

Multimedia im Netz

Wintersemester 2013/2014

Part III

Multimedia Distribution Services

Outline

* = Nicht für Nebenfach !

- | | | |
|-----|---|---|
| 1. | Introduction and Motivation | |
| 2. | Interactive Web Applications | Part I:
Web Technologies
for Interactive MM |
| 3. | Web Paradigms and Interactivity * | |
| 4. | Web Programming with Java * | |
| 5. | Communities, the Web, and Multimedia | |
| 6. | Digital Rights: Definition and Management | |
| 7. | Cryptographic Techniques | Part II:
Content-Oriented
Base Technologies |
| 8. | Multimedia Content Description | |
| 9. | Electronic Books and Magazines | |
| 10. | Multimedia Content Production and Management | Part III:
Multimedia
Distribution
Services |
| 11. | Streaming Architectures | |
| 12. | Web Radio, Web TV and IPTV | |
| 13. | Multimedia Conferencing | |
| 14. | Signaling Protocols for
Multimedia Communication * | Part IV:
Conversational
Multimedia Services |
| 15. | Visions and Outlook | |

9 Electronic Books and Magazines

9.1 Terminology, History

9.2 Formats for Electronic Books

9.3 Open Standard for Electronic Books: ePUB

9.4 Trends

Literature (German):

V. Wang: E-Books mit ePUB, mitp Verlag 2011

B. Stein/D. Visel: mao, king kong and the future of the book

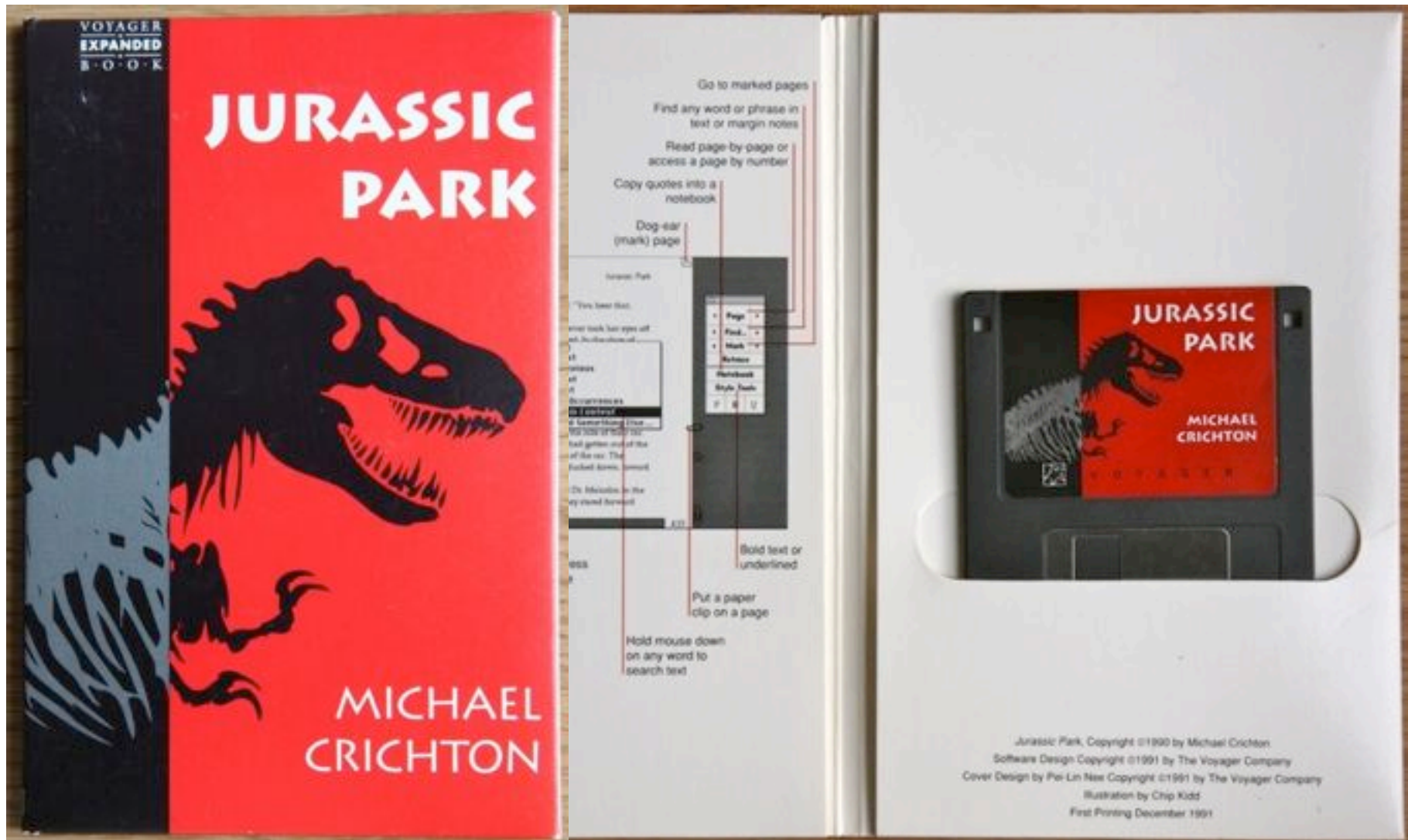
http://canopycanopycanopy.com/issues/9/contents/mao__king_kong__and_the_future_of_the_book

Douglas Adams: The Book Invented Properly



Audio: Douglas Adams, 1993; Animation: Gavin Edwards, 2012

Voyager Extended Books 1992



Source: Henrik Ahlen, alfabravo.com

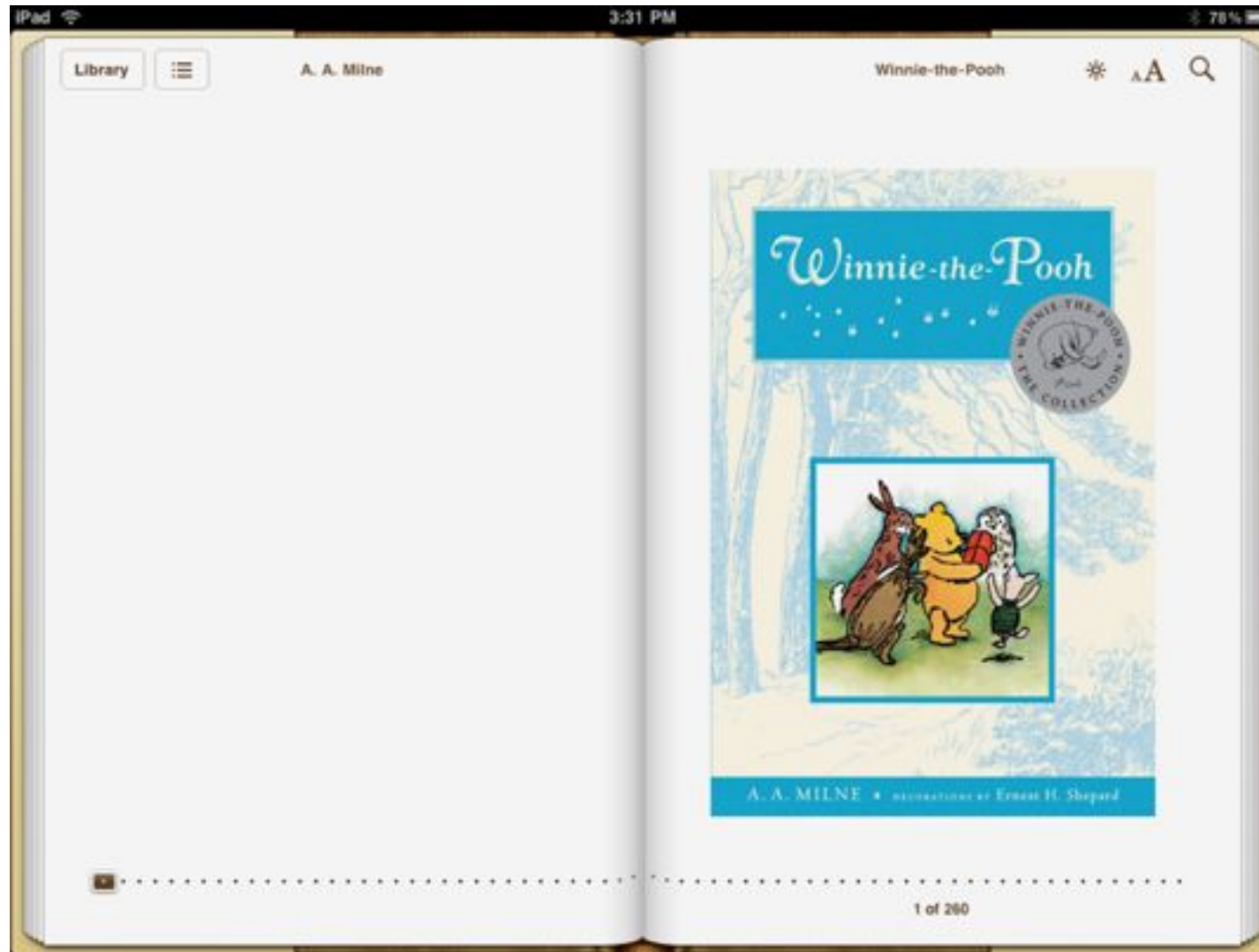
Electronic Book

- An **electronic book (e-book)** is a publication which
 - contains text and pictures as main content, possibly enhanced with further media (audio, animations, video)
 - is distributed in the form of a digital code
 - is optimized for the presentation with appropriate reading systems (hardware and software)
- Examples for proper e-books:
 - products made for viewing on specific e-book readers like Amazon Kindle
 - products of the Apple iBook store
- Examples for products similar to e-books, sometimes also called e-book:
 - Audio books
 - PDF versions of a printed book (one-to-one representation)
- An **electronic magazine** or **electronic newspaper** is a publication with the same characteristics as an e-book, but with a regular publication schedule of individual issues.

Conceptual Difference E-Book / Printed Book

- E-Book:
 - optimized for display on viewers
 - flexible e.g. for different font sizes
 - navigation by hyperlinks and bookmarks
 - search functions
- Many of the traditional elements of book pages are redundant or not usable:
 - chapter and section headers
 - (fixed) page numbers
 - margin columns
 - index
- E-Books often are produced from traditional books by extracting the pure text and removing unneeded elements

Example: Apple iBook



www.freeipadapps.net

Michael S. Hart: Project Gutenberg

Michael Stern Hart,
1947-2011



- 1971, studying at University of Illinois
 - Four year “individual plan of study”
 - Degree in *Human-Machine Interfaces*
 - Access to university mainframe computer (Xerox Sigma-5), connected to ARPAnet
- **July 4th, 1971:**
 - “I had been out later than usual watching the 4th of July fireworks. On my way back I decided to get some food and stopped at the grocery store, where a faux parchment copy of the US Declaration of Independence was given to me with my dinner. ... as the faux parchment fell out with the groceries a light went on over my head. As a result, ..., Project Gutenberg came into existence, as I sat down and typed in that historical document.”
 - Sending 5 KB file to 100 people would have crashed the system, so:
 - » File was put onto tape for download on demand
 - » Availability was announced on Usenet predecessor system



http://ia600201.us.archive.org/13/items/The_Basement_Interviews/Michael_Hart_Interview.pdf

Project Gutenberg



- From 1971 to 1998: One person, 313 books
- 1998:
 - Linking with PC Users Group, community of volunteers
 - Within one year, 1.600 books
- Principles:
 - To provide as many e-books in as many formats as possible for the entire world to read in as many languages as possible
 - Project Gutenberg does not claim new copyright on titles it publishes. Instead, it encourages their free reproduction and distribution.

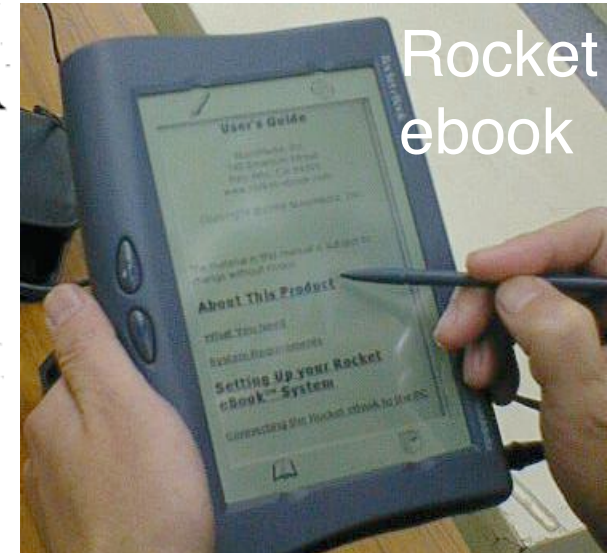
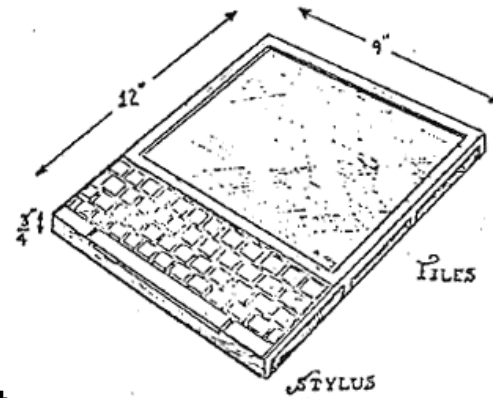


“Actually, Gutenberg didn't invent the printing press; he just added one element: moveable type. I didn't invent the Internet; I just added one element: books that can be copied at the speed of light. Like Gutenberg I made books so much easier for the masses to get, and so much cheaper.” Michael Hart

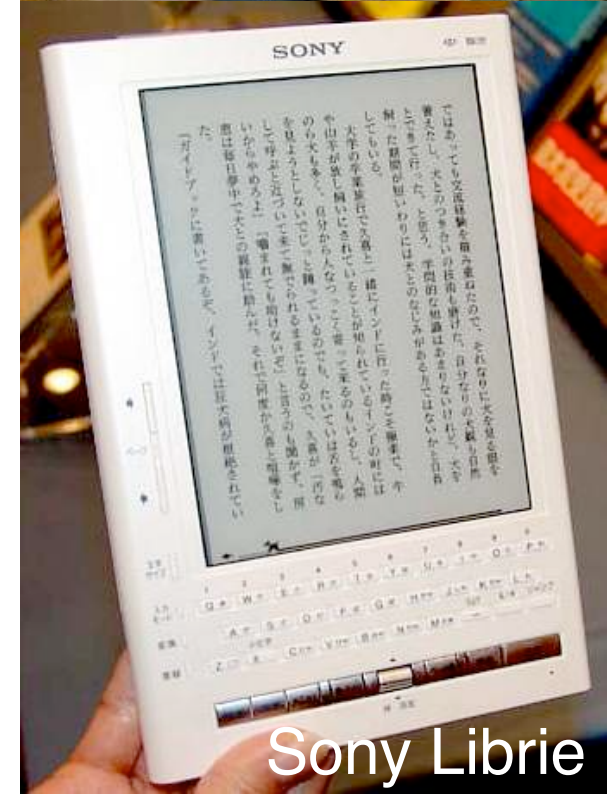
History of Electronic Books

- 1971: Michael S. Hart, *Project Gutenberg* (until today)
- 1972: Alan Kay, *DynaBook* concept
- 1985–1992: Robert Stein, *Voyager Company*
- 1993: Company *Digital Book*, Digital Book Format (DBF), books on floppy disk
- 1998: *Rocket ebook* and *Softbook*, first e-book readers
- 2004: *Sony Librie*, first e-book reader with e-ink
- 2004: R. Stein: Institute for the Future of the Book
- 2007: Launch of *Amazon Kindle*
- 2010: Launch of *Google eBooks*
- 2010: Amazon.com reports that e-book sales have for the first time outnumbered hardcover book sales (2nd Quarter 2010)

Source: Wikipedia,
 Images: harpowoman.wordpress.com, www.yesky.com



Rocket ebook



Sony Librie

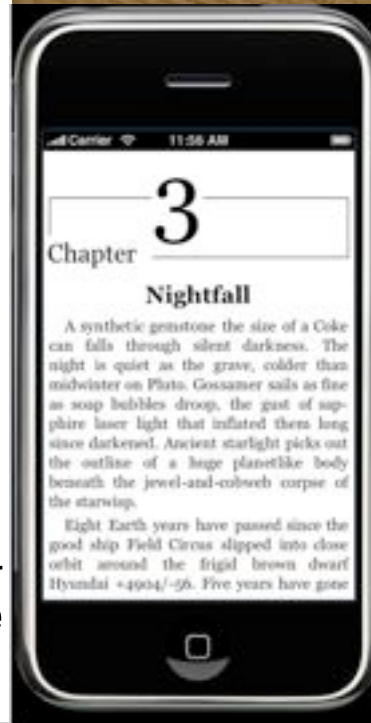
E-Readers

- An **e(-book) reader** is a (usually portable) device which is designed for being used to read electronic publications.
- Classification:
 - Dedicated e-book reading devices, often using **e-ink** display technology
 - Smartphones, music players or PDAs with reader software
 - Notebooks or netbooks with reader software
 - Tablets with reader software

Stanza
on iPhone
(lexcycle.com)

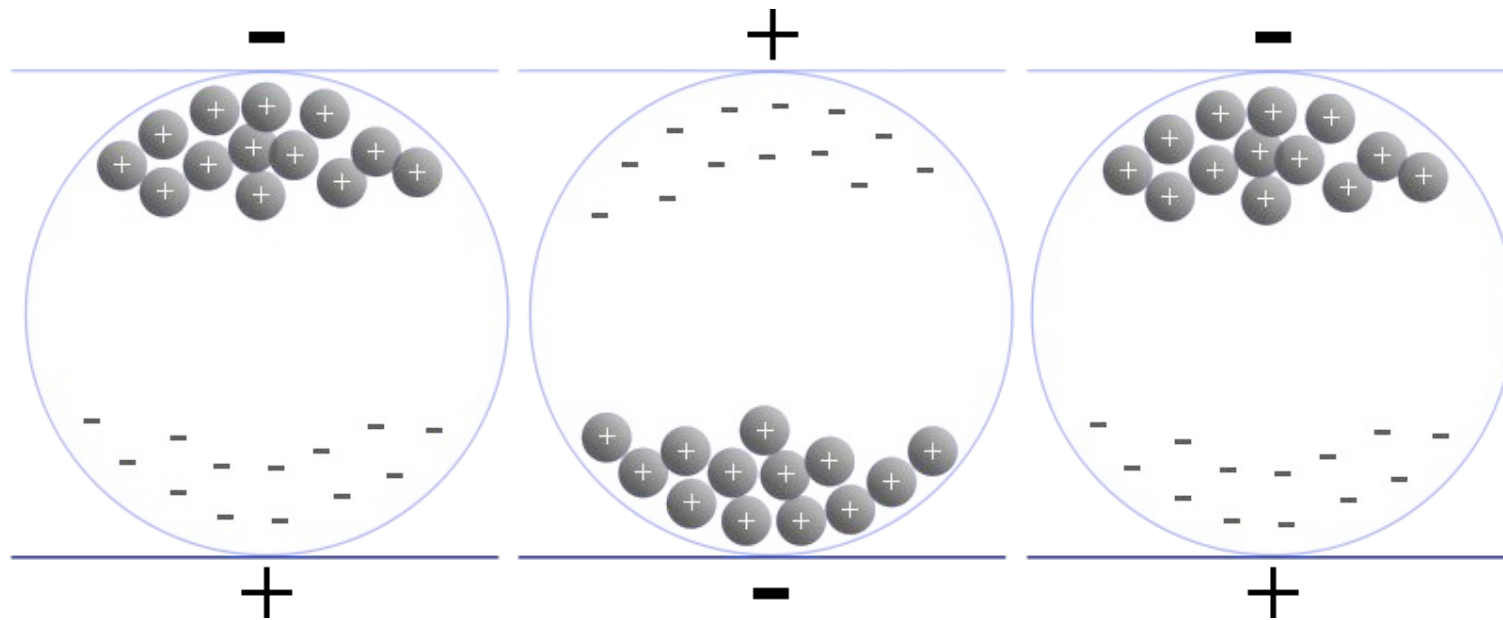


Various readers
(Wikimedia)



Electrophoretic Displays (E-Ink)

- Principle: Small coloured particles (one micrometer diameter) dispersed in dyed hydrocarbon oil, particles migrate to electrodes on opposite sides
- Relatively slow, only global updates (needs "flashing" to avoid "ghost images"), currently mostly black&white (color prototypes exist)
- Extremely low energy consumption, extremely high contrast, image stays



(Wikipedia)

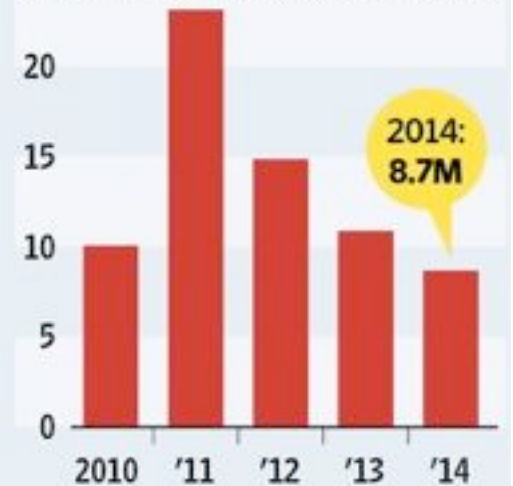
E-Reader Market



Past Peak

Global e-reader shipments are waning, iSuppli estimates show.

25 million units shipped (estimated)



Source: IHS iSuppli Research

The Wall Street Journal

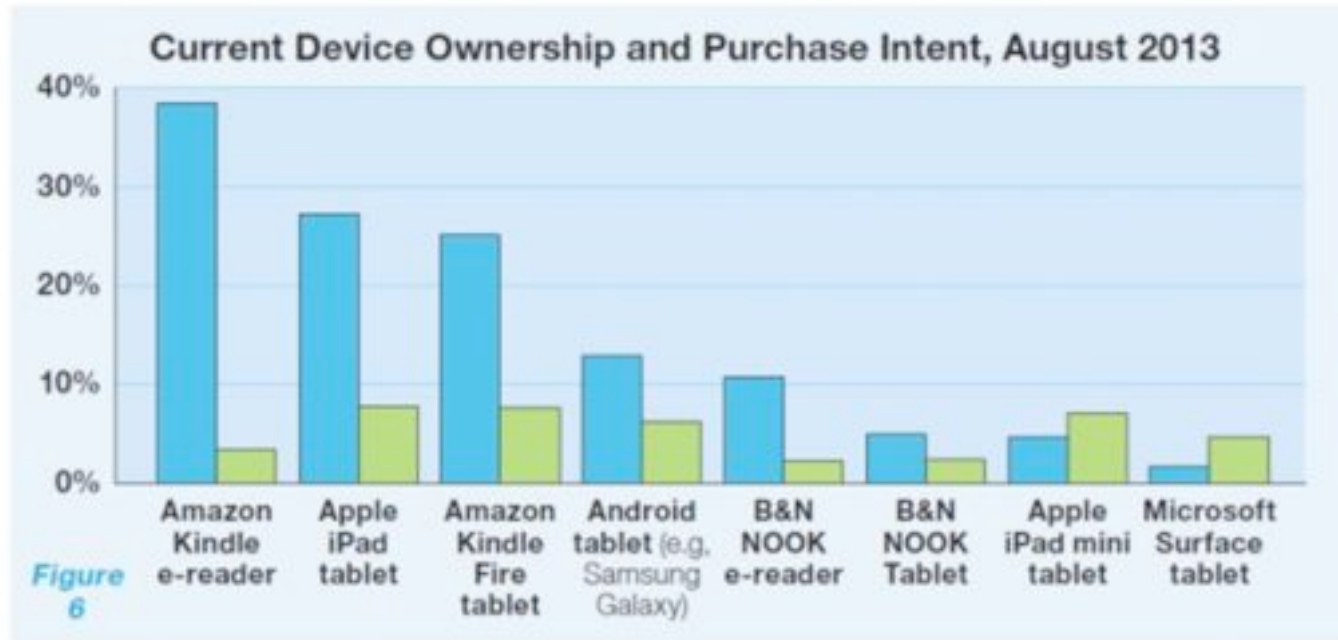


Figure 6

Legend:
■ Currently own
■ Plan to buy

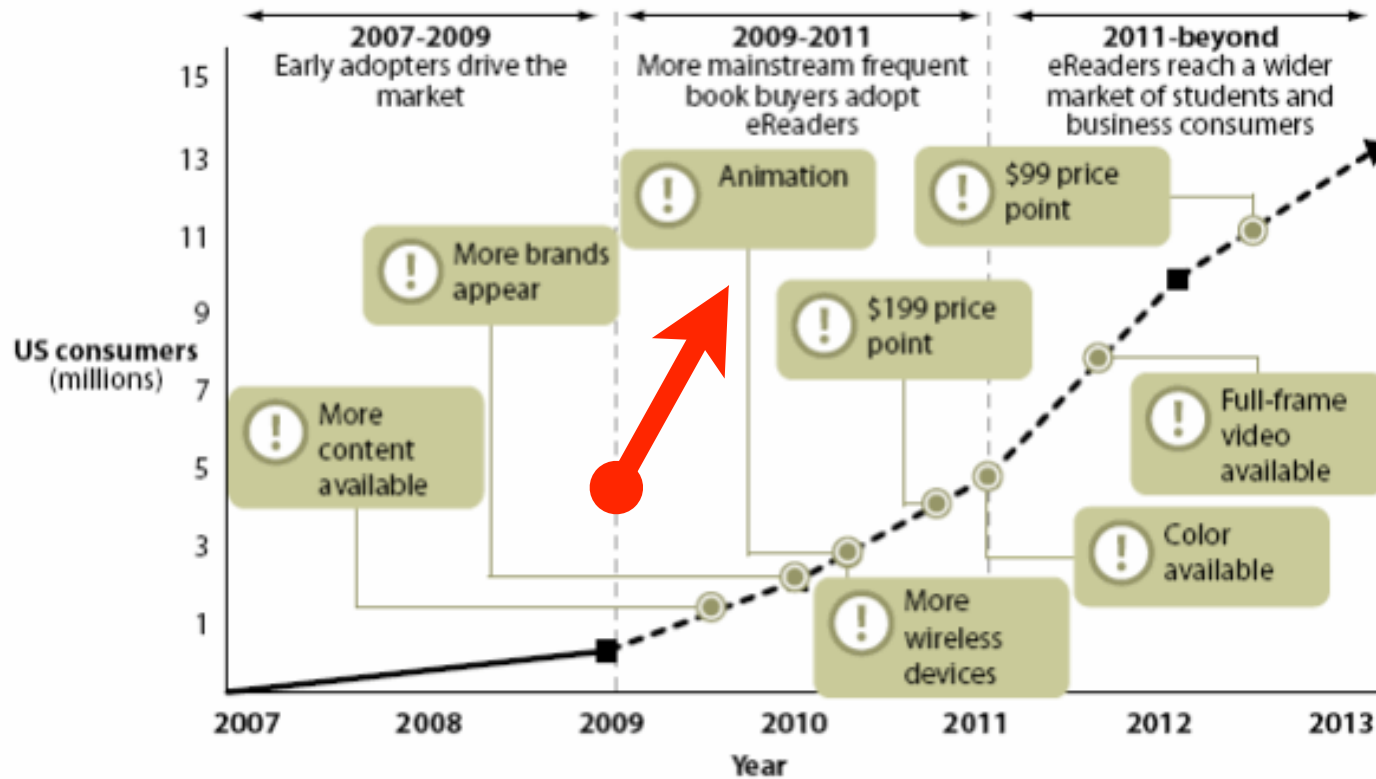
Source: BISG survey of 1,048 Americans aged 13 and up, August 2013. The data in this particular chart is from among those who say they read ebooks.

From forbes.com

lesen.net



Hype Cycle, Market Data for E-Readers



www.readwriteweb.com,
June 2009

54463

Source: Forrester Research, Inc.

Market survey data (pewresearch.org):

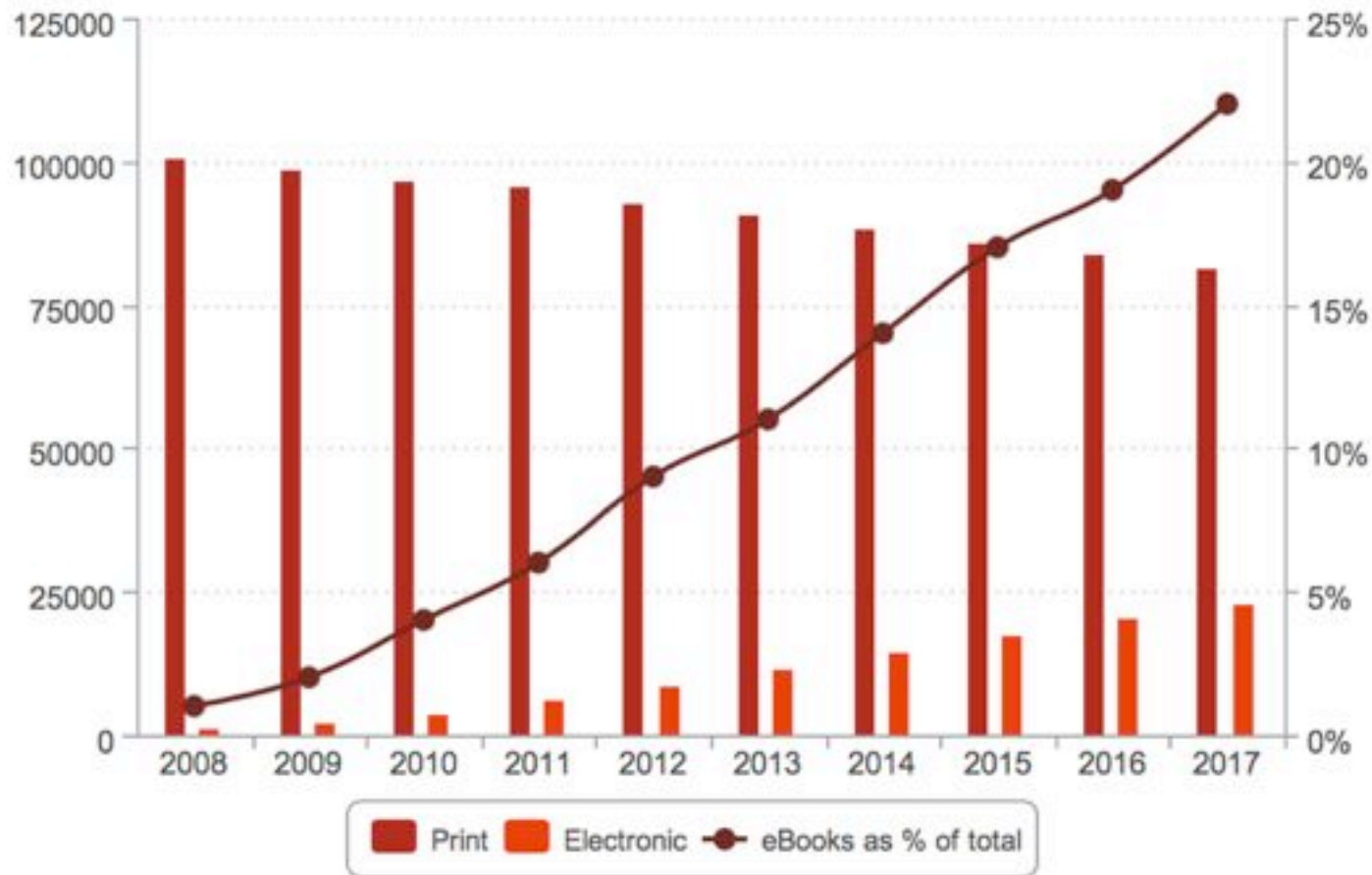
- 2009: 2% (US adults), approx. 4.5 mio users
- 2011: 12%, approx. 28 mio users
- 2013: 26%, approx. 65 mio users

Electronic Books on the Rise



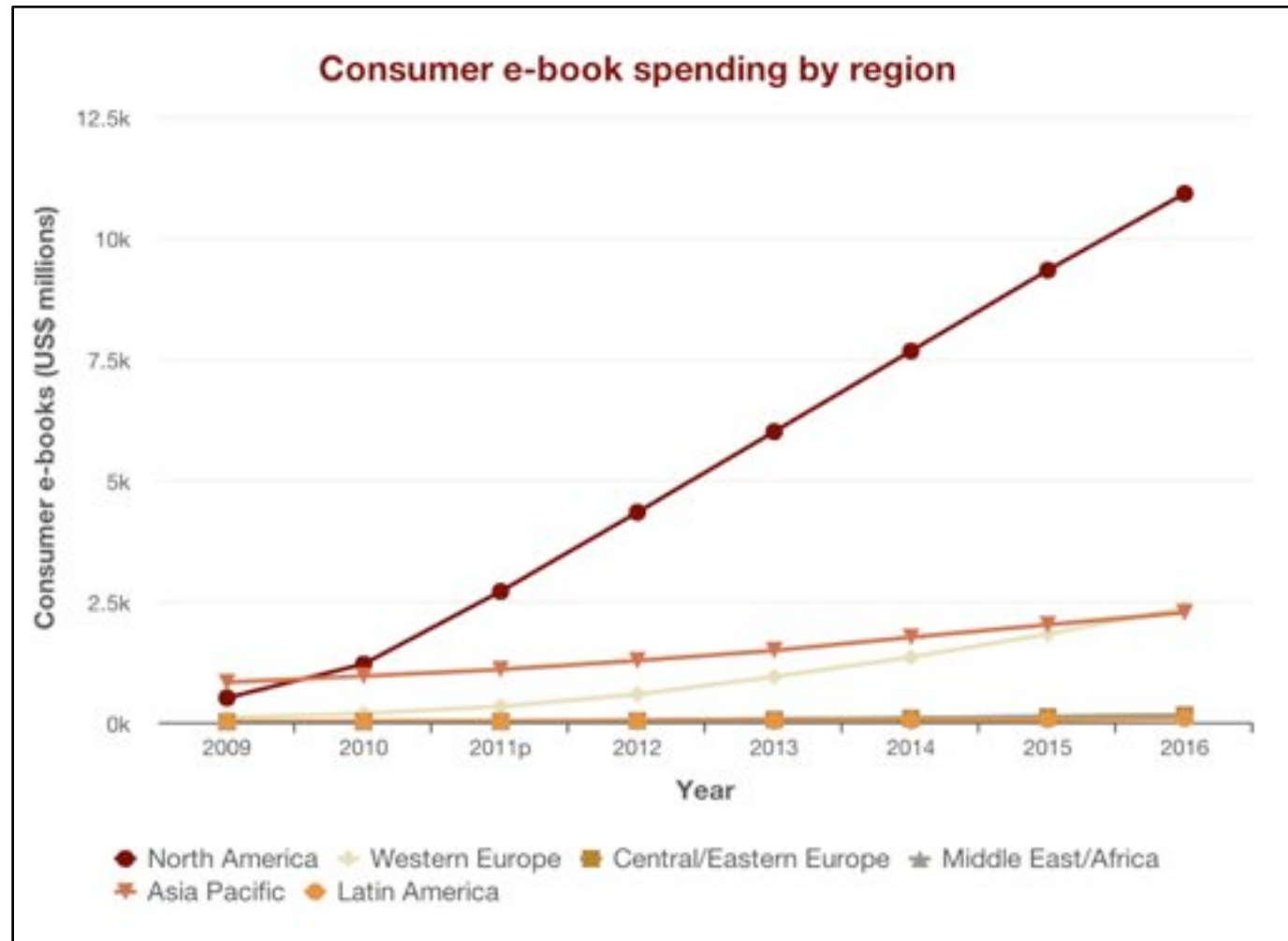
Global entertainment and media outlook: 2013-2017

Global consumer and educational book publishing revenues (US\$ mn) and e-books share of the market (%) 2008-2017



www.pwc.com

Strong Regional Differences in E-Book Usage



E-Book market share in Germany (2012): 2.4 % (mid-2013): 5 %

Source: Börsenverein des Dt. Buchhandels (in: Global EBook Report 2013)

Source: paidcontent.org based on PwC data

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H. Reibold: E-Books selbst gemacht, bomots Verlag 2010

HTML

- HTML is platform-independent and browsers exist for many platforms
- HTML can be used for simple e-books
- HTML is the basis for the chapter content in most current e-book formats
- HTML is not memory-efficient
 - HTML code needs to be compressed, eg. using ZIP

Open E-Book

- 1998: First e-book conference in the US (NIST)
- Working group "Open eBook Authoring Group" founded
 - 25 representatives of international companies and organisations
 - Developed Open eBook Publication Structure (OEBPS, OeB), 1999
- OEBPS:
 - Based on HTML 4 and XML
 - Uses subset of Cascading Style Sheets (CSS)
 - Package file with metadata (in Open Package Format OPF)
 - Chapters in HTML
- 1999: Open eBook Forum founded to maintain the standard
 - 2005 renamed to "International Digital Publishing Forum" (IDPF)
- OEBPS 1.01 (2001):
 - Fully compatible with XHTML 1.1
 - Works only with external style sheets
- Impact mainly indirectly through other formats

Microsoft LIT Format (.lit)

- DRM-protected proprietary format, since 2000
 - Originally developed for PocketPC
- Readable with
 - Microsoft Reader (protected files)
 - Lexstyle Stanza and other tools (unprotected files)
- Compressed form of Microsoft Hep Module Format (CHM)
 - Essentially based on OEBPS and HTML
- Uses patented *ClearType* technology for improving readability on LCD screens
- Supports user annotations
- "Verbosity functions" enable speech output

Mobipocket-Format (.prc)

- French company Mobipocket, 2000:
 - develops e-book reader software for PDAs, in particular for Palm devices
 - eBook Technology award 2001 (Frankfurter Buchmesse)
 - Has been ported to many operating systems
(including Windows, Windows Mobile, Blackberry, Symbian OS)
- File extension .prc just for compatibility with PalmOS
- Based on OEBPS and HTML
- Development tool *Mobipocket Creator*
 - Compiles into binary and compressed file format

Amazon Kindle Format (.azw)

- 2005: Amazon buys Mobipocket
 - Kindle devices on the market starting 2007
- "AZW" probably relates to "Amazon Whispernet"
 - Amazon network for wireless distribution of content
- Amazon-specific DRM, but otherwise compatible with Mobipocket format
- Conversion tool (command line) *Amazon KindleGen*
 - from HTML, XHTML, XML (OPF/IDPF), ePUB
- Kindle Direct Publishing Platform (KDP) for authors
 - integration of publisher, distributor, bookseller
- Topaz:
 - Proprietary format used by Amazon/Kindle, not many details known

More E-Book Formats

- Examples:
 - DAISY
 - » Digital Accessible Information System
 - » Mainly oriented towards accessibility for challenged people
 - » Used e.g. for audio books for the visibly impaired
 - » Being harmonized with ePUB
 - FictionBook (.fb2)
 - » Russian book format, used in particular for Russian literature
 - » XML-based
 - LRF
 - » Proprietary format by Sony
 - ...

Format Incompatibilities

- Market split:
 - ePUB:
 - » Open standard, many stores
 - » e.g. many titles in German language
 - Amazon Kindle
 - PDF and other formats
- Various DRM systems
 - Adobe Adept for ePUB and PDF
 - » readable with Adobe Digital Editions and many e-readers
 - Marlin DRM for ePUB
 - Apple Fairplay for iBooks
 - Amazon Mobipocket DRM
- Example problem:
 - Found a book in ePUB format, with DRM
 - Want to read on Kindle

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Why ePUB?

- ePUB is the most likely candidate for a long-lasting e-book standard
 - based on open standards
 - itself open standard
 - supported by major industry players
- Strong market forces:
 - iBook store on iPad/iPod/iPhone by Apple is based on ePUB
 - German main booksellers focus on ePUB format (and Tolino reader)

OPF/OPS and ePUB

- 2005: IDPF tries to harmonize the various similar but divergent formats
 - Single final format for e-books
 - Creation of a single flexible container format (Open Container Format OCF)
 - Compatibility with latest versions of related standards (e.g. XML, CSS)
 - Integration of accessibility aspects based on DAISY
- 2007: Definition of "ePUB" (.epub)
- 2011: ePUB 3.0 (Final Recommended Spec of IDPF):
 - XHTML/HTML5
 - Embedded still images, SVG vector graphics, math equations
 - Embedded audio and video
 - Interactivity with JavaScript (optional for e-readers)

ePUB 3: Four Parts of the Standard

- EPUB Publications
 - Publication-level semantics
 - Conformance requirements
 - Packaging, metadata
- EPUB Content Documents
 - Profiles for XHTML/HTML5, SVG, CSS
 - » Navigation
- EPUB OCF (Open Container Format)
 - Single file for publication
 - Logical file system within the (compressed) single file
 - DRM, watermarking
- EPUB Media Overlays
 - Synchronization video/audio
 - Based on SMIL



Open Publication Format (OPF)



- XML file in Open Publication Format file (.opf)
 - Navigation Document
 - » Until ePUB 2: NCX standard (from DAISY)
 - » ePUB 3: HTML5 `.nav` element
- Contents of OPF file:
 - `<package>` element containing:
 - » `<metadata>` based on Dublin Core Standard
 - » `<manifest>`: list of files
 - » `<spine>`: order of documents (serialization)
 - » `<tours>` (optional, deprecated): Alternative sequences
 - » `<guide>` (optional): Entrance point to overview parts of publication

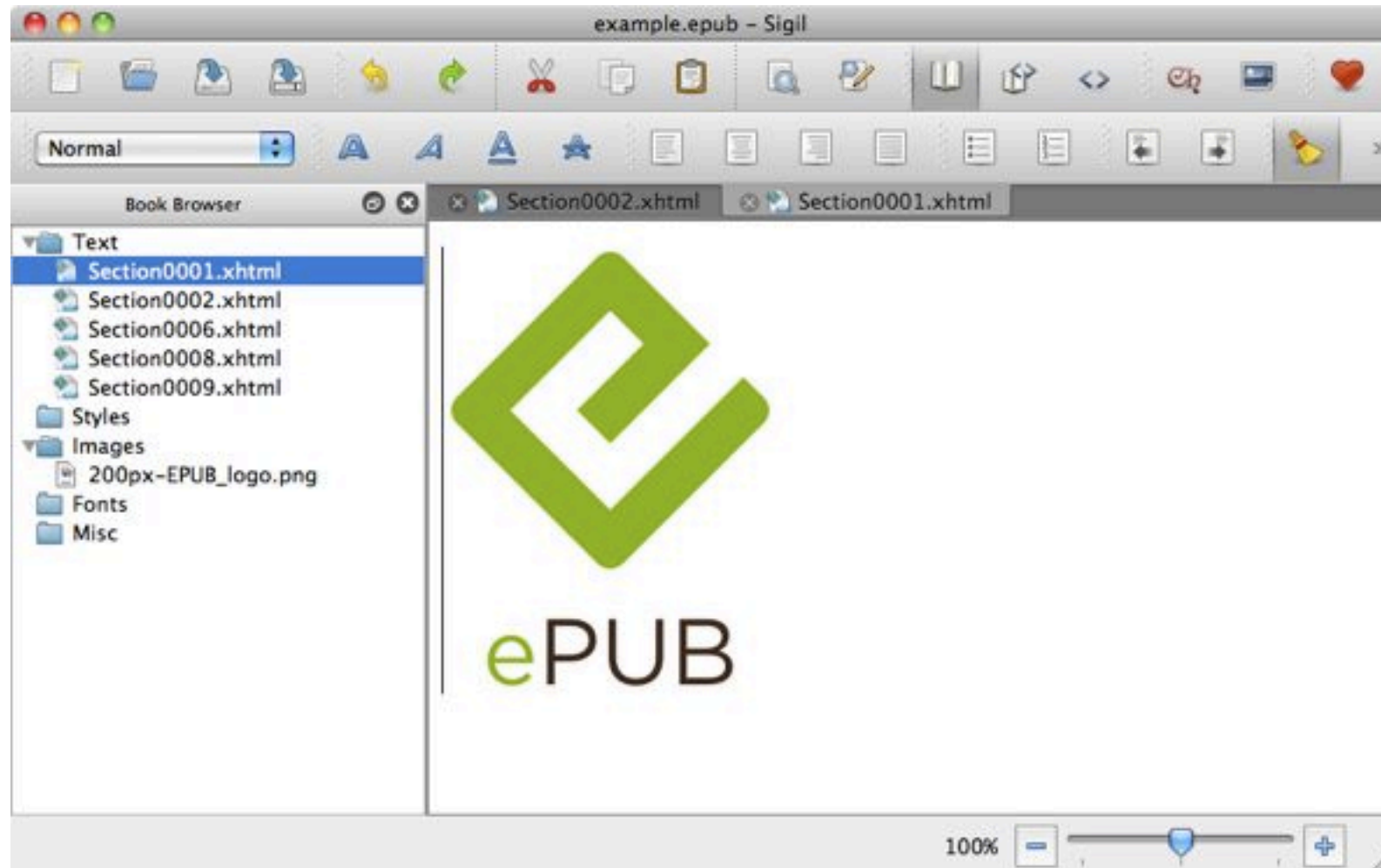
Open Container Format OCF



- OCF defines the structure of the ePUB file
- File is a ZIP file containing a file system (similar to e.g. jar files)
- META-INF folder:
 - container.xml: defines root directory and OPF file of publication
 - manifest.xml (optional), metadata.xml: required only for non-OPS contents
 - signatures.xml, encryption.xml, rights.xml (all optional): DRM info
- mimetype file:
 - Defines MIME type of file, usually "application/epub+zip"
- OEBPS folder:
 - Contains actual content files (XHTML)

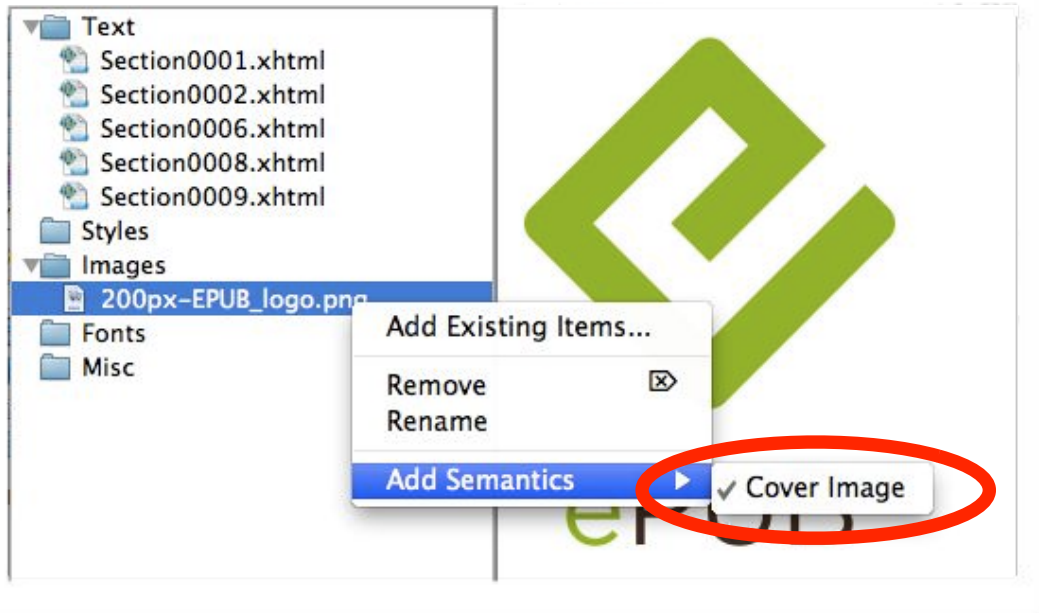
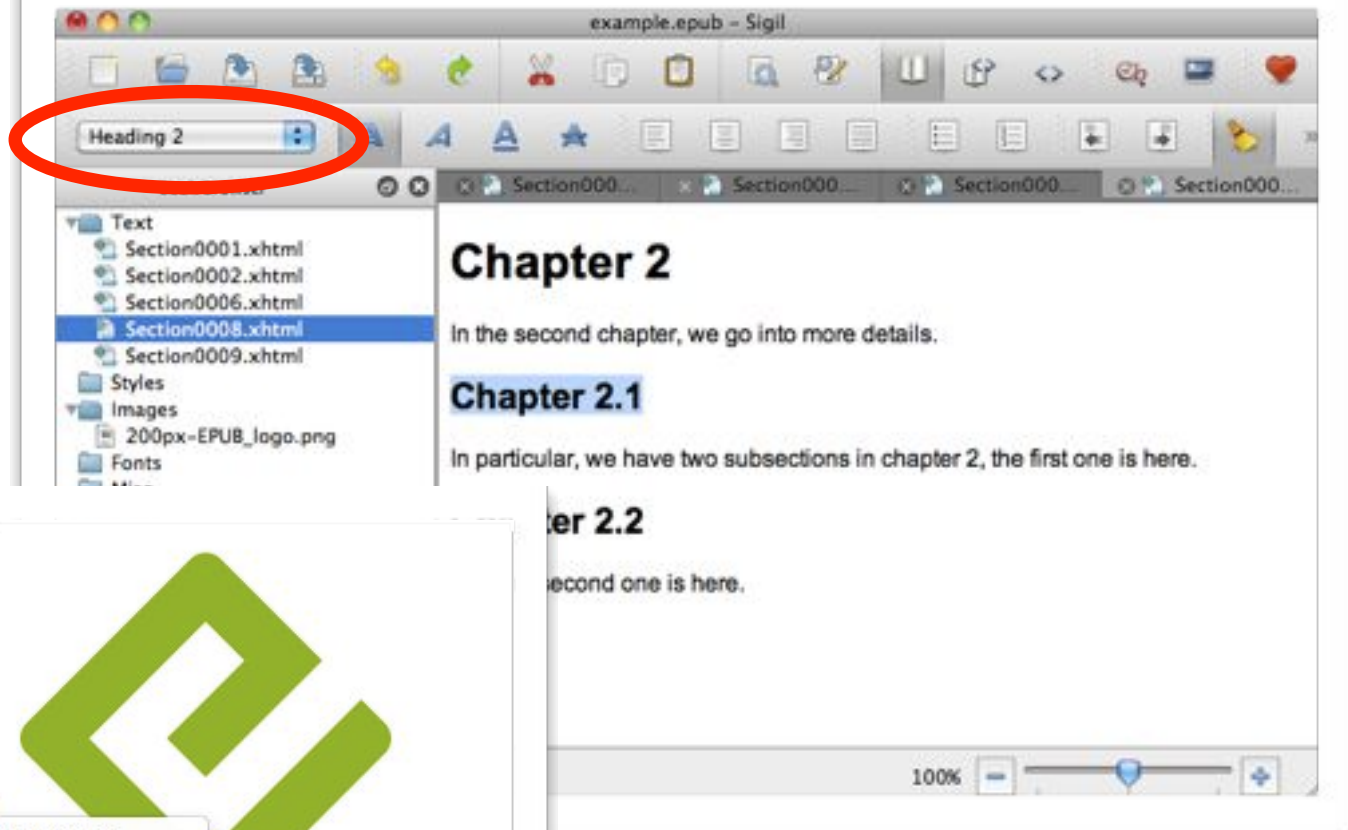
Example Using ePUB Editor (1)

- Tool used for the example: "Sigil" editor (<http://code.google.com/p/sigil/>)



Example Using ePUB Editor (2)

Declaring semantic attributes



Example Using ePUB Editor: Archive Structure

▼	Folder	META-INF	--	Folder
	File	container.xml	4 KB	Text document
	File	mimetype	4 KB	Document
▼	Folder	OEBS	--	Folder
	File	content.opf	4 KB	Document
▼	Folder	Images	--	Folder
	Image	200px-Epub_logo.png	8 KB	Portab...image
▼	Folder	Text	--	Folder
	Text document	Section0001.xhtml	4 KB	TextW...ument
	Text document	Section0002.xhtml	4 KB	TextW...ument
	Text document	Section0006.xhtml	4 KB	TextW...ument
	Text document	Section0008.xhtml	4 KB	TextW...ument
	Text document	Section0009.xhtml	4 KB	TextW...ument
	File	toc.ncx	4 KB	Document

Example Using ePUB Editor: container.xml

```
<?xml version="1.0"?>
<container version="1.0"
xmlns="urn:oasis:names:tc:opendocument:xmlns:container"
>
    <rootfiles>
        <rootfile full-path="OEBPS/content.opf"
            media-type="application/oebps-package+xml" />
    </rootfiles>
</container>
```

Example Using ePUB Editor: content.opf (1)

```
<?xml version="1.0" encoding="UTF-8"?>
<package xmlns="http://www.idpf.org/2007/opf" unique-identifier="BookID"
version="2.0">
  <metadata xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:opf="http://www.idpf.org/2007/opf">
    <dc:title>An example e-book</dc:title>
    <dc:creator opf:role="aut">Heinrich Hussmann</dc:creator>
    <dc:language>en</dc:language>
    <dc:identifier id="BookID" opf:scheme="UUID"> ... </dc:identifier>
    <meta name="cover" content="x200px-EPUB_logo.png"/>
    <meta name="Sigil version" content="0.3.4"/>
  </metadata>
  <manifest>
    <item id="ncx" href="toc.ncx" media-type="application/x-dtbnex+xml"/>
    <item id="x200px-EPUB_logo.png" href="Images/200px-EPUB_logo.png"
media-type="image/png"/>
    <item id="Section0001.xhtml" href="Text/Section0001.xhtml"
media-type="application/xhtml+xml"/>
    <item id="Section0002.xhtml" href="Text/Section0002.xhtml"
media-type="application/xhtml+xml"/>
    ...
  </manifest>
  ...
</package>
```

Example Using ePUB Editor: content.opf (2)

...

```
<spine toc="ncx">
  <itemref idref="Section0001.xhtml"/>
  <itemref idref="Section0002.xhtml"/>
  <itemref idref="Section0006.xhtml"/>
  <itemref idref="Section0008.xhtml"/>
  <itemref idref="Section0009.xhtml"/>
</spine>
<guide>
  <reference type="cover" title="Cover" href="Text/Section0001.xhtml"/>
</guide>
</package>
```

Example Using ePUB Editor: Content file

```
<?xml version="1.0" encoding="utf-8" standalone="no"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.1//EN"
  "http://www.w3.org/TR/xhtml11/DTD/xhtml11.dtd">

<html xmlns="http://www.w3.org/1999/xhtml">
<head>
  <title></title>
</head>

<body>
  <h1 id="heading_id_2">Chapter 2</h1>

  <p>In the second chapter, we go into more details.</p>

  <h2 id="heading_id_3">Chapter 2.1</h2>

  <p>In particular, we have two subsections in chapter 2,
    the first one is here.</p>

  <h2 id="heading_id_4">Chapter 2.2</h2>

  <p>And the second one is here.</p>
</body>
</html>
```

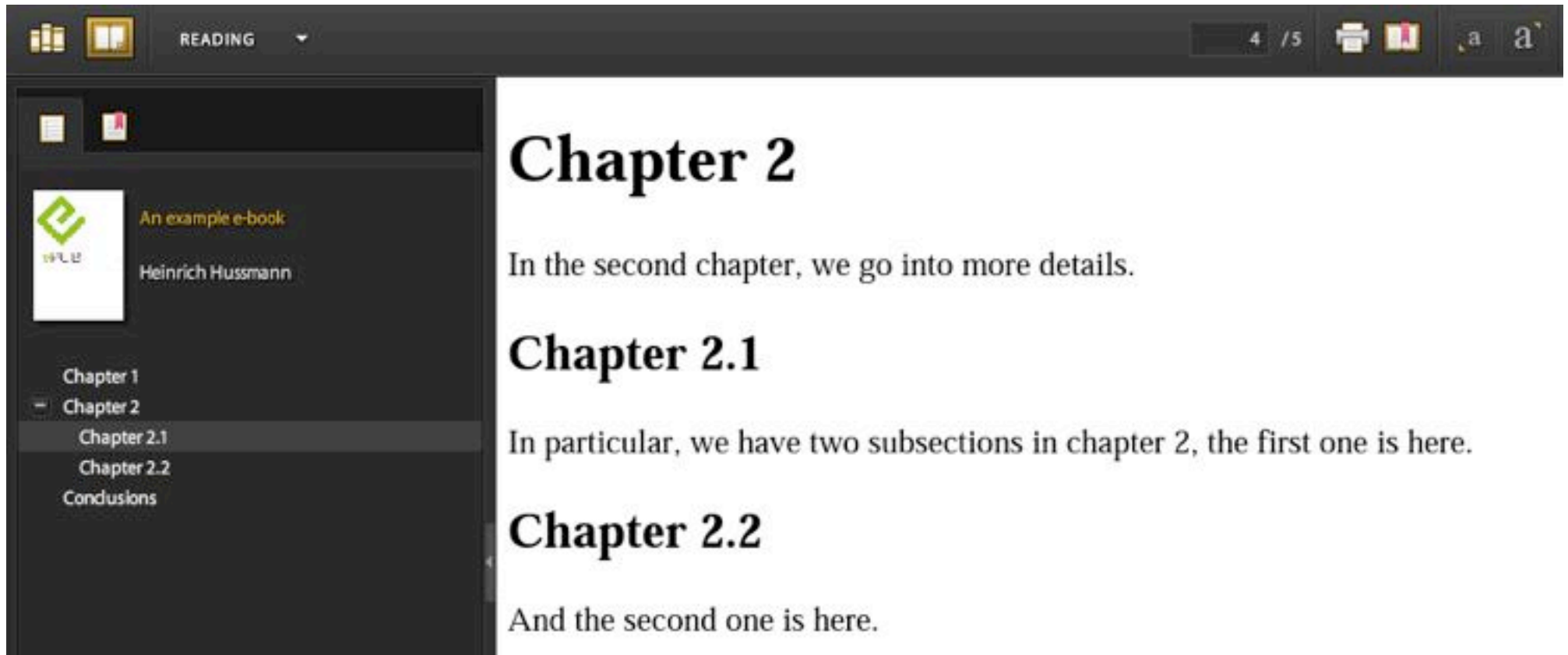
Example Using ePUB Editor: toc.ncx

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE ncx PUBLIC "-//NISO//DTD ncx 2005-1//EN"
    "http://www.daisy.org/z3986/2005/ncx-2005-1.dtd">

<ncx xmlns="http://www.daisy.org/z3986/2005/ncx/" version="2005-1">
  <head>
    <meta name="dtb:uid" content="47e865c1-81d2-42f6-ace6-de4953f3f222"/>
    <meta name="dtb:depth" content="2"/>
    <meta name="dtb:totalPageCount" content="0"/>
    <meta name="dtb:maxPageNumber" content="0"/>
  </head>
  <docTitle>
    <text>An example e-book</text>
  </docTitle>
  <navMap>
    <navPoint id="navPoint-1" playOrder="1">
      <navLabel>
        <text>Chapter 1</text>
      </navLabel>
      <content src="Text/Section0006.xhtml"/>
    </navPoint>
    <navPoint id="navPoint-2" playOrder="2">
      <navLabel>
        <text>Chapter 2</text>
      </navLabel>
      <content src="Text/Section0008.xhtml"/>
      <navPoint id="navPoint-3" playOrder="3">
        <navLabel>
          <text>Chapter 2.1</text>
        </navLabel>
        <content src="Text/Section0008.xhtml#heading_id_3"/>
      </navPoint>
    </navPoint>
  </navMap>
  ...
</ncx>
```

Example Viewed in E-Book Reader

Using *Adobe Digital Editions*:



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9.3 Open Standard for Electronic Books: ePUB

9.4 Trends

Literature

Unclear Trends

- Tablets vs E-Readers
 - E-Readers with LCD display (e.g. Nook Color, Kindle Fire)
 - E-Book applications on tablets (like iPad)
- Unstable tablet market
 - iOS vs. Android vs. MS Surface
- E-Book formats: market split
 - Proprietary (e.g. Amazon) vs. open (e.g. ePUB, PDF)
- **Lending of e-books from libraries:**
Increasingly popular in the U.S.
- **Self-published (user produced) e-Books:**
e.g. Amazon kindle direct publishing



Multimedia E-Books: Example iBooks Author

- Authoring software for Apple iBooks (ePUB 3 format)



Apple

Social Books

- <http://futureofthebook.org/blog/2013/08/18/socialbook-in-action/>

The screenshot displays a digital book interface. On the left, there is a sidebar with a 'Library' section containing 'My Groups' (Collin's section -- Oroonoko) and 'Inline: 20' (General: 0). Below this is a grid of user avatars. The main content area shows a text passage from 'Oroonoko' with several lines highlighted in yellow. An 'Inline Comments Scanner' window is overlaid on the right side of the text, showing three comments from users Dan Chen, odddecohen, and RubiMora, each with a 'reply' button. At the bottom of the scanner, it indicates '1 of 20 notes'.

presented to me, and I gave 'em to the King's Theatre; it was the Dress of the Indian Queen, infinitely admir'd by Persons of Quality; and was inimitable. Besides these, a thousand little Knacks, and Rarities in Nature; and some of Art, as their Baskets, Weapons, Aprons, &c. We dealt with 'em with Beads of all Colours, Knives, Axes, Pins and Needles, which they us'd only as Tools to drill Holes with in their Ears, Noses and Lips, where they hang a great many little Things; as long Beads, Bits of Tin, Brass or Silver beat thin, and any shining Trinket, The Beads they weave into Aprons about a Quarter of an Ell long, and of the same Breadth; working them very prettily in Flowers of several Colours; which Apron they wear just before 'em, as Adam and Eve did the Fig-leaves; the Men wearing a long Stripe of Linen, which they deal with us for. They thread these Beads also on long Cotton-threads, and make Girdles to tie their Aprons to, which come twenty times, or more, about the Waste, and then cross, like a Shoulder-belt, both Ways, and round their Necks, Arms and Legs. This Adornment, with their long Neck Hair, and the Face painted in little Specks or Flowers here and there, makes 'em a wonderful Figure to behold. Some of the Beauties, which indeed are finely shap'd, as almost all are, and who have pretty Features, are charming and novel: for they have all that is called Beauty, except the Colour, which is a reddish Yellow; or after a new Oiling, which they often use to themselves, they are of the Colour of a new Brick, but smooth, soft and sleek. They are extreme modest and bashful, very shy, and nice of being touch'd. And tho' they are all thus naked, if one lives for ever among 'em, there is not to be seen an indecent Action, or Glance; and being continually us'd to see one another so unadorn'd, so like our first Parents before the Fall, it seems as if they had no Washes, there being nothing to heighten Curiosity: but all you can see, you see at once, and every Moment see; and where there is no Novelty, there can be no Curiosity. Not but I have seen a handsome young Indian, dying for Love of a very beautiful young Indian Maid; but all his Courtship was, to fold his Arms, pursue her with his Eyes, and Sighs were all his Language: While she, as if no such Lover were present, or rather as if she desired none such, carefully guarded her Eyes from beholding him; and never approach'd him, but she looked down with all the blushing Modesty I have seen in the most Severe and Cautious of our World. And these People represented to me an absolute Idea of the first State of Innocence, before Man knew how to sin: And 'tis most evident and plain, that simple Nature is the most harmless, inoffensive and virtuous Mistress. 'Tis she alone, if she were permitted, that better instructs the World, than all the Inventions of Man: Religion would here but destroy that Tranquillity they possess by Ignorance; and Laws would but teach 'em to know Offences, of which now they have no Notion; They once made Mourning and Fasting for the Death of the English Governor, who had given his Hand to come on such a Day to 'em, and

E-Book Piracy

- Driven by various forces:
 - High prices for e-books
 - Platform, format incompatibilities
 - Low data volume of e-books
- Forms:
 - DRM circumvention
 - File sharing
 - OCR of printed/displayed books
- Strong efforts by publishers against piracy sites/forums
 - Main “hubs” under attack
 - Situation similar to digital music market?
- Roughly one third of e-book readers uses pirated content
 - Wiggin study 2011



Buchhandel und Raubkopien



*Wercke der Finsternis.
Der Beytrag zur Geschichte des Buchhandels in Deutschland Allegorisch vorgestellt zum besten,
auch zur Warnung aller bestehenden Buchhändler.
am Verlage bey C. F. Neuberger in Berlin*

“Wercke der
Finsternis”
Daniel Chodowiecki
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2010