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Abstract

If the modern office produces and is managed through written documents or files, as Max Weber famously argued in his work on bureaucracy, then so too does the office – and increasingly the private citizen – destroy them. Enter the lowly paper shredder, a machine that proliferates waste and serves as the repository of carefully guarded secrets and confidential records, even as it is designed to eliminate the dregs of bureaucratic culture. Until recently, in the United States as elsewhere, paper was the medium of official state law. The 20th-century rise of the paper shredder and its paper trail, as we shall see, thus reveals the material, cultural and economic entanglement of written law with destruction and consumption, security, and privacy, not only in the U.S., it turns out, but worldwide. The trail leads from formal recognition of the paper shredder in a 1909 U.S. patent to its actual manufacture and development as a business machine in Germany twenty-five or so years later, from the shredder's role in defining political moments to its appearance in cartoons that confuse it with fax machines or legal counsel, and from regulations governing the disposition of records to industrywide 'certificates of destruction' that ensure against the dangers of snoopy dumpster divers.

The Paper Shredder: Trails of Law

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‘Unfortunately, the paper trail led to the shredder.’¹

If the modern office produces and is managed through written documents or files, as Max Weber famously argued in his work on bureaucracy,² then so too does the office – and increasingly the private citizen – destroy them. Enter the lowly paper shredder, a machine that proliferates waste and serves as the repository of carefully guarded secrets and confidential records, even as it is designed to eliminate the dregs of bureaucratic culture. Until recently, in the United States as elsewhere, paper was the medium of official state law. The 20th-century rise of the paper shredder and its paper trail, as we shall see, thus reveals the material, cultural and economic entanglement of written law with destruction and consumption, security, and privacy, not only in the U.S., it turns out, but worldwide. The trail leads from formal recognition of the paper shredder in a 1909 U.S. patent to its actual manufacture and development as a business machine in Germany twenty-five or so years later, from the shredder’s role in defining political moments to its appearance in cartoons that confuse it with fax machines or legal counsel, and from regulations governing the disposition of records to industrywide ‘certificates of destruction’ that ensure against the dangers of snoopy dumpster divers.

1 Patents

The paper shredder's legal existence precedes its actual existence. In 1909, Abbot Augustus Low received a U.S. patent for a 'waste paper receptacle' that provided 'improved means for disposing of waste paper' and was 'designed more particularly for use in offices and other places where not only the collection and storage of waste paper is desirable, but also its cancellation or mutilation in such manner as to render it unavailable or unintelligible for re-use or for information.' The invention consisted

primarily of a receptacle having a cutting or cancelling device interposed between it and a receiving hopper, whereby the papers are disintegrated and rendered useless as such before they enter the body of the receptacle, in which latter the fragments are stored temporarily in a suitable bag to be removed from time to time for the disposition of the waste.³

Low's invention also included 'a device for compressing and packing the disintegrated paper within the receptacle.' He considered his machine

especially advantageous for use in offices, banks, counting houses, &c., under conditions, where the practical destruction of correspondence, memoranda, liquidated bonds, accounts, books, and the like is a desideratum, in that it reduces the paper and disintegrates it to such an extent that it can only thereafter be sold or used as paper waste, an article thus produced having a special market value, but serving no other purpose, since the particles of paper are useless for identification, information, or fraudulent purposes of any character. Furthermore the reduction and storage of the paper waste is a safeguard against fire ...

References to earlier patents for the use of knives or blades to pulverize cellulose or fiber, such as Robert Dietrich's German 1899 patent 120986 for 'Vorrichtung zum Zerfasern von Zellstoff', appear designed to refine pulped material for further production, rather than to 'render it useless', as Low put it. Patents for dozens of machines to disintegrate paper or to reduce it specifically from media to raw matter, by knives or other sharp blades, have followed Low's patent and go by

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various names in various places.⁴ The 'special market value' of 'paper waste' and its resistance to 'fraudulent purposes of any character' has varied, however, as we shall see. Today, the selection and use of a paper shredder is a complicated matter, not only of law and of economics, but also of science and technology, aesthetics and culture. The paper shredder features in works of mechanical engineers and contemporary artists alike.⁵

Given the patent recognition of Low's invention, it seems odd that a shredder was not manufactured until two and half decades later, but so goes the tale -- from website to website, from newspaper to academic article.⁶ Augustus Low, second only to Thomas Edison in terms of the number of U.S. patents he held when he died in 1912, was apparently more interested in invention than in production. Practical matters prompted the manufacture of a paper shredder in 1935 Germany. According to the *Baltimore Sun's* oft-cited 'Compleat History' of paper shredding, Adolph Ehinger was no friend to the Nazi regime. When a neighbor threatened to turn him in for some discarded printed materials that the neighbor had found in Ehinger's garbage, Ehinger built the paper shredder equivalent of a Spätzle or pasta maker in his garage. Thus a device whose original US patent claim emphasized the destruction of papers to safeguard offices against fire and their records against fraud was produced in Germany to protect individual speech from government interference. Ehinger took his device to trade shows and by 1956 the EBA Maschinenfabrik was selling shredders to banks, law firms, and governments in many countries.⁷ Today, the United States is the leading importer of German machines from EBA Krug & Priester GmbH and Co.⁸

Germany continues to dominate the paper shredding market. Krug & Priester advertises itself as 'the leading manufacturer of Business Shredders and small-format guillotines worldwide'.⁹ Its sophisticated and elegant shredders are a far cry from earlier shredders, such as Ehinger's, which worked by making long vertical cuts.¹⁰ Many domestic shredders available for personal use still work this way. But as Americans found out when Iranians took over the US embassy in Tehran in 1979

and managed to piece together disintegrated documents, the double horizontal-vertical cut would prove to have advantages. More complex cross-cutting office and industrial machines producing confetti-like shreds became the industry standard in the 1980s, during which decade, as we shall see, increasing numbers of businesses also took to what had formerly been the largely governmental practice of shredding.

2 Government Records

Long before the 1980s though, what to do about the U.S. government's paper records had emerged as a problem. As one-time National Archivist James Gregory Bradsher (1985) recounts, Congress in 1789 had provided for the keeping of federal records, but had not provided for their disposition. Destroying a federal record became a felony in 1853 and, until 1881, no authorization existed by which U.S. records could be destroyed. 'The total accumulation of Federal records up to 1860', Bradsher estimated, 'was probably less than 200 thousand cubic feet' – an amount, he added, that by the time he wrote in 1985, the federal government created in two weeks (1985: 2). Bradsher figured that of the 170 million cubic feet of records that the government had created by 1985, 130 million cubic feet had been destroyed, mostly after passage of the 1950 Federal Records Act (1985: 1).

The 1950 Act had consolidated various statutes which, beginning in 1881, had provided for the compilation of disposal lists of series of documents that agencies submitted to Congress for decisions as to the disposition of records. (Generally speaking, 'disposition' refers to the question or decision about what to do with the records; 'disposal' refers to getting rid of them.) No clear procedural guidance existed as to how to deal with these lists until President Taft signed an Executive Order in 1912 (Bradsher 1985: 5).

In 1934, after years of pressure to establish a building dedicated to storage of government records, Congress established the National Archives, which replaced the Library of Congress as the institution to which disposal lists were sent for review and concurrence before being forwarded to Congress (Bradsher 1985: 7).¹¹ Concerns about the

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growing number of records being created under New Deal programs in the 1930s prompted passage of the 1939 General Disposal Act and the 1940 Photographed Records Disposal Act. These acts authorized the disposal of selected paper records once they were filmed (Bradsher 1985: 9). Disposal was by sale, destruction, or transfer, which latter was to occur without federal cost to a public or private institution that applied for the records through the archivist of the United States (Bradsher 1985: 8). Like the still operative Administrative Procedures Act of 1946, which set out to articulate standards for agency rule-making and adjudication, the 1939 Act's comprehensive disposition program covered all federal agencies. So too did the 1943 Federal Records Disposal Act (and its 1945 amendment) which, in an attempt to reduce backlogs and streamline disposal, provided for continuing schedules of withdrawal so that agencies no longer had to submit new lists of similar items or series each year (Bradsher 1985: 11-12).

In 1949 to 1950, the National Archives Records Service was subsumed into the new General Services Administration. Bradsher writes of great strides that were made between 1933 and 1949 to destroy nonarchival records. Half the records in existence in 1949 were at that time scheduled for disposition, an impressive achievement given that four times as many records were created from 1933 to 1950 as had been created between 1789 and 1933 (Bradsher 1985: 17). The volume of records created during the 1950s alone would nevertheless equal the number created in both these periods combined (Bradsher 1985: 14), as records production and management processes spiraled.

3 Standards

From the 1950s to the 1980s, government entities were the main paper shredders.¹² In 1974, government shredding came to be widely associated with political scandal. Following the break-in and arrest in 1972 of five persons from Republican President Richard Nixon's re-election committee at the Democratic National Committee headquarters in the Watergate complex, G. Gordon Liddy shredded paper evidence of his involvement. Liddy used a Shredmaster 400 (or

300), or possibly a Fellowes paper shredder.¹³ In 1982, in what came to be known as the Iran-Contra scandal, U.S. Lieutenant Colonel Oliver North (and his secretary Fawn Hall) used Datatech's (Scheicher) Intimus 007-S shredder to shred documents implicating him in (illegally) diverting funds to Nicaragua from (illegal) sales of weapons to Iran -- while the FBI was searching documents in the next room (Basbanes 2013: 203).¹⁴

During the 1980s too, the U.S. government imposed stricter shredding standards, prompted in part by the reconstruction of U.S. embassy documents by Iranians after their takeover of the embassy in Tehran in 1979. The embassy disintegrator, as it was called, produced strips which staff did not have time to incinerate, as would have been the usual practice. While the use of traditional Persian carpet weavers to reconstruct the material may be an exaggeration, the publication and circulation of a multi-volume 'Documents from the U.S. Espionage Den' supports the basic story.¹⁵

News of these events prompted increased sales of machines. As the Los Angeles Times reported in a 1987 story on North's shredder, 'The shredder business, in the view of most industry observers, went mainstream with the revelations of Watergate. It has been increasing considerably ever since and the latest visibility is a thrill for government suppliers.' The newspaper reported that in 1986, 'according to ... the General Services Administration, the federal government spent \$4.3 million on shredders.' The same year, according to an Office World News spokesperson, American businesses were stocking up and bought shredders worth 'between \$80 million and \$100 million.'¹⁶

The dramatization of Tehran events in the 2013 movie 'Argo' about the 'Canadian caper' that freed six of the U.S. hostages and featured Ben Affleck in a paper shredding scene, has also renewed attention to reassembly. Blogs today tout the advent of new technologies, such as UnShredder software, which performs simple reconstructions.¹⁷ The painstaking reconstruction by hand and by machine of some 500 bags of relatively large fragments of handtorn Stasi files (out of 16,000 such bags) in unified Germany during the last thirty years

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has also highlighted such issues. Ten archivists carry out manual reconstruction, while a supplementary ‘virtual’ or computer project – in which many delays and assessments have occurred -- focuses on improving scanning.¹⁸

Most office shredders sold in the U.S. come from Germany. As commercial records center or CRC businesses have grown,¹⁹ U.S. shredding services and data destruction companies have come to use a standard German Deutsches Institut für Normung (DIN) classification for paper shredding machines. DIN classifications, in which ‘P’ refers to ‘Paper-Based’ material, are based on the size and type of particle and thus allow the classification of machines according to the particles they ‘create.’²⁰ U.S. government standards have not been unified and appear incrementally in various documents and policies. Hence, ‘before the most recent DIN, there was much less consensus on levels. For the whole picture according to the NSA/CSS, you have to look at the Evaluated Product List (EPL) for shredders and disintegrators, and the Storage Device Declassification Manual. These documents address the destruction of all media together, meaning sometimes the standards for different types of media overlap. Comparatively, the DIN is a well-organized document that echoes what the international community generally thinks data destruction standards should be, not only for paper, but also for five other types of media.’²¹ Classification P7 is ‘Specially designed to meet the requirements of the Department of Defense (DOD/NSA) and the exacting standards of the CIA, US Embassy’s [sic], Top Secret U.S. Military Departments, national security organizations, government agencies and government contractors.’²²

4 Practices

Guidance materials and best practices manuals for the disposal of government and business media do not dwell on what happens to paper shreds (although they sometimes point out that overfeeding and mixing media are the most common sources of jammed and overheated shredders). They usually mention recycling, pulping, pulverizing or

burning and, on the whole, they recommend the use of authorized third-party services, for reasons of security and confidentiality. Turning to the websites of these entities, one learns what the home shredder all too often realizes to her dismay – and what Augustus Low must have known when he incorporated a compactor into his receptacle: shreds take up more space than do piles or files of paper.

Private disposal services pick up whole or shredded waste paper for mobile, onsite, or outside shredding. They emphasize, as does Eco-Shredding, for instance, the cost of doing one's shredding oneself: 'You can't afford not to outsource.'²³ Shred Nations, an online marketplace connecting shredding services and customers explains that home and even office paper shredding is neither secure nor necessarily good for the environment; they themselves 'partner with secure industrial shredders throughout the U.S.'²⁴

Partnerships occur because local recyclers don't want shreds. Although shredding is often associated with recycling and recycling is always touted as more environmentally friendly than burning or incinerating, the cut fibers in shredded paper make it unsuitable for easily reconstituting into high quality paper products. Shredded paper works best as compost, packing material, or animal litter, so locally hauled shreds usually become landfill. Indeed, following implementation of China's 2017 'National Sword' policy, which drastically cut back its importation of waste material, even unshredded wastepaper now increasingly ends up in municipal landfill. China's policy has raised the cost of processing all kinds of waste worldwide. It has lowered, and even inverted, the price of wastepaper so that localities now must pay, rather than receive money, to get rid of it. As more paper in the U.S. becomes landfill, (more expensive) domestic pulping mills are also expanding.²⁵

Industrial disposal companies engage in various kinds of paper destruction and may partner with different kinds of facilities. As recyclers, they may turn wastepaper into high-quality pulp, to be used 'to make printing paper, writing paper, tissue paper, and even FDA-compliant paper products and packaging'. They can bale and compress

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shreds, before chemically treating them, rolling them out, and pulping them – either on their own sites or sending them out to other locations. Treating paper this way substitutes for the use of wood pulp and saves trees. This is no small potatoes: a 2019 university website on paper waste found that Americans annually use 85,000,000 tons of paper or about 680 pounds per person, averaging seven treesworth of products per year. The site also offers these factoids: 50% of business waste is composed of paper; U.S. offices use approximately 12.1 trillion sheets of paper a year; and paper accounts for 25% of landfill waste and 33% of municipal waste. ‘Each ton (2000 pounds) of recycled paper can save 17 trees, 380 gallons of oil, three cubic yards of landfill space, 4000 kilowatts of energy, and 7000 gallons of water. This represents a 64% energy savings, a 58% water savings, and 60 pounds less of air pollution! The 17 trees saved (above) can absorb a total of 250 pounds of carbon dioxide from the air each year. Burning that same ton of paper would create 1500 pounds of carbon dioxide.’²⁶

No wonder that Fox River Fiber, for instance, prides itself on being a ‘steward of the environment’: ‘using state-of-the-art equipment, energy saving strategies, new technology, and certifications with various green-focused organizations’. All this according to its partner, Federal Records Management and Shredding, a for-profit (despite its name) document destruction facility.²⁷

EcoShredding, Shred Nations, Fox River Fiber, and Federal Records Management and Shredding are among the AAA certified members of the National Association of Information Destruction or NAID®. NAID is itself one of two divisions, since 2017, of the International Secure Information Governance and Management Association™ (i-SIGMA™), an international body for companies providing secure information services; the other division is PRISM, a global trade association for information management companies. NAID’s mission is ‘to promote the information destruction industry and the standards and ethics of its member companies’.²⁸

NAID accredits companies as service providers, which are in turn authorized to give out certificates of destruction to their clients or

customers: 'Customers that use electronics recyclers, paper shredders, and records management services are required by law to ensure their service providers' data security and regulatory compliance. As a result, thousands of customers [using NAID members as service providers] rely on NAID AAA Certification or PRISM Privacy+ Certification to fulfill their due diligence obligation. Both certifications are conducted by trained, accredited outside auditors to inspect and verify the necessary elements and one or the other is required in thousands of contracts around the world'.²⁹ A 2-day NAID Shred School offers continuing education credits to industry professionals who 'actively destroy sensitive information'.³⁰

NAID accredited facilities may be able to assure customers of 'due diligence'; NAID and its members' environmental commitments are less clear. Fox River Fiber, the seemingly-green, AAA-certified paper recycling facility mentioned above for instance, recommends a 'shred everything policy' (foxriverfiber.com). Such a policy appears counter to a growing literature claiming that shredded paper is much more problematic to dispose of or recycle than 'mixed paper'. The Environmental Paper Network, a worldwide association of 140 civil society groups and NGOs concerned with the sustainability of pulp and paper practices indeed recommends to office managers 'Shredding Your Paper Only when Necessary'.³¹

5 Culture

Spatially speaking, the production of paper is more than matched by its destruction. Destruction, that is, proliferates the amount of space that paper (shreds) take up. Hence (perhaps) the recurring trope in cartoons and comic strips such as *Dilbert* (a strip featuring an office worker) of the confusion of the paper shredder with the copy machine and the fax machine. In comics and cartoons, otherwise confidential information proliferates and is sent to rivals.³² The office paper shredder serves as in-box, suggestion box, and complaints box, whether strategically or accidentally, in an association of inter and intra office communications with excess and waste. Reports one office employee of a meeting, 'Most

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of our brainstorming involved what we should shred first' (rde7762).³³

Law is never far from the paper shredder in this genre, in which, interestingly, visuals are often unnecessary or simple enough to imagine in grasping the gag: 'Notify Legal... my new turbo-powered paper-shredder ate my desk'. (rde4046). Three SEC officials approach a man at a desk: 'Your company raised the red flag when you purchased the super deluxe paper shredder' (dcrn1216). A man behind a desk states, 'We'll need to be strictly honest while our shredders are down'. (rde5992). A tax auditor asks, 'I see you have all your checks and receipts. What are you trying to hide?' (aban193). And of course, as in the epigraph above, 'Unfortunately, the paper trail led to the shredder': unfortunate, it seems, because the evidence is no more (dcr0399).

And yet, the paper shredder attests to and serves as evidence of law. It supplements and even replaces law in many cartoons. 'We fired our legal department and bought a paper shredder instead!' reads one cartoon (pjun1649). Four men crumple paper in McNally Law Firm, while one explains, 'This is only temporary ... till our paper shredder is repaired'. (rde1085). A shady looking character addresses the jury in a courtroom: 'I'm not technically a quote-unquote lawyer, but I do own a paper shredder and have visited several prisons'. (CC134416).

6 Privacy

Speaking of visiting prisons, the paper shredding industry received a boost not only from Oliver North and Richard Nixon, but also from the U.S. Supreme Court in a 1988 Fourth Amendment search and seizure case. Respondent(s) Greenwood (referred to only by surname and variously in singular and plural) was suspected of selling narcotics. For several weeks, police persuaded a garbage collector to keep the Greenwood house's garbage separate from that of others and to turn it over to them. Based on what was found in Greenwood's trash, the police twice obtained warrants to search the home. In a six-to-two decision, the Supreme Court held that Greenwood's (subjective) expectation of privacy as to the contents of the opaque garbage bags left on the curb for pickup was (objectively) unreasonable.

It is common knowledge that plastic garbage left at the side of a public street are readily accessible to animals, children, scavengers, snoops, and other members of the public. Moreover, respondents placed their refuse at the curb for the express purpose of conveying it to a third party, the trash collector, who might himself have sorted through respondents' trash or permitted others, such as the police to do so. Accordingly, having deposited their garbage "in an area particularly suited for public inspection and, in a manner of speaking, public consumption, for the express purpose of having strangers take it," respondents could have had no reasonable expectation of privacy in the inculpatory items that they discarded. (*California v Greenwood* (1988), 486 US 35, 40-1; notes and citations omitted)

In addition to pointing out that county ordinances mandated how Greenwood disposed of his trash and prohibited its burning, dissenting Justices Brennan and Marshall addressed societal norms of privacy. They argued that 'scrutiny of another's trash is contrary to commonly accepted notions of civilized behavior' (45) and to 'the way decent people behave in relation to each other' (52, citation omitted). The majority, however, sided with the police, balancing 'the benefits of deterring police misconduct against the costs of excluding reliable evidence of criminal activity' (44). Modern dumpster diving was born.

Following *Greenwood*, in other words, going through the trash of another is lawful, unless it is explicitly prohibited by state or locality. The New York City-based 'freegan' (from *free* and *vegan*) website of 'people who employ alternative strategies for living based on limited participation in the conventional economy and minimal consumption of resources' offers readers dumpster diving or waste reclamation tips, as well as advising on urban gardening and foraging, eco-friendly transportation, and the maintenance and repair of goods. 'Dumpster divers', it points out, 'are siphoning off the one thing consumer capitalism cannot live without: waste'.³⁴

If the reclamation of waste challenges consumer capitalism, it also renders problematic the characterization of discards as 'waste'. The potential value of discarded personal information underscores this point. Persons can no longer expect their garbage to remain private,

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but regulations exist and continue to be developed and fought over for the secure disposal of personal data contained in all manner of media. The development of administrative records and growing demands for government transparency during the 20th century led to federal and state privacy requirements. In the U.S., along with the passage in 1974 of the Freedom of Information Act, came the Privacy Act, which for the first time required the destruction of personal records by federal agencies (5 U.S.C. § 552a).

Since 1974, a virtual alphabet soup of federal laws and agencies and laws from 35 states, plus Puerto Rico, aim to prevent identity theft by requiring non-governmental 'covered entities' and their 'business associates' to dispose of records by shredding, burning, pulping or pulverizing. (Some laws also aim to reduce 'paperwork', but that is another story.) The FTC (Federal Trade Commission)'s 2005 Disposal Rule governs how banks, brokers, car dealers, insurance and credit agencies, and landlords, among others, treat consumer information, following FACTA (Fair and Accurate Transactions Act). The OCR (Office of Civil Rights), charged with enforcement and compliance of HIPAA (1996 Health Insurance Portability and Accountability Act) receives a relatively high proportion of complaints about breaches of paper records, even as these affect a relatively low proportion of patients.³⁵ As records and the media in which information is kept proliferate, formal regulations in the U.S. and abroad aim to protect against unauthorized use of potentially valuable information. Explicitly and implicitly, written laws and public and private policies at all administrative and organizational levels, support and reinforce development of the international economic system of professional information management and destruction services.

7 Materialities of law

If written records and files make the modern office or bureau go around, then so too does their destruction and disposal. Regardless of what one thinks of the coming of the digital office, the paper shredder has left its own complex paper trails. Paper trails are never complete. They establish a record. The trails of the paper shredder followed

above suggest that whatever the medium in which records and files are kept, modern law will continue to require private and government enterprises to dispose of documentary material and to track how they do so. As global security practices and networks develop, traces of state law – its writings and its creations, its discards and excesses – not only accompany, but also constitute, material waste and destruction every step of the way.

Endnotes

1. Carpenter, Dave. <https://www.cartoonstock.com/directory/p/papertrail.asp>; search id: dcr 0399. Spoken by man w/ SEC (Securities and Exchange Commission) briefcase to another man with a briefcase. See also Bacall, Aaron; search id: aban1940. Two men in suit-and-tie standing by a paper shredder, 'I tell all of our new hires that all paper trails must end here in the shredder'.
2. Weber includes the following in the 'fundamental categories of rational legal authority [...] ...Administrative acts, decisions, and rules are formulated and recorded in writing, even in cases where oral discussion is the rule or is even mandatory. This applies at least to preliminary discussions and proposals, to final decisions, and to all sorts of orders and rules. The combination of written documents and a continuous operation by officials constitutes the "office" (*Bureau*) which is the central focus of all types of modern organized action' (1978: 218-9).
3. <https://patents.google.com/patent/US929960> <https://patentimages.storage.googleapis.com/03/9a/4e/1fc4360578ddd0/US929960.pdf>
4. For other U.S. patents, see <https://patents.google.com/?q=B02C18%2f0007>. Names matter. Immi Tallgren situates the (French) 'dechiqeteuse' in the *monde diplomatique* to show how it serves as a gatekeeper in international law (2018); Katherine Biber shows how artists as well as state agents create visual spectacles from 'ghosts' of documentary and evidentiary destruction; Hyo Kang suggests that the (German) *Aktenvernichter* or 'file destroyer' has a more sinister meaning than the 'more innocent and descriptive' paper shredder. Clearly much remains to be said.
5. See Zhuang, Zheng-Yun, I-Jen Chiang, Chia-Rong Su, and Chih-Yung Chen. 'Modelling the Decision of Paper Shredder Selection Using Analytic Hierarchy Process and Graph Theory and Matrix

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- Approach'. *Advances in Mechanical Engineering*, (December 2017). doi:10.1177/1687814017737668. On art and economics, see commentary on Banksy's work: <https://www.theguardian.com/artanddesign/2018/oct/08/why-shredder-is-banksy-greatest-work> <https://www.inverse.com/article/49662-banksy-video-shows-how-he-rigged-frame-with-hidden-shredder>
6. <http://www.paper-shredder-info.com/history-of-shredding.htm>; <https://www.baltimoresun.com/news/bs-xpm-2002-02-10-0202110302-story.html>;
see also <https://shredrightnow.com/historical-shredding-machine/> ; Immi Tallgren frames these accounts, without attribution, with 'As far as is known' (2018: 205).
 7. See <https://www.baltimoresun.com/news/bs-xpm-2002-02-10-0202110302-story.html>;
see also <https://shredrightnow.com/historical-shredding-machine/>
 8. Based on information from 2007 to 2019. See <https://panjiva.com/EBA-Krug-Priester-GmbH-Co-KG/45861425>
 9. See also <https://www.eba.de/de/ueber-eba>
 10. See Krug & Priester website and 'history': <https://www.krug-priester.com/en/company/history/>
 11. See also <https://www.archives.gov/about/history>
 12. Wikipedia, see also graphic from accushred.net - graphic history: <https://accushred.net/wp-content/uploads/2015/07/HistoryofShredding.png>
 13. Sources differ, although most settle on the 400. <https://www.latimes.com/archives/la-xpm-1987-07-13-vw-2187-story.html>
 14. See Chapter 10 more generally, 201-214.
 15. The reference appears as a quotation from Malcolm Byrne of the National Security Archives at Georgetown University, in Douglas Heingartner, 'Picking up the pieces,' *New York Times*, July 17, 2003, and has been widely repeated. See Basbanes, 201-2, 392. Several versions of reassembly story appear: <https://www.bbc.com/news/magazine-16036967>; <https://shredrightnow.com/historical-shredding-machine/>. For skepticism as to the story, see Lewis Perdue, What the *Argo* Movie Got Wrong about Paper Shredders ('it wasn't a bunch of little carpet weavers as one story goes, or child labor as *Argo* played it.' <http://lewisperdue.com/archives/4052>

16. <https://www.latimes.com/archives/la-xpm-1987-07-13-vw-2187-story.html>
17. <https://www.consumerreports.org/cro/news/2014/04/paper-shredders-aren-t-as-secure-as-you-might-think/index.htm>
18. According to the Federal Commissioner for the Records of the State Security Service, <https://www.bstu.de/en/archives/the-reconstruction-of-torn-documents/>, ‘The Stasi left behind material, which had been torn up by hand, but which could still be processed in approximately 16,000 bags. Each bag contains between 2,500 and 3,500 fragments of torn-up pages. There are still roughly 400 to 600 million fragments which represent around 40 to 55 million pages’. Since 1990, it reports, ‘1.5 million pages from 500 bags have been manually reconstructed, indexed and archived. In 2007 research began on developing a computer-aided reconstruction program in a pilot project. Since the launch of the test phase at the end of 2013, approximately 60,000 pages from 18 bags have been reconstructed so far (status August 2016)’. A ‘few thousand other bags’ containing smaller shreds were destroyed in 1991. Cornelia Vismann writes that ‘For days and nights, members of the State Security Service fed files to their shredders until the latter had glutted themselves to the point where they had to be replaced with superior Western models; these too were unable to cope with the loads of papers’ (2008: 152).
19. <https://prismintl.org/history/>; <https://prismintl.org/learn-about-prism/>
20. <https://www.abe-online.com/paper-shredder-levels-of-security>
21. <https://prismintl.org/history/>; <https://prismintl.org/learn-about-prism/>
For an example of a now-obsolete articulation of U.S. destruction policy, see page 82 ff. of Department of Energy directive: <https://www.directives.doe.gov/directives-documents/400-series/0471.2-DMannual-1cc1/@images/file>
22. <https://www.abe-online.com/paper-shredder-levels-of-security>; <https://www.whitakerbrothers.com/shredsize>; <https://www.recycling.com/paper-shredder-security-levels-din-66399>
23. <https://ecoshredding.com/the-economics/>
24. ShredNations <https://partners.shrednations.com/>
25. The aim of the 2017 policy, which follows China’s 2014 ‘Green Fence’ policy, is to stop importing contaminated waste that winds up as landfill or in incinerators. <https://resource-recycling.com/recycling/2019/08/27/>

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<https://www.theatlantic.com/technology/archive/2019/03/china-has-stopped-accepting-our-trash/584131/>
26. From University of Southern Indiana: <https://www.usi.edu/recycle/paper-recycling-facts/>
27. <http://federal-recordsmanagement.com/news/what-happens-to-paper-after-its-shredded>
28. <http://www.naidonline.org/nitl/en/about/mission.html>
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30. <https://shredschool.org/>
31. This is the title of chapter 10 in <https://www.doi.gov/sites/doi.gov/files/migrated/greening/waste/upload/FINALRecOffPapGuide.pdf> ; available as <https://environmentalpaper.org/wp-content/uploads/2017/08/recovered-office-paper.pdf>
32. <https://www.cartoonstock.com/>
33. Parentheticals refer to search id's within cartoonstock. <https://www.cartoonstock.com/>
34. <https://freegan.info/what-is-a-freegan/freegan-practices/urban-foraging/diving-and-the-law>
35. The largest improper disposal breach for 2015 involved the disposal of medical records affecting approximately 113,528 individuals. In this case, the covered entity did not properly dispose of medical records which contained PHI. Law enforcement contacted the covered entity and informed them that the medical records of numerous patients were found in a dumpster. Most of the improper disposal cases involving paper records were the result of employees improperly disposing of documents containing PHI in regular containers rather than authorized shredding containers. <https://www.hhs.gov/sites/default/files/breach-report-to-congress-2015-2016-2017.pdf>

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