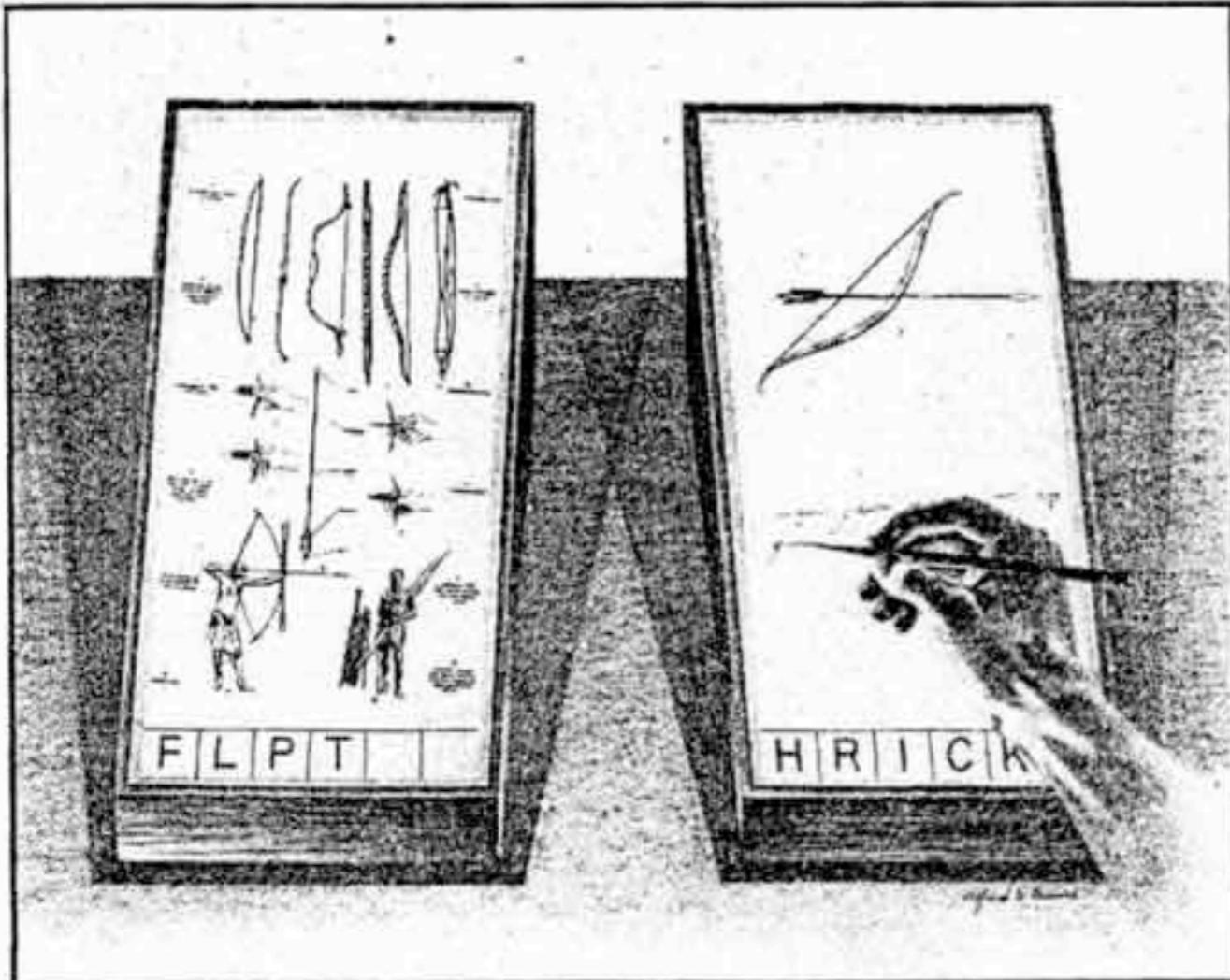
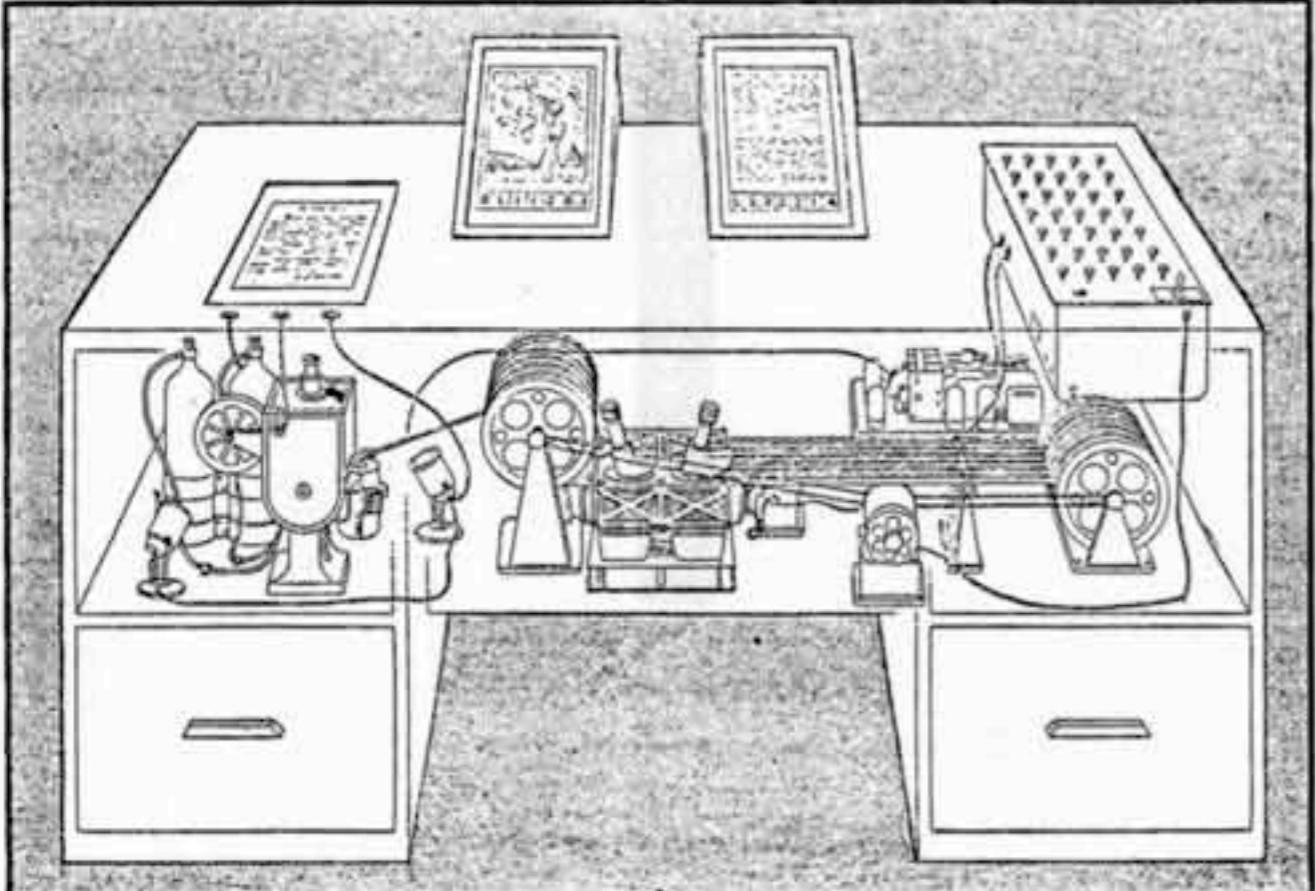


E-Paper Is Tomorrow

The Future of Disposable Information

Humboldt-Universität zu Berlin
Institut für Informatik
Dr. Jochen Koubek
jochen.koubek@hu-berlin.de

Vannevar Bush Memex



1945 As We May Think

WorldWideWeb

Info

HyperMedia Browser/Editor

An excercise in global information availability

by Tim Berners-Lee

Copyright 1990,91, CERN. Distribution restricted: ask for terms. TEST VERSION ONLY

HyperText: Text which is not constrained to be linear.
HyperMedia: Information which is not constrained linear... or to be text.

This version of the WWW application can pick up hypertext information from files in a number of formats, from local files, from remote files using NFS or anonymous FTP, from hypertext servers by name or keyword search, and from internet news. Hypertext files may be edited, and links made from hypertext files to other files or any other information.

For more help, use "Help" from the menu. If that doesn't work, then your application has been incompletely installed.

If you have any comments or have bugs, please mail timbl@info.cern.ch, quoting the version number (above).

Style editor

Style name: List

<< style of selection >>

Apply style to selection

Apply style to all similar text

Find unstyled text

Format

First line indent: 100

Successive indent: 130

Font: Helvetica

Point Size: 12

SGML tag:

Set

130 300

HotWired: What's New

Welcome to York , the electric neighborhood hits Wired, 24 May, via in On the Road

Flux Ned hears rumors of a deal between GN

Fetish Solar

Net Surf Pro

Jenny Holzer's truisms take a turn for the Web

If you feel a need for speed ... surf the Web

What's a week without a Bill Gates

Corporate recruiting form letters = t

Alt.cynicism ... What's the Point?

Don't be a winner, be a free.

**Information Management:
A Proposal , 1989**

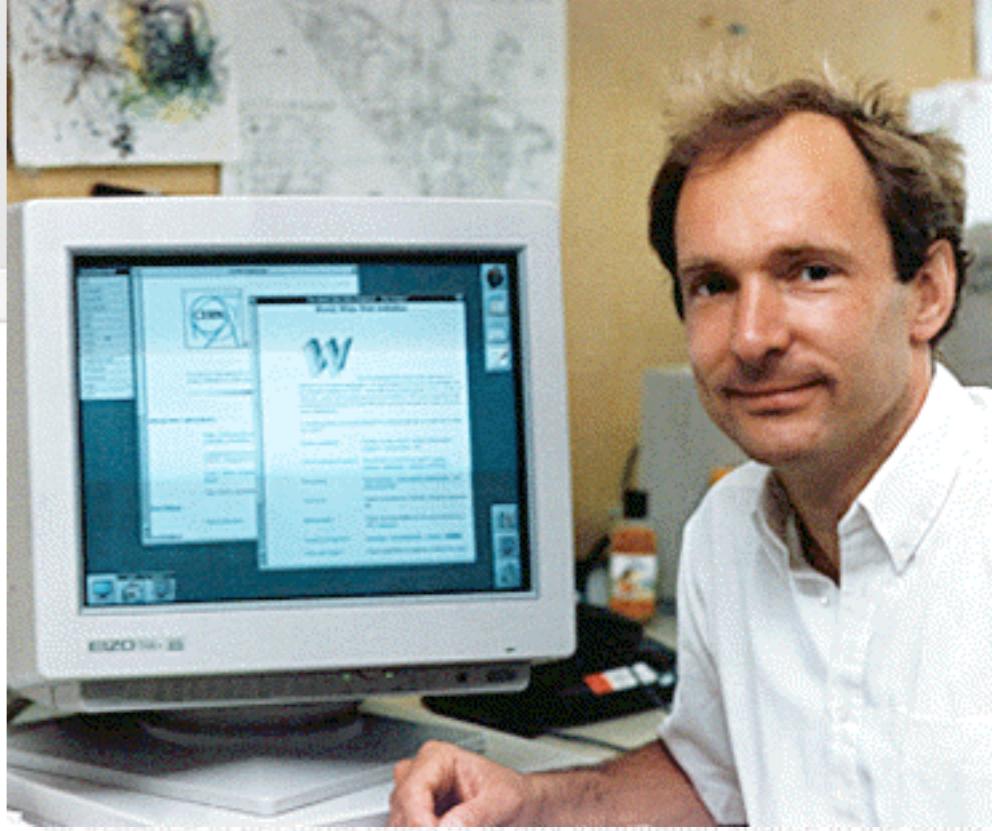
- Geographical list of WWW servers (at CERN)
- same list. Example : CERN phone book
- [...]
- WWW project documentation (at CERN)
- Weber -- /Hypertext

Non requirements

Marc Weber

Discussions on Hypertext have sometimes tackled the problem of **copyright enforcement** and **data security**. These are of secondary importance at CERN, where information exchange is still more important than secrecy. **Authorisation** and **accounting systems** for hypertext could conceivably be designed which are very sophisticated, but they are not proposed here.

[...]



HyperText Resource with Box

Mark all A

Mark selection M

Link to marked L

Link to file...

Link to New N

Follow link

Unlink Z

Help

A collection of links to various resources, including a geographical list of WWW servers, CERN phone book, WWW project documentation, and a link to Marc Weber's Hypertext proposal. The proposal itself discusses copyright enforcement, data security, authorisation, and accounting systems for hypertext.

Non requirements

Marc Weber

Discussions on Hypertext have sometimes tackled the problem of **copyright enforcement** and **data security**. These are of secondary importance at CERN, where information exchange is still more important than secrecy. **Authorisation** and **accounting systems** for hypertext could conceivably be designed which are very sophisticated, but they are not proposed here.

[...]

Wir leben in neuen Kommunikationsverhältnissen, die mit dem Leitmedium der Neuzeit, dem Buch, gebrochen haben. Computer und elektronische Medien befördern das Ende einer Welt, die Marshall McLuhan Gutenberg-Galaxis genannt hat.

Norbert Bolz

Death of Paper?

Paper printouts increase. The use of e-mail in the workplace show that it can lead to a 40% increase in paper consumption.

Advantages of paper can be described as affordance, i.e. affordable and allowance.

Screen reading provokes eye burning and back aching

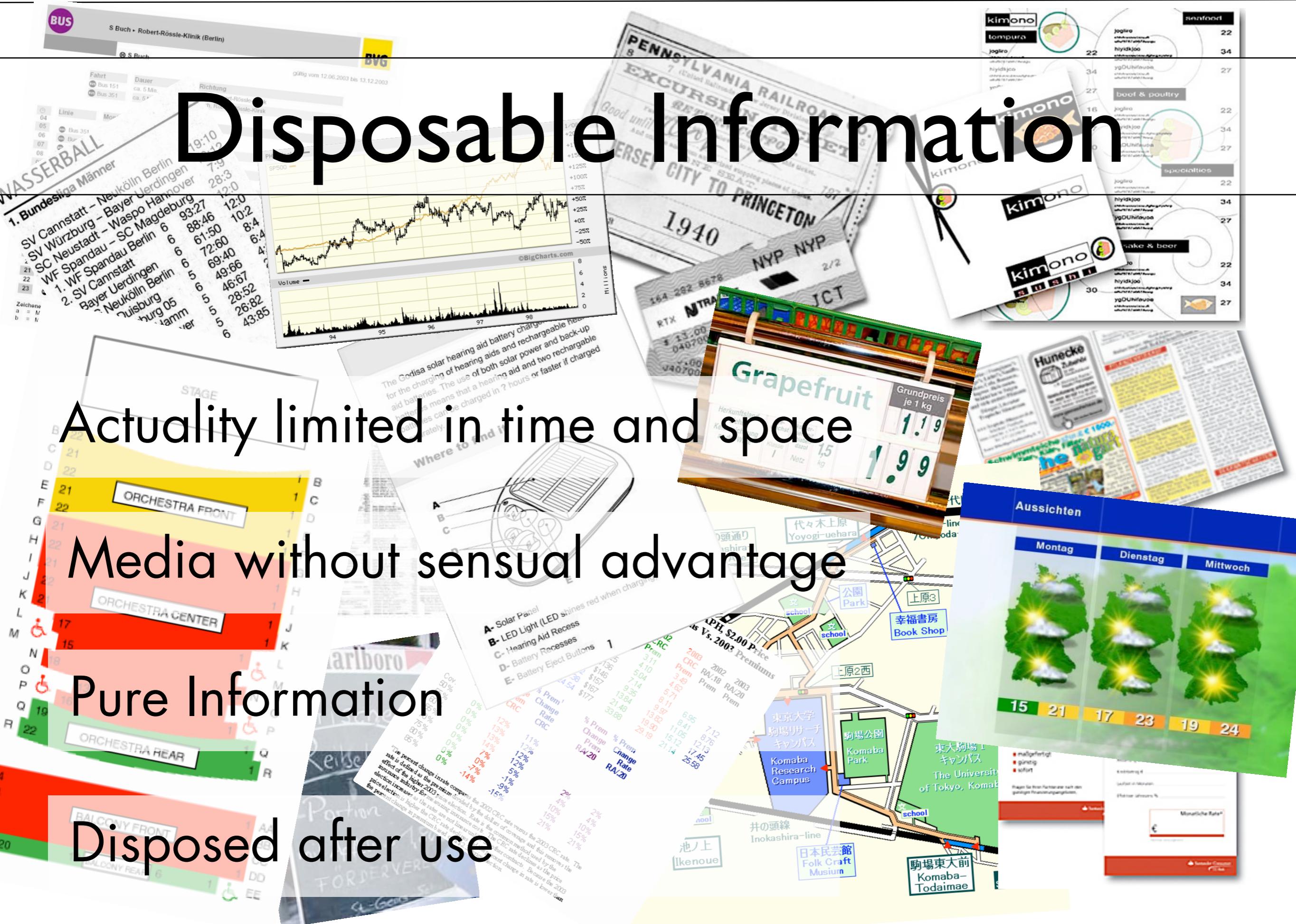
Disposable Information

Actuality limited in time and space

Media without sensual advantage

Pure Information

Disposed after use



The Vision



Spielberg: Minority Report, 2002

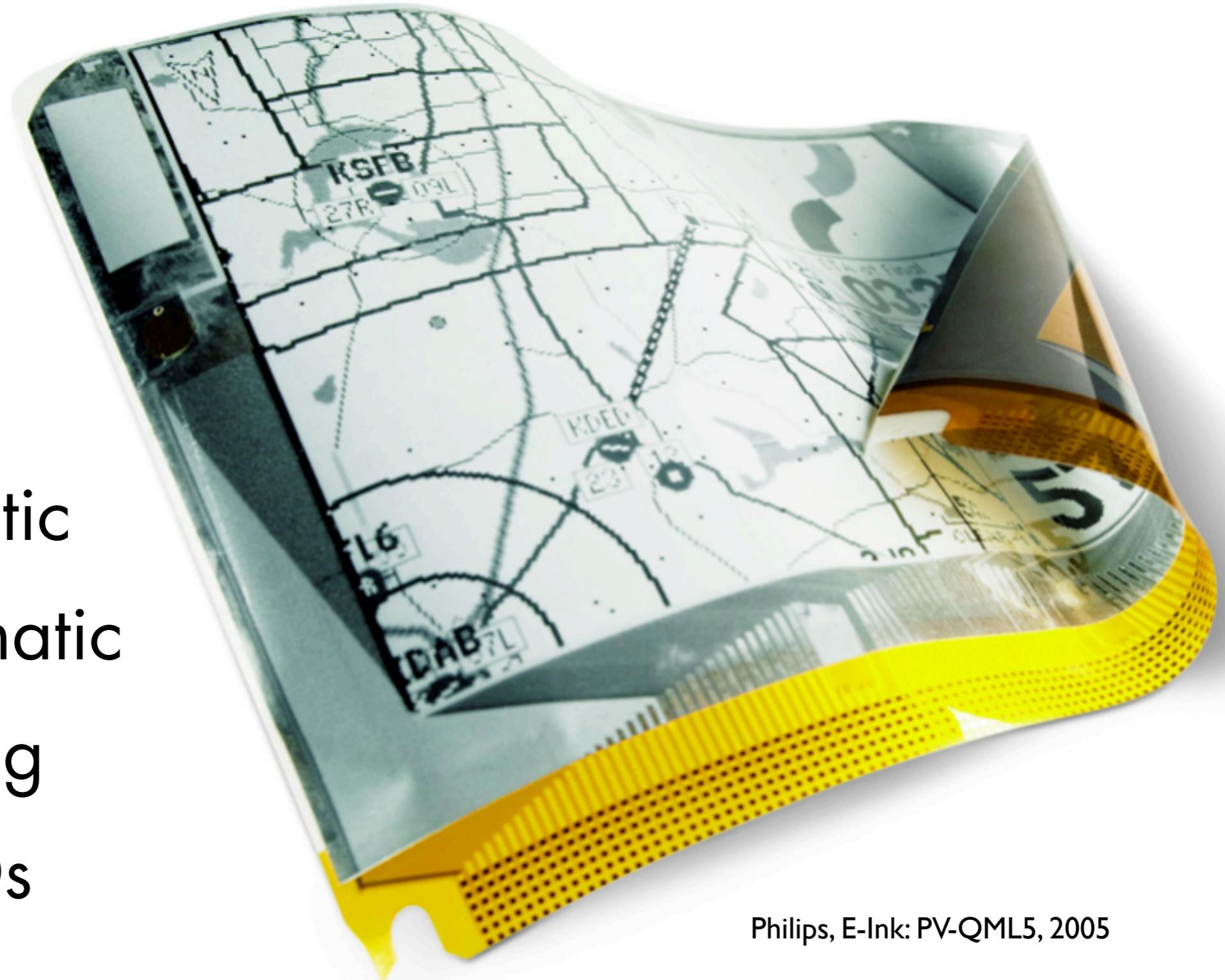
»Any sufficiently advanced technology
is indistinguishable from magic«

Arthur C. Clarke



The Technologies

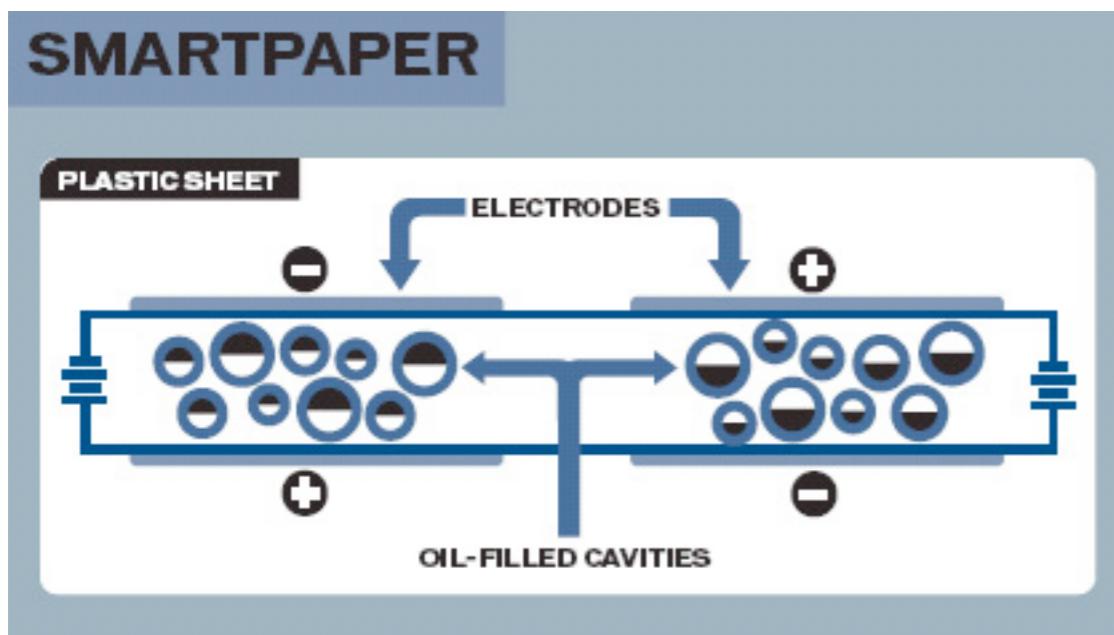
Elektrophoretic
Elektrochromatic
Elektrowetting
Bistable LCDs



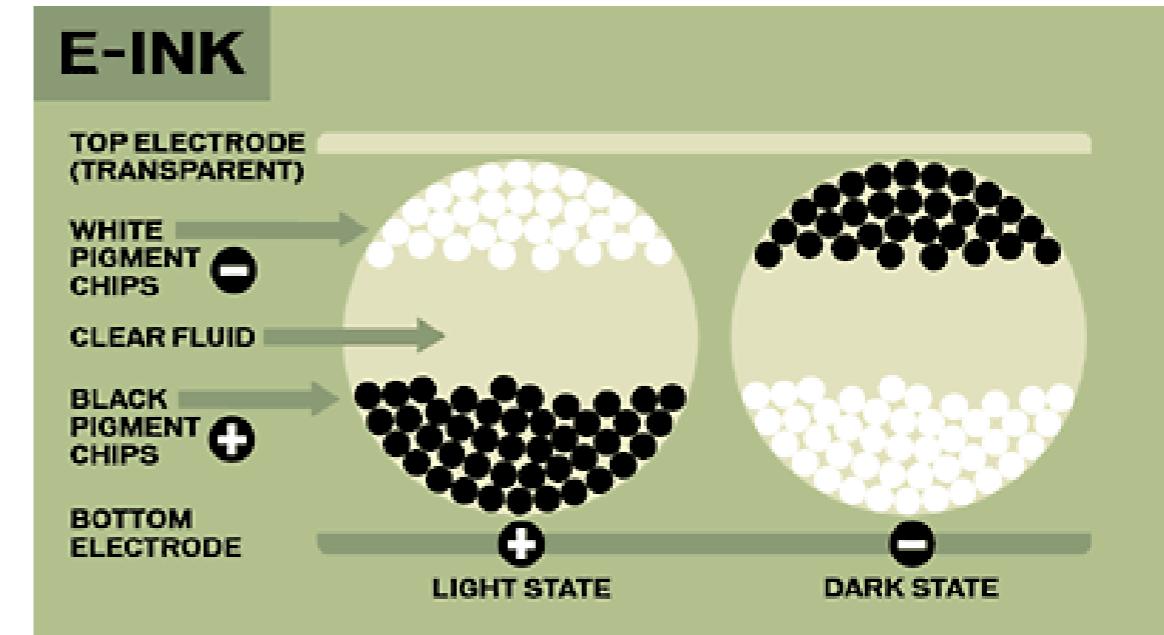
Philips, E-Ink: PV-QML5, 2005

Electronic-Ink

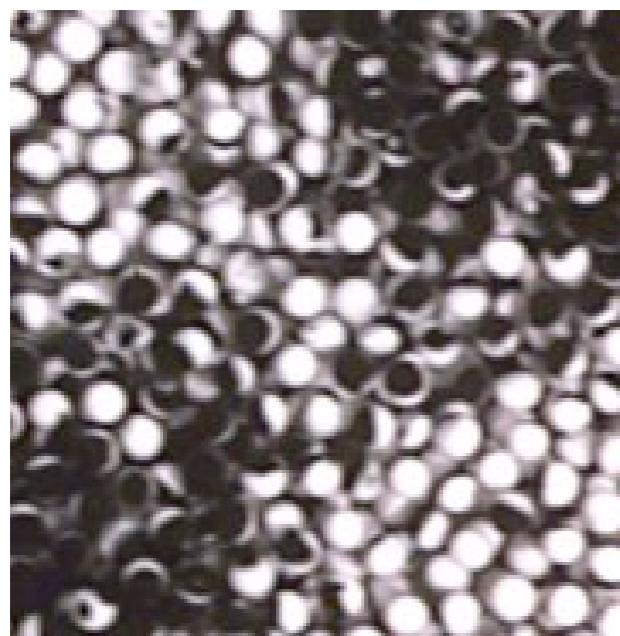
Elektrophoretic Displays (EPD)



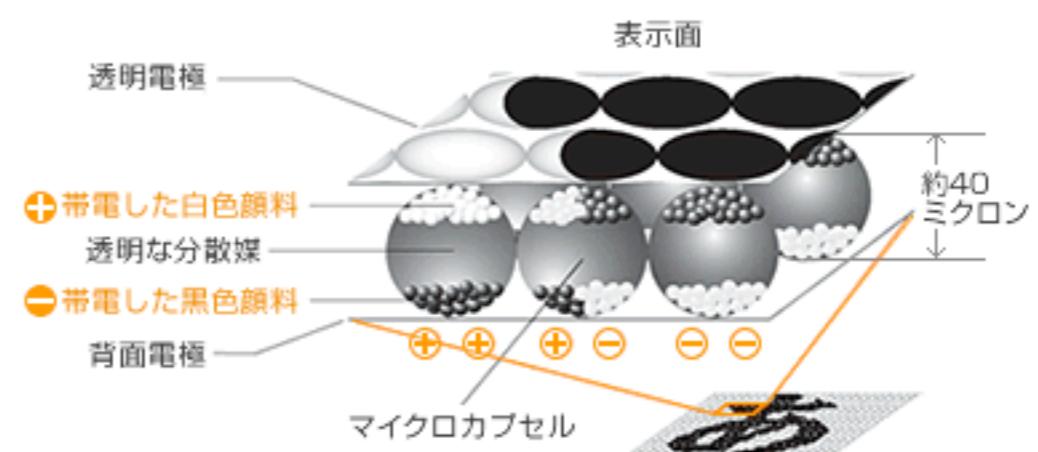
Nicholas Sheridan, Xerox 1975
Gyricon, *Smart Paper*



Joseph Jacobson, 1993: MIT, Philips, Toppan: E-Ink



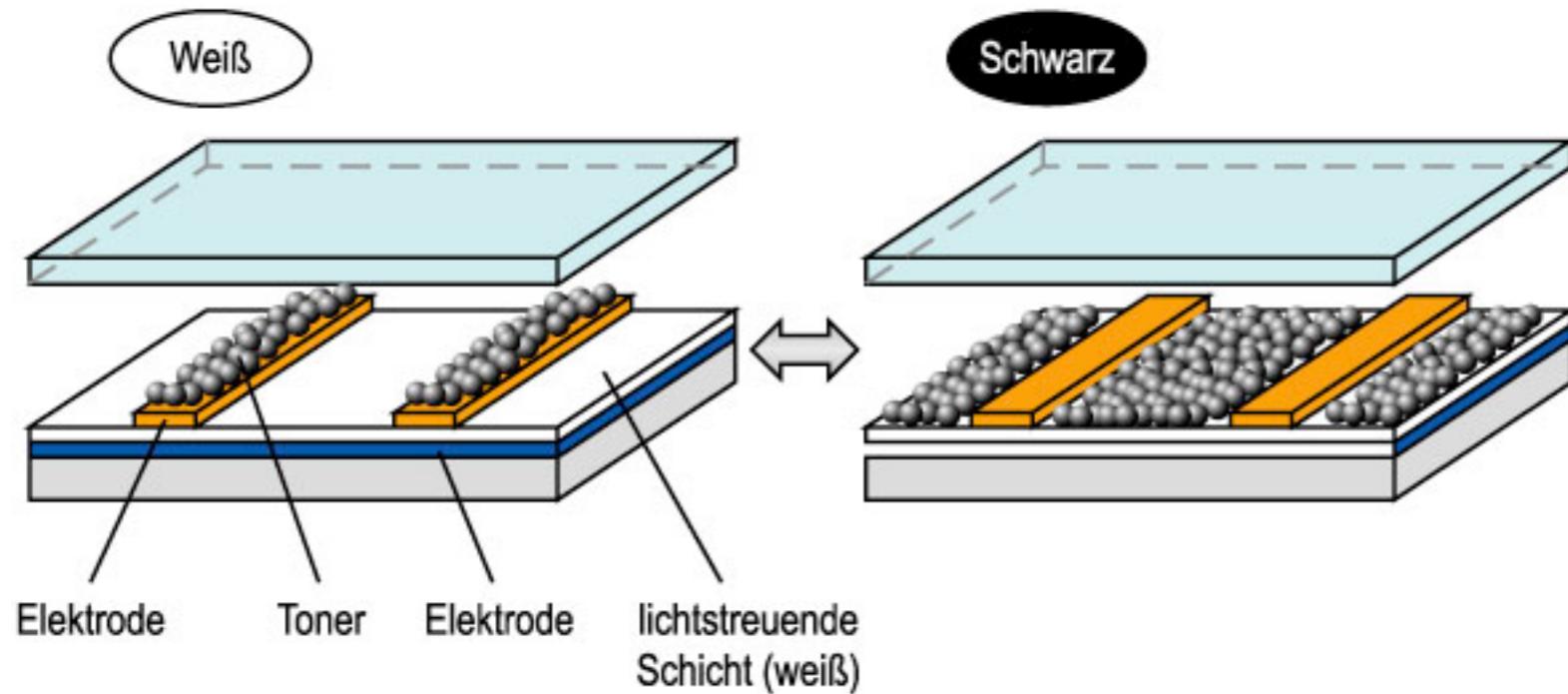
Librié



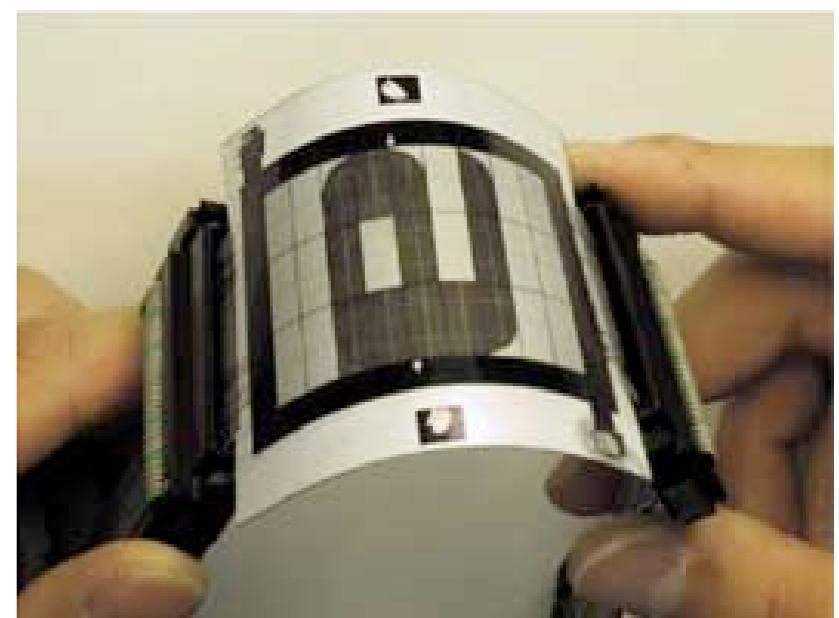
Sony Japan & E-Ink, 2004

Paper-like Display

Elektrophoretic Displays (EPD)

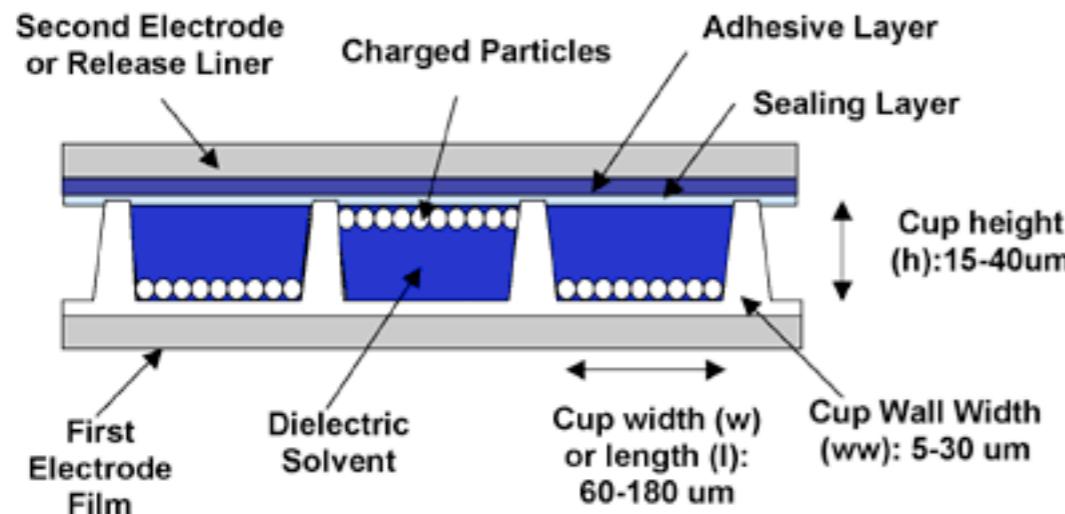


Canon, 2000

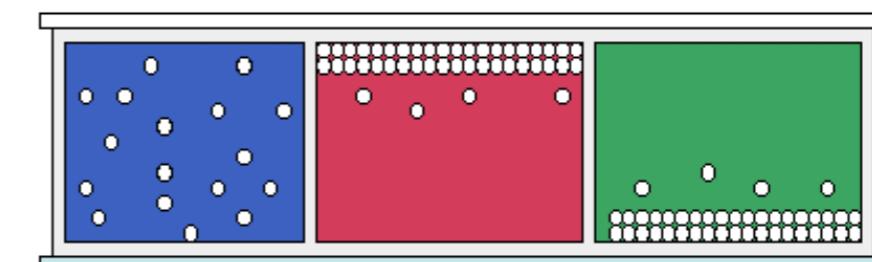


Microcup Electronic Paper

Elektrophoretic Displays (EPD)



Electronic book



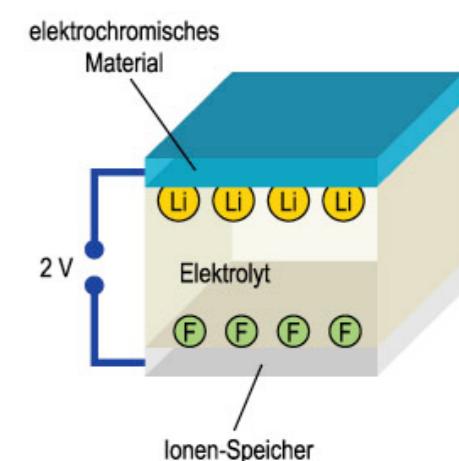
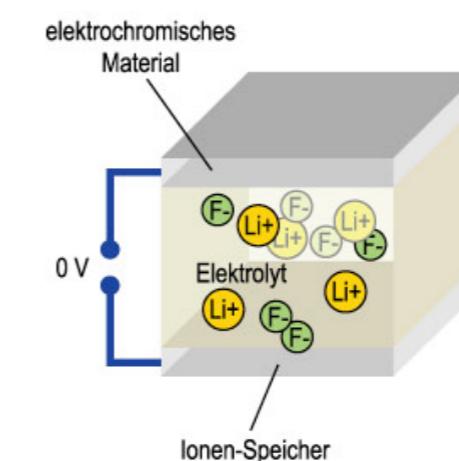
SiPix, 2004



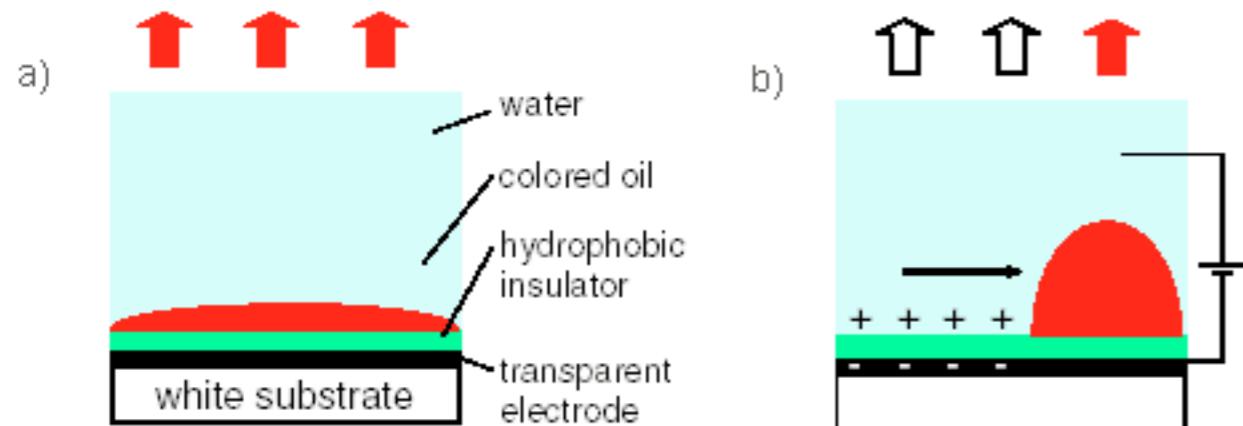
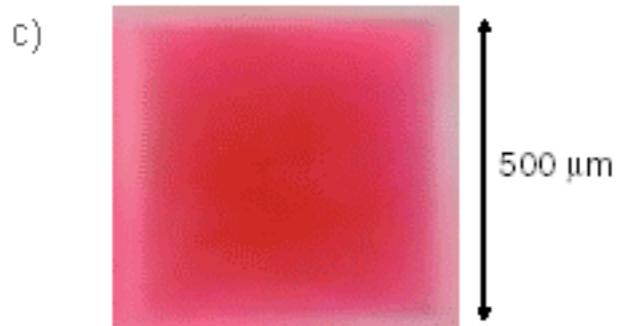
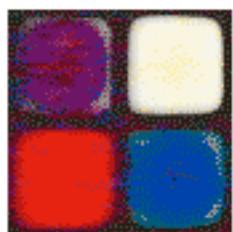
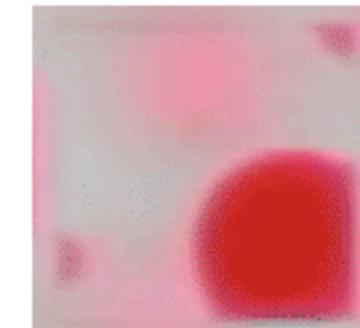


ePyrus

Elektrochromatic Display



Siemens, 2003

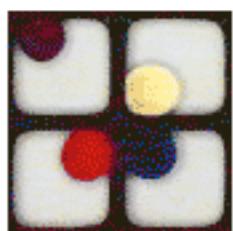
**Homogeneous oil film****Oil moved to side**

Video speed response (< 10 ms)

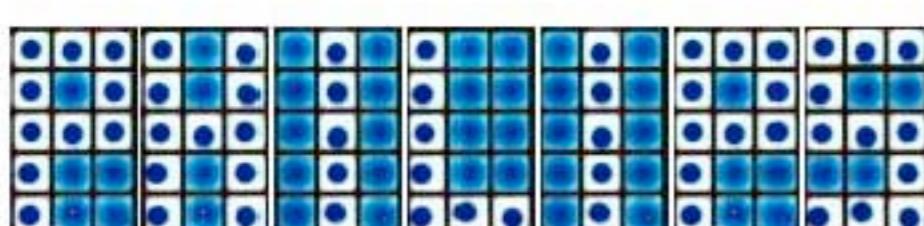
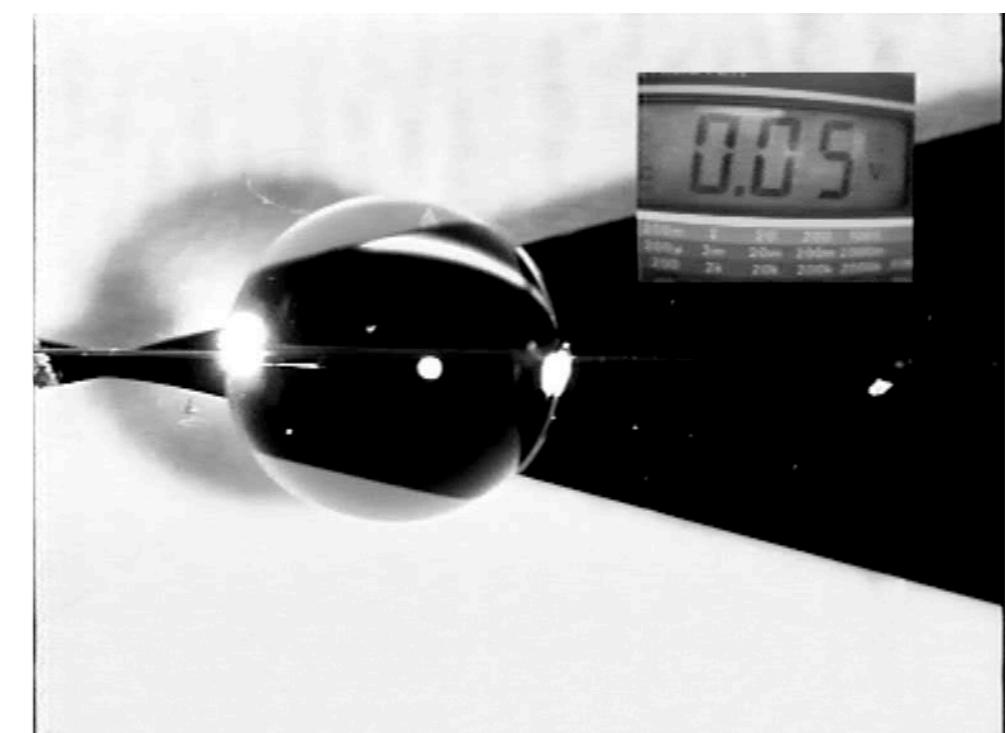
High color brightness (~40%)

Good contrast (~15)

Low power consumption (~LCD)

High resolution (≤ 160 dpi)

Elektrowetting

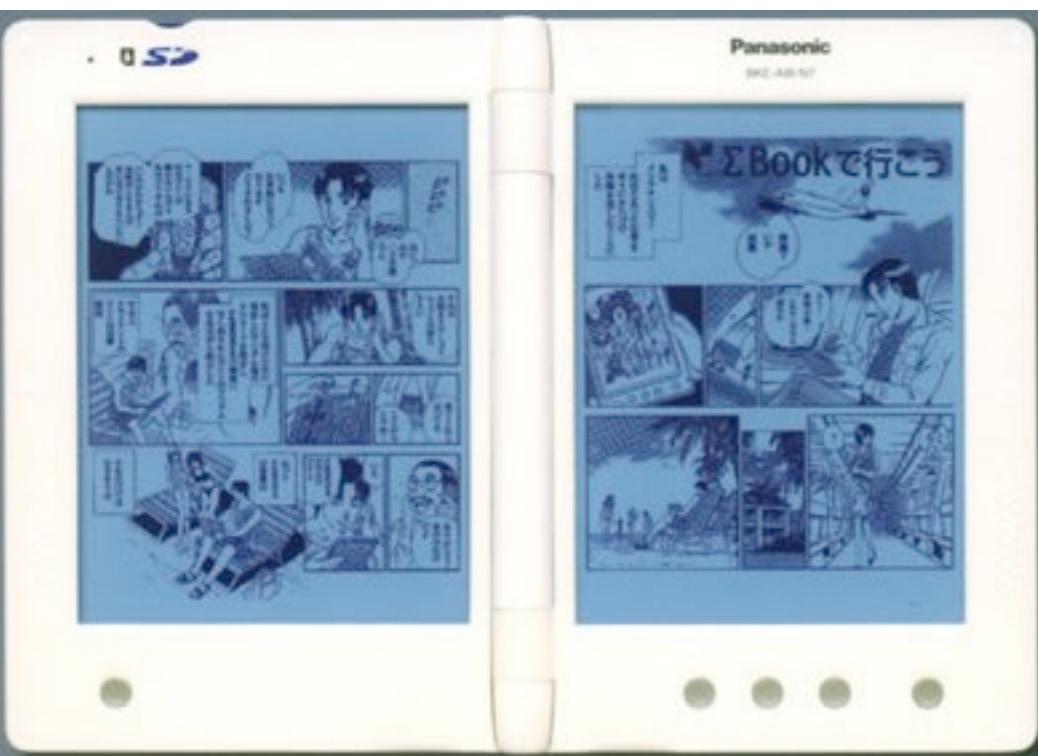
**5 x 3 Array**

Pixel-size	$2 \times 2 \text{ mm}^2$
Blue oil thickness	15 μm
Voltage	-18 V
Wall height	50 μm
Insulator	0.8 μm

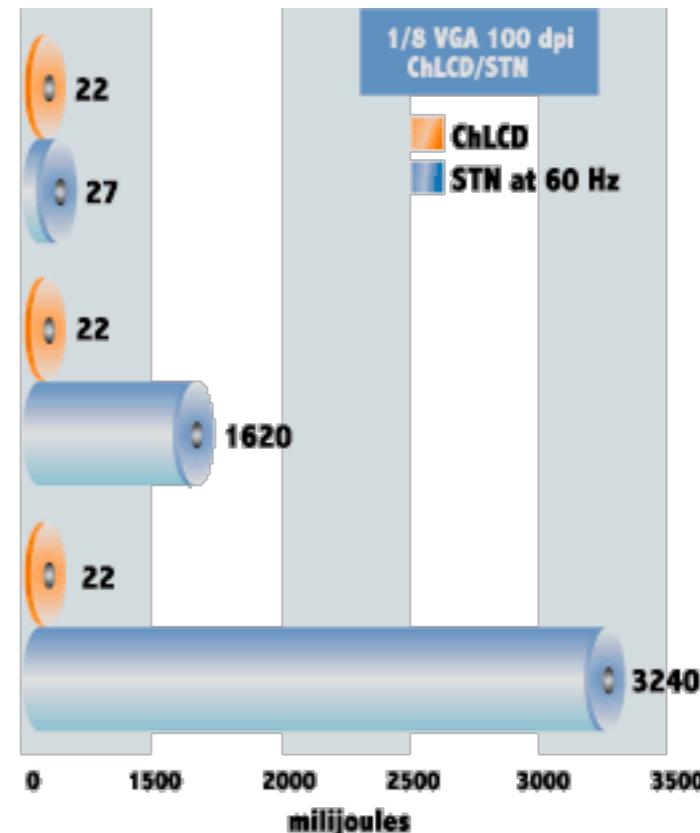
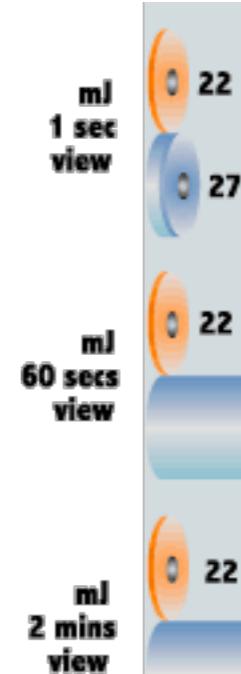
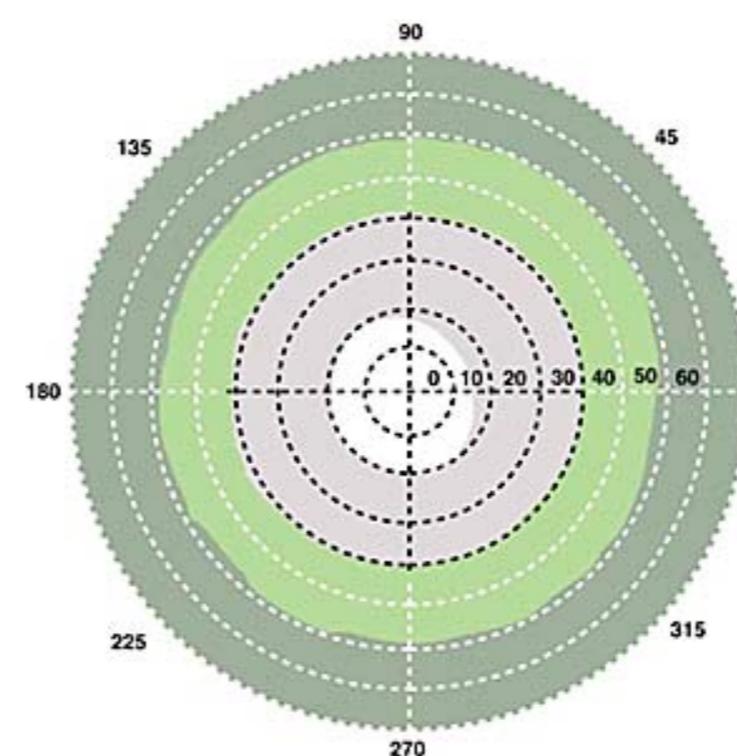
Philips, 2003

Cholesteric LCD

Non-Volatile, Bistable Liquid Crystal Display

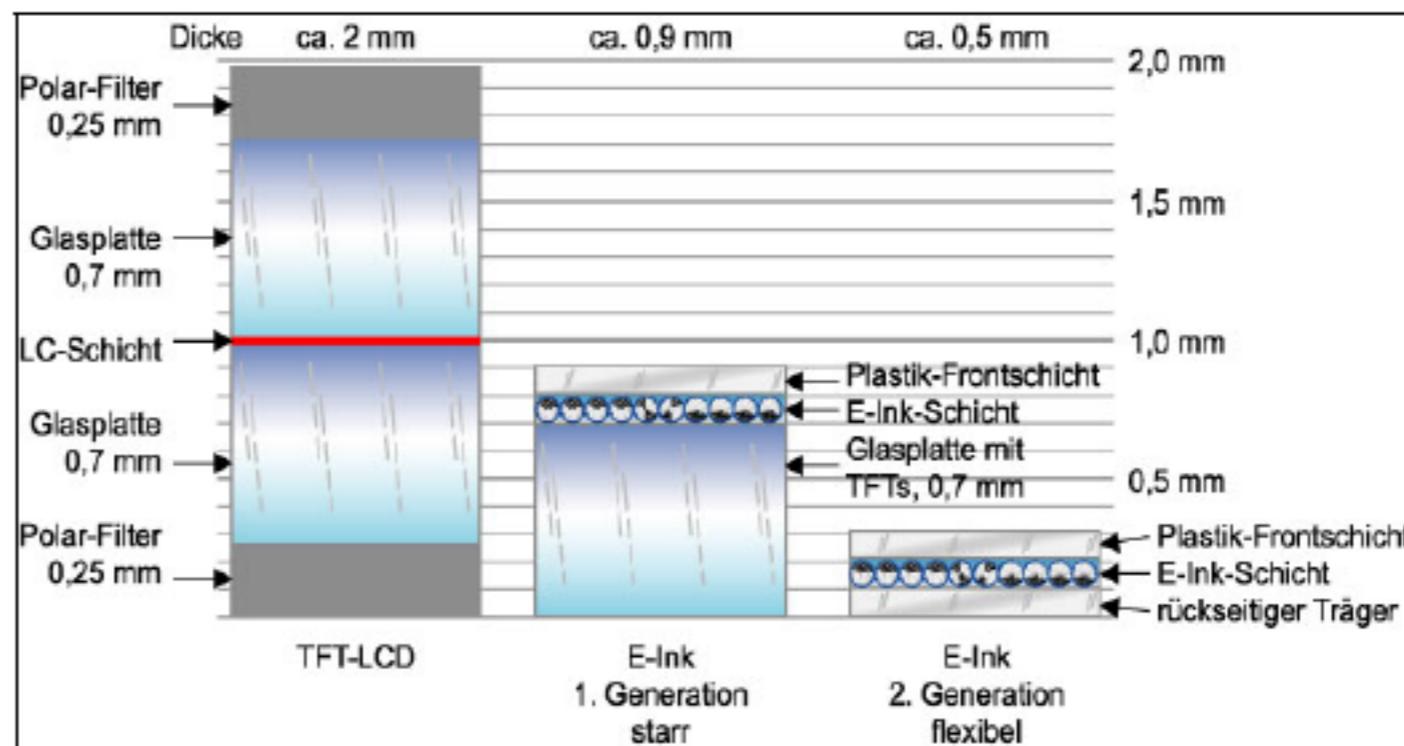


Sigmabook

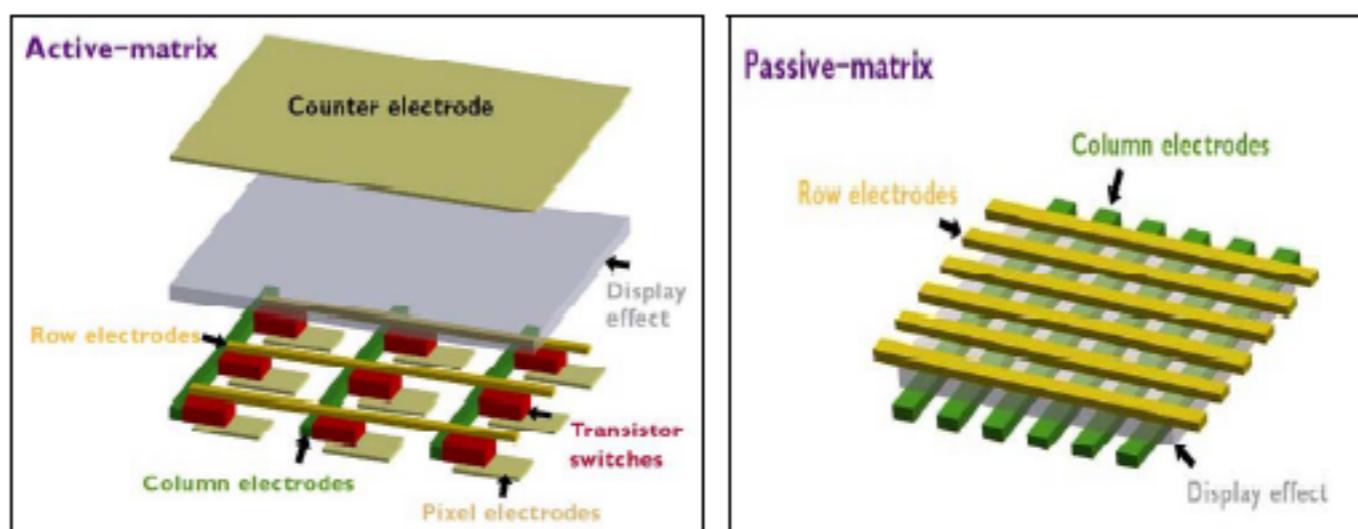




Backplane



LCD vs E-Paper



Active matrix and passive matrix

Bistable

Passive light

High Contrast

Wide reading angle

Flexible

Paper-like

Low energy expenditure

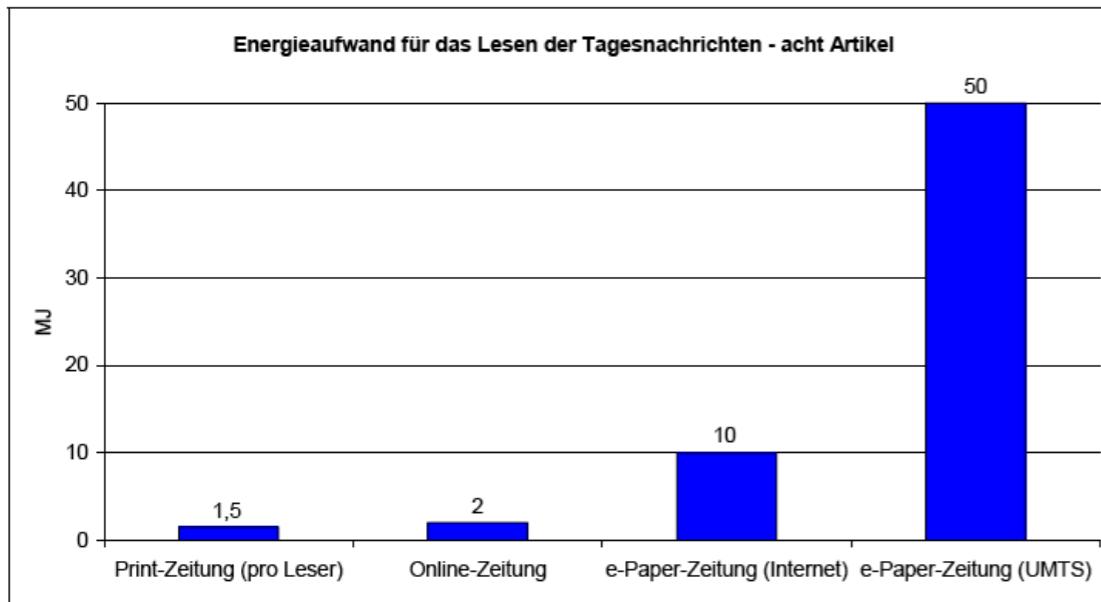
Cheap production

No Standards

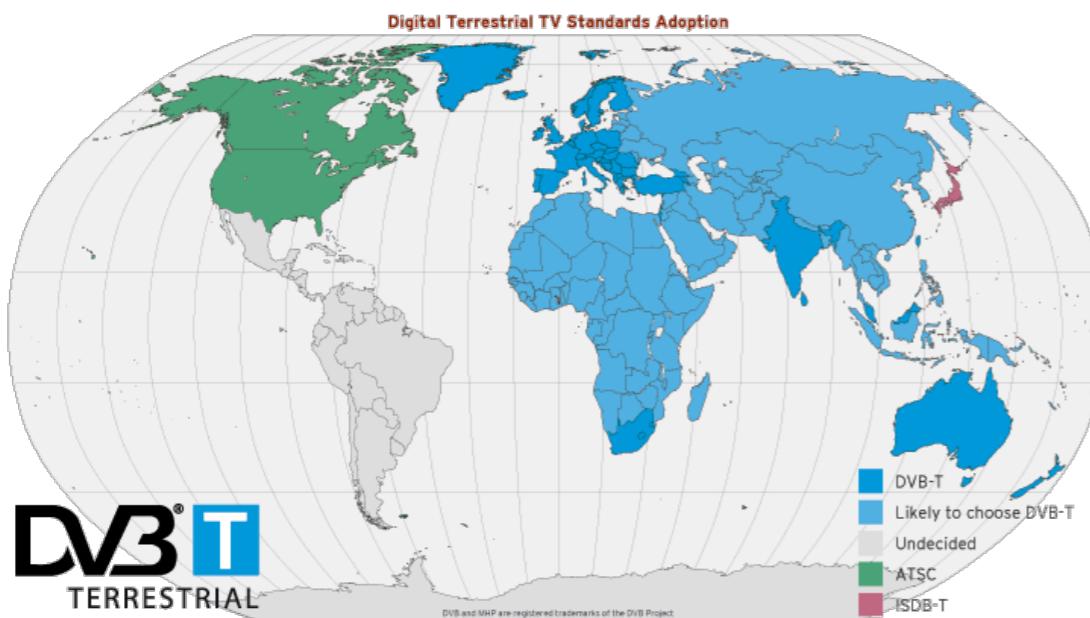
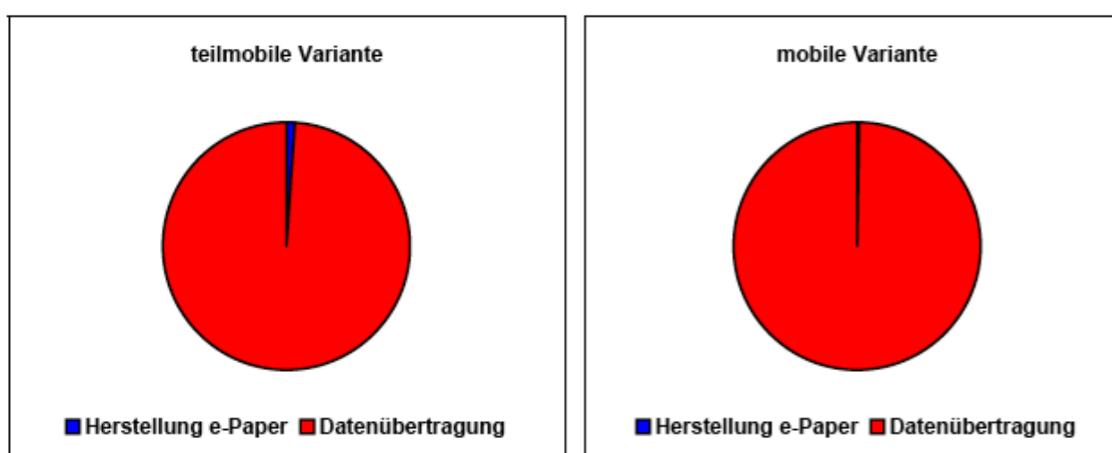
E-Paper



IBM, 1999



Energy expenditure



Distribution

UMTS

WLAN (IEEE 811.a-g) 10-54 Mb/s

Digital Audio Broadcasting DAB

Digital Video Broadcasting DVB-T



E-Paper Issues

Technology | Open Standards | User Acceptance | Archivation | Ecology | Digital Divide



Harry Potter And the Prisoner of Askaban

Thank You