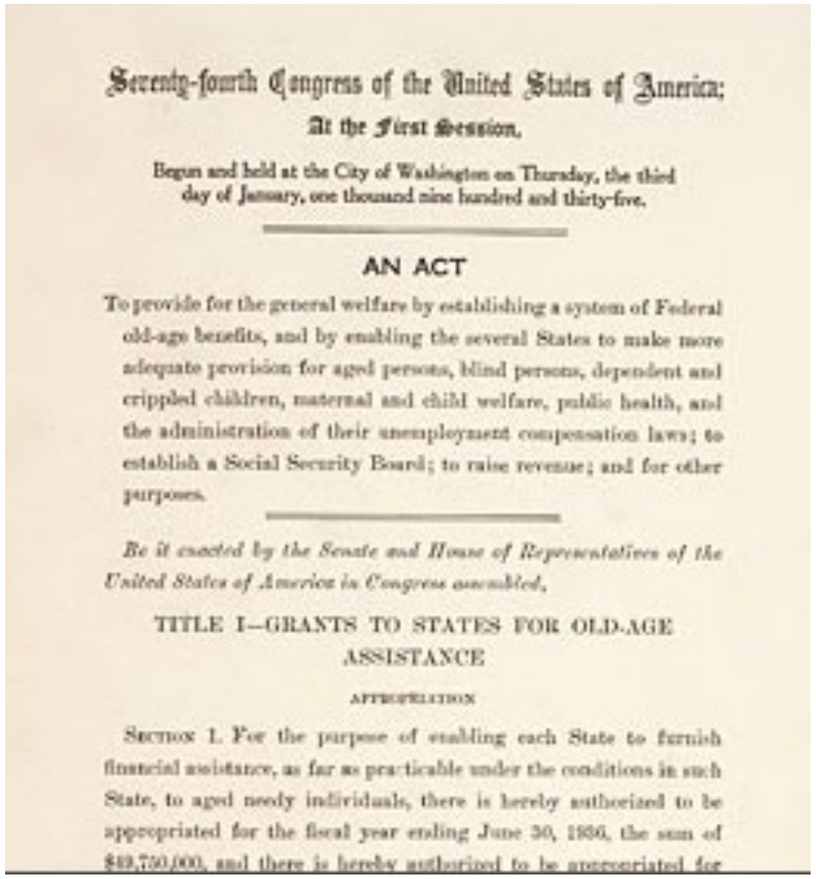
Thomas Watson

NCR to CTR to ...

the new deal

Social Security Act, 1935

"the world's largest bookkeeping job"



Seventy-fourth Congress of the United States of America;

At the First Session.

Begun and held at the City of Washington on Thursday, the third day of January, one thousand nine hundred and thirty-five.

AN ACT

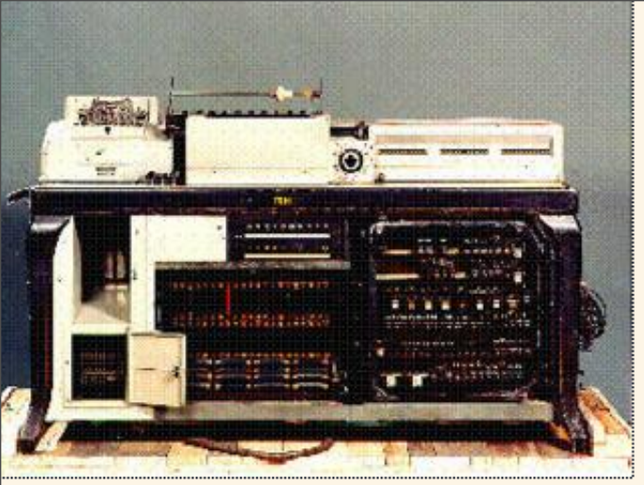
To provide for the general welfare by establishing a system of Federal old-age benefits, and by enabling the several States to make more adequate provision for aged persons, blind persons, dependent and crippled children, maternal and child welfare, public health, and the administration of their unemployment compensation laws; to establish a Social Security Board; to raise revenue; and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

TITLE I—GRANTS TO STATES FOR OLD-AGE ASSISTANCE

APPROPRIATION

SECTION 1. For the purpose of enabling each State to furnish financial assistance, as far as practicable under the conditions in such State, to aged needy individuals, there is hereby authorized to be appropriated for the fiscal year ending June 30, 1936, the sum of $49,750,000, and there is hereby authorized to be appropriated for



Hollerith-Maschine Dehomag D11, die 1933 in Deutschland

controlling numbers

controlling people

"the Nazi census" --Aly & Roth, 2004

IBM D11

Census, 1933, 1939

Labor Book, 1935

Health Pedigree book, 1936

Registry of the Populace, 1939

Blood (high, average, acceptable, inferior), 1940

Personal Identification Number, 1944

still registering

INDIA'S WAY

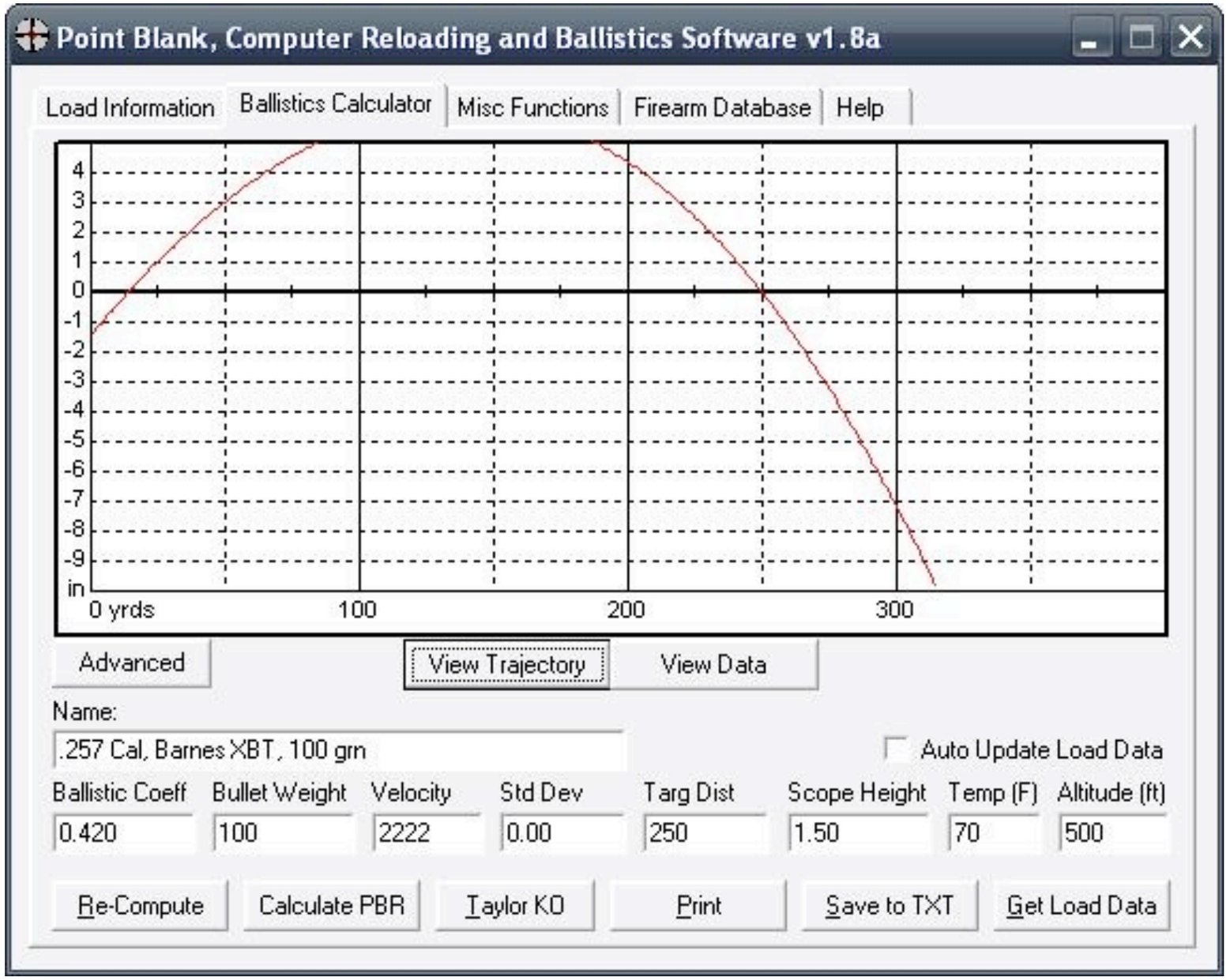
Scanning 2.4 Billion Eyes, India Tries to Connect Poor to Growth

Ruth Fremson/The New York Times

A migrant farm worker peers into an iris scanner in New Delhi in the first effort to officially record each Indian's identity as an individual.

By LYDIA POLGREEN

military takeover



military processing

ballistics "firing tables"

Vannevar Bush, 1935,

Differential Analyzer

analytical work

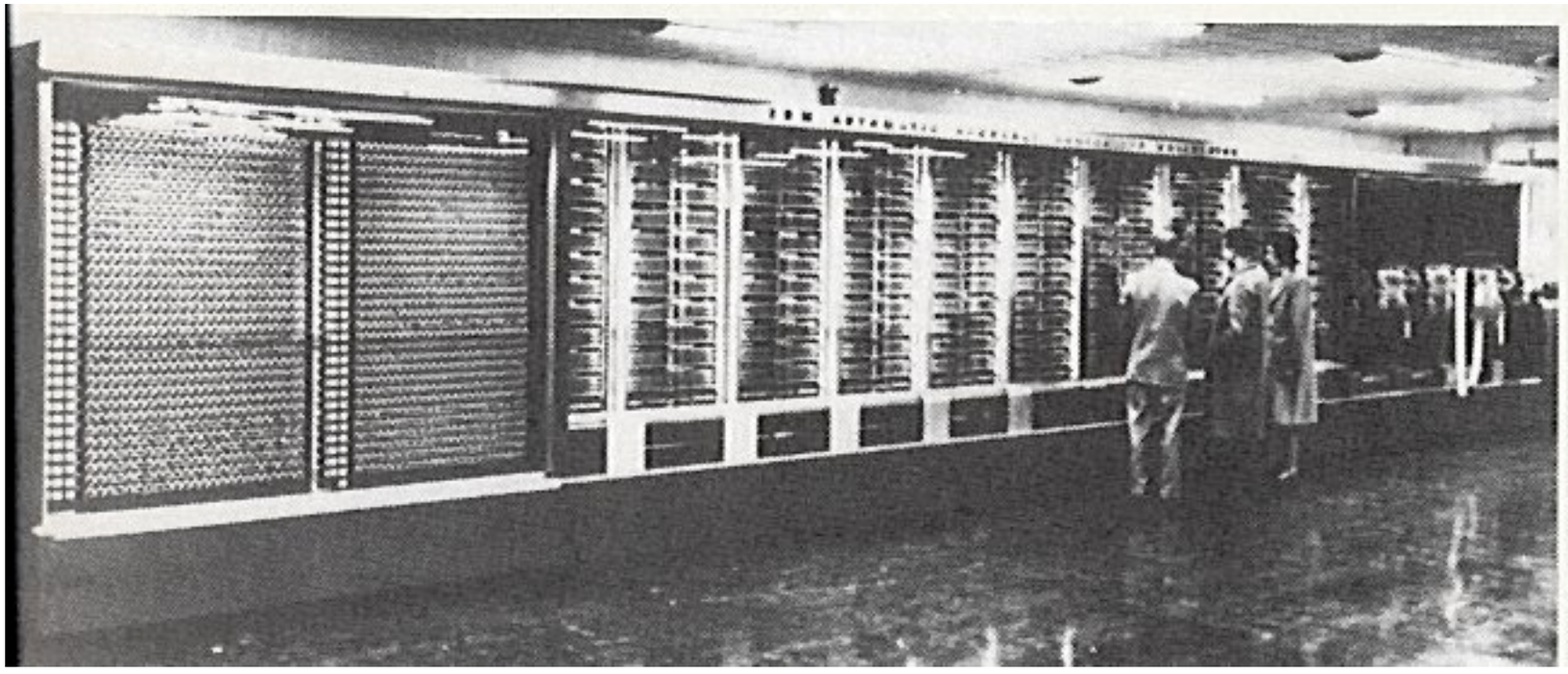
(Babbage)

Bush

Shannon, "A Symbolic Analysis of Relay and Switching Circuits," 1937

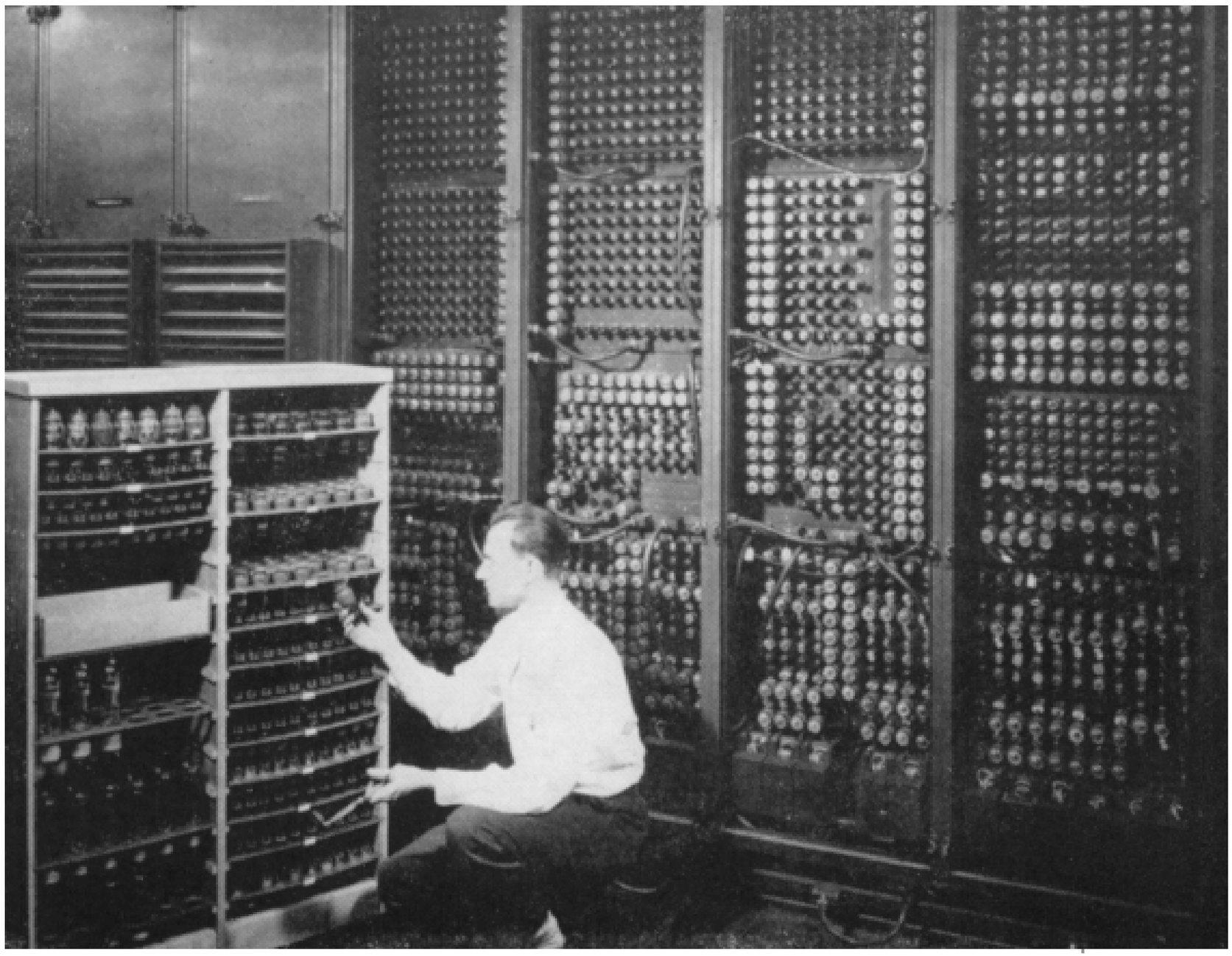
Harvard mark I

aka **IBM Automatic Sequence Controlled Calculator**



John von Neumann
1903-1957

military processing

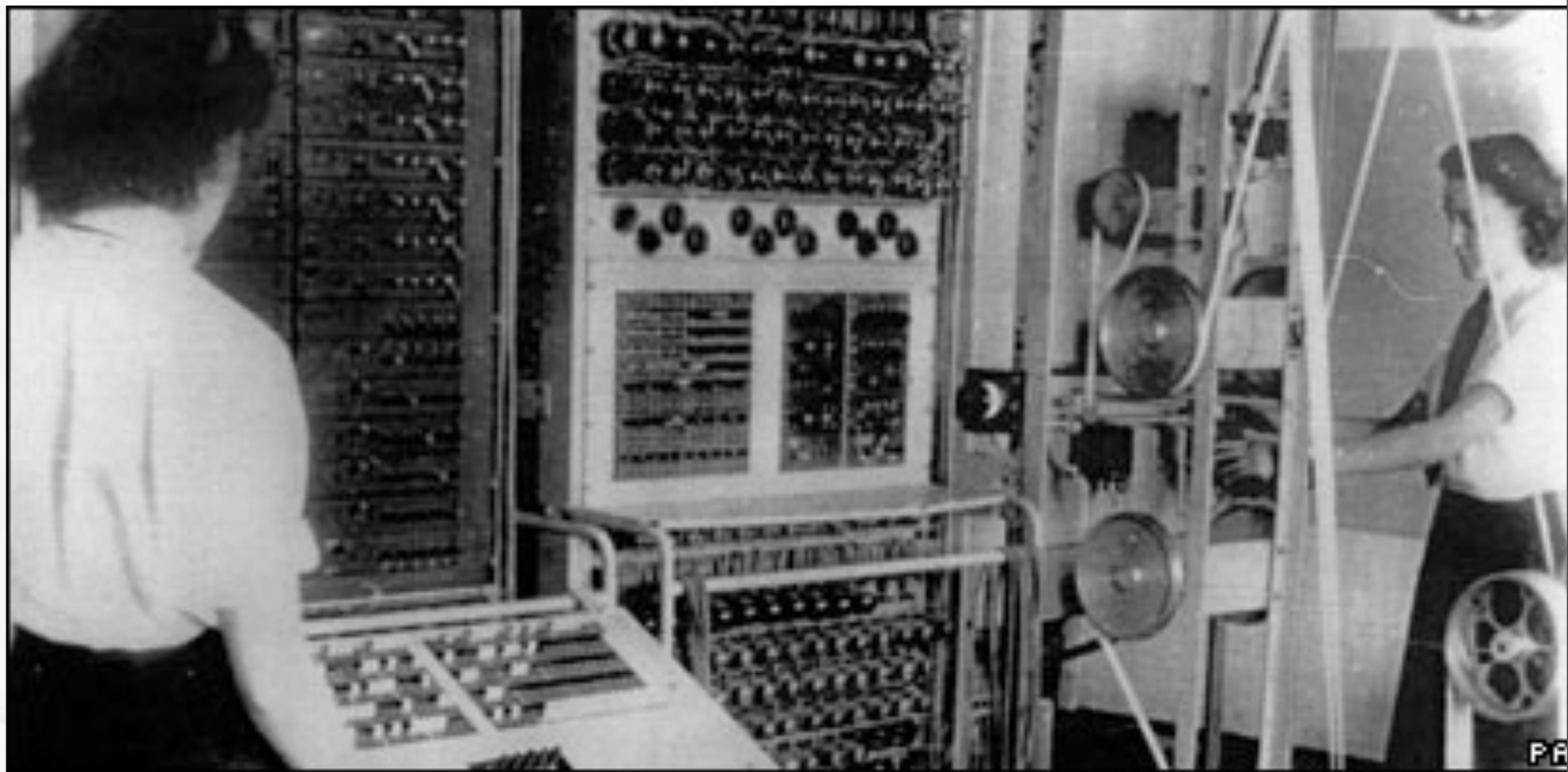


Alan Turing
1912-1954

decoding

1943, Colossus

Bletchley Park



back to Thamus

"I went to see Professor Douglas Hartree, who had built the first differential analyzers in England and had more experience in using these very specialized computers than anyone else. He told me that, in his opinion, all the calculations that would ever be needed in this country could be done on the three digital computers which were then being built—one in Cambridge, one in Teddington, and one in Manchester. No one else, he said, would ever need machines of their own, or would be able to afford to buy them."

--Lord Bowden, *American Scientist* 58 (1970) pp. 43—53

[just one] "would suffice the needs of the whole world" - Georg Scheutz

back to Thamus

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--Lord Bowden, *American Scientist* 58 (1970) pp. 43—53

THE MECHANICAL BRAIN

ANSWER FOUND TO 300 YEAR-OLD SUM

From Our Special Correspondent

Experiments which have been in progress in this country and the United States since the end of the war to produce an efficient mechanical "brain" have been successfully completed at Manchester University, where a workable "brain" has been evolved. Not only is it working satisfactorily, but for the first time a machine has been brought to the point at which it can work out problems which it is practically impossible to execute on paper.

The Manchester "mechanical mind" was built by Professor F. C. Williams, of the Department of Electro-Technics, and is now in the hands of two university mathematicians, Professor M. H. A. Newman and Mr. A. W. Turing.

It has just completed, in a matter of weeks, a problem, the nature of which is not disclosed, which was started in the seventeenth century and is only just being completed by human calculation.

Its appearance is somewhat unprepossessing. It is composed of racks of electrical apparatus consisting of a mass of untidy wires, valves, chassis, and display tubes. When in action, the cathode ray becomes a pattern of dots which shows what information is in the machine. There is a close analogy between its structure and that of the human brain. It differs from other mechanical brains in its method of storing information. The electronic method ensures that information is more readily accessible.

CALCULUS TO SONNET

Mr. Turing said yesterday: "This is only a foretaste of what is to come, and only the shadow of what is going to be. We have to have some experience with the machine before we really know its capabilities. It may take years before we settle down to the new possibilities, but I do not see why it should not enter any one of the fields normally covered by the human intellect, and eventually compete on equal terms.

"I do not think you can even draw the line about sonnets, though the comparison is perhaps a little bit unfair because a sonnet written by a machine will be better appreciated by another machine."

Mr. Turing added that the university was really interested in the investigation of the possibilities of machines for their own sake. Their research would be directed to finding the degree of intellectual activity of which a machine was capable, and to what extent it could think for itself.

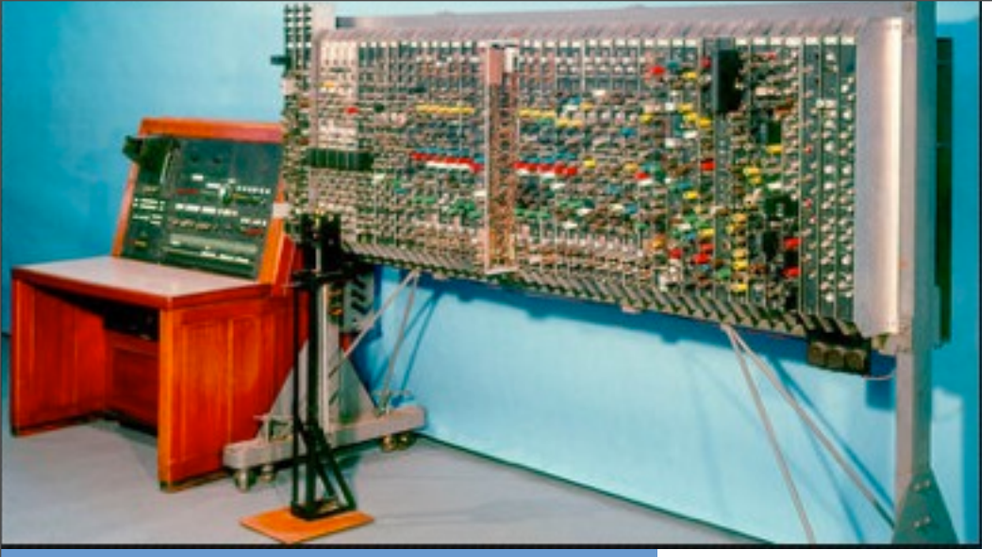
News of the experiments was disclosed by Professor Jefferson in the Lister oration reported in *The Times* yesterday.

Times, June 11, 1949

only a foretaste

"In reports to the US government, and in funding requests to the military (to calculate the effects of thermonuclear explosions), von Neumann and his colleagues expressed the view that 'at most six or so machines should suffice for the whole country.' Turing, in an interview with the *Times* in 1949, declared: 'This is only a foretaste of what is to come, and only the shadow of what is going to be … I do not see why it should not enter any one of the fields normally covered by the human intellect and eventually compete on equal terms.'"

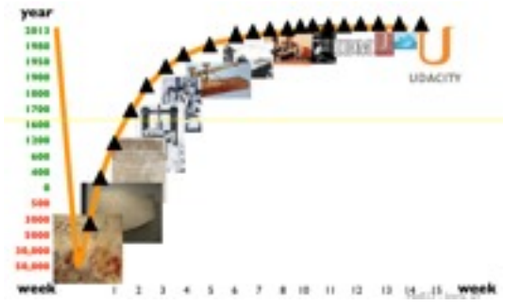
Philip Welch, *London Review of Books*, 2012



Manchester's mechanical brain

THE MECHANICAL BRAIN.—The apparatus which has been evolved in the electrical engineering laboratories of Manchester University to work out problems which are almost impossible to execute on paper. The section on the left contains the control circuit, in the middle rack of which is a cathode ray tube screen with (below) the control desk. The racks on the right-centre of the picture with the box-like containers provide the memory section of the machine. Nearer the camera are racks containing the calculating circuits. The machine is "fed" at the control desk and the answer is read on the cathode ray tube, which is the only visible means of showing that the brain is at work.

overview



changing perceptions

changing business

the demand side

past & future

inventions

computer

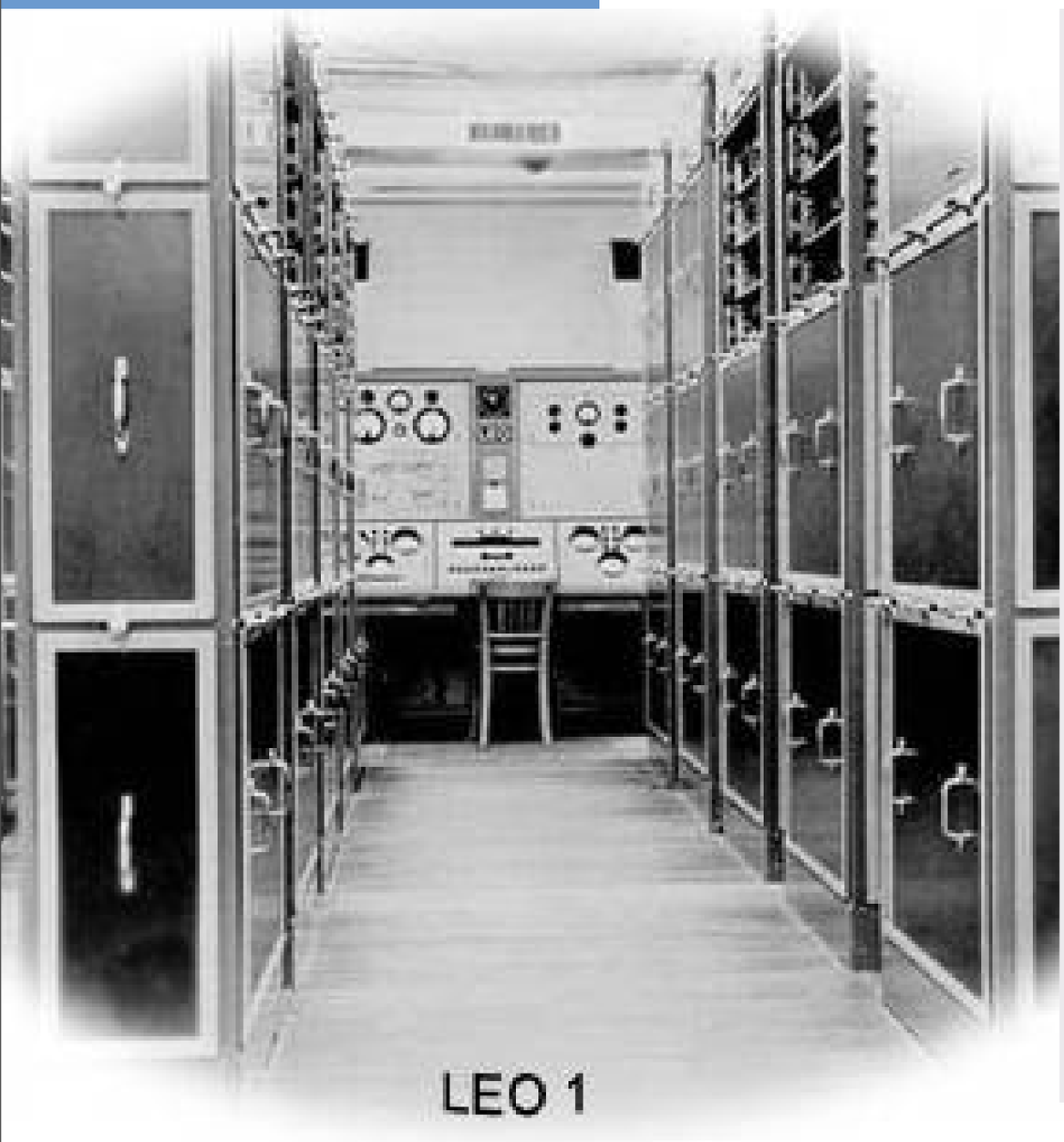
back in business vertical integration

John Simmons
Lyons & Cambridge (1947)
ENIAC, EDVAC, UNIVAC
EDSAC

1954
LEO (Lyons electronic office)
CLEO (Clear language for expressing orders)

from payroll to baking

back in business vertical integration



How a chain of tea shops kickstarted the computer age

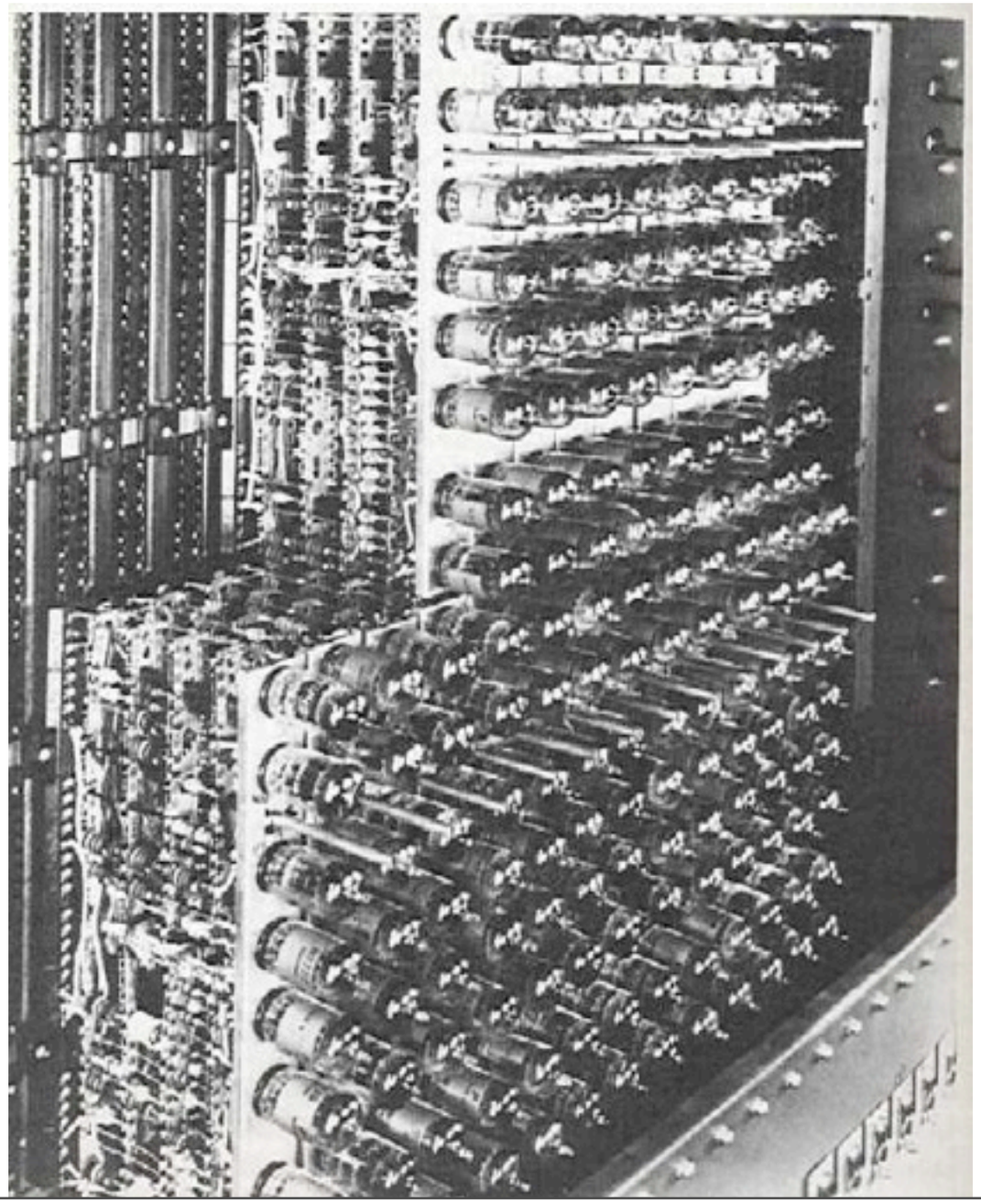
In November 1951 a British company switched on the world's first business computer

Image 1 of 3
LEO at Lyons HQ in Hammersmith

By Christopher Williams, Technology Correspondent
7:00AM GMT 10 Nov 2011

breaking down

Cathode-ray tube memory, from the IBM 701 Defense Calculator, 1952



breaking things down

1947 transistor

Bell Labs

John Bardeen, William Brattain, William Shockley

1958 integrated circuit

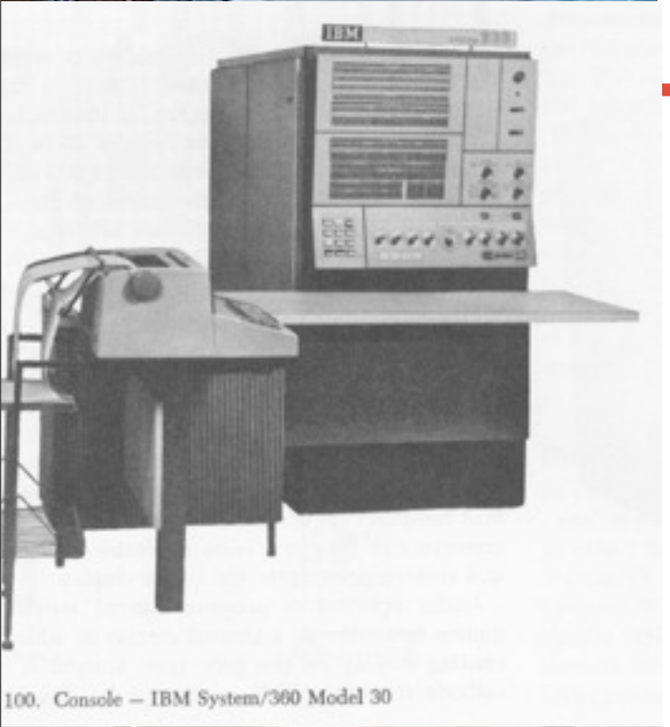
Texas Instruments

Jack Kilby

Shockley

Fairchild

Intel



100. Console – IBM System/360 Model 30

corporate computing

1960 DEC PDP-1

"programmable data processor"

1964 IBM 360

1969 Xerox PARC

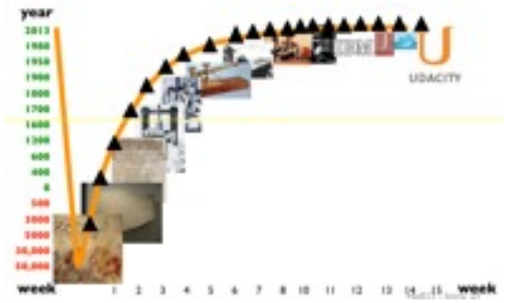
"the architecture of information"

(**1946** SRI)

vertical disintegration 1970-1990

Software	IBM	DEC	3d party	3d party	3d party
OS	IBM	DEC	Apple	AT&T-Unix	Microsoft
CPU	IBM	DEC	Apple	Sun	Intel & co
Hardware	IBM	DEC	Apple	Sun	[IBM]/OEM

overview



changing perceptions

changing business

the demand side

past & future

inventions

computer

culture clash

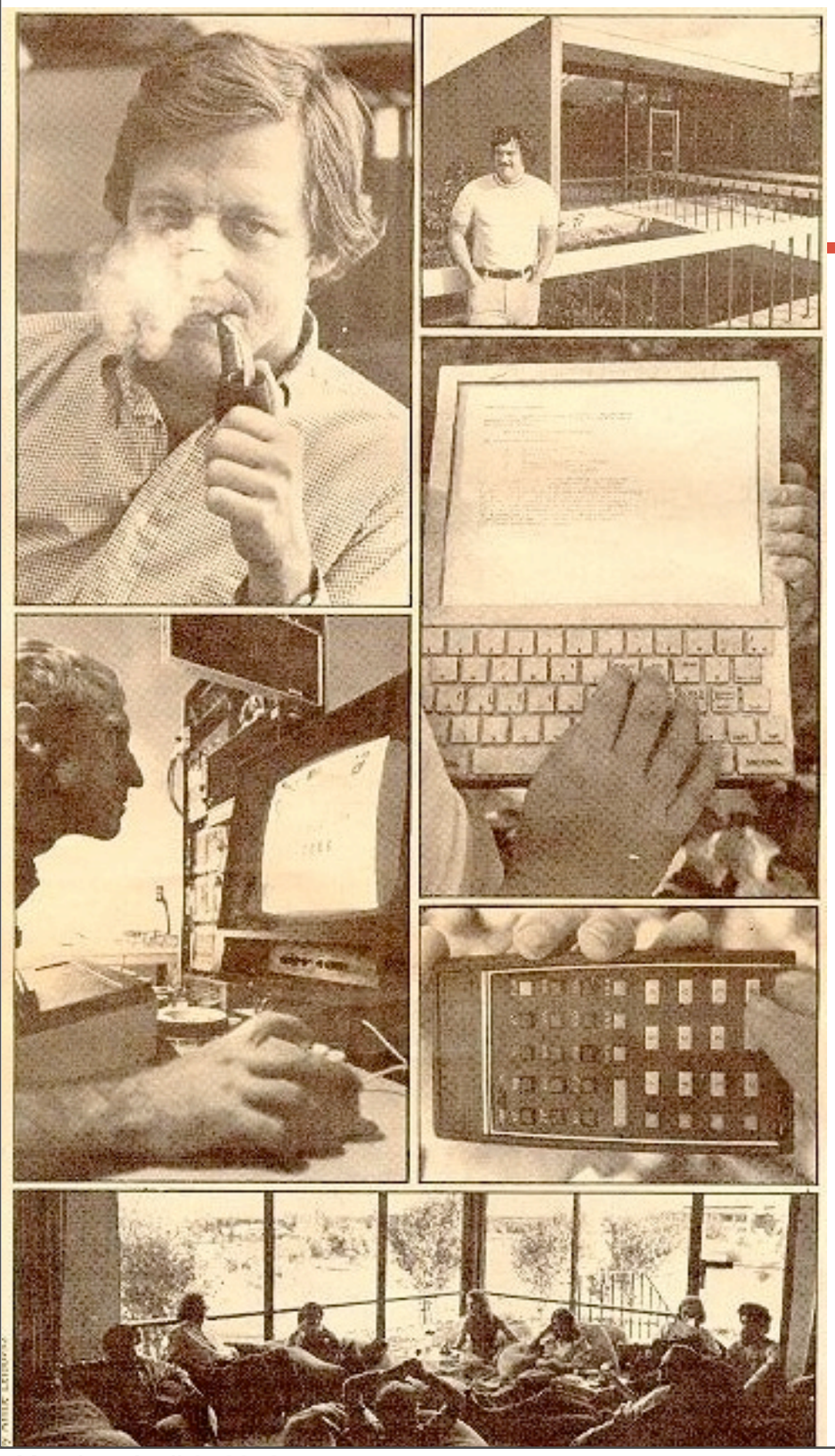
home brew, fone freaks

1975 Altair

1976 Apple I

1983 Lisa

1984 Macintosh



fast forward

Stewart Brand, "Fanatic Life and Symbolic Death Among the Computer Bums"

--*Rolling Stone*, 7 December, 1972

a libertarian vision

Brand, Barlow, Dyson, Gilder, Kelly, Rosetto,

"the internet ... an exciting kind of metaphor for spontaneous order" -- Gilder

--Fred Turner, *From Cyberculture to Counterculture*, 2006

killer apps

Charles Simonyi
Xerox PARC

Bravo, 1974

Dan Briklin &
Bob Frankston
HBS

Visicalc, 1978

Lotus 1-2-3, 1983

Excel (for Mac), 1984

Ken Thompson
Dennis Ritchie
Bell Labs

unix

Thompson, Ritchie, & AT&T

1965: AT&T, MIT& GE work on multics

1969: multics to unix

"What we wanted to preserve was not just a good environment in which to do programming, but a system around which a fellowship could form. We knew from experience that the essence of communal computing, as supplied by remote-access, time-shared machines, is not just to type programs into a terminal instead of a keypunch, but to encourage close communication."

--Ritche, "Evolution of the Unix Time-Sharing System"

unix at ucb

Bill Joy
UCB

1973: Thompson at Berkeley

Bill Joy develops em editor

1977: 1BSD released

1979: 3BSD (for Vax)

1981: 4.1BSD

1983: 4.2 BSD (with tcp/ip stack)

1-800-ITS-UNIX

SO ...

1991: Networking release 2; 386 BSD

1992: AT&T sues UCB

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY

UNIX SYSTEM LABORATORIES, INC.

Plaintiff,

vs.

BERKELEY SOFTWARE DESIGN, INC., and certain named individuals in their collective capacity as The Regents of the University of California,

Defendants.

Civ. No. 92-1667
O P I N I O N

settlement

1994 settlement: USL, UCB, Novell

SETTLEMENT AGREEMENT

This Settlement Agreement is entered into between UNIX System Laboratories, Inc. ("USL"), a Delaware corporation, and The Regents of the University of California (the "University"), a California corporation.

Recitals

1. USL contends it is the owner of the intellectual property rights in portions of certain computer operating system software (the "UNIX System").

2. USL and USL's predecessor in interest, the American Telephone and Telegraph Co. ("AT&T"), have licensed the University to use certain versions of UNIX® system software,

Richard Stallman
MIT

Linus Torvalds
Helsinki

elsewhere ...

MIT 1983-GNU

Finland 1991

```
From: torvalds@klaava.Helsinki.FI (Linus Benedict Torvalds)
Newsgroups: comp.os.minix
Subject: What would you like to see most in minix?
Summary: small poll for my new operating system
Message-ID:
Date: 25 Aug 91 20:57:08 GMT
Organization: University of Helsinki


Hello everybody out there using minix -

I'm doing a (free) operating system (just a hobby, won't be big and
professional like gnu) for 386(486) AT clones.  This has been brewing
since april, and is starting to get ready.  I'd like any feedback on
things people like/dislike in minix, as my OS resembles it somewhat
(same physical layout of the file-system (due to practical reasons)
among other things).

I've currently ported bash(1.08) and gcc(1.40), and things seem to work.
This implies that I'll get something practical within a few months, and
I'd like to know what features most people would want.  Any suggestions
are welcome, but I won't promise I'll implement them :-)

                Linus (torvalds@kruuna.helsinki.fi)

PS.  Yes - it's free of any minix code, and it has a multi-threaded fs.
It is NOT protable (uses 386 task switching etc), and it probably never
will support anything other than AT-harddisks, as that's all I have :-(.
```

going open?

101 Ways to Save Apple

By James Daly

An assessment of what can be done to fix a once

Dear Apple,

In the movie *Independence Day*, a PowerBook saves the ea
you look a little beleaguered these days: a confusing produ

But who wants to live in a world without you? Not us. So we
salvation. We chose not to resort to time travel or regurgit
your price/performance in 1993).

We don't believe Apple is rotten to the core. Chrysler nearly
to fix your once-great company using the material at hand.

Edited by James Daly

1. Admit it. You're out of the hardware game. Outsource your hardware production, or s
manufacturing boxes.

2. License the Apple name/technology to appliance manufacturers and build GUIs fo
them all use the same communications protocol. Result: you monopolize the market for sma

the story so far

registering

predicting

calculating

controlling

communicating

controlling again?

coming up

11 Apr: Visualizing Information