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The Practice and 'Pathologies' of Photocopying

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We esteem originals but are electrified by their epigoni.¹

Introduction

Outside of contemporary art practice, the act of photocopying is by-and-large not given much conscious consideration by general users and is only granted limited treatment within discussions of electronic media. This paper seeks to redress this neglect by speculating on the practice of photocopying and some of the less remarked on behaviours and drives which motivate and structure this practice. Informing these speculations are first-hand observations made at various intervals over the course of a year-and-a-half within a large public research library. These are supplemented by, and interpreted through, reference to a range of documentary sources and theoretical speculations on practises of copying.

The argument that is developed here is that a number of 'pathologies' – or curiosities of behaviour and motivation – attend and characterise the act of photocopying. Paying attention to these factors can prove illuminating for understanding the

practice of photocopying and, beyond this, for understanding human-technology interaction more broadly.

I begin by sketching briefly the development of the photocopier, as well as artistic interest in it.

The Development of the Photocopier

The photocopying process was developed in the 1930s by the American patent attorney and inventor Chester Carlson.² In 1938, Carlson discovered that it was possible to create a duplicate image on paper using static electricity, a chemical agent, and light. The full process involved taking a printed image, placing it on a glass plate which was then pressed against a second, sulphur coated zinc plate which had been statically charged and finally exposing both plates to light. When the two plates were separated, a copy of the original image would be left in the residual powder on the zinc plate.³ Carlson called this process 'electrophotography'.⁴ Some years later, however, with the assistance of a classics professor, the process was renamed 'xerography', from the Greek words xeros, meaning 'dry', and graphos, meaning 'writing', and subsequently shortened to 'xerox'.⁵ In 1944, Carlson's discovery was picked up by the Haloid company (later to be known as Xerox Corporation) and further developed into the photocopying process that we know and use today.⁶

The development of the modern-day photocopier was to be a slow process. Xerography involved a complex and rather cumbersome set of procedures. Refining the basic principles of this process for commercial application proved particularly difficult and elusive; with over twenty years passing before a convenient and economically viable general office copier was produced.⁷

What is most remarkable is that – aside from various minor modifications, including replacing zinc with the more efficient selenium – the rather convoluted multi-step process of Carlson's initial discovery still forms the basis of the modern copier.⁸ Even with digital copiers, which capture an image via a scanner and then store it

electronically until required, the actual output procedure remains the same. This inherent (and inherited) complexity is significant for a number of reasons. It has led to the creation and ongoing sustenance of a whole sub-industry requiring skilled personnel to maintain these machines.⁹ It also drives contemporary copier research and development, especially in the area of self-diagnostics. Indeed, such is the level of sophistication of such procedures that it leads one critic to suggest that the photocopier represents a 'good example of practical, if somewhat limited, machine intelligence ... it reacts to an undesirable situation, determines how to fix the situation, and – perhaps most impressively of all – interacts with a fickle and unpredictable human operator in order to achieve its goal'.¹⁰ The internal complexities of the modern photocopier are also significant in the present context in that they seem to mirror the complexities of human-machine communication,¹¹ and thus contribute in manifold ways to the quirks of user interaction and behaviour.

Art and the Copier

Following full-scale commercial development of the photocopier in the 1960s and 1970s, artists were quick to explore and exploit the possibilities of this new medium. This was not surprising given the photocopier's relative flexibility and affordability, and given that it combined basic photographic, screen-printing and mass reproduction capabilities into the one device. Exploring deliberate artistic engagement with photocopiers here can prove illuminating for understanding everyday photocopying. This is because art practice, especially conceptual art practice, often engages with everyday activities and associated 'technologies' in ways that shed light on their attendant meanings, implications and possible significances. Not only can this prompt a deeper appreciation of these everyday activities and technologies, but a renewed focus on them in their own right.

During the 1970s in particular, the photocopier emerged as a key instrument for artistic exploration and innovation. Much of this work explored the extremes of copier function (including variable tone and contrast, image degradation, image duplication, rotation, mirroring, warping, et cetera) and copier use (projection, body

copying, et cetera.).¹² One of the better-known examples of such experiments was Timm Ulrichs's witty commentary on Walter Benjamin's notion of the withering of the 'aura' through mechanical reproduction. In 1967, Ulrichs took the original 1936 title-page to Benjamin's essay and photocopied it, then photocopied the copy, and so on, performing 100 '(de)generations' of this process until it disappeared from view.¹³

Characteristic of this artistic engagement with the photocopier is an awareness of the technical capabilities of the machine. In the context of the present argument, what is most striking about this awareness is that it emerges from a particular attentiveness to the possibilities of the medium and to the nature of human-machine interaction—to how one interacts with and uses the photocopier. However, what the above example also highlights is an overall concern not just for copier function and use, but more particularly for the theoretical extensions and implications that these functions and their uses enable or prompt. This process of theoretical as well as functional exploration is laid bare in the following passage, in which conceptual artist Mike Parr reflects at length on the motivations driving his use of photocopiers in his work:

There's a set of photocopies where the original has been destroyed and where the photocopy has been made by working at the dark limit of the machine and ... the machine turned to its limit enacted a process of erasure while simultaneously reproducing the work. ... What I really want is an image of the reproduction and disintegration of the image so that the necessity of preserving the record requires that it be photocopied again, thus that process can only add to the meaning of the original intention. And if in fact you had to do it 10 times over a period of 20 years and finally you end up with an image which to all intents and purposes was an image of complete disintegration and chaos, simply an image of the machine's limitation, then ... the intention of the original impulse is fully met. ... [T]hese intentions are generally identified as part of the comprehensible intention of the piece.¹⁴

Such attentiveness to the theoretical implications that attend the practice of photocopying is rare outside of art practice. Even so, given the suggestion above that conceptual art practice can illuminate the everyday, greater attentiveness to *everyday* uses of photocopiers can provide an important complement to more conscious and deliberate artistic engagement. Looking more closely at everyday copying practice is also of value for understanding the practice and 'pathologies' of photocopying itself, and, beyond this, for understanding human-machine interaction

more broadly. It is to an examination of this everyday usage that the focus now shifts.

The Practice and 'Pathologies' of Photocopying

It is necessary to preface this discussion of photocopying practice with a few words on the use of the word 'pathology'. The term 'pathology' is used here in a specific but expansive sense to refer to behaviour that might be seen as curious or 'eccentric'. What is important to stress, however, is that this understanding is not meant to carry or imply an implicit opposition between 'abnormal' and 'normal', or 'dysfunctional' and 'functional', copying practice. On the contrary, a key argument of this paper is that such distinctions are largely unsustainable and that *all* photocopying practice – and perhaps, by extension, all human-machine engagement – involves complex interactional processes, negotiations and adaptations between human operators and machine operations that complicates such tidy distinctions.

Nevertheless, this particular approach to conceiving of 'pathology' does not preclude more conventional understandings of this term. In medical parlance, for instance, pathology refers to the study of the processes underlying disease and other forms of illness. While this definition is not the main sense in which the term is employed in this paper, this more precise medical understanding is still particularly pertinent to the practice of photocopying. Indeed, next to writing on copy art, the bulk of the available literature on photocopying is dedicated to documenting and analysing the many health issues attending photocopier use, from concerns over exposure to toxins and potential carcinogens in toner dust, to UV radiation, eye irritation and eye fatigue caused by the intensity of the scanner light in digital copiers, as well as myriad other more general occupational health and safety concerns.¹⁵

These health considerations notwithstanding, in the context of the present discussion the focus is on sketching some of the more nuanced, almost invisible because mundane, behavioural patterns that attend everyday photocopying. These do, at

times, include extremes of 'pathological' behaviour, which are generally discussed as forms of 'technophobia'.

Technophobia

Mark Brosnan defines technophobia as involving: resistance to talking about or even thinking about technologies; fear or anxiety towards technologies; and, hostile or aggressive thoughts about technologies.¹⁶ While Brosnan's specific focus is computers – he considers 'computerphobia' and 'technophobia' as interchangeable terms¹⁷ – the phenomenon is by no means restricted just to computers. These emotions are indicative of widespread engagement with many forms of contemporary technologies, including the photocopier.

During observations of customer photocopying, all aspects of technophobia were evident, but particularly the last two—fear or anxiety (techno-fear), and hostility (techno-rage). For example, the most common example of techno-fear was a tendency among some library visitors, who obviously felt a strong sense of intimidation when confronted with the task of operating a photocopier, to insist that the attendant guide them (or in some cases, perform for them) the entire copying process. Whereas, with respect to photocopier- or techno-rage, a survey conducted by Hewlett-Packard Canada in 2002 found that thirty percent of respondents confessed to being so frustrated that they became violent when using photocopiers.¹⁸ During observation, the most common triggers for hostility and violence were machine 'malfunction' (especially paper jams), incorrect programming of copier functions, or inadvertent activation of the multiple copies function. An interesting aspect of the resultant displays of frustration and aggression – which usually involved hitting, kicking or screaming at the machine – is the attribution (through transference) of 'agency' to the photocopier. This was generally expressed through statements such as, 'this machine has a mind of its own', injunctions to 'make it stop', or an insistence that, 'I didn't do anything, it just starting copying all by itself'. The idea of 'agency' is familiar to AI researchers, but is not given widespread consideration within studies of photocopying.¹⁹ This is despite the fact

that it appears to be a common feature of everyday encounters with photocopiers. Also, the attribution of agency and the underlying emotional responses of techno-fear and techno-rage all appear to derive from and circle back to the machine's inherent internal complexity, and its relative operational complexity.²⁰

Addiction, Abstraction, and the Pathology of More

A second, and rather less extreme, trait of everyday photocopying practice concerns copying addiction.

In research libraries, photocopying was permitted historically because it was considered a stand-in for transcription.²¹ However, as Hillel Schwartz notes in his book *The Culture of the Copy*, this 'agreement ignored the addictive, transformative, ungentlemanly nature of copying'.²²

The legal response to the addictive nature of copying is to demand – and occasionally threaten to enforce – abstraction through its ten percent rule. This is the regulation which permits the copying of one chapter or ten per cent of the total number of pages, despite the fact that such abstraction would seem to run counter to how texts are often consumed.²³ For example, in their book *Imagologies*, Mark C. Taylor and Esa Saarinen remark on the considerable pedagogical potential to be had in deliberately exploiting abstraction through photocopying. They note the 'excellent results' achieved in photocopying 'one page from a randomly chosen volume, with the intention of commenting and getting inspired by that text outside its "real" context'.²⁴ However, the fact that they dub this strategy 'shock-effect reading' acknowledges the disorienting effect that such contextual isolation and abstraction can generate.²⁵

It is also widely assumed that copying addiction is the exception rather than the rule. In a Federal Government Productivity Commission report into cost recovery by government agencies (including libraries), one commissioner comments on the high cost of photocopying, yet believes this poses no real issue as the average customer is only likely to copy a few pages at a time. He writes, 'I imagine that a lot of [...]

customers might well say, "Drat, 20 cents, but it's only going to be \$2 altogether for what I want to do today, so what?".²⁶ However, this assumption is contradicted by my own research, where it was observed that customers would regularly spend beyond their initial allocation due to the addictive nature of copying. This was revealed through the peculiar manner in which credit was commonly loaded onto copying cards. Only very rarely did users add ample or even sufficient credit at the outset of a copying session. Usual practice involved the addition of a minimum of credit. Once this ran out, they would return repeatedly to add more value in small increments of a dollar or more, which, by the end of a session, usually amounted to a substantial sum.

The reason for this pattern might, at least in part, be explained as follows:

Customers would come into the copy centre with the intention of copying a small passage or perhaps a single chapter from a book. Minimal credit would be added to cover this. However, to copy a given passage is to abstract it from the whole work. Thus, more credit was added in order to extend the passage and ensure wider contextual sense. Or, additional passages were considered important enough to also copy. The whole cycle is governed by a certain 'pathology of more': an over-compensation where increasing quantities of pages on both sides of a given passage – as well as additional passages – are copied in order to ensure full comprehension and contextual orientation.

These practices also need to be understood from the perspective of how photocopying is situated within the broader context of daily life. For example, the end cost of photocopying is preceded by and intertwined with numerous other costs: the costs associated with travelling to get to the library, time taken in finding a book, awaiting its retrieval, queuing for a photocopier, copying, getting home again, and so forth. Viewed in this way, the cost to the user of photocopying a single page is excessive, whereas the cost of copying 50 pages appears more reasonable, even prudent (especially given spiralling book purchase costs). Thus, the overall economics of research is an important element in – and part explanation for – copying addiction and the pathology of more.

When it comes to actual photocopying, however, addiction and the pathology of more do not solve the problem of boundaries. The question becomes one of what is enough to satisfy contextual orientation and guarantee satisfactory comprehension. More often than not, and despite the prominently displayed copyright infringement notices, the answer would be the furtive copying of whole texts.²⁷

Purity and Hygiene

In addition to the quirks of credit addition, a further identifiable pattern of user behaviour concerns cleanliness and purity. Customers would often request that the attendant clean the copying plate prior to use. Having applied the remarkably named Kunst-stoff cleaning fluid, the glass would then be scrutinised with the eye of a *CSI* detective for any visible sign of human residue—finger prints, smudges, wisps of hair, and so on. Discovery of such traces would lead to requests for second, third, and even further, applications until total visual purity was achieved.

There are many possible explanations for such fastidiousness. One explanation might be the display of varying degrees of obsessive-compulsive behaviour (which, at the more extreme end, included occasional requests to disinfect the operating buttons). For the most part, however, this fastidiousness appeared to be driven by a desire for the production of copies as 'spotless originals', to use Schwartz's words²⁸—copies which match if not transcend the original in being free from blemish.

What is interesting about this desire for the pristine copy unsullied by material marks and, as Schwartz puts it, 'any of the embarrassments of bodiliness',²⁹ is that it connects with broader concerns—such as the modernist concern for technological advance, visual purity and the clean surface.³⁰ Thus, while it is beyond the scope of the present discussion, it is possible to argue that photocopying practice can be implicated in a wider cultural project of visual purification.

Reduction and Precision

Extending this desire for pristine copies is the associated desire for the precise portion, usually in the form of isolated images. During observation, the customer most insistent on the context-free reduced or enlarged image was a gentleman the attendants dubbed the 'Flag Man'. He only ever copied flags and, from a page of flags, would request a particular one, to be cropped and enlarged on the colour copier. In this instance, the copier's reprogrammable functions were employed primarily to facilitate copying precision, visual purity and acutance—or, to put it slightly differently, to 'value-add' through 'remediation'.³¹

A further copy centre regular was the so-called 'Aeroplane Man' who had a penchant for copying images of various commercial and military aircraft. For him, the connection between machine programmability and visual purity was taken to somewhat frenetic behavioural extremes. Photocopied in his mind with extraordinary clarity was a detailed knowledge of each photocopying machine in the centre. This knowledge included each machine's quirks, functional differences, as well as the position of every screen imperfection and scratch. Depending on the location of a given image on a page, he would then flit between machines to achieve the most pure visual reproduction.

In the above cases, the response to abstraction is not so much addiction and the pathology of more as it is abstraction through reduction or enlargement.

Desire

So far, mention has been given to the desire for more and the desire for visual purity (and remediated 'originals'). Yet, there are other desires that attend the practice of photocopying. The most obvious form of desire appears where the act of copying follows from a wish to obtain something: knowledge, a precise quote or passage, a particular image, et cetera.

A further form of copying desire is that associated with prohibition. In the particular institution in which these observations of copier behaviour were conducted, the fragility of archival texts, and the destruction wrought by the photocopying process, mishandling and age, led to an increasing prohibition governing the frequent photocopying of vulnerable library collection materials. Even with purpose-built book-cradling overhead copiers, public copying of certain books was not permissible in certain cases.

One observable outcome of this was that, for the average library visitor, with every prohibition of copying, there was a corresponding escalation in desire for the “uncopyable” original. This fuelled a particular form of pathology known as “nympholepsy”: an ‘ecstasy or frenzy caused by desire of the unattainable’.³² For the casual library visitor who is unfamiliar with the protocols and restrictions imposed by research institutions, being told they could not copy an item proved a major source of anxiety, frustration, and, at times, rage for some customers. These individuals seemed to feel a keen sense of loss, of something cherished being stripped from or denied them.³³

In most cases, a prohibition on photocopying does not preclude these items from being viewed (albeit often in a secure environment), and, therefore, from being transcribed. Nor does it necessarily prevent them from being copied in some other form—such as via on-request digital photography or the increasingly antiquated process of microfilm. What these steps do, however, is place additional and often prohibitive layers of bureaucracy, monetary and time costs between the user and the item they wish to copy. For the researcher, the last of these factors – time – is in many respects the most debilitating. As one early essay on research photocopying puts it, ‘Because of the pressures of our society, waiting a long time for information cannot be tolerated. Time spent in reducing information to a usable convenient form is time wasted for the researcher’.³⁴

For a research library – where books can be accessed but not borrowed – the above are all significant issues. The ability to photocopy is critical in that it fulfils the consumer need for a tangible, take-home object. In this case, library management

tried to ensure that customers could copy wherever possible—largely because it was felt this would lead to better visitor satisfaction (which, in the bureaucratized favoured by such large public institutions, is a 'key performance indicator', alongside other measures such as visitor numbers, borrowing requests, and, for remote users, website hits). Thus, in combination with other forms of consumption, for the modern research library the humble photocopy plays a crucial part in the fulfilment of the consumer contract. In cases where photocopying is not permitted, other forms of 'reprography' – the library and archive industry term for all forms of copying, including photography, digitisation and microfilming – fulfil this same function.

Destruction and Production

The final point in this section concerns a further 'pathology'—that which might be described as an apparent pathology of aversion and intellectual disengagement through the accumulation of an archive of copied documents. The example Schwartz cites of this relates to one Professor Marcus Jernegan, who, in researching emigration to colonial North America, filled his office walls with photocopies of 'every pertinent archival document in Europe and America' which, once filed there, were allegedly never read.³⁵ Thus, for critics of photocopying, archival proliferation through copying leads inexorably towards 'copying→as→appropriation'.³⁶ This is the idea that reproduction, 'assume[s] that what we copy we instantly know intimately'.³⁷ In his essay "Xerox and Infinity", Baudrillard condemns this as devotion to the 'spectacle of thought' through machinic manipulation at the expense of 'thought itself'.³⁸ One difficulty with this argument is that it does not accurately reflect or account for the variety of reasons motivating the decision by library researchers to make photocopies, or how researchers ultimately use these photocopied documents.³⁹

Derrida puts the issue of archival proliferation somewhat differently, and more productively I would argue, when he writes of another form of pathology: what he terms 'archive fever'. In his short meditation on archives (*Archive Fever*), Derrida proposes that there is a dual logic at work within the notion of the archive, with one

'logic' counterbalancing the other. On the one hand there is what he terms 'archive desire' or passion (in the old, suffering sense of the word): a 'compulsive, repetitive, and nostalgic desire for the archive, an irrepressible desire to return to the origin', to return to the moment of 'impression'.⁴⁰ On the other hand, there is 'archival violence' (the death drive), or what he later comes to term 'archive fever' (*le mal d'archive*).⁴¹ The death drive, Derrida suggests, is 'archivolithic', exerting an 'annihilating force' against the archive.⁴² In the context of library and archive management, this includes the effects of access, aging and pests and disease, all of which work consistently against the archive.⁴³ Combined, the two – archive desire and archive fever – exist in tension. Thus, as Derrida sees it, any archive – partly through the technology it employs, including the photocopier – 'always works, and *a priori* against itself': it recollects and forgets, produces and destroys.⁴⁴ The photocopier generates a new and ever-proliferating product. It leads to the deterioration of 'the original', in conservation terms through handling and exposure to light. And, it removes us from the idea of the 'original', which is relegated to archive.

In overall terms, such a notion poses tantalising and manifold possibilities. The idea that the archive is simultaneously constructive and destructive is illuminating for a society such as ours, which, paradoxically, given our pervasive 'culture of the copy', is so often obsessed with origins and moments of inauguration and of historical significance. Yet, perhaps even more potent are the impacts of new technology on archives as Derrida envisions them, two of which are outlined below.

The first of these impacts concerns Derrida's pronouncement, that 'archivable meaning is also and in advance codetermined by the structure that archives'.⁴⁵ So-called 'new' technologies within archives – CD-ROMs, electronic databases, html files and Web sites, e-mail, microcomputers, as well as digital photocopiers – are all implicated in this structure. Utilisation of these technologies within the archival process, it is argued, serves to 'transform archives from top to bottom and in the most initial inside of its production, in its very events'.⁴⁶ That is to say, the archive 'produces as much as it records the event',⁴⁷ similarly to the way in which news media produce rather than report news events.

Strongly connected to the above point is the second impact of new technology on the archive. This concerns the emerging and popular perception within the library industry that new archival technology, especially electronic databases and other digital storage systems, holds twofold promise. For the archivist, it is hoped that this technology, applied in the 'digitising' of existing collection items, will serve as a kind of 'plumbing' that will 'unblock' an archival alimentary system constipated by a glut of physical (and ever-expanding) archival material so space-intensive it is measured in linear kilometres. For the researcher, this technology is intended to serve as some kind of *aide-mémoire* which will enable them to fruitfully grasp archivable history in its entirety, to 'objectivise it with no remainder'.⁴⁸ For Derrida, however, the very antithesis of this promise also holds true. This is partly due to the way in which 'the archivist [and the researcher] produces more archive, and that is why the archive is never closed. It opens out of the future'.⁴⁹ But it is also because new archival technology disperses as well as synthesises knowledge. The impact of this technology is such that the contents of our archives 'move away from us at great speed, in a continually accelerated fashion. They burrow into the past at a distance more and more comparable to that which separates us from archaeological digs'.⁵⁰ This reading of the archive – and archival technologies like the photocopier – echoes Derrida's understanding of the 'supplement', where the supplement, to use the example of the photocopy, is simultaneously both accretion and substitution.

Any recourse to digital technology in an archive management or research library context must recognise and engage with the double logic of 'archive fever', of that which *simultaneously* produces and destroys, synthesises and disperses, recollects and forgets, retrieves *and* loses. Within this double movement, this shuttling process, the photocopier is an interesting archival technology, especially insofar as degeneration and regeneration through proliferation occur *uno actu*—in a single act, and simultaneously. This is something clearly understood by artists such as Timm Ulrichs and Mike Parr. But it is also worth remembering that those engaged in everyday photocopying are equal participants in this process in a more general sense, whether knowingly or not.

Conclusions

This paper has outlined some of the factors attending the practice of everyday photocopying, which is a practice we rarely pay explicit attention to. Becoming more conscious of these factors can contribute a fuller self-knowledge of this practice. It also gives us an appreciation of the photocopier as a machine and cultural artefact. Paying attention to these practices can also contribute to our understanding of human-technology interaction more broadly.

Throughout this paper the term 'pathology' has been employed for a particular strategic purpose: in order to 'make the familiar strange'; to highlight how the practice of photocopying, while rarely remarked on, is in fact comprised of a whole complex of different and at times competing drives, motivations, and behavioural characteristics. Throughout, however, I have been careful *not* to describe these patterns of use as 'abnormal' or 'dysfunctional'. Closer scrutiny of these interactions might appear to render them 'extraordinary' (which literally means, outside the usual order). Nevertheless, a key aim of this paper has been to suggest that these practices and 'pathologies' are in fact part-and-parcel of the 'usual order' of everyday photocopying practice. What is thrown into question, however, is what one takes to be 'usual' or 'normal'.

The proposition I would like to put forward to close this paper is that the peculiarities of photocopying practice described above are illustrative of the wider, complex nature of *all* human-machine interaction. Ideas about addiction, purity, abstraction, desire, production and destruction, attend every interaction with technology, not just the photocopier. What can be considered 'normal' or 'abnormal' in relation to such interactions is a contingent and always-ambiguous affair. As Julian Orr notes (referencing the work of Bruno Latour), 'machines prescribe human behavior, forcing us to do certain things to use the machine or other things to accomplish our ends without using the machine.'⁵¹ As Orr goes on to explain, this is part of Latour's argument 'that machines participate in human society to such an extent that neither technology nor society can truly be considered apart from the other.'⁵² This means that humans and machines are inextricably bound to one another in everyday life. It

is this entwined relationship that makes it worthwhile being more cognisant of seemingly unconscious minutiae of how we engage with them.

Recognising and examining these semi-invisible practices can be productive for understanding both the influence that machines have on our behaviour, as well as the particular behaviours that we bring to each engagement with technology in our lives.

[NOTES]

1 Hillel Schwartz, *The Culture of the Copy: Striking Likenesses, Unreasonable Facsimiles* (New York: Zone Books, 1998), 377.

2 "The Story of Xerography," <http://a1851.g.akamaitech.net/f/1851/2996/24h/cacheA.xerox.com/downloads/usa/en/s/Storyofxerography.pdf> (accessed July 3, 2006).

3 "The Story of Xerography."

4 "The Story of Xerography."

5 "The Story of Xerography."

6 "The Story of Xerography."

7 "The Story of Xerography."

8 "The Story of Xerography." See especially page 13 of 13 where this process is illustrated diagrammatically.

9 Julian E. Orr, *Talking About Machines: An Ethnography of a Modern Job* (Ithaca, New York: ILR Press, 1996).

10 Farmey Joseph, "The Subcritical Photocopier and the Quest for a Thinking Machine," 2003, <http://web.mit.edu/farmey/Public/photocopier.doc> (accessed May 19, 2006).

11 A point that is driven home in Lucy Suchman's book-length study of the challenges these complexities pose for successful human-machine design and interaction. See, Lucy A. Suchman, *Plans and Situated Actions: The Problem of Human-Machine Communication* (Cambridge: Cambridge University Press, 1987).

12 See for example, Klaus Urbons, *Copy Art: Kunst und Design mit dem Fotokopierer* (Köln: DuMont Buchverlag, 1991). For a full inventory of copy art practice, see Reed Altemus's Leonardo on-line bibliography, October 10 2003, <http://mitpress2.mit.edu/e-journals/Leonardo/isast/spec.projects/electrobib.html> (accessed July 3, 2006).

13 Schwartz, *Culture of the Copy*, 239.

14 Mike Parr quoted in Robyn Sloggett, "Beyond the Material: Idea, Concept, Process, and Their Function in the Conservation of the Conceptual Art of Mike Parr," *Journal of the American Institute for Conservation* 37, no. 3 (Fall/Winter 1998): 323-324, 320-321.

15 Representative of such literature is the following report: *Central Occupational Health Unit, Plain Paper Photocopiers: A Review of the Occupational Health Problems Associated with their Use* (Wellington, New Zealand: Occupational Health and Toxicology Branch, Division of Public Health, Department of Health, 1981). For an earlier example of medical concern over the detrimental health effects of photocopying, see J. C. Graham, "A Hazard of Photocopying," *The Lancet*, May 14 1960, 1070.

16 Mark J. Brosnan, *Technophobia: The Psychological Impact of Information Technology* (London and New York: Routledge, 1998), 12. Craig Brod argues that technophobia in fact acts as a key contributing factor in producing what he terms "technostress". According to Brod, "Technostress is a modern disease of adaptation caused by an inability to cope with the new computer technologies in a healthy manner. It manifests itself in two distinct but related ways: in the struggle to accept computer technology, and in the more specialised form of overidentification with computer technology". Brod goes on to suggest that, "The primary symptom of those who are ambivalent, reluctant, or fearful of computers is anxiety," which is expressed in manifold different ways. See, Craig Brod, *Technostress: The Human Cost of the Computer Revolution* (Reading, Massachusetts: Addison-Wesley, 1984), 16.

17 Brosnan, *Technophobia*, 10.

18 Laurel Wellman, "Thank you, HP, for Casting Light on Copier Rage," SFGate.com, March 19 2002, <http://sfgate.com/cgi-bin/article.cgi?file=/chronicle/archive/2002/03/19/MN209792.DTL> (accessed July 3, 2006).

19 A notable exception is Joseph, "The Subcritical Photocopier and the Quest for a Thinking Machine".

20 Suchman, *Plans and Situated Actions*.

21 It is on similar grounds that the photocopier is promoted to librarians in the 1970s, where it is seen as a useful 'adaptation of photography to achieve speed and cheapness'. Peter G. New, *Reprography. for Librarians* (London: Clive Bingley, 1975), 51.

22 Schwartz, *Culture of the Copy*, 245.

23 *Photocopying in Libraries and Archives* (Milsons Point, NSW: Australian Copyright Council, 1985).

24 Mark C. Taylor and Esa Saarinen, *Imagologies: Media Philosophy* (London and New York: Routledge, 1994), 9 ("Superficiality" section).

25 Taylor and Saarinen, *Imagologies*, 8.

26 Spark & Cannon, "Transcript of Proceedings: Productivity Commission Inquiry into Cost Recovery by Government Agencies," *Australian Government* (Canberra), 29 November 2000, <http://www.pc.gov.au/inquiry/costrecovery/trans/canberra001129.pdf> (accessed May 19, 2006).

27 Such issues have long been a source of consternation to those interested in photocopying and questions of copyright law. For historical discussion, see eds. Lowell H. Hattery and George P. Bush, *Reprography and Copyright Law* (Baltimore, Port City Press, 1964).

28 Schwartz, *Culture of the Copy*, 229.

29 Schwartz, *Culture of the Copy*, 229.

30 See, in particular, Scott Drake, "The Architectural Antimephitic: Modernism and Deodorisation," *Architectural Theory Review* 2, no. 2 (1997): 17-28.

31 The term 'acutance' is defined as 'a scientific measure of definition, or image sharpness'. W. J. Barrett, *Glossary of Photocopying Terms* (London: Hall Harding Ltd, 1961), 5.

- 32** J. M. Hughes, P. A. Michell and W. S. Ramson, *The Australian Concise Oxford Dictionary*, 2nd edition (Melbourne: Oxford University Press, 1992), 775.
- 33** As Taylor and Saarinen put it, "the technologies of electronic reproduction instill desires that can never be satisfied". Taylor and Saarinen, *Imagologies*, 2 ("Ad-diction" section).
- 34** Charles P. Yerkes, "Interests of the Copying-Machine Industry," in *Reprography and Copyright Law*, eds. Lowell H. Hattery and George P. Bush (Baltimore, Port City Press, 1964), 71.
- 35** Schwartz, *Culture of the Copy*, 235.
- 36** Schwartz, *Culture of the Copy*, 229.
- 37** Schwartz, *Culture of the Copy*, 246.
- 38** Jean Baudrillard, "Xerox and Infinity," in *Transparency of Evil: Essays on Extreme Phenomena*, trans. James Benedict (London and New York: Verso, 1993), 51.
- 39** Some of these reasons are canvassed in Kenton O'Hara and others, "Student Readers' Use of Library Documents: Implications for Library Technologies," in *Human Factors in Computing Systems: CHI 98 Conference Proceedings*, eds. Clare-Marie Karat and others (New York: The Association for Computing Machinery, 1998), 233-240 (see especially 238). And, on the early uses of photocopiers by librarians, see Ronald E. Barker, *Photocopying Practices in the United Kingdom* (London: Faber and Faber, 1970).
- 40** Jacques Derrida, *Archive Fever: A Freudian Impression*, trans. Eric Prenowitz (Chicago and London: University of Chicago Press, 1996), 91.
- 41** Derrida, *Archive Fever*, 81 & 90ff.
- 42** Derrida, *Archive Fever*, 10 & 12.
- 43** For discussion of these effects, see: and, Miles Ogborn, "Archives," in *Patterned Ground: Entanglements of Nature and Culture*, ed. Stephan Harrison, Steve Pile, and Nigel Thrift (London: Reaktion Books, 2004), 240-42; and, Thomas A. Parker, *Study on Integrated Pest Management for Libraries and Archives* (Paris: UNESCO, 1988).
- 44** Derrida, *Archive Fever*, 12.
- 45** Derrida, *Archive Fever*, 18.
- 46** Derrida, *Archive Fever*, 16.
- 47** Derrida, *Archive Fever*, 17.
- 48** Derrida, *Archive Fever*, 68.
- 49** Derrida, *Archive Fever*, 68.
- 50** Derrida, *Archive Fever*, 18.
- 51** Orr, *Talking About Machines*, 105.
- 52** Orr, *Talking About Machines*, 105. See also, Bruno Latour, "The Prince for Machines as Well as for Machinations," in *Technology and Social Process*, ed. Brian Elliott (Edinburgh: Edinburgh University Press, 1988), 20-43; Jim Johnson (a.k.a. Bruno Latour), "Mixing Humans and Nonhumans Together: The Sociology of a Door-Closer," *Social Problems* 35, no. 3 (June 1988): 298-310.