DIGITAL FORENSICS IN LIBRARIES AND ARCHIVES

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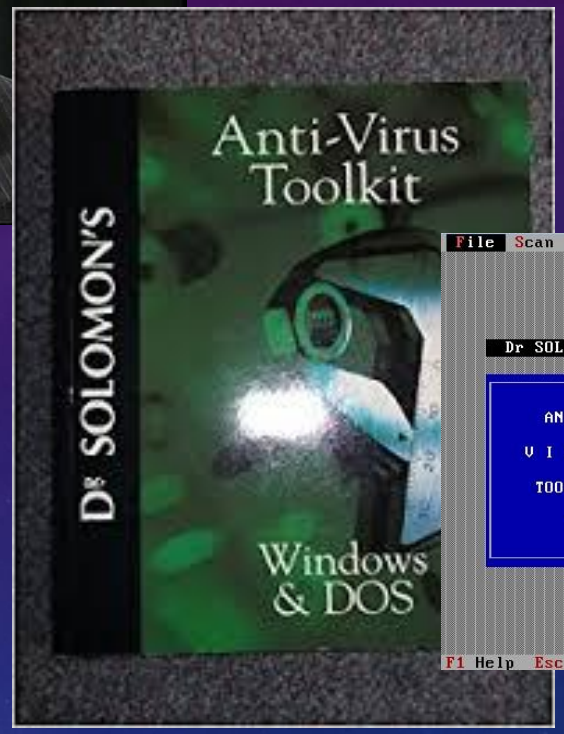
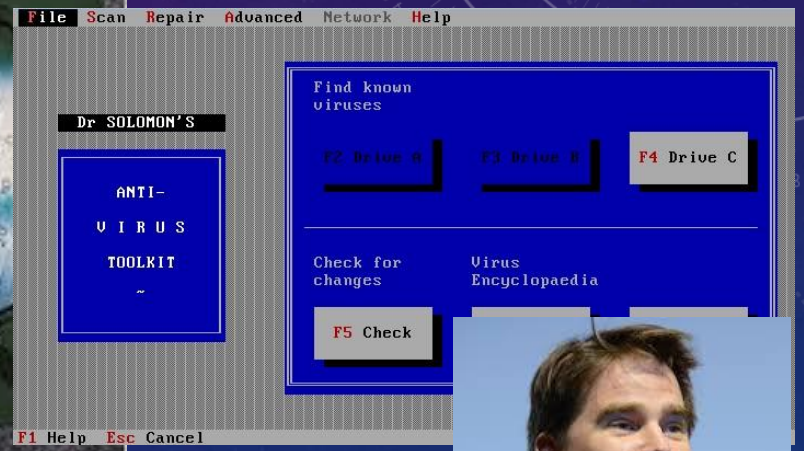
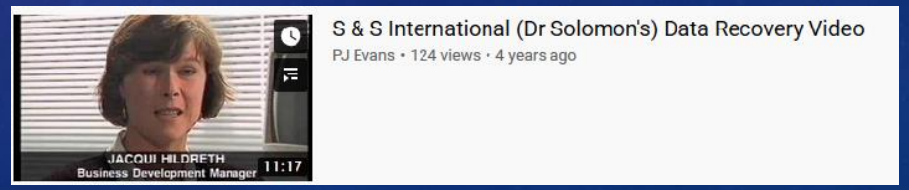
NOT MY FIRST TIME!





- A long time ago…
  - …well early 90's
  - Dr Solomon's Anti-Virus Toolkit for DOS
  - A chap called Graham Cluley worked on Windows…
- Dr Solomon's Data Recovery…
  - …Authentec
  - …Vogon
  - …Ontrack
- https://www.youtube.com/watch?v=pJ0wASeHQHo



FORENSICS IN RESEARCH LIBRARIES

- Long Term Data Management is only now becoming a expectation/requirement:
  - funders, institutions, policy makers share the blame
  - …and libraries for not being noisy enough
  - …and probably not getting involved earlier
- When research projects ends there is no funding/time for:
  - Specifications
  - Documentation
  - Hand-over
  - …everyone has moved on to the next project
- A box arrives…
  - If you are lucky someone is still around from the project
  - If you are really lucky, they are technical

BUT AT LEAST IT WAS WORKING RECENTLY

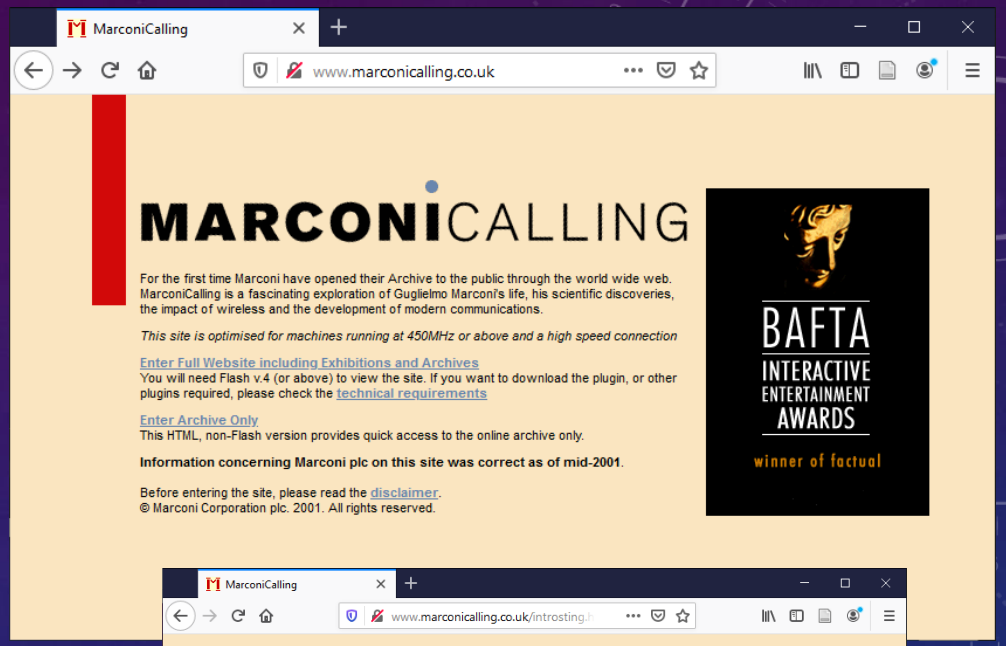
AND THERE IS A GOOD CHANCE SOME OF THE PEOPLE ARE STILL ALIVE

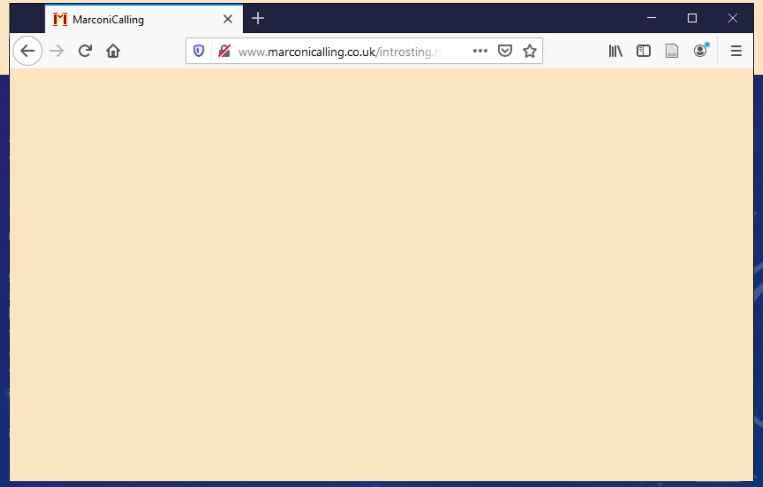
FORENSICS IN ARCHIVES

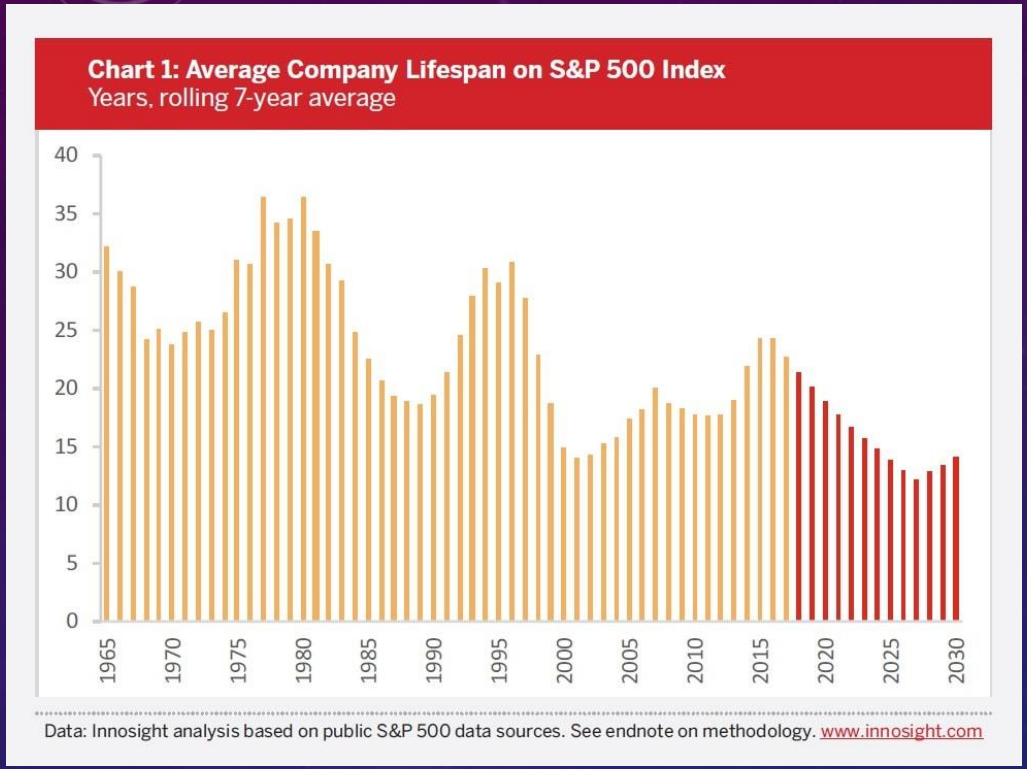
- Personal archives
  - People “papers and effects” are increasingly digital
  - The number of eminent people who get their “effects in order” is very small
  - …and this frequently does not include digital
- Boxes of media and devices
  - Can’t easily tell if it works
  - Can’t easily tell if it’s valuable
    - Triage issue – to fix or not to fix?
  - Dates, times, labels?
- An increasing problem
  - The number and variety of memory devices is increasing

CORPORATE ARCHIVES

- Not entirely dissimilar to personal archives
  - More complex
  - The work of multiple people
    - Less consistency, fewer patterns to work with
  - Corporate systems are not designed for long term access
    - Complex proprietary formats
    - Lots of home grown software/systems
  - Corporate failures are often messy
- Lots of boxes of media and devices
  - Corporate storage devices can be expensive
  - Spanned media…
  - And all the problems of personal archives







MORE CORPORATE ARCHIVES

HTTPS://WWW.INNOSIGHT.COM/INSIGHT/CREATIVE-DESTRUCTION/

"Amazon is not too big to fail...In fact, I predict one day Amazon will fail. Amazon will go bankrupt. If you look at large companies, their lifespans tend to be 30-plus years, not a hundred-plus years."

Jeff Bezos, Nov 2018

"ARCHIVING IN THE CLOUD"

...SHOULD BE APPROACHED WITH EXTREME CAUTION – EGRESS (COSTS AND SPEED)

SIMILAR TOOLS

- Write blockers
- Kryoflux
  - https://github.com/archivistsguidetokryoflux
- eBay (or other sources of ancient kit)
- Forensic Toolkit
- … or BitCurator (https://bitcurator.net/)

- And sometimes we have to crack things…

But we are concerned with information extraction rather than legal admissibility…although scholarly authenticity is similar

- Signature systems age badly
- Access matters

FORSENSICS SEGUES INTO DIGITAL PRESERVATION

Need to retain access to extracted information in the long term

- Format registries (https://www.nationalarchives.gov.uk/PRONOM)
- Format conversions
  - Significant properties
  - Stable formats
  - Stable delivery (https://iiif.io)
- Emulation (for difficult encapsulated formats)
- Physical preservation (games, art installations etc.)
- Machine analytics and access increasingly important

Downstream curation and processing

- ePadd (https://library.stanford.edu/projects/epadd)
- Digital preservation tools like Archivematica
- Oxford Common File Layout (https://ocfl.io) designed for recoverability

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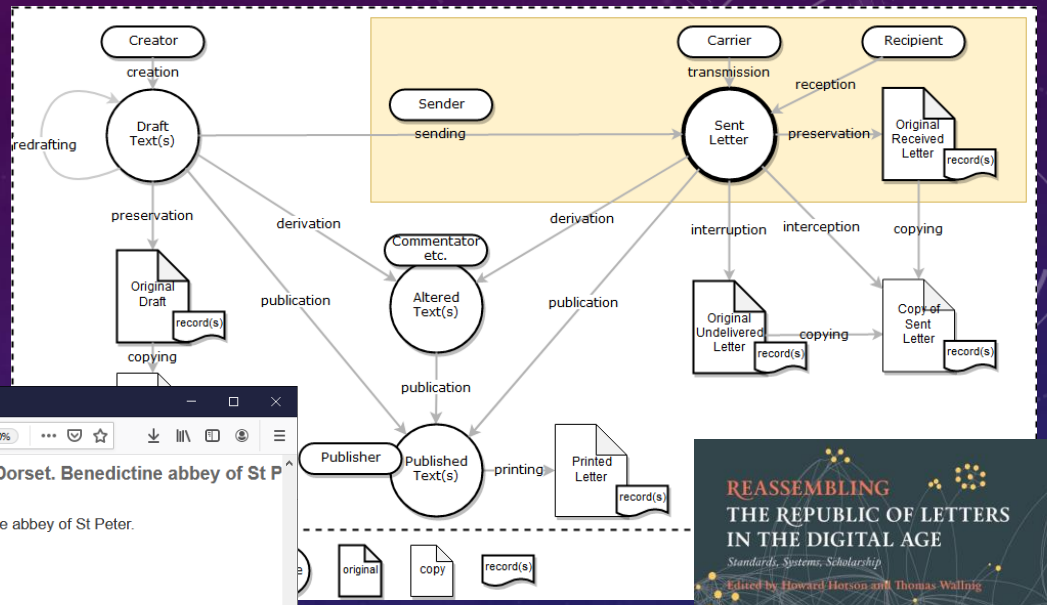
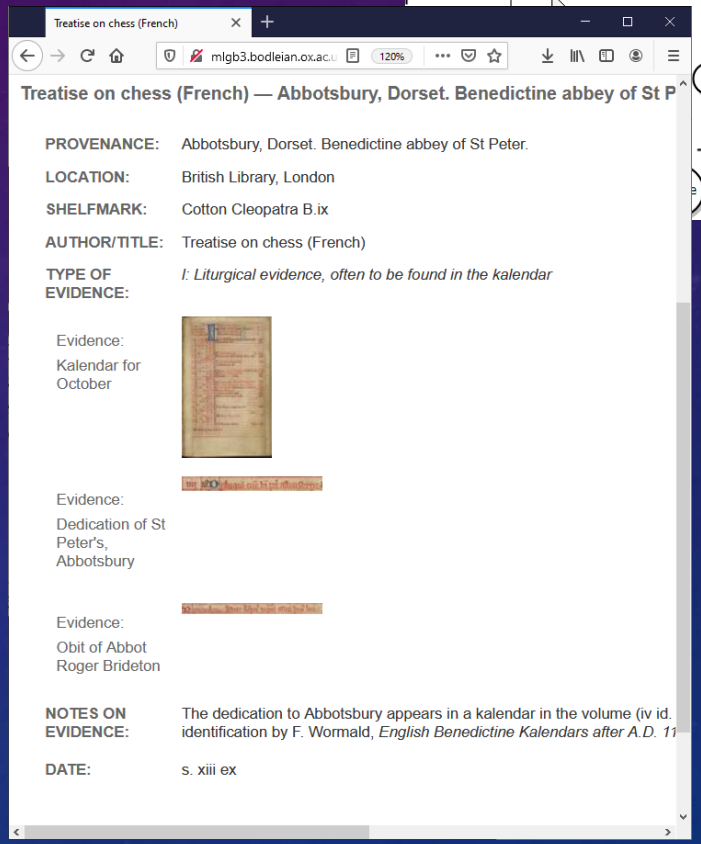
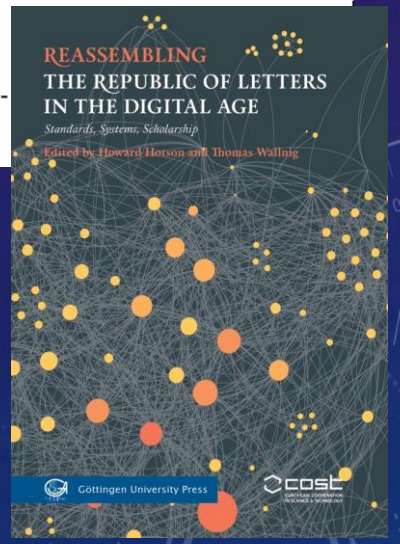
FORENSICS IN HUMANITIES

- A lot of Humanistic research includes elements of reconstructing narratives from extant physical resources (usually libraries, museums and archives) – in effect, timeline reconstruction
- Increasingly broad range of resources becoming available digitally (https://doi.org/10.17875/gup2019-1146)
- Not just timelines are being reconstructed
  - Medieval Libraries of Great Britain and the Corpus of British Medieval Library Catalogues reconstructs libraries (http://mlgb3.bodleian.ox.ac.uk/)







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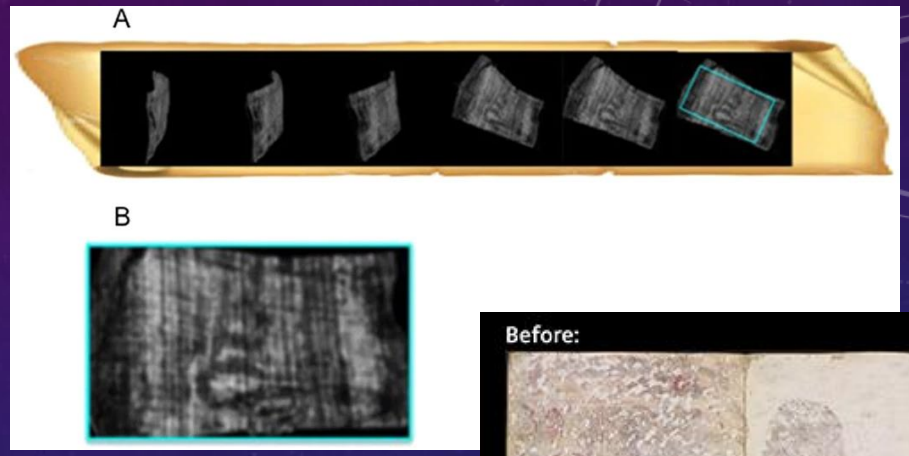
BUT THERE'S MORE

- Forensic techniques in cultural heritage
  - Meaning and Cultural Importance are often critically dependent of context
  - The collection process is not impartial so provenance matters
  - Hyperspectral and spectroscopic analysis of materials
    - Mexican palimpsests (https://www.bodleian.ox.ac.uk/news/2016/aug-18)
  - 3D reconstructions
    - Digitally unrolling burnt and fragile manuscripts (https://www.nature.com/articles/srep27227/)
- More advanced analytics based on access to larger digital corpora
  - Handwriting analysis and recognition
    - Often enhanced by predictive linguistic models
  - Linguistic text mining approaches – Sentiment and topic analyses
  - Entity extraction and identification
  - …and yes, Machine Learning and AI



LOOKING FOR OPPORTUNITIES TO COLLABORATE

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