



Information work

Wednesday

Oct 10

2007

4-5:30

Paul Duguid

203a South Hall

510 643 3894



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ORIGIN Old English *Wōdnesdæg*, named after the Germanic god ODIN ; translation of late Latin *Mercurii dies*; compare with Dutch *woensdag*.



information economy

Solow Paradox

"We see computers everywhere but
in the productivity statistics"
c. 1988



Solow solved?

determinism with lag time?

David, Paul. 1990. 'The Dynamo and the Computer: An Historical Perspective on the Modern Productivity Paradox,' *American Economic Review*, 80(2): 355-361.

"techno-economic regimes formed around general purpose engines"

"regime transition"

"diffusion lags"



alternatively

towards an information society

a long-term, sedimentary process

process of abstraction

time, time keeping

money, balancing



time is money

the spirit of capitalism?

Remember that TIME is Money. He that can earn Ten Shillings a Day by his Labour, and goes abroad, or sits idle one half of that Day, tho' he spends but Sixpence during his Diversion or Idleness, ought not to reckon That the only Expence; he has really spent or rather thrown away Five Shillings besides.

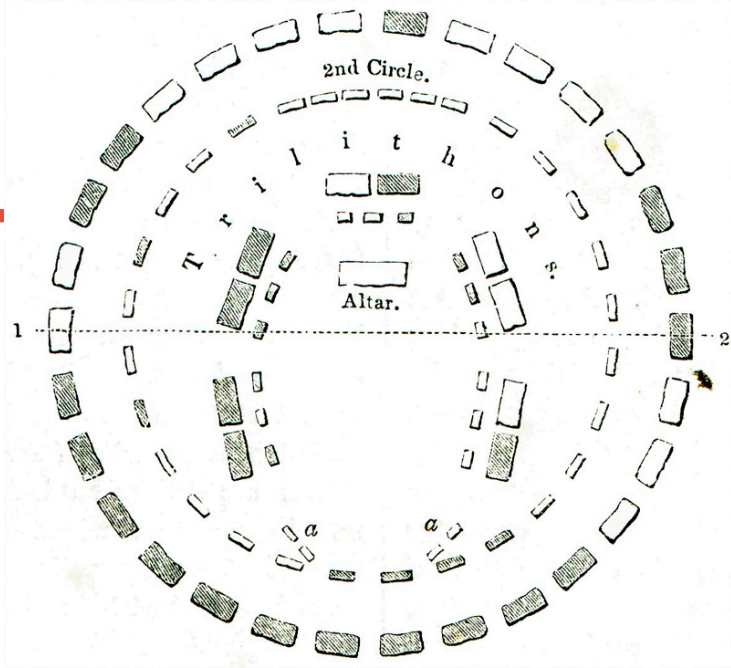


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Five Shillings besides.

Benjamin Franklin, *Advice to A Young
Tradesman Written by An Old One.* 1748



the long then

c 3100 bce





dividing the year

Julius Caesar (100 - 44 bce)
Julian Calendar

troublesome equinox

46 bce: 445 days

45 bce: 365-1/4

Augustus (63 bce - 14 ce)
8 bce: a further course correction



*Ut Severus receptam Britanniae partem vallo
à ceteris distinxerit.*

Ða þær ýmb hund teontig
þintu þu nýgan 7 hund eah-
tattig þintu þu fram bþihtnes
menniscnýrre þ Severus Cae-
re se þær * þeppica cýnnes of
þære býrug De Lepti hatte se
þær feofonteogeta fram Agu-
sto þ he rice onfeng. 7 þ hafde
feofontýne gear þer Caepe

Anno ab incarnatione Domi-
nicentefimo octogefimo no-
no, Severus genere Apher tripoli-
titanus ab oppido Lepti, deci-
mus septimus ab Augusto impe-
rium adeptus, decem & septem
annis tenuit. [Hic naturā sa-
vus, multis semper bellis laceffi-
tus, 7 fortiffimè quidam rem-
publicam, sed laboriofiffimè re-
xit. Victor ergò civilium bello-

Ann. Dom.
119.

þ 3

"The 1118st year AD, the 21st year of Pope Alexander III, the 27th regnal year of King Henry II of the English, the 11th regnal year of King Henry the son of the king, the 18th year that time has passed since the translation of Bishop Gilbert Foliot from Hereford to London, when this inquest was made by Ralf de Diceto, dean of London, in the first year of his deanship."

AD: Dionysius Exiguus (c470-c544)

Venerable Bede (c672-c735)

Historia Ecclesiastica Gentis Anglorum, 731

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marking the years

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beginning again



New Year

January 1 or March 25 (ab incarnatione)?

the struggle for Easter

1582: Gregory XIII

recalibrating: leap years & centurial years

cutting time:

Thursday October 4 to Friday October 15



beginning again



New Year

January 1 or March 25 (ab incarnatione)?

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Gregorian Calendar

Get an instance of the Calendar class.

```
Calendar cal = GregorianCalendar.getInstance();
```

beginning again



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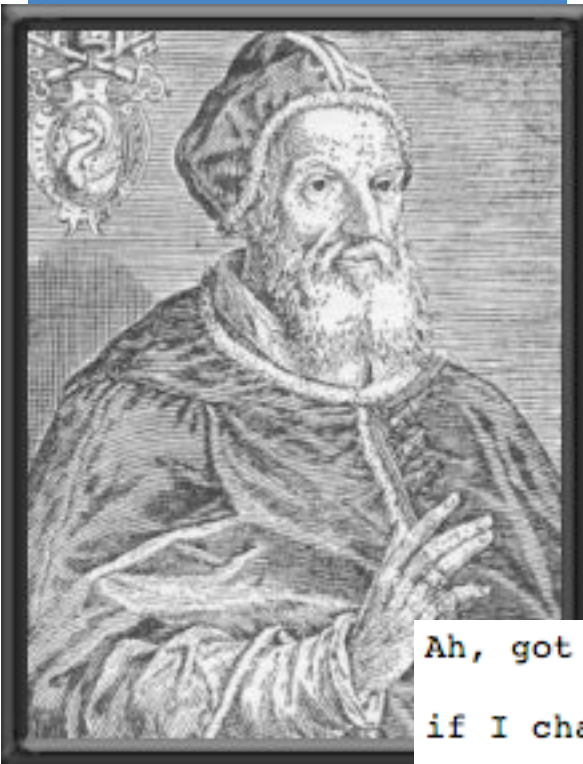
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beginning again



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Ah, got some light:

if I change

```
Calendar cal = GregorianCalendar.getInstance();
```

to

```
Calendar cal = new GregorianCalendar(  
    TimeZone.getTimeZone("CEST"), new Locale("DE"));
```

I get better results:

Gregorian Calendar



fighting back

Orthodox & Protestants unchanged

Feb 1/12; Feb 1 [OS]

1694/5

1752: Anglo-American course correction

"give us back our eleven days"

revolution

year 1 again [1792]

Vendémiaire, Brumaire, Frimaire, Nivôse, Pluviôse,

Ventose, Germinal, Floréal, Prairial, Messidor,

Thermidor, Fructidor



dividing the day

the holy hours

"seven times
a day I praise Thee"
Psalms 119: 64

matins, prime, tierce, sext
none, vespers, compline





dividing the day

accordian hours

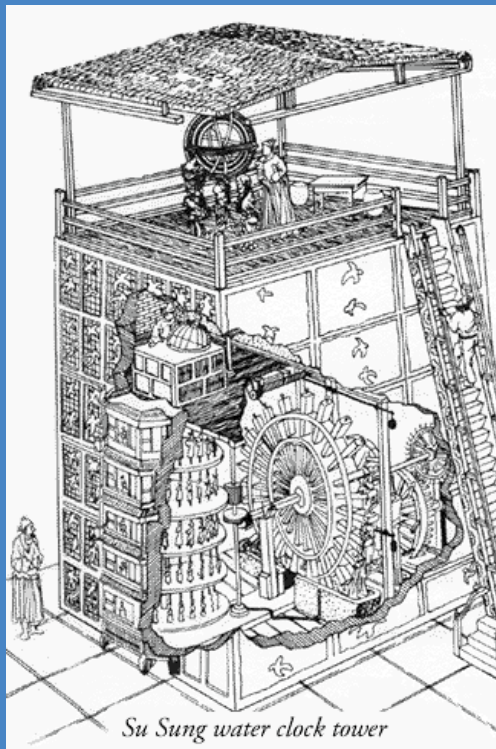
"are there not twelve
hours in the day?"
John 6.6.

equal hours

1330 (Germany)
1370 (England)



and the technology



3500 bce: sundials

700 ce: hourglasses

1086: Su Sung's water clock

1300: mechanical clocks

1580... : Chinese trading with West; looking for ways to fix calendar

1656: Huygens pendulum clock

1761: Harrison's nautical clock

c1850: telegraph time

1852: Greenwich mean time

1884: Meridian Conference, Washington DC



times

absolute time

"Absolute, true, and mathematical time,
of itself, and from its own nature, flows
equably without relation to anything
external."

Isaac Newton, *Principia Mathematica*, 1687

mundane time

"looking upon her Watch, I accidentally
discovered the Figure of a Coronet on the
back Part of it?"

--Addison, *Spectator* 8, March 1711

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by 1800,
"recorded time
(one suspects)
belonged in the
mid-[18th]
century still to
the gentry, the
masters, the
farmers, and the
tradesmen"
Thompson



time control

bell tolling

1335, Amiens start of work, lunch, end
of the day controlled by bell rung by
the city
--decree of Phillip VI

1664 "that as many as might live within
the sound might be thereby induced to a
timely going to rest in the evening,
and early arising in the morning to the
labours and duties of their several
callings"



fields to factories

"England's was the first industrial revolution, and there were not Cadillacs, steel mills, or television sets to serve as demonstrations as to the object of the operation"

Thompson

task orienting to time orienting

"the industrial revolution demanded a greater synchronization of labour"

"a vigorous and licensed popular culture had evolved, which the propagandists of discipline regarded with dismay"

Wedgwood ... 'the first recorded system of clocking-in"

schools "a spectacle of order and regularity"

"fight, not against time, but about it"



controul



The Guide, the Wardens of our faculties
And Stewards of our labour, watchful men
And skilful in the usury of time,
Sages, who in their prescience would controul
All accidents, and to the very road
Which they have fashion'd would confine us down
Like engines.



accounting for time



work and leisure

How longe tyme wol ye rekene and caste
Youre somme, and your bookes, and your thynges?
The devel have part on all swich rekenynge
Geoffrey Chaucer, *The Shipman's Tale*

"January 1st
[1668]. Up, and
all morning in my
chamber making up
some accounts
against this
beginning of the
new year."

Pepys

"What can there great and noble be
expected from him whose attention is ever
fixed upon balancing his books,
and watching over his expenses?"

Joseph Addison, *Spectator*



determinism again?

[is it true that]
"Scientific
bookkeeping was
causal, or at
least a
predisposing
factor in the
emergence and
development of
capitalism"

Basil Yamey, 1949

Max Weber (1864-1920)

"a rationalistic capitalistic
establishment ... one with capital
accounting, that is, an establishment
which determines its income yielding
power by calculation according to the
methods of modern bookkeeping and the
striking of a balance"

Werner Sombart (1863-1941)

"abstraction of profit [leads to]
economic calculation ... systemic
organization ... **depersonalization.**"



from accounts to accounting

Record keeping

Sumerian tablets

Bookkeeping

Roman *membrana, tabulari*

monastic cartularies

Accounting

Edwards

pipe rolls

merchant accounts, double entry

about 15,900,000 for "bottom line"

the bottom line



the Italian method

1211: proto double entry, Florence

c 1340: double entry in Genoa

1366: The Merchant of Prato
(Francesco di Marco Datini)
"Arabic" numerals

1494: Luca Pacioli *Summa de Arithmetica*





entry

"On this day, we have (or I have) bought from Filippo de Ruffoni of Brescia, twenty pieces of white Bresciani cloth. They are stored in Stefano Tagliapietra's vault and are of so many arm lengths apiece, as agreed upon. They cost twelve ducats each and are marked with a certain number.

Mention if the cloth is made of triple warpcord, four to five arm lengths square, wide or narrow, fine or medium, whether Bergamene, Vicenzan, Veronese, Paudan, Florentine, or Manuan. State whether the transaction was made entirely for cash, or

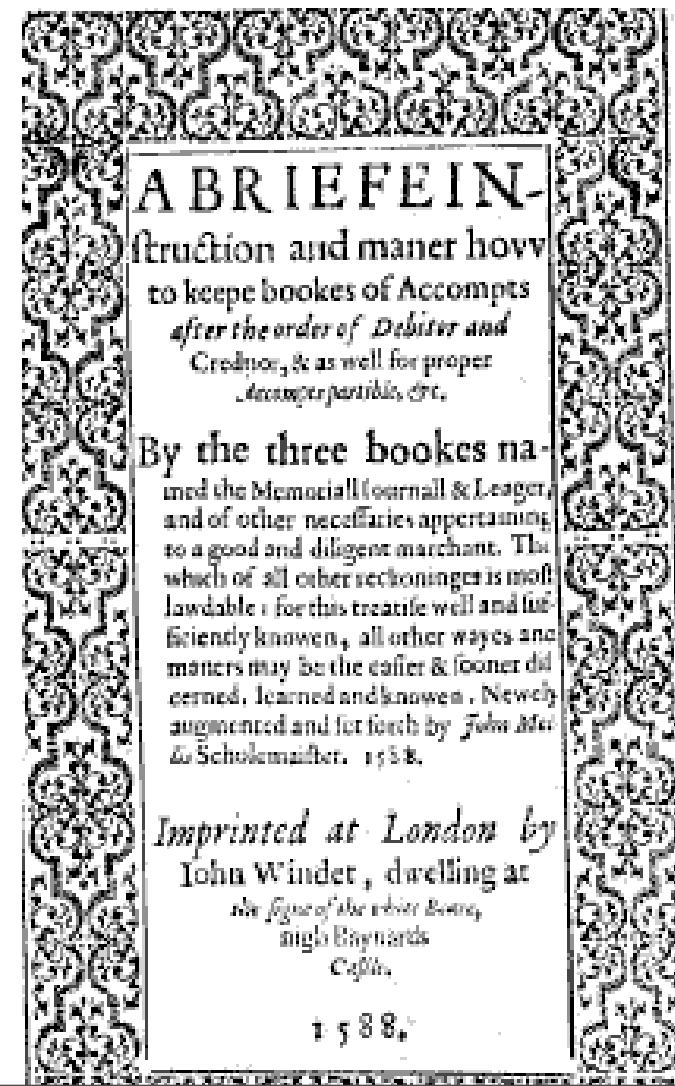
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10/7/07	592	Ronald H. Berman		37.70		5,025.28
		Medical	checkup			
10/19/07		MBNA		371.20	Deposit	4,654.08
	32	[WAssetsVisa-7978]	6ZZ4F-P1NJH	Open Split		
10/22/07	EFT	PG&E		50.66		4,603.42
		Utilities:Gas & Electric	6ZZ4H-L9X79			



abstraction





the books

"after the form of Venice"

"the three principall bookes"

memorial
journal
ledger



memorial

"in which a merchant writes all his daily business"

19

October 9th, bought two pipes of wine @ £30 each from Joseph Smith, paid £20 cash with balance to be paid January 1.

27

October 30, sent two pipes of wine to England for sale there; cost £10.

30

November 1, sold two pipes of wine to B&H @ £50 ea.



journal

"This Journal ought to bee signed and marked with the same marks or letter as the memorial. And also the leaves numbered."

Chest of money is Debitor (or
oweth) to Locke belonging to mee
M. N. and is for pounds, shillings,
and pence, so many, &c. or buckets
so many, &c. expressing the name,
number and value as appeareth in
such a lease, or folio of your Inven-
tory, &c. amounting to the summe
of l. 00. 00 s. 00 d.

li. s. d.

Kings and Jewels, set and vn-
set, waying or, graines, &c. oweth
to stock, and specifying every thing
by it selfe, &c. as appeareth in such a
lease or folio of the Inventory a-
mounting to the summe of li. s. d.

li. s. d.



Journal

October 9

19. **Wine** owes cash £20 for deposit on two pipes of wine bought of **Joseph Smith**

19. Wine owes Joseph Smith £40 for balance of two pipes of wine bought October 9.

October 30th, wine owes transport £10 for carriage of two pipes of wine to England.

November 20, B&H owes wine £100 for two pipes of wine sold them.

ledger

"every one parcell that is sette
in your Journall ought to bee made
two parcels in your ledger."

wine account

39	to cash	20	19	from B&H	100
11	to Joseph Smith	40			
27	to transport	10			
		70			100
	To profit & loss	30			

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		70			100
	To profit & loss	30			

double entry

Joseph Smith

			19	for 2 pipes of wine	60
39	from cash	40			
	from wine	60			60



accounting for

interlinked accounts

a debit in one set is a credit in another
linking money and merchandize

proto hypertext?

balancing the books



spreading the numbers

"In the past seven centuries bookkeeping has done more to shape the perceptions of more bright minds than any single innovation in philosophy or science. While a few people pondered the words of René Descartes and Immanuel Kant, millions of others of yeasty and industrious inclination wrote entries in neat books and then rationalized teh world to fit their books."

Alfred Crosby, *The Measure of Reality*



information workers

telling times and counting coins
rise of numeracy



bottom up?

Graunt: shopkeeper's arithmetic



Pepys

"Up by five o'clock... Comes Mr. Cooper, mate of the Royal Charles, of whom I intend to learn mathematiques... Up by four o'clock and at my multiplication-table hard"

July 4 & 9, 1662

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balancing nations

Treaty of Utrecht, 1713

War of the Spanish Succession

the commercial treaty

free trade with France

the balance of trade

mercantilism and national interest



science, statistics & the public sphere

rousing the wool interest

Mercator

VS

British Merchant



science, statistics & the public sphere



rousing the wool interest

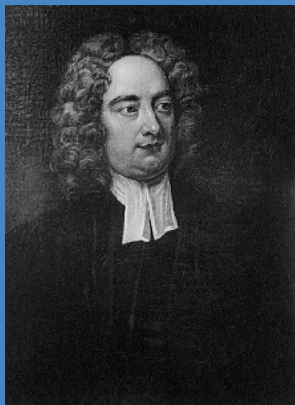
Mercator

VS

British Merchant



science, statistics & the public sphere



rousing the wool interest

Mercator

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search for statistics

THE ¹⁷
**BRITISH
MERCHANT;**

OR,

Commerce Preserv'd.

IN THREE VOLUMES.

By Mr. CHARLES KING,

*Chamber-keeper to the Treasury, and late of
London Merchant.*

LONDON:

To sum up all, if we pay to *France* yearly,

For their Wines	450000
For their Brandies	70000
For their Linen	600000
For their Paper	30000
For their Silks	500000
	<hr/>

1650000

And they take from us in
Lead, Tin, Leather, Allum,
Copperas, Coals, Horn-Plates,
&c. and Plantation-Goods, to
the Value of

200000

Great Britain loses by the
Balance of that Trade yearly

1450000

Charles Davenant
*An Essay upon the Probable
Methods of Making a
People Gainers in the
Ballance of Trade 1699*

VS

Paul Methuen

Economic Policy

RESEARCH FOR BROADLY SHARED

November 17, 2003 | EPI Briefing Paper #147

The high price of 'free' trade

NAFTA's failure has cost the United States jobs across the nation

by [Robert E. Scott](#)

Distorting the record

NAFTA's promoters play fast and loose with facts

by [Robert E. Scott](#)

1990 - 1996

Period	Mexico Exports to U.S.	Mexico Imports from U.S.	Mexico Trade Surplus U.S.
1990	\$18,456.180	\$20,521.430	-\$2,065.250
1991	\$33,952.648	\$36,867.648	-\$2,915.000
1992	\$37,468.032	\$44,278.592	-\$6,810.560
1993	\$43,116.192	\$46,539.800	-\$3,423.608
1994	\$51,943.048	\$57,008.632	-\$5,065.584
1995	\$66,472.408	\$53,994.560	\$12,477.848
1996	\$31,762.440	\$26,318.440	\$5,444.000

Note: Data for 1996 is for January-June. All Trade Data is FOB

Source: INEGI, Banco de Datos, 1996

Trade with NAFTA with Canada (Consump) : 2005

NOTE: All figures are in millions of U.S. dollars.

Month	Exports	Imports	Balance
January 2005	5,223.1	10,550.7	-5,327.6
February 2005	5,689.3	11,272.1	-5,582.8
March 2005	6,820.2	12,138.4	-5,318.2
April 2005	6,577.5	11,303.9	-4,726.4
May 2005	6,839.8	11,765.8	-4,926.0
June 2005	6,881.9	12,240.1	-5,358.2
July 2005	5,113.9	9,717.4	-4,603.5
August 2005	6,365.8	13,398.3	-7,032.5
September 2005	6,719.8	13,457.7	-6,737.9
October 2005	6,838.9	13,780.0	-6,941.1
November 2005	6,559.4	13,914.1	-7,354.7
December 2005	6,160.8	12,723.1	-6,562.3
TOTAL	75,790.4	146,261.6	-70,471.2



balancing acts

"apprehension of the wrong balance of trade, appears of such a nature, that it discovers itself wherever one is out of humour with the ministry, or is in low spirits."

David Hume,
"Of the Balance of Trade," 1752



in sum

time is money

technological developments

social agreements

standards and interdependencies