



**Radical Tactics
of the Offline
Library**

HENRY WARWICK

Network ⁰⁷
Notebooks

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of the Offline
Library**

COLOPHON

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This book is dedicated to the memory of Aaron Swartz.

Sharing isn't immoral — it's a moral imperative. Only those blinded by greed would refuse to let a friend make a copy.

Aaron Swartz (2008)

Never underestimate the bandwidth of a station wagon full of tapes hurtling down the highway.

Andrew S. Tanenbaum (1989)

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Henry Warwick, May 2014

It's a Numbers Game

Never underestimate the bandwidth of a minivan full of multi-terabyte hard drives hurtling down the highway.

Henry Warwick (2012)

The Library of Congress contains about 35 million books. Some are longer than others, but each book would likely be less than one megabyte in size if it was reduced to a text file (.txt) on a computer. The math is simple: one byte = one typed alphabetic character. One page of text contains about 2,000 characters, so one million bytes, aka one megabyte (MB) would hold about 500 pages of text data. Most books are much less than 500 pages – any visit to a library or bookstore will provide ample evidence of that. Still, the math is straightforward and powerful: 35 million books equal roughly 35 million MB, or 35 terabytes (TB). If the average length of a book is 350 pages, then the whole of the Library of Congress would fit in less space – a 24 TB drive. If the average length is 250 pages, it would fit on an 18 TB drive with a little room to spare. It just so happens that one can purchase a 20 TB drive for about \$2000 as of this writing. The costs of storage are expected to continually decrease over time. These numbers form a simple calculation of how to corral the entire book collection of the Library of Congress, *the largest library in the history of civilisation*.

Obviously, most people don't need 35 million books. And many people, especially scholars, do need pagination for referencing, and pagination is something not found in .txt files. A more obvious choice in digital book formats would be a paginated form such as the Portable Document File format (PDF). There are many issues and problems with that format, especially in relation to different e-reader devices. Still, setting those issues aside, we can use PDF as a kind of measure point, where the average book can fit into a 5 MB PDF file. Again, the math is straightforward. 35 million books equal 175 TB of storage in PDF format. Indeed most libraries don't have a million books, much less thirty-five. I have visited several local libraries and simply asked: 'How many books are in your library?' Answers ranged from 40,000 to 100,000 books. I asked librarians at Ryerson University Toronto, the university where I teach, how many books are in the Ryerson Library. While no one knew exactly, they all guessed the same number; about 500,000. 500,000 books, each a PDF 5 MB in size, equals 2.5 TB for the whole Ryerson Library. In 2013 a 3 TB drive can be acquired for less than \$180. A large local library of 100,000 books put in PDF format, can presently fit on a 1 TB drive that costs less than \$75. A small local library of 10,000 books could fit on a 64 GB thumb drive the size of a pack of chewing gum and costing perhaps \$40. This is an astounding fact, with immense implications. People are acting on this information, both in terms of building and propagating such digital, offline libraries as well as trying to prevent such portable libraries from flourishing.

It is trivially simple to start collecting e-books, marshalling them into libraries on hard drives, and then to share the results. And it is much less trivially important. *Sharing is caring*. Societies where people share, especially ideas, are societies that will naturally flourish. Where people have plenty of knowledge and information, sharing this cornucopia of knowledge with others less informed improves both their lots – those less endowed with information have increased access and become more informed, and those with much data to share receive appreciation for their good deed of sharing.

If there is one thing digital media has provided, then it is the overproduction of data. Cisco Systems, a provider of hardware that powers the internet, states in its latest edition of their annual report, the Visual Networking Index Forecast: 'Annual global IP traffic will surpass the zettabyte threshold (1.4 zettabytes) by the end of 2017. In 2017, global IP traffic will reach 1.4 zettabytes per year, or 120.6 exabytes per month. Global IP traffic will reach 1.0 zettabytes per year or 83.8 exabytes per month in 2015.' And this remarkable figure: '*In 2017, the gigabyte equivalent of all movies ever made will cross global IP networks every 3 minutes.* Global IP networks will deliver 13.8 petabytes every 5 minutes in 2017.'⁰¹

These are stunning numbers. 1.4 zettabytes (ZB) is 1,400,000,000,000,000,000 bytes. Remember, the Library of Congress book collection in PDF was 174 TB. That would be 174,000,000,000,000 bytes. From this, we can calculate that Cisco is predicting that in a few years, the amount of data traffic would equal 8,275,680 Libraries of Congress book collections (in PDF format) that year and *even more the following*.

This explosion of data – this knowledge – is materially contextualised in computer systems, and as such it is also 'gated' by access to electricity and the intellectual property regime of proprietary capital. As electrification expands and thus reduces that gating factor, the proprietary regime of copyright enforcement soon follows, seeking to narrow the ability to freely transmit and share knowledge, so as to take advantage of an artificial scarcity against a huge demand, one growing fastest in the poorest areas. Cisco notes: 'IP traffic is growing fastest in the Middle East and Africa, followed by Asia Pacific. Traffic in the Middle East and Africa will grow at a CAGR of 38 percent between 2012 and 2017.'⁰²

The knowledge provided by whistleblowers like Edward Snowden has made it very clear that there is no privacy online. There is no truly private sharing of knowledge in the online realm with this vast sea of information. As a response, people are naturally led to an atavistic and reversalist workaround. *The radical tactics of the offline*: abandoning the online for more secure offline transfer.

OFFLINE FILE SHARING

Offline file sharing was known in the 1990s as 'Sneakernet', where someone with data would put it on a floppy disk, and walk it to another computer. Online file sharing eliminated the need for that. With the new precarity of the online, the logical choice is a transformed return, a *reversalism* to the Sneakernet. The differences today, however, are tremendous. A floppy disk held 1.4 megabytes of data. Today an inexpensive 1 TB hard drive can hold more text than a human being could possibly read in one lifetime, as it would result in approximately 500,000,000 pages. If one lives to be eighty, one would have to read about seven books a day every day from cradle to grave.

This is where the once quotidian practice of the Sneakernet gains a radicality far beyond what it once held – the simple act of sharing shifts from a lengthy novel to an *entire library*. One simple act of generosity can transform the life of a student, a scholar, or an entire city.

01 | Cisco Visual Networking Index: Forecast and Methodology, 2012-2017, http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-481360_ns827_Networking_Solutions_White_Paper.html. Emphasis in the original.

02 | Cisco Systems, *Visual Networking Index*.

By returning to an earlier and more secure form of exchange with contemporary devices, the quality of the exchange is amplified. The ‘old joke’ with Sneakernet was: ‘Never underestimate the bandwidth of a station wagon full of tapes hurtling down the highway.’⁰³ The new metric: ‘Never underestimate the bandwidth of a minivan filled with multi-terabyte hard drives hurtling down the highway.’

Through sharing files via offline systems, and the copying and exchanging of these offline systems, a new device has come to the fore – the Personal Portable Library. Because it focuses on the sharing of e-books, the Personal Portable Library doesn’t only refer to Sneakernet, but to the key function libraries had for thousands of years prior to the invention of the printing press: Libraries as centers for copying data. Libraries as warehouses where books are stored are a comparatively recent phenomenon. A Personal Portable Library takes the contemporary notion of warehousing knowledge to the hard drive and feeds into its own history. The library-as-warehouse is now a copy, but while scrolls or codices of centuries ago took years to copy – today, many thousands of books can be copied in minutes.

All throughout the development of the digital world, from the Sneakernet on, publishing industries have had a variable relationship with file sharing, ranging from draconian rage (viz. MPAA, RIAA) to benign neglect (viz. Microsoft’s meagre defence to the sharing of MS Office in the 1990s) to outright support (viz. the fact that the internet basically runs on Free or Open Source Software such as Apache Server technologies). Insofar as corporations fight or promote file sharing, they hinder or help realize the dream of universal access to knowledge. Unfortunately, the most draconian of the lot seem to be driving the debate.

The theoretical implications surrounding this practice are immense and would easily fill another book or three. Rather than diving deeply into how the Personal Portable Library reframes our theory of property, or how it operates in the philosophies surrounding Access to Knowledge theory, I will explore the basic ideas of what these new Personal Portable Libraries are, their place in history, and how to make one.

ON PIRACY

Computers, by their nature, copy. Typing this line, the computer has copied the text multiple times in a variety of memory registers. I touch a button to type a letter, this releases a voltage that is then translated into digital value, which is then copied into a memory buffer and sent to another part of the computer, copied again into RAM and sent to the graphics card where it is copied again, and so on. The entire operation of a computer is built around copying data: copying is one of the most essential characteristics of computer science. One of the ontological facts of digital storage is that there is no difference between a computer program, a video, mp3-song, or an e-book. They are all composed of voltage represented by ones and zeros. Therefore they are all subject to the same electronic fact: *they exist to be copied and can only ever exist as copies.*

It is important in this discussion to understand that people who share files are not ‘pirates’ and what they are doing is not ‘piracy’. As Aaron Swartz noted: ‘It’s called stealing or piracy, as if sharing a wealth of knowledge were the moral equivalent of plundering a ship and

03 | Andrew S. Tanenbaum, *Computer Networks*, New Jersey: Prentice-Hall, 1996, p. 83.

murdering its crew.⁰⁴ Some twelve year old sharing a sliver of a torrent file from a song by some prefabricated pop star on his computer in his mother's air conditioned basement is not a pirate, and in the context of this discussion, such language is offensive. From a perspective of cooperation and communal activity, it was immensely foolish and a gross strategic error that file sharing networks chose to take the Pirate epithet as their emblem and run with it.

The arguments are ill-advised, and should be addressed:

People who have shared files outside of copyright regulations have been called 'pirates' for centuries.

And it was the forces of capital and property that applied this name as an epithet. Information sharing was no more piracy then, than it is today. Letting the opposition control the terms of debate means the debate is lost. Letting other people define one's behaviour as piracy means that all discussion will be framed in terms of classical property theory, and it is the framing of classical property theory that is an essential problem to the debate.

We (filesharers) take up 'Pirate' like the LGBT community reappropriated 'Gay' or 'Queer'.

People who fileshare are not subjected to mob murder or the torment of chemical castration at the hands of the state.⁰⁵ It is true that file sharers are subject to repressive laws – there have been moves in the U.S. Congress that, had they been enacted, would have resulted in someone who shared a song by Michael Jackson facing more time in prison than the doctor who actually killed him.⁰⁶ This, of course, is ludicrous. The bravery of the LGBT community to appropriate 'Gay' and 'Queer' was of an order of magnitude more courageous than online activists appropriating 'Pirate' given the violence and brutality LGBT people have faced over centuries of oppression. Secondly, LGBT rights activists did so in a particular historical context where 'shock' value in cultural gestures had traction; from Chris Burden to Karen Finley to Andres Serrano. By the time file sharing came of age in the late 1990s and early 2000s, there was little left to shock. Hence, calling oneself a Pirate is a good bit more facile and cynical and 'late to the game' than it seems.

Pirate societies on pirate boats were run in a very egalitarian manner, as compared to privateers. This is a red herring. The internal social conditions of a pirate society is of zero consequence if it is made of pirates – an egalitarian society of murderous thugs is still composed of murderous thugs.

Pirates have a certain 'romantic' appeal as swashbuckling rogues which helps in marketing the file sharing mode of distribution.

The romantic appeal of Pirates is more a reflection of capitalist self-delusion, as capitalism itself is a piratical system that extracts resources and exploits others, often brutally and mortally.

04 | Aaron Swartz, *The Guerilla Open Access Manifesto*. 2008, http://archive.org/stream/GuerillaOpenAccessManifesto/Goamjuly2008_djvu.txt.

05 | Like the case of Alan Turing. http://en.wikipedia.org/wiki/Alan_Turing.

06 | CBC News, 'Michael Jackson's Doctor to Serve Halved Sentence', *CBC News*, 29 November 2011, <http://www.cbc.ca/news/arts/story/2011/11/29/jackson-doctor-conrad.html>. According to the article, 'Conrad Murray, who served as Michael Jackson's personal physician before the pop superstar's 2009 death, will serve less than two years in jail in Los Angeles, despite being sentenced to four years of incarceration for his involuntary manslaughter conviction.'

In short, there is no reason to use the term ‘piracy’. Pirates don’t change the idea of property – they reinforce it. Hunter-gatherers chasing the bison herds didn’t have pirates – the idea makes no sense. What are the terms for file sharing? That is a discussion well worth having. I will not use the term piracy, as it is inapplicable to the activity or philosophy of file sharing and bears no relation to the kind of society file sharing anticipates. I would also suggest the Pirate Party restructure itself so as to take advantage of what leaving the epithet ‘Piracy’ behind can offer.

BASICS OF THE PERSONAL PORTABLE LIBRARY

I started developing an e-book library in 2005. I found a (now defunct) website with an odd name, something like welovephotoshop.com, and they had about 100 books on philosophy available for download. I downloaded them all. I then spent a lot of time on archive.org and gutenberg.org, searching for books I was interested in. Archive.org was more varied than Gutenberg, and Gutenberg wasn’t keen on PDF. Gutenberg’s collection consisted of things that had been available in the public domain for a long time. Finding contemporary materials there was impossible. When I started my PhD program in 2008, I discovered aaaaarg.org. At the time it had about 10,000 e-books and documents, and much of it fairly current. So, over Christmas I downloaded the entire archive, book by book. In the end I had a duplicate of aaaaarg.org on my hard drive, arranged by author. I spent a few months fixing file names and filing each document into folders labelled from A through Z, and one with a #, for authors with number names. At the time, aaaaarg.org had a daily mailing on what had been uploaded that day. This allowed for a quick and easy way to update my library. Later that year, I met a student who had about 2000 books on his drive. We shared our files, and that put me up at around 13,000 books. Later I made a master directory filled with folders based on fields of interest. I called it ‘Library’ as opposed to the alphabetical Archive and put them both on separate drives to insure a back up.

After an illuminating conversation on my dissertation topic with my advisor Geert Lovink, I looked into my actual practices. One of them was this offline library. I shifted my research to my practice, and moulded my practice around my research. During the research process I discovered library.nu, Library Genesis ([libgen](http://libgen.org)), and other online library systems. library.nu and [libgen](http://libgen.org) are both discussed later. While researching offline libraries, I found that a huge collection of e-books isn’t all that useful, even if it’s divided into folders by author and/or folders by interest. For example, I want to look up a specific book. I remember the author’s name starts with D and it’s on philosophy. The library consists of 46,000 books using 200 GB of drive space and the directory for authors with a D alone has 2787 titles. I remember that it’s a book of Philosophy or Rhetoric. So, I go to my subject oriented directories, and find that the Philosophy and Rhetoric folder has 7545 files. If I select all the files that have authors starting with a D, I still get 584 entries. This is a suboptimal method of researching digital files, to say the least.

My operating system can index e-books, however the resulting index is so huge, that it makes the computer sluggish. I looked into acquiring an indexer. The best are Copernic, DTSearch, and Dropout. DTSearch is the fastest, but it’s also the most expensive at \$199. It’s a very powerful piece of software allowing for a range of Boolean and proximity searches.

Copernic is nearly as good. Copernic has a free, very limited⁰⁷, version. The paid version is quite powerful, although it's a bit slower than DTSearch. Copernic only costs about \$50. Then there is Dropout.

Dropout is free (as in beer) software and uses the Apache Lucene search engine. It is not as easy or as fast as either Copernic or DTSearch, but the price is right, and it works. One thing that is extremely useful about Dropout is its portability. You simply place the program itself, `dropout.exe`, in the directory you want to index. Then you let it index that directory (if you have 45,000 books, it will take about a week) and it will produce a file called 'SearchIndex' within the directory. While none of these indexing systems work on the Macintosh or Linux operating system – they require Windows OS – Dropout has the advantage of portability.

Indexed in Dropout, the drive can be attached to any Windows OS computer and run without the need to re-compile the index. This also means that the entire system, index and all, can be copied to another drive, creating instant pre-indexed research libraries. Copying an entire drive can be slow, depending on the size of the library and the speed of the system. USB3 is much faster, and Apple Thunderbolt even faster, and USB4 is likely to be faster still. Using these systems, copying 45,000 books can take a few hours up to an entire day. Even if it takes a day, one still has a library of indexed 45,000 books.

Every time Dropout is opened, it will go through the entire directory and check its index. Luckily, once indexed, the checking process goes quickly. If one has added files to the library between indexations, Dropout re-indexes the books. With no changes to an index of about 45,000 books, using my old HP i3 laptop running Windows 7, Dropout will take about 30 seconds to run through its `IndexSearch` file and make sure that everything is correct. With 100 additions to the library, Dropout takes about 5 minutes to re-index.

Over time, my research practice changed into a routine, where over the period of a week, I would collect e-books, documents, reports, papers, et cetera, usually totalling somewhere around 100-200 documents. On Saturday morning, I'll sort the documents into the subject categories in my Library, and then into the alphabetic directories by author in the Archive. Then I'll open up Dropout in the Library and let it run while I go have some breakfast. When I get back I'll run Dropout in Archive.

In curating my Personal Portable Library, I developed a number of different categories of interest that continue to evolve. These categories grow organically as I need them, and are by no means some kind of definitive statement or epistemology. For example, there was a folder for Art that grew quickly, turned into Art and Aesthetics and then rapidly branched out into Architecture and Urbanism, Art-Photography, Art History, Art Instruction, Film & Video-practice, Film & Video-theory, Film, Theatre, Video Scripts, Literature, Museums, Dance, Music, Audio, and Design. This continuous re-shuffling of files isn't very productive; an inefficiency that underlines the usefulness of software like Calibre, a powerful e-book management system, especially insofar as one may use an e-reader device, such as an iPad or a Kindle. Metadata is found online and automatically associated to the file in the Calibre

⁰⁷ | Namely, a 2 GB index file limit. If you only have a few hundred or a few thousand books, that shouldn't be a problem – if your library is much larger, then Copernic won't work.

system itself. It can easily convert files from one format to another, place them on a variety of devices, collect metadata on an e-book from multiple sources, and is a generally useful manager. However, it does not index e-books – *it merely manages them*.

That's it in a nutshell. Download books. Index them. But wait, there's more – because when you build a Personal Portable Library, you are entering into the rich and highly contested world of libraries. When you have a library, you have access to knowledge, and to paraphrase a line from Michel Foucault, *Knowledge Is Power*, so access to knowledge gives you access to power. Library power is different however – it is a power that inherently ennobles and amplifies the good in people – a power that thrives on being linked and shared, because simply, *sharing is caring* and the sharing of knowledge is the essential purpose of a library. When you collect e-books, it is practical to share them with friends and build a personal network, as copies build resilience against hardware failure.

Personal Portable Libraries don't necessarily have to be filled with e-books, and often they aren't. People frequently trade devices filled with recordings of music in mp3 files, in fact most file sharing is done using offline means, much more so than online means.⁰⁸ By focusing here on the case of e-books and the Personal Portable Library, we are thrust directly into the contradictions of Intellectual Property, human rights, and the exigencies of the digital. Although this ties us to a specific modality and technique and to a particular historical juncture, by surrendering some of the broadness of an 'offline file sharing system' and looking at the more concrete example of a Personal Portable Library, we gain a great deal of historical context, continuity, and strength. The research can be followed by and extended to other media that have greater storage requirements and different relationships to Intellectual Property.

ONLINE AND OFFLINE – BREAD AND BUTTER

Offline file systems exist in a relationship with online file systems. How to acquire these online files varies depending on the architecture of the system in question. This is where online and offline systems complement each other. In terms of files that are less infringing on the belligerent hypertrophied proprietary regimes of capital, the aforementioned archive.org and gutenber.org are useful. Both have an extraordinary collection of e-books and linkages to library systems where the e-books are available. For those in need of more recent material, it is very simple to go to amazon.com or barnsandnoble.com or any other website and purchase e-books. If your research requires books that are not in the public domain, and your budget, location, or inclination is such that you can't afford, access, or abide Amazon et al, then acquisition is less straightforward and devolves to P2P torrents and permutations of data locker technology.

08 | Ernesto, 'RIAA: Online Music Piracy Pales in Comparison to Offline Swapping', *TorrentFreak*, 26 July 2012, <http://torrentfreak.com/riaa-online-music-piracy-pales-in-comparison-to-offline-swapping-120726/>. In 2011, online file sharing accounted for only 12% of 'music acquisition', while offline accounted for 46%.

DATA LOCKERS

While there are many different types of data lockers, the fundamental architecture can be contrasted with P2P. In the following chart we see a basic P2P system, the arrows showing the flow of data.

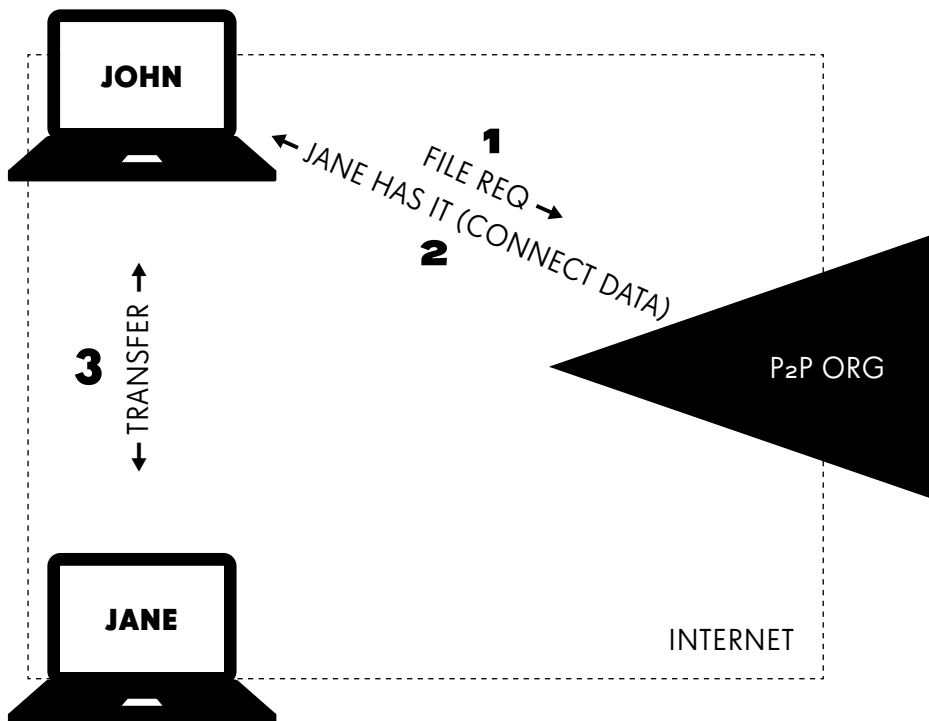


FIGURE 1. P2P STRUCTURE VIS-À-VIS FILE LOCATIONS. BY THE AUTHOR.

The systems that contain the data belong to individuals and files are directly exchanged from one drive to the other through the internet. There is an intermediary (labeled 'P2P ORG'), and the amount of control, interference or value the intermediary provides or inserts is variable. For example at Napster, the Napster database was controlling. Other more decentralised systems, such as the gnutella network, are less so, due to the structure of gnutella style file sharing. The fundamental point is that individuals in the public realm have drives with files on them, and through the internet their computers directly communicate and send files (or in the case of torrents, parts of files) to each other. This puts them in a position of equality to one another – all are free to trade with all, and their collective libraries of files create a positive commons of contribution. Through chat systems, blogs, and other social media, they are able to form communities of preference and trust that increase the value of the data aggregate as a distributed commons. Also they can create more or less active file sharing sub-networks, again formed through trust and preference.

The difference with data lockers is stark:

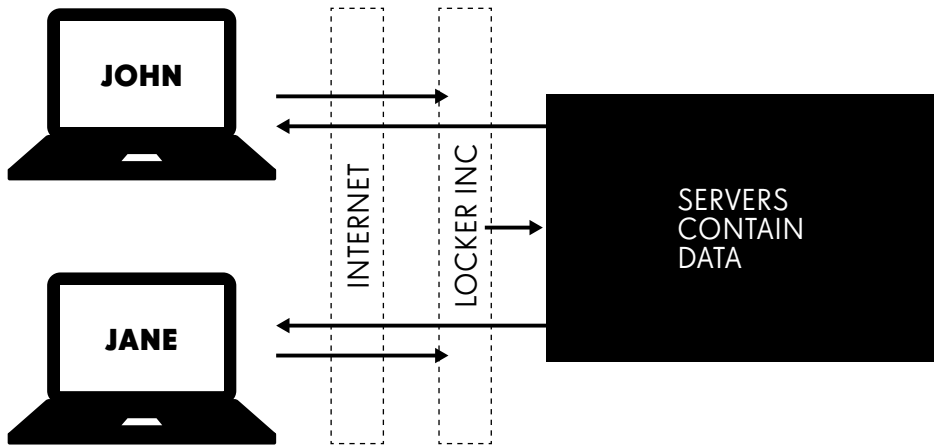


FIGURE 2: DATA LOCKER STRUCTURE AND FILE LOCATION. BY THE AUTHOR.

Whether the locker is the iTunes Music Store (iTMS) or one of the popular 'File Hosting' or 'Cloud Storage' systems, they all share this fundamental structure which is radically different from Napster's P2P structure or torrent systems. It is important to remember that 'Cloud Storage' is usually one particular type of data locker. In the data locker system depicted above, there are individual users (John and Jane) who connect to the file locker service. There are variations at this point. Some systems, such as iTMS or Amazon, require payment for the release of data from their servers to the user. Other systems, such as those of the cloud storage companies, only require a proper URL directing the user to the desired file location.

The similarities between cloud storage companies and commercial data sales companies (iTMS, Amazon, etc.) are striking. The only real significant difference is one largely derived of policy around a few questions: can one download a file from the system at no cost? Can one upload a file of one's choice that others can download at no cost? Otherwise, their fundamental architectures are very similar.

THE POLITICS OF DATA LOCKERS

The fundamental structure of data lockers is in keeping with the structure of neoliberal consumerism: people as individuals contact a corporation that provides them commodities. Whether these commodities come at a cost or are freely distributed is not part of the architectural question – that is simply a gatekeeping variable. Even free data locker sites shape and manage bandwidth to prevent people from downloading too many files at once or too often. Comparing and contrasting the two architectures, one might think that a genuine P2P system fosters community and a positive commons of data, while a data locker atomizes its clientele as consumers of a service. Some data lockers, such as aaaaarg.org

have a more active community than a commercial system like mediafire.com, while both operate from a similar architecture of data flow to user. Early P2P systems such as Napster had chat groups allowing peers direct contact to share their taste and interests, creating relationships between them. Through these trust systems, filter bubbles were assembled around these relationships and interests, strengthening the community and promoting the transfer of data in that community.

Shortage creates opportunity for profit. If something is ubiquitous and undesired, it has no value. If something is desired and ubiquitous, it is also unvalued as its exploitation cannot be a source of profit. With a shortage against a demand, there is profit to be made. In the case of Napster it was different, the shortage lay in access to the Napster database and the trusted networks of preference it spawned through its chat system – networks of users and user preferences based on their file sets. What was *not* in shortage were the assets (music files), as they were in the possession of the members of the network forming these communities of preference.

Data locker systems have no such need for communities of preference; they are handled by reference systems, such as blogs or social media. These systems see users as atomized individuals seeking access to their data stored in servers. A user comes to the locker and asks permission to download one of the millions of files in store. If it is a commercial system (iTMS, Amazon) the gatekeeper answers ‘Pay up first.’ If the user pays, then the server sends the file to the user. If it is a file sharing cloud storage system, the user comes to the system with a request for a URL that is specific to a certain file held on the cloud storage server. The gatekeeper drops a cookie on the user’s system, to manage the use of the system by the user.

The file may have been uploaded to the cloud storage system by a user, but this doesn’t alter the underlying general architecture of the system. For example, in iTMS independent musicians can upload files to sell in the iTunes system. While iTMS sees the musician as a different kind of user, they are individual users nonetheless. The customer-user pays money to download a file from iTMS; the musician-user must pay to upload a file to iTMS by allowing iTMS a cut of the money charged in downloading. In this way, the architecture of the exchange enforces a conservative individualistic approach and a notion of neoliberal identity and property relations, a monetization of commodities, as opposed to a more radical community of sharing which is inherent to P2P file sharing.

DATA LOCKERS AND COPYRIGHT

Data lockers require a neoliberal international system in both a positive and negative manner. Negative in that they need the free flow of data across borders to avoid parochial differences in intellectual property law – there is no boundary to distribution. Positive in that they can then take advantage of these same asymmetries in intellectual property law to their own advantage. Without the free flow of data these systems cannot operate in multiple markets. But even if the markets have differing restrictions imposed by local authority, the data locker systems naturally adjust to them. An example is the American Digital Millennium Copyright Act (DMCA) which has a ‘safe harbour’ clause allowing for the storage of copyrighted data by a hosting system. When a complaint is lodged about a given piece of data that may be copyrighted, the data must be made unavailable.

This creates an asymmetry in time, a delay, a space between the file being uploaded and then taken down for copyright infringement. There are other active axes in this system: vigilance of the rights holder, economic value of the data, copyright terms of the file in question, and a variety of other issues. Any of these can speed up or hinder finding and taking down the infringing file. The ideology of globalist certainty and the ubiquity of international IP systems inherent to neoliberal doctrine foster confidence in these systems to continue their efforts in the potentiality of universal distribution of data. Of course, in a neoliberal system all this comes at a cost, measured in money.

The consumerist model is plainly visible in the structure of data locker systems – the user is a unique individual who seeks a commodity, held scarce behind the firewalls, procedures and requirements of the data locker corporation. Even if the consumer of data isn't charged, he or she is still an individual consumer, not necessarily part of any community or network – not even necessarily human. However, the user in such a system is an isolated individual who has no name and is reduced to an IP address. The only thing required is a code, and thus the file sharing actually happens between fields of codes, behind which humans are said to lurk.

At the same time, the data locker system is dependent, indeed, vampiric and parasitic on community based systems. Data lockers are simply giant closets in the cloud filled with files, and people need to know how to find the files they want. Some have search engines built in, but they don't act like filters. Over the years blogs have taken on this role of being a guide to files. Users find a download link to a file in the data locker through these blogs. Contrastingly, P2P system Napster didn't store copyrighted data, and was not in control of the direct transmission of the data itself; it merely set up the conditions by which data could be transmitted from peer to peer. Through a chat client Napster created social value and facilitated the filtering of data between users as they formed communities of interest. The database of users and their files used to make the file sharing connections was their undoing.

Datalocker architecture such as iTunes, Amazon, Spotify, Netflix, MedNet, Rdio, JSTOR, and others, allows file transfers or the streaming of media. Other data lockers are more engaged with letting people store their files in the 'cloud' (i.e., on internet servers) and make them available to others, such as Mediafire, Rapidshare, DepositFiles, and others. These data lockers came with front-end assemblies that enabled non-members to download files. Some of them directly operate with a locker (like library.nu with ifile.it), while others are more 'locker agnostic' (AVAX) and others sit somewhere in between. One hybrid is aaaaarg.org, which has its own file storage system but also can link files in other data lockers.

Rights holding corporations are apprehensive about people banding together to form communities online, as their interests may not be consanguineous. As a consequence, P2P systems were and are targeted for removal as they challenge the fundamental vampiric drive of capitalism: the complete monetization of all human cultural activity. The level of stress laid upon these organizations is tremendous and implosive.⁰⁹

⁰⁹ | My experiences as a QA engineer at Napster were instructive, as I will relate from p. 34 on.

Directly managed P2P systems like Napster and similar examples like Kazaa, Limewire, and Morpheus, all floundered and died in the face of the same proprietary juggernaut. They also failed for similar technical and legalistic reasons. But other file sharing systems were developed both as competition and as an evolution of P2P. Chief among them, bittorrent.

The torrent system of file sharing continues to this day, and has been largely successful, even in the face of major setbacks such as the shutting down of Pirate Bay. It has a number of advantages – by distributing parts of files among a variety of machines, the torrent system reduces the signature of a user in terms of a file's use, allowing for an arbitrarily large number of files to be shared. There are downsides to the torrent system. One is its speed – downloading a file can take days, sometimes weeks, and this means leaving the computer operating online the entire time while it collects the parts. Another is the 'stupidity of the crowds' – the tastes and interests of crowds can be abysmally lacking in variety, resulting in millions sharing music by the *popstar du jour*, while finding a particular piece of writing by an unpopular author can be difficult and sometimes impossible.

In conclusion, P2P systems are slower than data lockers and operate from a more communal set of principles. However, while some online sources of e-books are better known than others, all are precarious. It is this precarity of the online that makes offline Personal Portable Libraries so valuable, as they become offline repositories of collections that can be re-uploaded when proprietary forces eliminate online sources. In this way, the offline precedes the online, both historically and conceptually.

Because of the symbiotic relationship between the online and offline, we have discussed some basic architectures of the online and how the online and offline work together to provide information. Other purposes for offline file sharing systems and Personal Portable Libraries exist, for the relationship of the online to the offline is of an existential variety. One does not exist without the other. The online exists inside the offline, and the online is not so much a thing of its own, as it is more a connectivity between offlines – all online content is held in hardware, somewhere. Like neoliberal manufacturing jobs, the hard work of online storage is done elsewhere, allowing consumers in the overdeveloped world to think they live in a clean state of virtuality and information, without armed guards, wires, or steel. On the other hand, hard drives are cheap, small, capacious, and plentiful, although, due to their physicality, they are slow to share.

HOW ARE PERSONAL PORTABLE LIBRARIES USED?

The use of the offline library has fascinated me since I began, and has been the hardest part to research. People tend to simply accept what they can get and can be very idiosyncratic in the usage and development of their libraries. They can both benefit from and be encumbered by some offline libraries that are being traded. One that is common is the Alexandria Project: a folder filled with files arranged by the author's last name in subfolders named A through Z. Its size varies – usually somewhere between 35,000 and 50,000 books – and it is derived from a combination of aaaarg.org and libgen.info books.

The benefit of something like the Alexandria Project is that it's a huge collection of books that can be used immediately. The downside is that due to its size, people are less prone to do anything to or with it, as moving and processing that many files can be quite tedious.

This is where software like Calibre and Dropout comes in very handy. However, those also require some effort, and many readers are happy to just do simple searches for a particular document they need. At the same time, some have built up Alexandria Projects into something different, larger and more useful. For example, in December 2012 the Makerere University Business School (MUBS) in Kampala Uganda received 50,000 electronic books. Three years earlier, four Dutch students from the University of Amsterdam (New Media and Digital Culture program) visited MUBS to research ICT implementation in Uganda. During that time, MUBS built a library, but had little money left over for books or furniture. This changed in 2012 with a single hard drive with files from the Alexandria Project.¹⁰ Regardless of what happens to that particular collection of books, the direction is clear: this inexpensive gift can have a profound impact. It is bound to be an increasingly popular use of the Personal Portable Library in years to come.

This can be transferred to other arenas, with matters of endocolonial maldevelopment. From the destitute rural reservations of First Nations to the abandoned cities of post-collapse America a Personal Portable Library could mean a transformation.¹¹ These municipalities have seen their libraries full of paper books closed and abandoned, the ragged remains of the cities sold off to the highest bidder in a turgid fit of neoliberal shock doctrine, the domestic post-industrial brown lots degenerated into toxic latifundia. It is in this ruined post-urban world where learning and libraries are most needed. As the costs for Personal Portable Libraries are trivial compared to paper book libraries, these new digital systems can fill a desperate need.

10 | Albert Mucunguzi, 'Makerere University Business School (MUBS) Receives 50,000 eBooks', *PC Tech*, 5 December 2012, <http://pctechmag.com/2012/12/makerere-university-business-school-mubs-receives-50000-eBooks/>. More examples are from interviews I have had with a number of people who have had the good fortune to have an Alexandria Project drive. For their sake, they will remain anonymous, but suffice to say, they are all active scholars and intellectuals.

11 | The Shrink to Survive plan was devised by Dan Kildee in Flint, MI. The idea has since caught on in several other cities. Detroit has actively bulldozed sections of itself, and Gary Indiana is considering bulldozing 40% of its land, which is now largely abandoned. Nick Bogert, 'Battered City of Gary, ID, Considers Shrinking 40 Percent to Save Itself', *NBC News*, 19 June 2013, http://inplainsight.nbcnews.com/_news/2013/06/19/18956862-battered-city-of-gary-ind-considers-shrinking-40-percent-to-save-itself?lite.

Towards a History of the Personal Portable Library

The acquisition of books is by no means a matter of money or expert knowledge alone. Not even both factors together suffice for the establishment of a real library, which is always somewhat impenetrable and at the same time uniquely itself.

Walter Benjamin

To understand how the Personal Portable Library is a logical continuance of traditional or archaic library systems (i.e., libraries that existed prior to the printing press and the development of intellectual property regimes) we must first look at the place of the Personal Portable Library in a material and rhetorical history. The Personal Portable Library draws back on different points in the history of libraries and literacy – as ancient as the clay tablets of Babylonia and the papyrus scrolls of Egypt, and as contemporary as today’s headlines brought to you by the internet. Like the libraries of the past, the Personal Portable Library is a subject of controversy.

The fundamental process of creating a Personal Portable Library is copying files from one hard drive to another hard drive. Users inhabit the traditional role of copyist, so to speak. In ancient libraries, you had your common copyist. The job of copyist was straightforward, but difficult – he (it was usually a he) had to scrupulously and accurately copy every letter of every word of a text onto a fresh substrate. In Babylon, this would be on clay tablets. In ancient Egypt, the preferred surface was papyrus, parchment in the European late archaic and medieval period, which in the Renaissance gave way to paper, an invention from China. As the substrates – papyrus, vellum, parchment, paper – had a limited span of use that declined with greater contact, texts needed to be copied. Especially those that were foundational to an ideological state apparatus, as the Bible is for religion. In a medieval or Renaissance context, copying books required significant effort and skill that was honed by years of training under a writing Master. If concentration was broken in the slightest then errors occurred, and the repair was often difficult, time consuming, and expensive. Thus, the workflow and practice of the copyist created precarities unique to the writing profession.

THE ANGEL OF THE DIGITAL: PROTECTING DIGITAL SCRIBES AND COPYISTS

In a process of common magical thinking, each medieval profession had a patron saint that would protect the worker in that profession from harm in the execution of their duties. For example, the patron saint of fishermen was St. Andrew, tanners relied on St. Bartholomew, and libraries had St. Jerome as their patron. With hundreds of saints, nearly every profession and every ailment has a patron saint – St. Maurice guards over knife sharpeners as St. Dymphna protects lunatics and St. Bernadine of Siena is the patron saint of the lungs and chest. There are even patron saints for more contemporary professions – St. Hubert for machinists, St. John-Francis Regis for social workers, and St. Columba for ‘bookbinders; the Knights of Columbus; plagiarists; poets; Ireland; Scotland’¹². One saint

12 | Information on patron saints is from Rosemary Ellen Guiley, *The Encyclopedia of Saints*, New York: Facts On File, Inc., 2001.

– St. Expedite – has even been appropriated by computer hackers.¹³ With such semi-divine protection fishermen might not be lost at sea, knife sharpeners and machinists might keep their fingers, plagiarists continue plagiarizing, and presumably computer hackers continue merrily hacking away.

Copyists, however, had a different set of problems, mostly all forms of distraction. A distracted copyist is prone to error, and errors once made became consistent over time. The copyist did not need a patron saint to protect them – they needed a supernatural scapegoat. When ink was spilt or a word misspelled, the cry rang out to curse the distracting demon who torments all copyists: Titivillus. Thus, through the material necessities of their work, copyists didn't have a patron saint – they had a patron demon.¹⁴

The digital copyists of the Personal Portable Library don't have to face such horrors; with simple measures, especially the basic responsibility of backing up data, most digital errors can be fixed. Assuming that the files on a back up drive are working, the idea of 'error' is not nearly as critical or even relevant. Aesthetic choices become less problematic with adequate search facilities, metadata, and curation. So the Personal Portable Library copyist has no need for a demon, but for a patron saint or angel, like any other profession. Following the precedence of hackers in appropriating St. Expedite, it makes sense to appeal to and appropriate a figure deeply associated with vast knowledge, and as it so happens, there is an archangel especially associated with Universal Knowledge. Pre-echoed and pre-mediated for our anticipation of its culmination in contemporary media, we now bear witness and behold Metatron, the Recording Angel, patron of Personal Portable Libraries, as revealed by his 'prophet', Sol Yurick in 1985.

*Behold! Metatron, the Recording Angel and patron of Personal Portable Libraries*¹⁵

Metatron is a very special angel: 'Metatron is perhaps the greatest of all the heavenly hierarchs, the 1st (as also the last) of the 10 archangels of the Briatic world. He has been called the king of angels, prince of the divine face or presence, chancellor of Heaven, angel of the covenant, chief of the ministering angels, and the lesser YHWH (the tetragrammaton). He is charged with the sustenance of mankind.'¹⁶

The details of Metatron are complex, and related to the occult and mystical Judaist schools of Qaballah.¹⁷ Simply, it works like this: one cannot see the Godhead – when one is dealing with God, one is actually dealing with Metatron. God is perfect and beyond knowledge, so the archangel Metatron mediates between God and humans. Between these two realms is knowledge – the entrance point to the realm of angels. Metatron, who is often depicted writing in a book, is the protector of knowledge. Thus, through a mythological lens the Personal Portable Library can be seen as a weak, microscopic, partial, and hope-

13 | Michelle Delio, 'Patron Saint of the Nerds', *Wired*, 4 October 2011, <http://archive.wired.com/culture/lifestyle/news/2004/11/65184>.

14 | Mark Drogin, *Medieval Calligraphy: Its History and Technique*, New York: Dover, 1989.

15 | Sol Yurick. *Behold Metatron: The Recording Angel*, New York: Semiotext(e), 1983.

16 | Gustav Davidson, *A Dictionary of Angels, Including the Fallen Angels*, New York: Free Press, 1967. p. 192.

17 | There are a number of different spellings: Qaballah, Kabbalah, Kabala or Cabala, depending on the spiritual tradition's norms, such as The Hermetic Order of the Golden Dawn, or the Ordo Templis Orientis.

lessly inadequate material reflection of the complete universal knowledge in the mind of Metatron, the archangel of the Divine Countenance.

The sustenance of mankind is electronic and under the auspices of Metatron the Recording Angel, which is especially poignant: for ‘man does not live by bread alone, but also by the communication of words’¹⁸; and the Personal Portable Library is the radical distribution and copying of words to all mankind, the psychic, intellectual, digitally operant food for all mankind.

Protection is valuable, for centers of copying and the retention of knowledge have been consistently targeted for destruction and oppression by rigid ideologies. The Personal Portable Library is no exception. Foes of free thinking, the enemies of free knowledge – be they religious zealots, business profiteers, or political ideologues – frequently target libraries in their quest for power over the minds of others, and continue to do so to this very day as libraries expand into the realm of the digital. The scholars and students who need these libraries could use some protection, however insubstantial.

On the more mundane political plane, there is also the matter of one’s right to Access to Knowledge as noted in the UN Declaration of Universal Human Rights, Article 27, section 1: ‘Everyone has the right to freely participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits.’ This forms the ethical foundation (and protection) for the Personal Portable Library, and, indeed, for the entire Access to Knowledge Movement. It is through a re-engagement with the purposes and methods of ancient libraries and the history of the Public Library that contemporary digital archives of shared files can regain meaningful purpose. Then the enclosure and warehousing of knowledge by the modern library might also be recognized as the destructive historical aberration it is.

ANCIENT LIBRARIES

The components of the earliest library known is a collection of clay tablets discovered in 1975 by the Italian archaeologist Paolo Matthiae, in the ancient city of Ebla, in contemporary Syria. The city was destroyed in ca. 2250 BCE, and the texts were from ca. 2500–2250 BCE. Some 20,000 tablets and fragments of tablets were found. It is very likely that there were thousands more documents because at that historical time there were other writing surfaces available (boards and papyrus). The archives contain royal ordinances, edicts, treaties, lists of place names, trade records, dictionaries, and syllabaries of Sumerian associated with Eblaite pronunciations, copybooks, lists of lexicons, scratch pads for students, king’s lists, and other educational material. After several invasions over a period of millennia, Ebla was finally abandoned in the eighth century CE.¹⁹

The development of libraries continued in both the Middle East and China, with a significant milestone in the library of King Ashurbanipal II who assembled a huge library in Nineveh. The expansion of his library came through the production of clay tablets and

18 | Matt. 4:4: ‘But he answered and said, It is written, Man shall not live by bread alone, but by every word that proceeds out of the mouth of God.’

19 | Michael Dumper and Bruce E. Stanley (eds) *Cities of the Middle East and North Africa: A Historical Encyclopedia*, Santa Barbara: ABC-CLIO, 2007.

pillage from defeated subject and client states of the Assyrian Empire. Included in the library were some of the great works of ancient Near Eastern mythology, including the Epic of Gilgamesh, the Enuma Elish creation story, the myth of the First Man, Adapa, and other similar foundational narratives. Once acquired, a tablet was usually copied as soon as possible. While clay tablets can last indefinitely, they were fragile, and prone to shatter if dropped. This copying of clay tablets leads to a central feature and a major function of any library (until the rise of the printing press): *its use as a copy-making center*. This was especially true of the library at Alexandria.

THE LIBRARY OF ALEXANDRIA

Shortly after its founding by Alexander III of Macedon in ca. 330 BCE, Alexandria became the main point for grain export from the Nile Delta and the center for papyrus trade²⁰ – the substrate for data inscription in the form of scrolls. Much has been written about the fabled library of Alexandria. At the time, it was the largest library in the world. Eventually it came to hold approximately 490,000 scrolls in the main building and 42,800 in the ‘daughter’ building, a total of about 532,800 scrolls at its peak.²¹ To compare: that is roughly the size of the library.nu website before its vaporization at the hands of the proprietarian jihad against file sharing.

A major innovation at the Library of Alexandria was by its first director, Zenodotus. With thousands of scrolls to organize, Zenodotus had to ascertain the identity of the author of the scroll and scan the content to give it a proper tag. Once tagged, the scrolls were organized by type; religious, literary, scientific, factual, philosophical, etc. From there proceeded a secondary sorting according to form (poetry, theatre, etc.) or genre (myths, omens, prophecies, origins, etc.). Once sorted, the scrolls were semi-alphabetized and tagged with the given section (say, theatre). There was no alphabetization beyond the first letter, and further alphabetization would not happen until the second century CE.²² This tagging of scrolls can be seen as the predecessor of metadata.

A later director, Callimachus, sorted all the Greek writers on a large set of tables (‘pinakes’), largely based on the categories set up by Zenodotus. This resulted in tables for philosophers, orators, medical writers, even one for ‘miscellaneous’ including cook-books.²³ The pinakes were more than just a list, as they included metadata – the author’s name, the name of the author’s father, the place of origin, and a statement about and a brief discussion of the content of the scroll. Together, these lists created a metastructure that we today might call a ‘database’. In both relational databases and flat file databases, a core concept is precisely the notion of the ‘table’ – a set of data elements often organized by a two-dimensional grid of columns and rows, a rhetorical and systemic atavism harking back to Callimachus’ ‘tables’. Later directors, such as Eratosthenes and Aristophanes, focussed more on science, geometry, and mathematics, and elaborated upon Callimachus’ system of organizing the scrolls through the creation of more tables, a greater pinakes; a

20 | Matthew Battles, *Library: An Unquiet History*, New York: W.W. Norton, 2003, p. 26.

21 | Casson, *Libraries in the Ancient World*, New Haven: Yale University Press, 2002, p. 36.

22 | Casson, *Libraries in the Ancient World*, p. 37.

23 | Casson, *Libraries in the Ancient World*, p. 40.

more complete database. It is the development of these categories based on preference that reveals library organization to be a product of curation, and subject to aesthetic decisions of preference and choice.

Scroll production was another issue. Many were produced by the resident scholars. Another supply came from scrolls aboard ships that were confiscated and copied. The originals were kept in the library, while the owners received the copies. Older scrolls were preferred over younger ones as they were seen as more 'original', meaning with fewer errors than newer scrolls. The demand for these 'original' documents was so high that Ptolemy III, the Pharaoh of Egypt and ruler of Alexandria, deeply intent on acquiring the original Athenian scrolls of the plays of Euripides, Sophocles, and Aeschylus, pulled off a trick. He offered the rulers of Athens a rental agreement to have copies made at his expense. Athens didn't trust him, and replied that he had to insure the safe return of the documents with fifteen talents of gold, today amounting to about \$25,000,000. Ptolemy sent the gold, and the scrolls were shipped to Alexandria where the scrolls were copied by the best scribes on the highest quality papyrus. The copies were then shipped back – the originals remaining in Alexandria! – and Athens was left with some deluxe copies of their most precious scrolls and a lot of gold.²⁴ The key point is clear: the library operated as a copy centre. Making copies generated scholarship and brought vast amounts of creativity and great power and wealth to the Ptolemy dynasty.

The Alexandria Library wasn't merely some noble public deed with a lofty goal and intent, it was also a way to empower, project, and extend the grasp of the Ptolemaic kings. Their desire to increase their power over scholarship as manifested in the Library of Alexandria, had an outcome that was eventually suboptimal for the Ptolemaic system. The aggressive acquisition practices reduced the resilience of the ancient Mediterranean literary world as a whole. Once a book had been 'captured' it stayed in the Library, to be copied only for own use or when another library was willing to finance the work and shipment.

If Alexandria had followed a less aggressive model of file acquisition, and would have allowed opportunities for scrolls to be copied elsewhere and more than once, a greater regional resilience would have been created for a given book.²⁵ The artificially maintained scarcity made scrolls of importance even more precious and valuable. Consequently, other cities also started to develop collections at great expense.

The greedy and vain Ptolemaic regime did not respond well to competition. Feeling threatened by the libraries in Rhodes and Pergamum, the Ptolemies banned the export of papyrus. This ill-considered move came with what we might call a 'blowback'.²⁶ In this case, the blowback came from Pergamum. Faced with a collapse in scholarship from the loss of papyrus, parchment was invented. Parchment consists of animal skin that has been processed into a thin surface optimal as a substrate for pen and ink. Parchment also allows for moderate erasing; the skin can be shaved thinner to correct errors or can be scraped overall to allow for reuse as a palimpsest – something which is impossible with

24 | Casson, *Libraries in the Ancient World*, p. 35.

25 | Battles, *Library: An Unquiet History*, p. 31.

26 | Following Chalmers Johnson, *Blowback: The Costs and Consequences of American Empire*. Macmillan: 2001.

papyrus. Parchment is also much more durable than papyrus. Humidity helps parchment stay pliable, while it rots papyrus. Dryness hardens parchment, while dried out papyrus crumbles easily. So, in trying to hinder competitors, the Ptolemy regime actually spurred the development of parchment – a superior writing surface and communication substrate that would eventually obviate and replace the need for papyrus, not only the essential substrate of the Alexandria library but also a valuable export item for the Egyptian economy.²⁷

Another significant problem with papyrus is its flammability. Stories of the burning of Alexandria are well known up to this day. A fire of another order was even more destructive however: languages changed. Ancient Greek became incomprehensible to the scribes of the Christian era, who spoke Coptic, Aramaic, Hebrew, Latin and demotic Greek. They simply ignored these now unreadable scrolls and over the centuries the papyrus crumbled to dust. Rome took over administration of the library in 30 CE. Directorship of the library did not go to great scholars or librarians, but was distributed as a gift of favoritism to administrators, military leaders, and even athletes.²⁸ By the time the famous Library of Alexandria burned and was damaged beyond repair in 270 CE, it had already suffered serious losses and centuries of bad administration.

What remains from Alexandria are its immaterial contributions to culture, for these never burn – they can only be forgotten. One contribution was the table, the analogue premonition of a database element, the core feature in all computer databases today. What also remained was the notion of knowledge curation and the development of an epistemology enacted in the organization of books – which lives on until today in the Dewey Decimal System and in metadata tagging. Also, the basic tools of scholarship itself remained – the bibliography, alphabetization, the commentary and the glossary, and most important for our discussion; the idea of the library as a *locus of copying*.

AFTER ALEXANDRIA

At the time the Library of Alexandria started its downfall and burned, several innovations transformed western libraries. One, as discussed earlier, was the development of parchment and vellum made of animal hides. Scrolls fell into disuse and were replaced by the codex: books with pages. The codex made its way to Rome in the third century CE, and greatly increased the ability of people to collect personal libraries. It became considered *de rigueur* for a great villa or home to have its own personal library, and there are descriptions of reading habits in these villas going back to the late hours of the Western Roman Empire. In a letter Sidonius Apollinaris writes (430 CE):

books in any number ready to hand; you might have imagined yourself at the shelves of a professional scholar or at the tiers in the Athenaeum or at the towering presses of booksellers. (...) manuscripts near the ladies' seats were of a devotional type, while those near the gentlemen's benches were works (...) of Latin eloquence (...) it was a frequent practice to read writers whose artistry was of a similar kind – here Augustine, there Varro, here Horace, there Prudentius.²⁹

27 | Johnson, *Blowback*, p. 29.

28 | Johnson, *Blowback*, p. 47.

29 | Battles, *Library: An Unquiet History*, p. 52.

In the fourth century, the city of Rome was largely abandoned, and with its sacking in the fifth century, Western European scholarship suffered a heavy blow as it was left to Christian monks to copy the books, first and foremost the Bible, and battle the demon Titivillus in the scriptoria of medieval monasteries. The church took a rather dim view of pagan authors, and those volumes were left to rot or burned. Meanwhile, societies in Asia and the Near East actually prized literature and somewhat more independent thinking. The efforts of these societies would result in the reintroduction of the ancient pagan works to a Christianized Europe centuries later.

ALEXANDRIA LIBRARY – PERSONAL PORTABLE LIBRARY

The defects and strengths of the Alexandrian Library can be used as a guide for the Personal Portable Library. Alexandria had many strengths: its size, its range, its function as a copying device, its ‘shareability’ (albeit slow and hideously expensive), its library science innovations, and the quality of its inventory. Some of the defects are also instructive: its growth through appropriation, theft and chicanery, its centralization, its error prone copying system, its expense, and its existence as an institution which conferred power, honour, and influence to its directorship and the local government.

The Personal Portable Library can and should appropriate and optimize ideas inherent in the Alexandria Library. It can quite easily adopt and wildly improve some of the strengths: size, range, the function as a copying device, ‘shareability’, and the quality of inventory. To begin with the size, the Library of Alexandria was about the same size as my university’s library, and subject to the same analysis: the total data size of the collection would be less than 3 TB and would fit on a drive the size of a book and cost less than \$200. If each book were an EPUB file of 1 MB in size, the storage need would be approximately 530 GB, which would fit on a drive the size of a deck of cards and cost less than \$80. While the cost of such a drive is completely out of reach for billions of people on the planet (according to the World Bank Development Indicators of 2008, about half the world, 3.5 billion people, live on less than \$2.50 a day³⁰), for many people in industrialized nations it’s not an insurmountable cost, and for a good many people in the overdeveloped world, it’s a fairly trivial price. Cost is a comparatively low hurdle. Moreover, the range of the collection of a Personal Portable Library would easily exceed the Library of Alexandria, as there are many fields of enquiry, study, and art that have come into being since then.

In terms of resembling a copying machine, the Personal Portable Library *only exists as a copy*. Digital data lacks origination, since it *always already* exists in a state of reproduction. The Personal Portable Library isn’t just a copy of the Library of Alexandria, but a kind of amplified socio-political inversion of it, in that the Alexandrian Library was a product of forced tribute to a central repository, while a Personal Portable Library is a library that exists precisely to be curated, copied and shared.

This is amplified by its shareability – as Personal Portable Libraries are produced with common consumer ICT items, they naturally proliferate. Documents are shared and copied at rates that exceed the Library of Alexandria by many orders of magnitude. The rate

30 | World Bank, *Poverty and Inequality Database*, <http://data.worldbank.org/products/data-books/WDI-2008>.

only increases as price/performance ratios intensify and speeds increase. The public in its multitude can simply copy what it wants and share these copies, amplifying the rate of copying. However, while these libraries are copies of copies, they are not identical, as people will add or subtract files, curating these drives in their interests.

The basic innovations of the Library of Alexandria are still used as formal features of the database that is the operating system of the computer and of the Personal Portable Library. At its root is the Alexandrian alphabetization schematic, carried over into the Personal Portable Library in the way that hard drives organize their file names. On top of that lies the question of how users arrange and name directories in their curation of the drive, just as the ancient librarians of Alexandria curated their scrolls.

The defects of the Library of Alexandria – its growth through policed appropriation and chicanery, its centralization, its error prone copying system, and its expense – are transformed in the Personal Portable Library. Theft and chicanery in the acquisition of scarce goods is replaced with gifting and sharing in ubiquity and abundance (although some prosecutors and institutions condemning file sharing and ‘piracy’ of course think differently). Centralization is replaced with radically decentralized accumulation and sharing. There is no centre, no organization, people simply think and act as positive contributors to a larger and greater good in the spirit of free scholarship, which is part and parcel of power dispersal and the positive empowerment of multitudes. There is no ‘institution’ or center point – simply people sharing files to the good and betterment of themselves and others, towards a democratization of scholarship, knowledge production, and information distribution.

THE DEVELOPMENT OF THE LIBRARY, MEDIEVAL TO MODERN

The development of the printing press brought along the rise of the modern library, and the political function of the library as an object of political value and concern became much clearer. At the same time the library came under the strictures of the proprietary regime of intellectual property and notions of copyright. The Library of Alexandria was a kind of hybrid between a public and private library. It wasn’t completely private and at the same time it wasn’t completely public either. Many people used it every day, but only qualified people could request to read scrolls and there was no direct access to the ‘stacks’ for anyone other than dedicated librarians. With the abandonment, invasion, and sacking of Rome and its provinces, larger libraries were found elsewhere in Asia. These were, by and large, private libraries owned by aristocrats or, like Alexandria, semi-public collections run by an aristocratic bureaucracy. As such they were also subject to the whims of aristocratic ego and the vagaries of bureaucratic administration.

In ancient and medieval China text was painted on vertical strips of bamboo that were sewn together so they could be stacked like window blinds, or text was painted onto sheets of silk. The first emperor of the Qin dynasty Shi Huang ordered, for political reasons, the destruction of thousands of these books, as well as the deaths of hundreds of scholars, in order to break the Confucian bureaucracy and establish his reign as the first of a new era.³¹ In this way, Shi Huang came to the same conclusion as the Ptolemies in Egypt, namely,

31 | Battles, *Library: An Unquiet History*, pp. 34-38.

‘that a monopoly on intellectual resources was as important to rule as imperial control over the production of rice and silk.’³²

The following dynasty, Han, placed great value on classical education, yet books continued to disappear through theft, fire, and rot; the common problems of a library. To promote durability at one point Buddhist scholars carved the Sutras into stone, totalling 4.2 million words.³³ Another development was the carving of stone cylindrical stelae that allowed for paper rubbings to be made, beginning in the third century CE. With the invention of paper in China, it took little time to develop actual printing in the eleventh century, and by the twelfth, Chinese paper money was being printed using copper plates. Paper made its way to Europe and in the fifteenth century, Gutenberg developed his moveable type press. The cylindrical drum press was developed in 1843, mechanizing the process that had been conceptually developed in China 1600 years earlier.

During the medieval period, Europe – compared to Asia – was a cultural backwater. As noted above, China developed paper, printing, and a vast legal and social bureaucracy. The zero was invented in India, and algebra developed in the Middle East – developments made possible by the research capacity fundamental to and enabled by the broadening and funding of libraries, the copying and maintenance of the content, and the intellectual climate this permitted. In China, stone stelae and wood blocks were carved for printing important documents and classics, as with Gutenberg’s developments of the press. The vast bulk of documentation was still confined to hand lettered documents. Also secondary research was handwritten and hand-copied, and libraries were central to this process. For short documents handwriting was the rule until the development of the typewriter in the 19th century, and stayed the general habit of personal communication well into the 20th century.

These paper books felt and read differently than the animal hide codices of the ancients. This new form of text was a product of an exacting machined identity, no longer a hand fashioned object of a team of dedicated and highly trained artisans such as the parchment maker, the scribe, and the bookbinder. It was now a product of a machine and exhibited the uniformity of its provenance, the mechanized maw of modernity itself.

Hundreds of libraries soon filled up with hundreds of thousands of books. When a book fell into disrepair, it was simply replaced with another copy or a newer edition. The order was sent out, and if the publisher’s warehouse was nearby, it could arrive in a few days or weeks and at fairly low costs. With the development of huge public libraries such as the British Museum and the great university libraries of the 18th and 19th centuries, librarians developed library sciences in order to deal with the torrent of books filling the shelves. With industrial (over-)production and a collapse in prices for books, people started to collect their own libraries. Personal libraries were no longer status objects of the ruling class – they became available to a broad literate professional class and even to some of the working class, who, with some surplus wages and time, were gradually able to collect a shelf or two of their favorite books.

32 | Battles, *Library: An Unquiet History*, p. 37.

33 | Battles, *Library: An Unquiet History*, p. 40.

To make this happen one more breakthrough was required, and that was the development of pulp based paper. Until the development of pulp paper mills, most paper was made from cotton, and prior to the development of the cotton gin in the mid-19th century, cotton was not an easy substance to acquire. Since clothing was still mostly homemade, there were few scraps left over for papermaking.³⁴ The recycling of cotton was a source of income for poor boys who would go from door to door collecting old rags to sell them for a few pennies to the paper mills. This is the source of the word ‘ragamuffin’.³⁵

The material ability to make paper out of wood pulp, which also meant environmental destruction of industrial deforestation, permitted the popularization of written texts – high speed printing systems won’t function on something as delicate and expensive as parchment or silk. Libraries, literacy, and access to printed material expanded exponentially, while simultaneously dooming countless old growth forests and their climate ecosystems. Instead of just a few hide-bound books of hand-lettered parchment being kept in a small library owned by a wealthy member of the ruling elite, suddenly there were millions of books, magazines, journals, chapbooks, flyers, broadsheets, newspapers, tabloids, reports, manifestos, novels, scripts, and used books proliferating at low cost.

With this mechanization came several changes to the purpose and meaning of the library. As a printing press was an expensive piece of gear, investment costs in printing books was high. The result was the development of copyright laws to protect the interests of capital and its investment in production. Libraries ceased to be centers of copying and became warehouses of information. Such a huge collection no longer serves as an object of personal knowledge or as a locus of learning, as much as it is a memory bank for that which in general is known. Scholarship had been a process of linking and linkage, situated in the library, where people ‘built upon’ pre-existing knowledge with new experience or insights to create new knowledge, which was then put in the library for the next generation to build upon. The function of a library as a place for new linkages gave way to rote memorization. It shifted from a locus learning and insight, to one of training, study, and instruction. Its social meaning changed as well. Literacy was not common in antiquity; the demand for knowledge was high, while the production of books was low. Therefore, in antiquity the library *equalled* learning. With the invention of the printing press however, that role has been ceded to schools and universities, who have their own libraries adjacent to the classroom experience. ‘The library’ then became a warehouse of data and the kind of learning of the ancient libraries shifted to personal libraries.

A small private library, outside or parallel to the academic or public library, can make learning detailed and intimate – the owner knows the books well and can easily find what he needs in them. As the libraries grow, the intimacy with the collection as a whole gradually lessens. Still, even as the number of books may go into the many hundred, they are still of personal value and insight. For example, Charles Darwin’s personal library amounted to 1,480 books in total, of which 730 copies contain detailed research notes in their margins. These books are being digitized at the Cambridge University Library, eventually allowing scholars all over the world to access Darwin’s personal book collection. Through studying

34 | Derrick Jensen and Aric McBay, *What We Leave Behind*, New York: Seven Stories Press, 2009, p. 48.

35 | Jensen and McBay, *What We Leave Behind*, p. 49.

Darwin's library and his notes, scholars will be able to delve into his ideas with greater appreciation. If Darwin had 100,000 books, such an intimate appreciation would be impossible.

THE CASE OF WALTER BENJAMIN'S PERSONAL SEMI-PORTABLE LIBRARY

A bulky predecessor of the Personal Portable Library was the portable set of bookcases developed by Walter Benjamin. In his 1931 essay 'Unpacking my Library'³⁶, he investigates a number of perceptions and experiences in the development of his own personal library. Loaded into a series of trunks or cases, Benjamin always carried a core collection of literature with him to have at his disposal. Benjamin reveals how he acquired precious books at auctions and the tactics he used to win out over other more well-heeled customers. He also talked about the kind of mania required in book collectors, one that is based in anticipation and intense desire: 'Every passion borders on the chaotic, but the collector's passion borders on the chaos of memories. More than that: the chance, the fate, which suffuse the past before my eyes are conspicuously present in the accustomed confusion of these books.' And, he noted: 'For what else is this collection but a disorder to which habit has accommodated itself to such an extent that it can appear as order? You have all heard of people whom the loss of their books has turned into invalids, or of those who in order to acquire them became criminals.'³⁷

Benjamin, once one digs past his bragging rights at auction,³⁸ makes some points that contribute to the Personal Portable Library: 'For inside him there are spirits, or at least little genii, which have seen to it that for a collector – and I mean a real collector, a collector as he ought to be – ownership is the most intimate relationship that one can have to objects'.³⁹ 'And indeed, if there is a counterpart to the confusion of a library, it is the order of its catalogue'.⁴⁰ In the Personal Portable Library, the order of the (card) catalogue is lost either through a recapitulation of epistemological categories based on curatorial decisions or else made redundant, dispensed with, except in the most rudimentary method of the default alphabetization of documents by file name. The Personal Portable Library has a bare bone architectural order built into it through the fundamental, default order inherent to operating systems – systems inherited from Alexandria.

Benjamin's library was something of great personal and intimate value. He wrote prior to the development of computer technology; these weren't files on a drive – data on a substrate – these were books made of paper that had texture and smell and that existed as finite material objects, in a sense, beings, that one encountered. Unlike a computer, they permitted him immediate random access – he only had to go to the shelf, pull a book out, open to a page, and begin reading. A computer system requires one to start the computer,

36 | Walter Benjamin, 'Unpacking My Library' in: *Illuminations*, New York: Schocken Books, 1968.

37 | Benjamin, 'Unpacking My Library', p. 58.

38 | Which are not insignificant – he really was able to sneak his way into some excellent deals through cleverness and manipulation and a little bit of luck.

39 | Benjamin, 'Unpacking My Library', p. 67.

40 | Benjamin, 'Unpacking My Library', p. 60.

select a file and open it and then search inside it, or start the computer and open an indexing software and search on terms. There is very little that is random or serendipitous to the computer's file system.

As Benjamin remarks in the first quote, 'ownership is the most intimate relationship that one can have to objects'. This logically leads to questions concerning property theory. What is intriguing is the introduction of the personal – *ownership is the most intimate relationship with objects* – as it touches on Hegel's personality theory of property, where property is seen as an expression of the personality. Suffice it to say, Benjamin's affect towards his library has some value for the Personal Portable Library. Regardless whether the specific and personal relationship that Benjamin had with each of the books in his collection may or may not be possible in a Personal Portable Library (with many tens of thousands of books), one can develop an affective personal relationship to the Personal Portable Library itself as an archive and be quite devoted to its continued existence and expansion. In this way, there is affective similarity and difference in the relation of ownership.

Objects are arranged in concentric circles of cathexis, where those objects (people or things) most dear are central and the ones less dear are peripheral. In this way, a distinction can be drawn between property and possessions. The boundaries, necessarily permeable and imprecise, can be distributed by vectors of affect, power, and bureaucracy. So, an outer perimeter would be property as determined by bureaucracy. For example, my wife and I own an acre of desert in New Mexico somewhere outside of Albuquerque. Her father gave us the deed to this land. We own it bureaucratically, and if someone usurped it, we would have recourse to use state power to reclaim it through the judicial system. The level of affect approaches nil. It's a nice piece of, well, desert. Conversely, there's a photo of me and my daughter, Elizabeth, hanging on my wall right here. That is a prized possession. I see it several times a day, and it always brings me joy. I framed it myself in copperleaf. The level of affect is high, the intrusion of state power approaches nil, and the bureaucracy involved is effectively zero. This photograph is in a closer circle on the plane of objects – to me this photo is much more valuable than an acre of sand.

It is in this range that a Personal Portable Library exists. While one may not have much affection for any given book, one may have a great deal of affection for the library itself, especially as it embodies a field of possibility and unknown delight, and, when properly indexed, acts as a means of connection. It is this affection for a collection, that touches on a sense of the sublime, that is unique to the Personal Portable Library. For if knowledge is power, then access to knowledge is access to power. This makes the Personal Portable Library access to a great deal of power, especially when its contents match one's interest and design.

In hindsight, Benjamin's enormous and unfinished *Arcades Project* was a work that would have been completed very quickly if he had a Personal Portable Library of indexed e-books. Searching, copying, pasting and assembling the *Arcades Project* would have accelerated and completing the task would have been much easier using Query Based Research techniques in a Personal Portable Library. Benjamin's entire library could have fit on a \$10 USB stick.

On/Off/Line

With books ready to be shared, meticulously catalogued, everyone is a librarian.
When everyone is librarian, library is everywhere.

Marcell Mars

I can't tell if I'm a kingpin or a pauper
Greedy little people in a sea of distress
Keep your more to receive your less
Unimpressed by material excess
Love is free love me say hell yes
Give it away, give it away, give it away NOW!
Red Hot Chili Peppers, 'Give it Away'

ONLINE PRECARIETY

There was a time not that long ago when the internet was seen as the fulfilment of a Deleuzian rhetoric of rhizomatics.⁴¹ In the 1990s, this description wasn't that far from the truth. It seemed that the internet was this indestructible MilSpecs⁴² network; impregnable to assault, a final bastion of free speech and virtual community building. People bragged for years about how file sharing was impossible to stop, given internet topology: any clamp down would be met with a rhizomatic resistance that would always overcome the stiff arboretics of censorship.

This was proven wrong not long ago in Egypt, and continues to be demonstrated in country after country as national governments and corporations seek to limit, filter, record, and otherwise hinder free traffic on the internet. With the 2011 rise against the regime of Hosni Mubarak, the failure of the rhizomatic became clear through its victory. As tensions escalated, people were using social media to organize protests, circulate videos of government brutality and send a variety of messages, opinions, and observations both to the internal and external Egyptian mediasphere. For the Mubarak government this was out of alignment with its interests, and it basically 'pulled the plug' on the internet by shutting down the local Internet Service Providers (ISPs). This had a number of effects, not all of them intended or desired by the Mubarak regime.

First, there was the desired effect of most people in Egypt not being able to access the internet. Second, there was the rhizomatic reaction: people began looking for ways around the restrictions, for example by accessing satellite phones. These phones had limited bandwidth, which enabled digital transmission of images, text and short video clips. However, most people did not have access to these systems, so, the vast majority of internet users in Egypt were effectively denied access to online resources that made the protests potent and possible. Third, there was the secondary effect desired by the ruling elite, namely to drive

41 | As a model for culture, the rhizome resists the organizational structure of the root-tree system which charts causality along chronological lines and looks for the original source of 'things' and looks towards the pinnacle or conclusion of those 'things'. A rhizome, on the other hand, is characterized by 'ceaselessly established connections between semiotic chains, organizations of power, and circumstances relative to the arts, sciences, and social struggles.' Gilles Deleuze and Felix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, Minneapolis: University of Minnesota, 1987, p. 7.

42 | 'A United States defense standard, often called a military standard, "MIL-STD", "MIL-SPEC", or (informally) "MilSpecs", is used to help achieve standardization objectives by the U.S. Department of Defense.' Wikipedia, United States Military Standard.

most people into more direct and unmediated forms of communication. The Mubarak regime felt these would be slower and more open to infiltration and therefore more desirable than digital communication and the spontaneously organized networks that such communication facilitated.

This, of course, was a complete miscalculation of the situation, as there was the fourth and final reaction: the army turned away from Mubarak and sided with the protestors when they realized that the revolution against Mubarak could be won, and calculating that siding with the revolution, they could easily dominate the resulting government. As with many revolutions, revolution is resisted by the army and won by the army. And that is exactly what transpired: the revolution aiming for a new and greater democracy, run by a younger and more secular population was stopped by the Egyptian Higher Military Council with political allies in the Muslim Brotherhood. The removal of Mubarak and a dozen of his associates was the first step in the Egyptian military's power play. The end result was no great change from the Mubarak regime, as the head of the military council, General Tantawi, has been the defense minister under Mubarak for over 25 years. Tantawi was forced to resign by the new President of Egypt from the Muslim Brotherhood. Tantawi's successor is another long-term career officer, Abdel Fattah el-Sisi. The military thus appropriates power to itself and its political allies as it saw fit, and the political allies were conversely able to affect the leadership of the military.^{43,44} Elections were permitted, which Mohamed Morsi's Muslim Brotherhood won. When Morsi's rule fell into disfavour, again, the military stepped in and deposed him. At this writing, Egypt is still under military rule.

Another angle on that is provided by Andy Bichlbaum of The Yes Men when he said in a recent interview in answer to the question why 'we bother with the real world if we all sit in front of our computers for the majority of our lives anyway':

Because the real world is real, and the virtual world doesn't really exist. Computers are only good for communicating simple information from one point to another, which is an improvement over the telephone, or town criers, or smoke signals. But the smoke signal has to reference something visceral. *In Egypt, Facebook was supposedly so important, but it was really useful only to tell everyone to go to Tahrir Square, and that only worked because everyone knew there was a reason to. Facebook didn't give the reason; everyone knew why because of life.*⁴⁵

The failure of the internet is demonstrated in 2013 with Edward Snowden's leaks, showing how the NSA simply eats the internet whole, digests its contents as a database, and thus exerts control through a hyper-panoptic dragnet of fear and assumed loss of privacy. Even though the files from Snowden were provided over the internet, what they show is that the NSA basically records and files the entire transmitted digital infosphere – every single email, every single webpage, every single phone call.

43 | Hani Fakhouri, 'Arab Spring Revolution and Rise of Religious Sectarianism', *Mid East Today*, 12 April 2012, <http://mid-east-today.blogspot.ca/2012/04/arab-spring-revolution-and-rise-of.html>.

44 | Recent upset in Egypt only serves to underscore these points: The military made a deal with the Muslim Brotherhood, but when the leader, Morsi, proved suboptimal and millions turned out to protest his reign, the military stepped in and Morsi was deposed. What this shows is not the power of the internet in Egypt but the power of the military.

45 | Laura Gottesdiener, "'Why Do Oppressed People Have such Great Jokes?' The Yes Men's Andy Bichlbaum", *Waging Non Violence*, 23 April 2012, <http://wagingnonviolence.org/2012/04/why-do-oppressed-people-have-such-great-jokes-the-yes-mens-andy-bichlbaum/>. Emphasis added.

The perceived success of the web in Egypt compared to its actual efficacy mirrors the kinds of claims made in the early ‘frontier’ days of the internet⁴⁶ that the web was unstoppable and uncontrollable. It is becoming very clear now, with the suppression of data lockers, the closing of library.nu, the constant barrage of restrictive legislation (SOPA, PIPA, ACTA, etc.), and the overwhelming surveillance by the NSA that the web *is* stoppable, vulnerable, and precarious. Indeed, the web has become so obviously precarious that Julian Assange stated on SXSW in Austin Texas, 2014: ‘Now that the internet has merged with human society... the laws that apply to the internet apply to human society. This penetration of the internet by the NSA and [British spy agency] GCHQ is the penetration of our human society. It means there has been a militarisation of our civilian space. A military occupation of our civilian space... is a very serious matter.’⁴⁷ At the same event, Edward Snowden noted: ‘The NSA, with this global mass surveillance that’s occurring in all different countries, not just the U.S. – it’s important to remember that this is a global issue – they’re setting fire to the future of the internet.’ Snowden went on to exhort the audience to be ‘firefighters’.⁴⁸ While some people enlist themselves as ‘firefighters’ others are simply moving the valuables out of the house before it burns down.

Although rapid communication is impossible offline via Sneakernet, the ability of people to exchange vast swaths of data in a secure manner is amplified, as the Personal Portable Library concept shows. The material is always more resilient than the virtual, and in a digital context, the material consists of computer components, for the Personal Portable Library: *the hard drive*. The exchanges of Personal Portable Libraries are a direct response to the end of the internet. Following the collapse of the electronic frontier into walled gardens and economic satrapies, the foundation of radical responses should be advocated by some and anticipated by all, and the Personal Portable Library is one of these responses. There are a plethora of online technologies and websites that intersect with the Personal Portable Library, and to even attempt to list and discuss them all would be foolhardy. As examples, I’ll talk about a few sites and resources that I have found most useful over the years, and which will provide some historical context.

NAPSTER

An early and useful model was the one developed by Napster, which I had the opportunity to work at for nine months – almost half of its existence. I worked for Napster in two locations from April to November 2001. The first was a light blue warehouse in Redwood City that looked to be some kind of a former truck repair space – the back wall was a bank of huge garage doors, and the ceiling in the main room was at least six meters tall. We were there until summer 2001 when we moved to a more ‘modern’ building in an office park in Redwood Shores. Neither building was marked with the name Napster, and at the second office in Redwood Shores, there was always a van in the parking lot with a mirrored window

46 | The geographic metaphor of the internet as frontier is one I hope to explore in a future volume. It was explored by Beth Scannell in her master’s thesis *Life on the Border: Cyberspace and the Frontier in Historical Perspective* (<http://www.kether.com/words/thesis/index.html>) and deserves greater development now that the frontier is closed and the enclosure process has begun.

47 | Stuart Dredge, ‘Julian Assange Tells SXSW Audience: “NSA has grown to be a rogue agency”’, *The Guardian*, 8 March 2014, <http://www.theguardian.com/media/2014/mar/08/julian-assange-wikileaks-nsa-sxsw>.

48 | Cory Doctorow, ‘Edward Snowden: “The NSA Set Fire to the Internet. You Are the Firefighters”’, *The Guardian*, 11 March 2014, <http://www.theguardian.com/technology/2014/mar/11/edward-snowden-sxsw-nsa-internet>.

that faced our building. Curtains were drawn as we were concerned about eavesdropping and photography. By then, Sean Parker had long been banned from the company – he had written an email saying something to the effect that Napster was a great way to steal music, and this memo was considered a smoking gun for the prosecution. Sean Fanning was a friendly presence and could be counted on to do good work, at least until the afternoon when his attention waned. Heck, he was 19 years old, what do you expect?

The stress level was very high, and the level of mismanagement even higher, which didn't help at all. For example, prior to my being hired, I was invited to the Napster Christmas party. The party planners had rented a jazz club in San Francisco, Storyville, for the event. The two Seans were not permitted in on their own Christmas party. Why? Because the law in San Francisco is very clear, no one under the age of 21 is permitted in an establishment that serves alcohol, no exceptions. Who plans a party in such a way that the principles in the company can't attend? Another example: in late 2000 Napster received funding from Bertelsmann, who hoped to turn Napster into a 'paid' service. That was one of the reasons I was hired – to do black box and grey box testing of the billing client, which was going to route all Napster income through Chase Bank. The dysfunctional thing with Bertelsmann funding Napster is stunning: Bertelsmann's music unit, BMG, was at the same time suing Napster for millions of dollars. From a not unreasonable perspective the whole thing stank of a scam. BMG sues Napster for millions of dollars while Bertelsmann's main company (BSE) puts millions into Napster. So, if BMG wins, then BSE loses, and they write millions off for backing Napster, while the BMG unit sees a massive profit for winning. If Napster and BSE win, then BMG writes off their costs in prosecuting the case (millions of dollars) and Napster and BSE make millions in profit going forward. In effect, from this perspective, it seemed that this dysfunctional mess of a company was acting as a kind of money mule in a shell game for BSE and BMG. It was confusing and dispiriting.

Needless to say, as soon as the idea of a 'paybox' was put into planning, many engineers were very upset, as in, *completely outraged*. The dream of Napster was for everyone to freely share files to the benefit of all. At one engineering meeting where this plan was discussed, one of the programming engineers gave a loud and angry speech about how Napster was betraying its most basic reason for being – the free sharing of music in a P2P environment – and how this paybox idea was evil and wrong. She stood there wagging her finger at management, barking her disdain for their betrayal of the file sharing principles she held so dear. It was a long and inspiring tirade, and when she finished she slumped in her chair, burst into tears and then left the meeting. I believe she resigned shortly thereafter. At one point the arguing grew so heated that one afternoon two of the programmers got into a shouting match that quickly escalated into a brutal fistfight, and they both had to be physically restrained from beating the crap out of each other. The police weren't called. The two troublemakers were told to go home and cool off. For a time, emotional meltdowns and shouting matches became a frequent occurrence, and then a sense of quiet desperation took hold. When things were finally coming to a head in late 2001, a couple of people attempted suicide out of utter despair.

Still, every morning we had a free breakfast of bagels and spreads, fruits, and coffee...

One can criticize the engineers for their naivety. After all, they were working for a multi-million dollar corporation – what were they thinking? That somehow Napster, a company

propped up by the parent corporation of one of the very companies suing them for millions of dollars, was going to operate outside the laws of capitalist extraction? Such was the depth of the delusional California Ideology, a weird pseudo-anarchism of technological commodity fetishism and libertarian idealism so common in Silicon Valley at the time – an ideology with its own propaganda organ in the form of *Wired* magazine. The architecture of P2P fed directly into this – which allowed things to be freely shared between developers (as in the Free or Open Source Software movement) and between users as well. At the same time cracking open the final recalcitrant shell of the proprietary regime, and still being completely beholden to the mechanical substrate of computer systems, devices made by and for corporations whose interests lay in quarterly profit statements.

The saddest part of this entire episode is that the idealism wasn't entirely misplaced: P2P *does* strike out at the very notion of intellectual property as it had come to be. It *does* permit users to exchange any kind of digital file. It *is* coherent with the fundamental architecture of the computer: copying data from one memory register to another. Unfortunately, due to the exigencies of the proprietary regime's stranglehold on IP that undergirds nearly feudalistic⁴⁹ socio-economic arrangements, unremitting and often brutal applications of intellectual property ideologies have been imposed in order to maintain the social, political, and economic dominance of this unbalanced class structure.

In September 2001, Napster lost the case. In November there were massive layoffs. When we came in that day, we all had to line up and, in turn, sit with a rep from Human Resources⁵⁰ who had us sign our 'go away' papers, shook our hand, and ordered us out of the building. Although I was not happy about that, I was not surprised. Very simply put, Napster was one of the worst work environments I've ever had the displeasure to collect a check from. While it wasn't as bad as some other day jobs I've had from the planet of bad day jobs, it certainly was in a close orbit. Still, I made many friends there, forged in that pit of dysfunction and adversity, and I am proud to have served with them. We fought the good fight – *we lost*. Napster was an early effort in public file sharing. The structure of P2P evolved and moved to other systems (Limewire, Kazaa, etc.) and its structure, as discussed earlier, stands in stark difference to the data lockers and torrent systems that followed.

LIBRARY.NU

In the early 2000s there was a website called ebooksclub.org which evolved into gigapedia.com, a massive online library. Over time it grew and shifted the structure of its operation, changing its name to library.nu. The files on library.nu were stored on a data locker, ifile.it. Ifile.it paid for its hosting bills using advertising. Soon, library.nu was the largest repository of freely downloadable e-books in the world, with some half million titles – very similar in size to the Library of Alexandria.

This remarkable resource for humanity was removed from history by publishers of extortionately expensive textbooks. In 2011, investigators hired by book publishers found that

49 | For more on informational feudalism, I recommend Drahos and Braithwaite's *Information Feudalism: Who Owns the Information Economy?* New York: The New Press, 2002.

50 | Human Resources is a notion I find repellent in its dehumanizing transduction of people with hopes and dreams into mere 'resources' like glass, steel, and concrete. At least the term 'Personnel' has the word 'Person' in it.

the names of those responsible for library.nu were the same as those linked to ifile.it. In the publisher's view, this made them accountable for the profits derived from the advertising revenues; they maintained that library.nu was basically the front end for ifile.it's advertising business model, and that the fact that the same people ran both was sufficient proof.

Christopher Kelty wrote about the erasure of library.nu, noting that these weren't

just any books – not romance novels or the latest best-sellers – but scholarly books: textbooks, secondary treatises, obscure monographs, biographical analyses, technical manuals, collections of cutting-edge research in engineering, mathematics, biology, social science and humanities. The texts ranged from so-called 'orphan works' (out-of-print, but still copyrighted) to recent issues; from poorly scanned to expertly ripped; from English to German to French to Spanish to Russian, with the occasional Japanese or Chinese text. It was a remarkable effort of collective connoisseurship.⁵¹

The results of the loss were predictable, and telling:

To the publishing industry, this event (the closing of library.nu) was a victory in the campaign to bring the unruly internet under some much-needed discipline. To many other people – namely the users of the site – it was met with anger, sadness and fatalism. But who were these sad criminals, these barbarians at the gates ready to bring our information economy to its knees? They are students and scholars, from every corner of the planet.⁵²

With the erasure of library.nu, the precarity of the online became transparent: it is painfully obvious that online projects that provide knowledge are subject to the whims of lawyers acting in the interests of proprietary regimes.

AAAAARG.ORG

Aaaaarg.org was developed as arg.org some ten years ago as a way for the artist Sean Dockray and his friends to share and exchange ideas about a text. For everyone to read and comment on the text, it had to be shared. This is comparable to a local book club or literature discussion group, where people share books for the purpose of sharing ideas and observations.

Over time, as Dockray has noted⁵³, the focus of aaaaarg.org shifted from a small group of people sharing ideas about a few books, to thousands of people uploading and downloading

51 | Christopher Kelty, 'The Disappearing Virtual Library', *AlJazeera*, 1 March 2012, <http://www.aljazeera.com/indepth/opinion/2012/02/2012227143813304790.html>.

52 | Kelty, 'The Disappearing Virtual Library'.

53 | 'It was pretty simple at the beginning – sharing things with people who I was working with or in contact with. The community originally was tiny. The ways that people have since figured out how to use it are very personal to them, or are communal, forming relationship with others through the site. I like that people pass it on like it's a gift. But as for an understanding of where it would go, I had no idea it would become so big and active in the way it is now. I didn't expect 20,000 people to participate. Its growth has been exponential since early summer: 80% of what's there has been contributed in the last six months or so.' Morgan Currie, 'Small is Beautiful, Interview with Sean Dockray', *Masters of Media blog*, 5 January 2010, <http://mastersofmedia.hum.uva.nl/2010/01/05/small-is-beautiful-a-discussion-with-aaaarg-architect-sean-dockray/>.

a non-trivial archive of e-books, articles, and journals. The structure of aaaaarg.org is very much that of a data locker. People can upload and download materials from its server without charge, leaving it vulnerable to proprietarian actions. In 2009, the publisher of leftist books Verso, asked aaaaarg.org to remove all Verso books, per the Digital Millennium Copyright Act (DMCA). [Aaaaarg.org](http://aaaaarg.org) complied. The results were less than optimal for Verso. People soon re-uploaded the books from Verso, and a disgruntled user set up a blog called fckvrso.wordpress.com, with links to books by Verso in other data lockers. This was an unfortunate fracas, not in the least because Verso's publications are of a left-wing nature, featuring books by Žižek, Agamben, Lukacs and Althusser, among others. This episode also serves to point at the central contradiction the Personal Portable Library brings to the fore: that of intellectual or imaginary property in a capitalist system of digital data which depends on the copying of data for its most fundamental operation. Recently aaaaarg.org changed its UI design and its membership structure. Now, instead of applying to aaaaarg.org for membership, it is by invitation by other members. This decentralizes the membership and creates genealogies of relation between older members and newly invited members. All uploading activity is now part of an ongoing list of actions one can scroll back. So, while it doesn't have the mechanical usefulness of a daily statement of uploaded material, it does invite one to examine what has been uploaded in a more thoughtful manner. Should aaaaarg.org ever be shut down, it could, theoretically, be revived as another site by one of those Personal Portable Librarians who meticulously monitor its acquisitions. Despite its size, aaaaarg.org's entire contents fit on a handful of USB keys or an inexpensive hard drive.

ARCHIVE.ORG

Housed in a beautiful building, a former Christian Science Church in San Francisco, archive.org is a treasure trove of over ten petabytes (PB) of information. It has been recording parts of the internet for years and is accessible via the 'Wayback Machine', which allows one to visit a website as it was on various moments in history. As a library, it runs an active and ongoing book scanning and Optical Character Recognition (OCR) program, with over 1 million books available for download. [Archive.org](http://archive.org) is very attentive to claims of copyright – due to its 10 PB size it can't really afford to tweak the proprietarian powers that be. Despite these limitations, the depth and breadth of archive.org is stunning and far beyond the capacity of any Personal Portable Library, as it occupies banks of servers. [Archive.org](http://archive.org) is also an active and much needed activist advocate for a free and open internet and for Access to Knowledge.

GUTENBERG PROJECT

As discussed earlier, the Gutenberg Project, founded in 1971, is the oldest online library. It is scrupulously fixed on only providing works that are available in the public domain. As a consequence, it only has about 42,000 books, making Gutenberg about the same size as aaaaarg.org. Downloading the entire Gutenberg library would be a tedious yet worthwhile activity and a valuable resource for any library.

AVAXHO.ME

Avax is a shadowy organisation based in Russia. Links to any kind of digital object can be found there – software, videos, music, books. The Avax site is a kind of centralized, all-in-one mimic of the blog with data locker structure. In many file sharing scenarios, people set up interest blogs with links to files in data lockers elsewhere. Avax centralizes all this, by allowing users to create file sharing blogs inside the Avax structure. These ‘blogs’ link out to data lockers, hence, Avax merely provides a space for people to link to files. Avax also has its own search engine, avaxsearch.net, so finding material on Avax is easy. That said, Avax is completely dependent on the rhizomatic nature of the internet and on the associated data lockers, and for that reason is vulnerable. When Megaupload and ifile.it were taken out by the proprietary regime, Avax lost a lot of its linked content. All that was left was a network of blogs with dead links. In the past few years it has rebuilt its content, and is now big as ever. Avax monetizes its size with advertising in the blogs that link to the files.

LIBGEN

Libgen is a massive online (book) library. Libgen, short for Library Genesis, is also based in Russia, and is even more shadowy than Avax. It was briefly offline in 2011, but soon returned bigger than ever. At the time it had about 800,000 books. It now has well over a million volumes and occupies approximately twelve terabytes of storage. Many e-books in libgen are not optimized – hundreds of them are well over 100 MB in size. For example, *Middle Egyptian: An Introduction to the Language and Culture of Hieroglyphs* by James P. Allen weighs in at over 107 MB and is not even downloadable via their web portal. Then how to acquire this book? Well, either by downloading the entire 9 TB libgen.info library which is available via torrents (linked in the Tor network), or finding someone who has already done that, so as to acquire it from them. Libgen is a kind of hybrid that is too big to be a convenient Personal Portable Library and so by definition, like archive.org, is an online entity. Yet its survival is predicated on an offline strategy. People have developed their own online libraries on the ground provided by libgen. An example is bookfi.org, based on the original Library Genesis data set, and grown in a different direction. In February 2013, libgen branched out into libgen.org. This has the entire libgen library, and allows people to add books. My research indicates that, around mid-2013, it had an upload rate of approximately 100-150 items per day.

OTHERS

Online e-book libraries come and go – new ones appear all the time. This is in keeping with the underlying structures of online systems combined with the power and depth of offline systems. It’s not possible to provide a comprehensive list, on the other hand, all one needs do is search on Google for free downloadable books. Online file sharing systems – whether they be front ends for data lockers such as library.nu or precious narrowcast collections like aaaaarg.org – are always in the cross hairs of proprietary legal action and must constantly adjust their strategy and tactics for staying online. Claims of rhizomatic strength mask the actual precarity of the individuals operating these systems. This precarity is amply balanced by offline file sharing systems.

OFFLINE APPROACHES

Methods of offline file sharing often spring from the realm of fine art. Some art projects take the concept of file sharing as their start or end point and I will discuss some of them below. Fine art objects are localized and limited – they are on display for a fixed amount of time as part of an exhibition and are seen as a materialization of free speech. In this way the projects have only a temporary or limited impact, and by the time someone notices the work it is gone, the exhibit closed up and disassembled. Also, since practicality isn't a central feature of art, the works exist in a pretensive space, where they operate under an 'as if' condition. Some of these projects aren't practical at all, and function more like gestures.

THE DEAD DROPS PROJECT

Dead Drops was created by the Berlin artist Aram Bartholl, while being artist in residence at the New York art space EYEBEAM in October 2010. It consists of putting USB sticks – Dead Drops – in public places, often cemented into cracks in the wall or between bricks.

The advantages of Dead Drops are clear – they require no commitment, they are easily accessible in public spaces, extremely inexpensive and quick to set up, and they are inherently local, require no significant computer skills, and serve local parochial needs and interests. Also, all is very private – no record is made on the Dead Drop of who visited it and what they left or what they took. In this way, the system is completely anonymous, with all the strengths and pitfalls that engenders. Also, Dead Drops is sensitive to weather and viruses. A good rainstorm ruins the USB stick, and one person with one infected machine can render the network dangerous. Still, Dead Drops was a unique and vital gesture in offline file sharing as it encouraged participation.

THE PIRATEBOX SYSTEM

The PirateBox, originally called Freedrop,⁵⁴ is a creative gesture by David Darts, an art professor at New York University. He built it to fill a need for himself and found that others could use it also. He posted the instructions on how to build it on a wiki page.⁵⁵ The first one he made is a metal lunch box, painted black with a white skull-and-crossbones. Inside a microserver is mounted running the Linux (Debian distro) operating system, and on top of that is a barebones Python-powered web server and Wi-Fi router. The device creates an open file sharing network in any public space.⁵⁶

54 | Jacob Aron, 'PirateBox Lets You Share Files with Anyone Close by', *New Scientist*, 28 January 2011, <http://www.newscientist.com/blogs/onepercent/2011/01/piratebox.html>.

55 | David Darts, 'David Darts: Pirate Box DIY Page', http://wiki.daviddarts.com/PirateBox_DIY.

56 | 'Inside the PirateBox sits a Free Agent Dockstar, an Asus WL330GE wireless router, and a SanDisk 16GB flash drive. The software, including Debian Linux and the DD-WRT open-source router firmware, is all free. The total build cost is under \$100, not counting the lunchbox enclosure and the optional battery pack (the PirateBox can alternately run on AC power).' From: Nate Anderson, 'PirateBox: An Artistic Provocation in Lunchbox Form', *Ars Technica*, 30 January 2011, <http://arstechnica.com/tech-policy/news/2011/01/piratebox-an-artistic-provocation-in-lunchbox-form.ars>.

Darts describes the PirateBox as a device

designed to facilitate sharing which, by definition, is the opposite of stealing. The misleading connection between stealing and sharing has been promulgated by old media interests and their well funded lobby groups who claim that sharing and remixing copyrighted materials hurts artists... Today it is not productive to restrict sharing in order to pay for centralized production and distribution. Prohibiting people from freely sharing and remixing information and culture serves no one's interests but the publishers.⁵⁷

The PirateBox creates a temporary space for file sharing, a temporary community in a virtualized space, overlaid on a real public space. The social space that the PirateBox creates can be seen as a kind of network-generating object, where the social doesn't really exist until the technology that creates such an affordance of relation is connected. Darts decries the centralization of media and sees the PirateBox as a 'symbolic response to this centralized control'.

The Pirate Box is a significantly useful tool as it can be easily scaled in size, and act as an ad hoc locus of knowledge dissemination and distribution. An application of Pirate Box could be as follows. Someone walks into a café, announcing 'Pirate Box has arrived. This is an open network. Share its contents. Add things at your will.' The denizens of the cafe would take note, and share as they see fit, or not. If this is repeated, consistently, then people will know they can pick up interesting books and media at the cafe. If repeated in enough places, it would reframe our experience of knowledge acquisition and help reform our notion of property, as these are things shared, not owned. With a Personal Portable Library attached to such, anyone could become a travelling library, as scaling a Pirate Box from a small USB stick to a terabyte drive is a trivial effort. This would change the Pirate Box from a small number of files to a huge Datafield. Indeed, my own creative activity in developing DATAFIELD was inspired by Pirate Box.

COPY THIS DRIVE

In the installation *Copy this Drive* (2011) digital artist Nick Briz left the content of his hard disk available to the public. The installation was composed of an Apple CRT monitor made of transparent plastic, mounted on a plexiglas column which housed an Apple computer that contained the artist's hard drive. The artist permitted anyone to connect to the computer via a USB cable and copy any file they desired or even clone the whole computer drive. This gesture of generosity and vulnerability showed in a great manner that the contents of a drive and its curation are personal belongings that can be shared – they are something other than property.

57 | See, 'David Darts: Pirate Box DIY page', http://wiki.daviddarts.com/PirateBox_Diy.

DEADSWAP

Developed by Berlin based Dmytri Kleiner, the best description of deadSwap is from the deadSwap website itself:

deadSwap is an offline file sharing system where participants covertly pass a USB stick from one to another. The route of the USB memory stick and the identity of the other participants is not known by the users but controlled by local, independently operated SMS gateways that are kept as a carefully shared secret by their users [...] deadSwap is a social experiment exploring the possibilities of creating an entirely off-line file-sharing and communications platform where people pass a USB memory stick from one to another. The coordination of the passing-on of the stick is done through an anonymous SMS gateway, meaning that the system does not require Internet availability and also that, with certain precautions, it can be a very private system that is quite difficult to monitor.⁵⁸

This kind of technology is extremely valuable for strangers to be able to share data on offline devices. It could be as small as a USB key, or as large as a station wagon filled with terabyte hard drives. This is an example of a potentially very practical interface for offline file sharing, creating connectivity and clandestine community building (or, as clandestine as the NSA permits). As of this writing deadSwap is offline. That may change, but the instance highlights the precarity of online systems.

DATAFIELD

Datafield is an installation I put together for the 'Dark Side of the Digital' Conference in Milwaukee, Wisconsin in May 2013. I took a few of the technologies discussed above and amalgamated them together. Essentially, Datafield is a Wi-Fi router attached to a terabyte hard drive that contained the 45,000 books from the Alexandria Project. Instructions were provided on how to sign in to the drive and how to find, download or upload files. It was a small and tightly scheduled conference, yet ten files were left behind by users, and dozens more were downloaded. Unlike the PirateBox, which requires some knowledge of Linux and computer building, all of the equipment for Datafield came off the home entertainment/media server technology department. It showed that using common consumer technology (a Cisco Router and a Western Digital hard drive) works for the strategies of offline file sharing. This kind of technology could be easily extended to any public place of learning – universities, schools, libraries, cafes, parks...

MARCELL MARS

Marcell Mars is doing a great deal of research in the field of on- and offline libraries. An artist and a technologist, he runs workshops like *Programming for non-programmers* and *Social software and semantic web in practice*. As an artist, I resonate with his approach and practice – like me, he is many. He has developed a remarkable plug-in for Calibre that allows one to trade books directly with others. For these efforts he has been banned from the Calibre conversation. He is actively engaged in open source systems that already exist, manipulating them to synergize new, more powerful library systems. He will be someone

⁵⁸ | See, <http://deaddrops.com/deadswap>.

whose efforts I will track as the Personal Portable Library grows and becomes less personal and more library. I suggest you do the same.⁵⁹

These are a few of the projects around at the time of this writing. They point at a bright future for public file sharing reflected in a broad dissemination of knowledge and an enhanced circle of learning. But the realization of all these promises depends on what *we* make of the future.

59 | See, <http://gle.ovo.kom.uni.st/>.

Futures and Potentials

Books bombarded his shoulders, his arms, his upturned face. A book alighted, almost obediently, like a white pigeon, in his hands, wings fluttering. In the dim, wavering light, a page hung open and it was like a snowy feather, the words delicately painted thereon. In all the rush and fervour, Montag had only an instant to read a line, but it blazed in his mind for the next minute as if stamped there with fiery steel. 'Time has fallen asleep in the afternoon sunshine.'

Ray Bradbury, *Fahrenheit 451*

The Personal Portable Library is a practical reality, and it is not only so in the province of file sharing communities and other fringe actors. Mainstream scientists are now discovering the power of the offline as they work to preserve their research in the face of government oppression, even in a 'Western democracy' like Canada. There are various scenarios for the future of offline library systems, largely dependent on issues of property claims of copyright and strategic technology decisions by both proprietary forces and resistance. What follows are some scenarios from the best possible outcomes to other options.

OPTIMAL SCENARIOS

The most optimal scenario would be for the publishing industries to admit they are wrong and go away. Given present political circumstances and the economics involved, the odds of that happening range somewhere between infinitesimal and none. So we should view the set of scenarios that enhance the possibilities and usefulness of the Personal Portable Library in the face of the opposition from said industries and forces.

If a clever programmer out there decided to merge a search engine into Calibre, either directly or as a plug-in, basically all other e-book management systems would instantly pale in comparison, especially if Calibre were as transportable as Dropout. As it is Calibre works on all the major platforms (Mac, Windows and Linux) so all that's missing is the ability to index the contents of the e-books, something handily done by Dropout's Lucene search engine. With Calibre's organization and metadata capabilities combined with a search engine, Query Based Research could mature into something extremely powerful. There is talk to build such a plug-in on the Calibre site. For now, there are alternatives like using Calibre to organize files and then using Dropout or similar software to index the collection.

Query Based Research, still in its infancy, would permit the application of a variety of computer based practices to text in a way that is only being hinted at with systems like Google Scholar. While Google Scholar has access to a huge variety of texts, the inability to process these texts seriously limits its use value as a research composition tool. Calibre with search would be profoundly powerful – you could have your own 'Google Scholar' of a focused set of texts on your own computer, with copyable content.

With the offline sharing of Personal Portable Libraries, people in the developing world would only need inexpensive computers to access and process enormous amounts of information. One properly curated Personal Portable Library could easily turn a small poor school into a centre of research. Certainly a 12 TB sized system, if indexed, would be profound and powerful, as it would rival the libraries of all but the largest cities or institutions. An

interesting development is that one libgen variant now has a search function. However, due to its size and bandwidth considerations, the system is slow and unwieldy, and its search parameters are loose. To make it compelling (and a lot faster) would require localizing it onto a hard drive.

Students would be able to access books that aren't available in their library or even country. Through local, informal networks of libraries, people work together and share information in a positive commons of knowledge. In a sufficiently progressive environment, a public library could simply be an amplified version of Datafield – where people can freely access documents via localized offline Wi-Fi networks or meshnets. There are some hybrid projects: digital distribution systems with proprietarian oversight. San Antonio, Texas, has an example of this, where a digital library has been set up and patrons access books on-site. As noted in the Wall Street Journal:

The trial location, opening in a satellite government office on San Antonio's south side in the fall, will have a selection of about 10,000 titles, and 150 e-readers for patrons to check out, including 50 designed for children. The library will allow users to access books remotely, and will feature 25 laptops and 25 tablets for use on site, as well as 50 desktop computers. It will also have its own coffee house.⁶⁰

With 5 MB PDFs, the entire library collection could fit on a 64 GB USB stick. If they are EPUB or text files, the entire library would fit on an even smaller substrate, perhaps as small as a 16 GB USB stick. This public library scenario is hamstrung by proprietarian regimes of copyright and actually rather trivial compared to a system like Datafield or the PirateBox, and microscopic compared to online systems.

SUBOPTIMAL SCENARIOS

Suboptimal scenarios are scenarios that threaten the possibility of Personal Portable Libraries. There are many suboptimal scenarios, so we shall examine them more by strategy than tactic. Broadly, there are a few approaches: legalistic, strategic or social, and technological – manipulating how people use technology, which comes laden with ideology.

The legalist approach is a familiar one: capture career politicians to make increasingly draconian laws with ever more brutal punishments for file sharing. As noted earlier, if SOPA had been passed, one could spend more time in jail for sharing a Michael Jackson song than the doctor who killed him. The intensity and brutality of this approach has harmed the lives of many. It was, per his loved ones and family, a factor in the suicide of Aaron Swartz.⁶¹ This draconian approach has not been particularly effective at stopping file sharing⁶², nor has it done much good for the image of the proprietarian corporations

60 | Miguel Bustillo, 'Library that Holds no Books', *Wall Street Journal*, 6 February 2013, <http://online.wsj.com/news/articles/SB10001424127887324761004578286253988145208>.

61 | See Aaron Swartz' family statement regarding his death: Owen Thomas, 'Family of Aaron Swartz Blames MIT, Prosecutor For His Death', *Business Insider*, 12 January 2013, <http://www.businessinsider.com/statement-family-aaron-swartz-2013-1>.

62 | Dan Tynan, 'The RIAA Knew SOPA and PIPA Were Useless yet Supported Them Anyway', *ITWorld*, 29 July 2012, <http://www.itworld.com/it-managementstrategy/287788/riaa-knew-sopa-and-pipa-were-useless-against-piracy-and-supported-them>. 'The industry knows that most music files are swapped offline, notes Torrent Freak.'

as it has created its own nemesis in the Pirate Party and similar organisations. For that reason, while the legalistic approach is a consistent pressure, it has become a secondary strategy compared to the social and technology-based strategies.

There have been a number of computer-based approaches. In 2001, Western Digital developed hard drive software that would ‘phone home’ reporting on its use. This was met with derision by users, and was abandoned. There is no reason why similar devices would not again have such malware installed. The use value for companies would be to know what files people use, so as to be able to market to them more accurately. The flow of this data would, of course, be captured by the NSA, and given the complicity between the U.S. Government and proprietary copyright advocates, the idea that it might be known what is on one’s drive would be disheartening to say the least.

Previously, companies have proposed various Digital Rights Management (DRM) systems. Even though all of them have largely failed, this hasn’t stopped them trotting out new schemes. These draconian tactics are counterproductive. A much more strategic approach in hardware has been to obviate the need for hard drives by emphasizing the use of cloud storage and marketing devices that don’t readily connect to external drives. The emphasis on cloud storage is clear and obvious – for some time Microsoft was giving away 25 gigabytes of online cloud storage – everyone could have a personal data locker in the sky. Even scaled back, the efforts of Microsoft, Apple, and Dropbox are not to be underestimated. Once cloud storage is so cheap that it is essentially free, and bandwidth is unlimited, the short-term value proposition of offline file storage seemingly diminishes against the convenience and low costs associated with streaming media and cloud storage. However, these systems, as discussed earlier, are precarious and dependent. If you have a library in the cloud, and the cloud company goes out of business, your files could disappear instantly. If you depend on streaming technology, and your stream source disappears, you are left with nothing. An offline storage system – a Personal Portable Library – is resilient against the vagaries of the marketplace and the whims of political censorship and control.

The strategy of streaming and online dependence is enabled and emphasized by the marketing of tablet based computing and the rise of streaming audio companies. Tablets have no need to connect to external hard drives – they are increasingly aligned with cloud computing data lockers. As discussed earlier, every data locker has a gatekeeping mechanism; putting a paybox on the front is trivial. An example of this is Adobe Systems, shifting away from standalone software on a hard drive to a subscription model that is managed via the cloud. This subscription model is easily extensible to other media. Tablets are predisposed by their architecture to favour payboxed systems of data access, in that they are basically devices of media consumption. While tablets can be used for media production, they are decidedly secondary and of limited quality, and more integrated into the precarities of the online.

Tablets, cellphones, and similar devices are optimized for the distribution of media commodities, not for copying and sharing media from machine to machine. This architectural difference embodies the neoliberal program of cultural economy, where culture is produced by an industry for the consumption interests of an individual. This doesn’t mean that tablets can never be used for file sharing – they are simply optimized to act as a peripheral device to either a computer or the cloud computing system. This is done,

ostensibly, to limit battery use; if a tablet had to power an external storage device, the amount of time one could use the tablet on a single charge would be greatly limited. The ancillary effect is their inherent sub-optimality as file sharing devices. This of course feeds the needs of those ICT industries that are increasingly vertically interwoven with media distribution, e.g., Apple's integration of the iPad with the Apple Store, the Amazon Kindle, etc., and so tablets, smartphones and similar devices are, from the start, part and parcel of the same media consumption paradigm. The expansion of tablets and mobile technology as nodes of media distribution and consumption can be seen as a strategic 'technological fix' for offline file sharing. Not so much as a direct action to counter file sharing, but more as an 'unintended' strategic consequence of energy optimization, interface design, and media distribution practices.

In terms of manipulating how people use technology, the broadest and most powerful method is to act in terms of convenience. This is the method of online streaming companies, used to undermine the value of the file. In the late 1990s, the public had spent billions on CDs. With Napster, people could share the songs they wanted to hear – it was faster and more convenient than going to the store, buying the CD, taking it home, finding that one particular song you want and then ripping it to the computer for use on other devices. With streaming technologies like Spotify, Rdio, and Pandora, the tide of convenience has shifted even farther to the online, as these systems have millions of instantly accessible songs. However, by streaming the data, the user is herded into a data locker: access to the files themselves are only available at a price, either outright or through advertisement and datamining. The users cannot share the data – they can only share references to that data, itself kept on hard drives in the service's server farms.

Amazon is doing much the same with e-books – one no longer 'owns' the data, but merely rents it – even if the file is on one's Kindle. A few years ago, there was controversy over publishing rights of George Orwell's *1984*, and Amazon globally withdrew the book from all Kindle readers – a chillingly ironic display of proprietarian prerogative and force.⁶³ This shift from knowledge provision to knowledge rental is a profound one, and one that a Personal Portable Library directly refutes.

THE END? NO END

And if I have a book to read
If I have a block you need
If you come to me and ask
I'll share it with you.
Raffi (1976)

We teach songs about the virtues of sharing to our children, but we can't actually seem to find a way to let them live them. Property gets in the way. The ability for people to share knowledge is under assault by a variety of corporate and government entities, yet the need to share knowledge is an innate human desire. The internet is no longer the resilient and

63 | Brad Stone, 'Amazon Erases Orwell Books From Kindle', *The New York Times*, 17 July 2009, <http://www.nytimes.com/2009/07/18/technology/companies/18amazon.html>.

secure place its proponents have made it out to be – the events in Egypt proved its fragility and precarity, while the Snowden leaks regarding the NSA have proven that it is fundamentally insecure, as the NSA basically records the actions of the internet in whole. The only secure system for sharing information is now offline, a kind of reversalist tactic to the ongoing dismantling of the online. Libraries have always been at the forefront of this kind of change. Public libraries that hold books made of paper are being made vulnerable and in some cases obsolete by the advent of digital e-books – just as paper displaced parchment, and parchment displaced papyrus. It is now feasible to have a complete and very large library on a hard drive the size of a pack of playing cards – indexed, searchable, and secure. These Personal Portable Libraries are being copied, shared and distributed.

Offline libraries are fed by, and in turn, feed into, online systems – thus the online is displaced and subsumed into hardware: there is no ‘online’, there is a condition of connectivity between storage systems that creates the ‘online’ experience. As discussed, the Personal Portable Library reaches back beyond the Sneakernet – recalling and resurrecting the library practices of the ancients that were predicated on the acquisition and copying of documents. The very existence of the library depended on the ability to copy information from one substrate to another, just as a computer exists by copying information from one memory location to another. Inherent to this reversalism is free information for and to all, open access to knowledge, and the sharing of knowledge for the common good.

This brings into question different directions and systems of operation, distinguished by the difference between metadata and indexing, especially regarding Calibre. Metadata exists around a file, while indexing manages the file itself. Metadata is lighter and easier than an index, but less useful when one needs specific data. Metadata is better for organizing files into semantic fields or objects – for example a list of all books with tag X. But metadata doesn’t help find a particular quote for research. Systems that do both would be optimal, and that’s a direction worthy of development. However, since Calibre may never integrate an indexing engine, Personal Portable Libraries could simply use Calibre for organization and metadata, while using Dropout, Lucene or similar apps for indexing of the collection.

Another great question centres on libgen. At present it is too big to easily copy, only accessible online, and its database structure requires php and mysql programming to make it work. It takes a few weeks to download, days to set up, and a fairly high skill level in computer programming. Still, it is not likely to go away and its book collection is second to none, and if the San Antonio digital library were based round a libgen node, it would be a much more interesting and valuable library and not the techno-fetishist spectacle flash in the pan it is. Libgen, found at libgen.org, is actually more useful than Google Books and Google Scholar, as it provides access to the contents of books and papers, and unlike Google allows downloading and copying of the documents. However, as libgen’s indexing and presentation is primitive, Google has the advantage of Query Based Research results.

With Google you can find the data, but to be able copy and paste, for example, you’d have to take multiple screen shots in Adobe Acrobat Pro and run the OCR command to turn the images into useful text data. In that way, Google’s efforts combine the worst of both worlds – the precarity and difficulty of the online and the limitations of print. These limitations are understood and stipulated as common fact – they are a product of copyright laws.

For these reasons, libgen is the most viable large-scale online digital library system. Downloaded, it is the largest offline library. As storage density increases over the next decade, all 12 or more TB of libgen will eventually become easily portable. Indexed, libgen will signal a shift to the next level of digital library science. How libgen might operate in an offline capacity remains to be seen. Smaller libraries, such as aaaaarg.org, can be downloaded and set up to be much more viable directions of offline library development.

Resisting the precarities of the online and the encroachments of the security state in a reversalism of older practices based in the replication of knowledge substrates, the Personal Portable Library propels us into a future beyond the sociopathic greed of proprietary regimes. Owning and managing a Personal Portable Library is more than just good research practice – it's a radical tactic of resistance against informational feudalism, a strategy of dismantling proprietary theory, and an ennobling act of sharing the fruits of culture with all for the good of all. May Metatron the Recording Angel protect and guide us.

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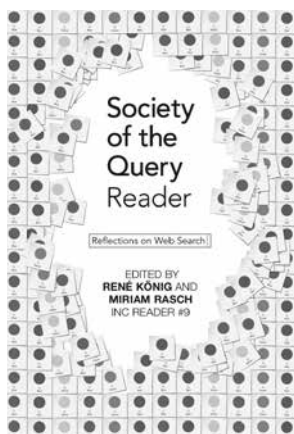
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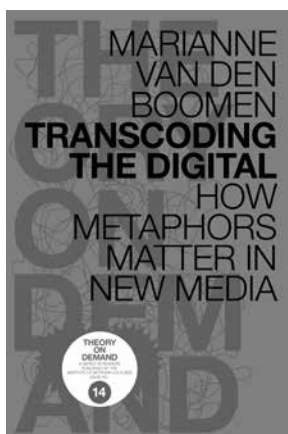
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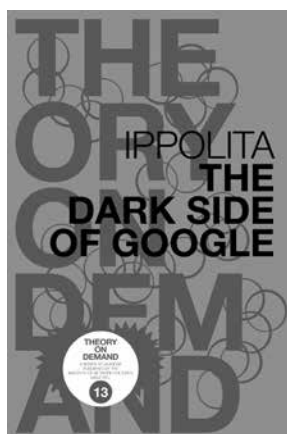
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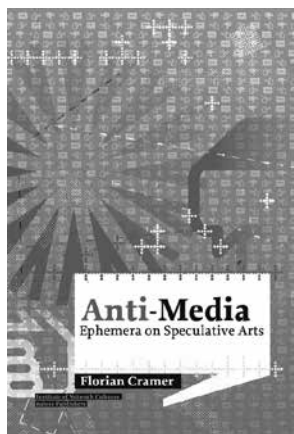
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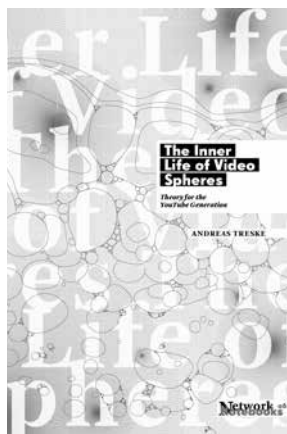
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The Personal Portable Library in its most simple form is a hard drive or USB stick containing a large collection of e-books, curated, archived, and indexed by an individual user. The flourishing of the offline digital library is a response to the fact that truly private sharing of knowledge in the online realm is increasingly made impossible. While P2P sharing sites and online libraries with downloadable e-books are precarious, people are led to an atavistic and reversalist workaround. The radical tactics of the offline: abandoning the online for more secure offline transfer. Taking inspiration from ancient libraries as copying centers and Sneakernet, Henry Warwick describes the future of the library as digital and offline. *Radical Tactics of the Offline Library* traces the history of the library and the importance of the Personal Portable Library in sharing knowledge and resisting proprietary forces.

The library in Alexandria contained about 500,000 scrolls; the Library of Congress, the largest library in the history of civilization, contains about 35 million publications. A digital version of it would fit on a 24 terabyte array, which can be purchased for about \$2000. Obviously, most people don't need 35 million books. A small local library of 10,000 books could fit on a 64 GB thumb drive the size of a pack of chewing gum and costing perhaps \$40. This is an astounding fact with immense implications. It is trivially simple to start collecting e-books, and then to share the results. And it is much less trivially important. Sharing is caring. Societies where people share, especially ideas, are societies that will naturally flourish.

Henry Warwick is an assistant professor at the RTA School of Media at Ryerson University, in Toronto, where he teaches media and communications theory and audio production. An artist and musician, much of his work can be accessed for free at kether.com. He likes to collect books and music and build libraries.

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