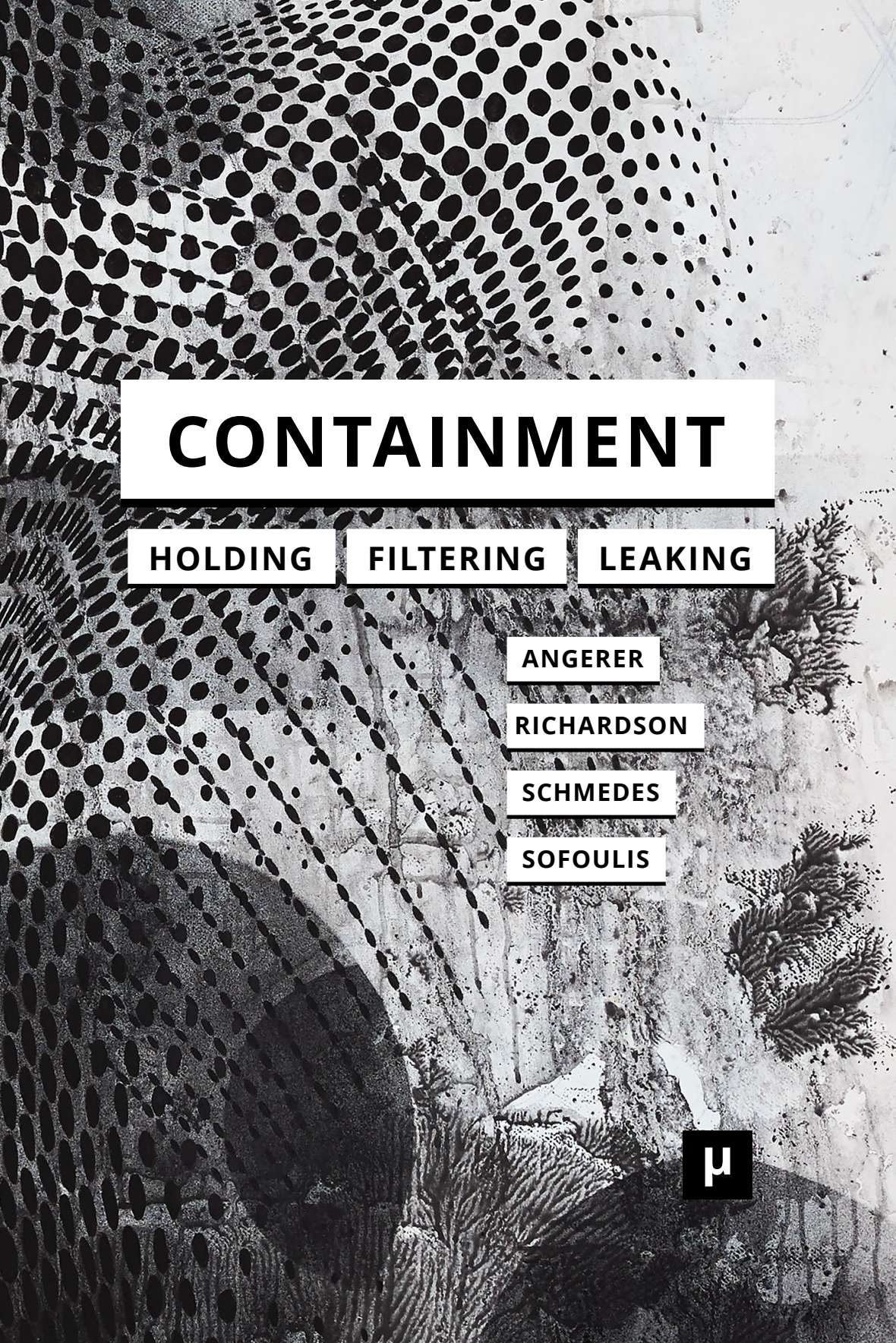

CONTAINMENT

HOLDING FILTERING LEAKING

ANGERER
RICHARDSON
SCHMEDES
SOFOULIS

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Containment

In memoriam
Marie-Luise Angerer 1958–2024

For Marie-Luise, who made this book possible through her generosity and intellectual openness. Her unique ability to nurture new spaces for thought, her unconditional encouragement and infectious laughter will continue to resonate within us and the lives of so many people she touched.

Containment: Technologies of Holding, Filtering, Leaking

edited by

Marie-Luise Angerer, Ingrid Richardson,

Hannah Schmedes and Zoë Sofoulis

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A leaf a gourd a shell a net a bag a sling a sack a bottle a pot a container. A holder. A recipient. … this vast sack, this belly of the universe, this womb of things to be and tomb of things that were, this unending story. — Ursula K. Le Guin

Introduction

Ingrid Richardson and Zoë Sofoulis

This book arose out of an online "Container Technologies Workshop" held in March 2021, but its origins go back further. In June 2018, Marie-Luise Angerer and Noam Gramlich had convened a workshop in Potsdam on "Feminist speculations with strange bedfellows," whose presentations formed the basis of their collection *Feministisches Spekulieren: Genealogien, Narrationen, Zeitlichkeiten* (Angerer and Gramlich 2020) that included Gramlich's original translation of Ursula Le Guin's *The Carrier Bag Theory of Fiction.* This short essay, which reimagines both the history of technology and writing science fiction as centered around bags rather than weapons, had in the meantime been reprinted, with a new introduction provided by Donna Haraway (Le Guin 2019). The idea was to continue exploring carrier bag theory at a symposium that Zoë Sofoulis would address in Potsdam in 2020. But like so many events planned for that year, this was cancelled due to travel restrictions imposed in response to the COVID-19 pandemic. An online "Container Technologies Workshop" was subsequently held via Zoom over three days in March 2021, where contributors presented draft versions of the chapters found below. The overarching theme was for everyone to make some reference to the essay "Container Technologies" (Chapter 1), originally published in the feminist philosophy journal *Hypatia* (Sofia 2000). Participants invited to the 2021 workshop by Marie-Luise Angerer and Zoë Sofoulis included some of Marie-Luise's current postgraduates, some of Zoë's former postgraduates (now in senior academic positions), and other people whose work was salient to the topic. As Zoë outlines in her retrospective (Chapter 2), Ingrid Richardson, Meredith Jones, and Dinesh Wadiwel were integral to the project's pre-history in the mid-2000s, which included a research institute seminar and a national conference panel.

The COVID-19 pandemic has directly affected this book, not least because almost all of the authors caught the virus (some more than once), which slowed down work, especially for those with enduring "brain fog" symptoms. Our editorial meetings often began with comparing notes on restrictions,

vaccines, infections, and haircuts (or lack thereof). Experiences of the pandemic in 2020–22 heightened awareness of techniques of containment, whether through mask-wearing and hand-sanitizing, or lockdowns, quarantine, "social bubbles," restrictions on outdoor movements, and curtailment of workplace and cultural activities: all efforts to contain and slow the spread of the virus by containing and restricting those it could infect.

At the time of our online workshop in March 2021, the gigantic container ship Ever Given was stuck across the width of the Suez Canal, obstructing global shipping and supply chains, providing a topical focus for Paul Raven's planned talk on shipping containers (now expanded to a more general consideration of packaging in Chapter 6). The Ever Given exemplified containerization gone so far as to obstruct the global mobility it was intended to facilitate. Just under a year later, Russia's incontinence about its own borders was demonstrated in its belligerent invasion of Ukraine, which in turn led to many war refugees spreading out across Europe, requiring food, assistance, and shelter somewhere other than train stations. These events directly affected our European contributors. Then, as we headed towards the completion of the book, the destruction of the Kakhovka hydroelectric dam in the south of Ukraine in June 2023 resulted in horrifying scenes of massive decontainment, as one of Europe's largest reservoirs was drained, thousands of people were displaced, croplands were ruined, and ecocide ensued downstream. That same month saw a massively overcrowded refugee boat capsize in the Mediterranean near Greece, drowning hundreds of (mostly) women and children, while much more of the world's media attention was captured by the fate of five billionaires who lost their lives sight-seeing in deep waters near the wreck of the Titanic. These are just some of the events that have made the contributors to this book aware of containers and containment as being not merely of theoretical interest, but very much of practical and geopolitical concern.

Container/Containment Distinction

What started out as a "Container Technologies Workshop" in March 2021 has become a book on "Containment." Why this shift in emphasis from containers to containment?

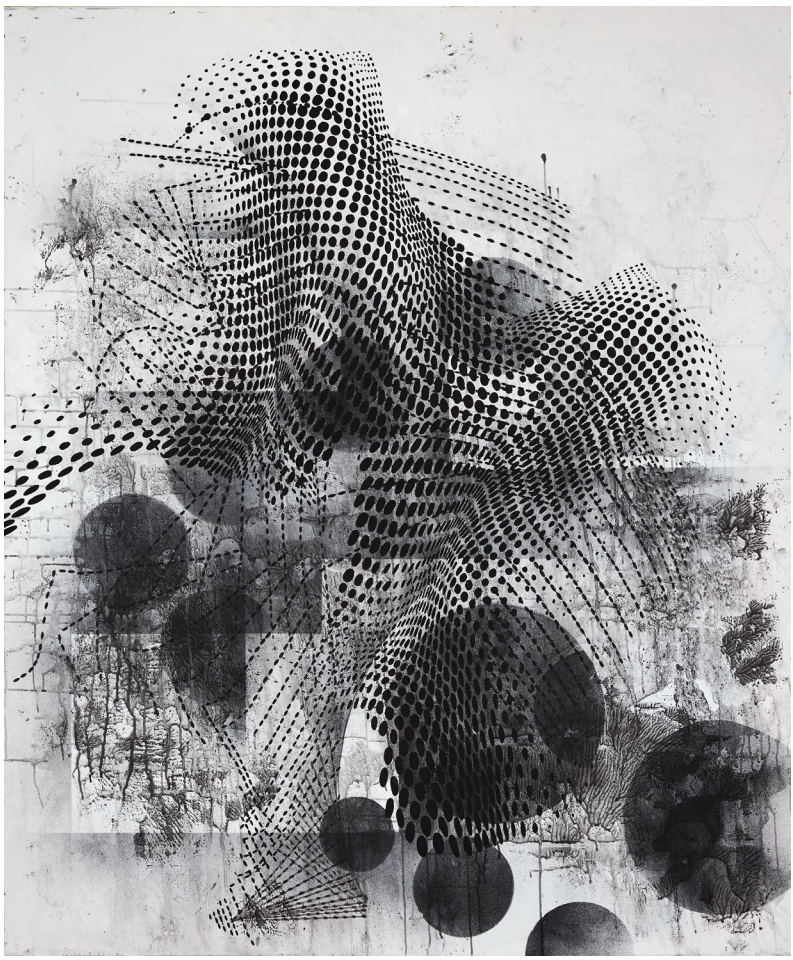
As Zoë admits in the retrospective on her 2000 essay (Chapter 2), for all of her feminist commitment to rethinking space as smart, and to understand containing—or "encapsulation" (Otter 2017)—as an active labor, she remained biased towards a reified view of the container as a thing, an object that held stuff, and did not have much to say on conduits, channels, and leaks; moreover the essay made only limited references to actor-networks.

However, it is not simply as a corrective to the limits of Sofia (Chapter 1) that themes in this book pay more attention to issues around containment than

to containers as objects. It signifies a historical shift in concerns of the past two decades, when even before the COVID-19 pandemic, matters around containment, and fears of the dangers and risks of inevitable failures to contain, have pressed ever more urgently upon our own embodied lives—and life in general—as the air, waters, and soil become increasingly polluted with radiation, greenhouse gases, microplastics, and innumerable chemicals. This pollution of our lifeworld makes it hard to theorize any form of container without thinking about failures of containment, or contemplating the uncontainable.

A shift in emphasis from containers to containment does not mean somehow "going beyond" the container. After all, a key point of Sofia's essay was to call us to pay attention to those objects, utensils, and infrastructures that facilitate production but that we all too often let slip into the background, ignored and overlooked (Chapter 1, 27). Rather, we invite readers to situate the container-as-object as part of a broader set of containment techniques and functions. As the book's subtitle is meant to suggest, the "holding" performed by a container, which usually means "holding within," but can also mean "holding together," is the primary technology of containment that comes to mind, but it is not the only one. "Filtering" is another kind of containment, where the emphasis is on discriminating between what is let in and what is excluded, and the container functions as a permeable membrane, a fence, or a gateway. "Leaking" implies a movement from inside (a container) to outside of it. Leakiness is not just the sign of a failed container: it can be a deliberate design feature, such as in a drip-feed irrigation system. More worryingly, leakiness may be a constitutive and essential—though often hidden or denied—operating feature of systems and protocols that are ostensibly designed to contain and hold.

An elegant distinction between containers and containment has recently been made by Ignace Schoot and Charles Mather, theorizing on the problem of containment in salmon aquaculture. Whilst Science, Technology and Society (STS) studies of containment have "focused on what containment technologies and practices do," their own declared interest is in "what containment practices fail to do, which is to successfully contain" (2022, 941). To conceptualize the issue of failed containment technologies, they retrieve an older meaning of contain that is close to the original Latin, *con-* (together) plus *tenēo* (holding): "containment is not only about holding inside and preserving. It is also about holding together, an obsolete meaning of the term 'to contain.'" (937). As the authors explain, reminding us of actor-network approaches, "in emphasizing the role of containment as 'holding together,' we engage with and draw on broader STS interventions that have considered how things and worlds are made to hang together" (939). One example of inevitably leaky containment is oil pipelines that not only link the source with the point of its re-sourcing,



[Figure 1] *Your Mobile Soul (3),* by Katja Davar, graphite powder & acrylic on canvas, 2019 (reproduced with permission from the artist).

but all the lives and livelihoods that are altered along the way by the presence of leaky pipelines. Containment as a process of creating and holding together leaky networks is not primarily about stasis, keeping and preserving: it is about relationships and can be "provocative" in changing the world by "generat[ing] new relationships between humans and things" (940). The plastic water bottle generates new markets for bottled water as well as for recycled plastic (Hawkins, Potter, and Race 2015); the potato chip packet requires different potatoes to be grown for processing and packaging (Kenner, Mirzaei, and Spackman 2019). Making the important—and dare we suggest, widely applicable—point that "many of the regulations that govern containment infrastructures tolerate incontinence and seepage" (2022, 941), Schoot and

Mather's own study shows the failure of containment protocols to prevent non-native ocean farmed salmon from escaping into wild rivers, where they compete and/or hybridize with native species and can be caught by anglers.

The cover image on this book (Fig. 1) was chosen for its evocation of this duality of containers as "holding in" and containment as "holding together," with its spherical forms suggesting worlds and bubbles, some seeming to hold something within, and its swathes of meshes tracing dynamic networks that hold elements together in permeable and leaky arrays. The hints of oblong blocks imply background shaping structures, while amorphous smudges seem to gesture to materials that are uncontained.

This duality of container and containment has echoes with the relation between the thing and the network suggested in Zoë Sofia's "Container Technologies" essay, which "translated Heidegger's fourfold into a shorthand way for thinking about the way things, objects, are a *gathering* together of many elements, forces, purposes and dimensions, both human and extra-human" (Chapter 1, 32). The corollary of the idea of the thing as a gathering—in Latour's formulation "every entity is an event" (1993, 81)—is that a network could be understood as an unraveling of the thing into its constituent actors and factors.[1] Whereas the thing is a network condensed, the network is a thing expanded.

Relational Ontology and Material Metaphor

This book can be situated as part of the "new materialism" in social and cultural studies. In the latter part of the twentieth century, poststructuralist and postmodernist approaches gave dedicated focus to epistemology—the "how" of knowing—by positioning language and "the text" as our primary access to the world. In reaction to this "linguistic turn," a subsequent materialist and corporeal turn (Sheets-Johnstone 2009) sought to reinstate the significance of ontology—the "what" of existence—and the irreducible relation between humans and "things," with all the material, physical, and sensory aspects involved. A wide-ranging number of fields have contributed to this effort, including philosophy of science and technology, phenomenology, feminist theory, cultural and media studies, anthropology, sociology, architecture, and cultural geography.

1 Donna Haraway is a brilliant practitioner of "unpacking" or unraveling a thing—such as Oncomouse™ (Haraway 1997)—into its constitutive multiscale networks of interacting factors and actors, in a kind of lapidary material hermeneutics. For kindred recent endeavors unraveling the relations or networks of a thing, see Kate Crawford and Vladan Joler's *Anatomy of an AI System* (2018), tracing the environmental footprint of a single Amazon Echo device, and Crawford's *Atlas of AI* (2021), looking at the planetary and other costs of AI.

In the introduction to their collection on new materialism, Diana Coole and Samantha Frost (2010) identify a diverse range of research foci that have an "interest in the emergent materialities of contemporary coexistence" (28). What these conceptual trajectories have in common is the view that materiality is complex, dynamic, and multiple, and a recognition that we as researchers and theorists join all humans in our thorough immersion "within materiality's productive contingencies" (7). In a broad sense the chapters in this book join this conversation by exploring the contingencies that emerge from our figurative and literal encounters with containing and holding. Premised on Sofia's insight that any experience of containment is "an (inter-)active process" (Chapter 1, 19) involving the agency of humans and the material world, each of the contributions critically explores the dynamic constraints and possibilities of the "structural necessity" that is containment.

As noted here and throughout the book, containment in its various incarnations is frequently mobilized as a powerful trope, and it is worth briefly mentioning the importance of metaphor and its significance for ontology. For a number of philosophers, such as Norman O. Brown (1966) and George Lakoff and Mark Johnson (1980; 1999), the body is the source of all metaphor, both as constraint and as potentiality. That is, our conceptual systems are always already materially mediated and arise "through the commonalities of our bodies and brains and the environments we inhabit" (Lakoff and Johnson 1999, 5). Spatial, navigational, and directional metaphors are the most common of all metaphors, and for the most part are determined by how we experience our bodies in the world: up–down, in–out, front–back, on–off, deep–shallow, central–peripheral (Lakoff and Johnson 1980, 14). These orientations are intrinsic to our motor functions and relative to our gravitational field. Similarly, body metaphors such as congestion and contagion, and conduit metaphors of movement and passage through space, are often adopted as explanatory tropes for the transmission and corruption of information. This book's metaphors of holding, filtering, and leaking have resonance with bodily processes of holding in, and eating and excreting.

Lakoff and Johnson categorize these most basic metaphors as ontological metaphors—or more specifically as entity, substance, and container metaphors. They write:

> We experience ourselves as entities, separate from the rest of the world—as containers with an inside and an outside. We also experience things external to us as entities—often also as containers with insides and outsides. (1980, 58)

The containment metaphor is intricately related to the perception that not only our bodies, but parts of our bodies—our own heads and minds—are themselves containers which carry, transform, "massage," and embrace

thoughts and ideas (as in the expressions "wrap your head around this," "put some thought into it," or "can't get you out of my head").

For Lakoff and Johnson, metaphors are the extension of our corporeality into the world: only that which can be metaphorized *qua* embodiment is realized or made real. Far from being merely conceptual or figurative linguistic devices, as we are often taught in school, metaphors are essential to and formative of meaning; they are quite literally world-shapers with material effects.

Yet despite the seemingly simple correlation between bodies and containers as the source of metaphor, the chapters in this book reveal the incredible variation and ambiguity in our metaphors of containment, across a spectrum of slippery ontological conditions. As the book's title indicates, liminal states of containment—porosity, filtering, leaking—are of key importance, as they highlight points of resistance, provocation, and change.

Outline of Chapters

Authors and editors of books on containers can succumb to "container delirium" (Sofoulis, Chapter 2) and seek to include a comprehensive, if not encyclopedic, range of examples, as Alexander Klose nobly attempts in *The Container Principle* (2015), and Susanne Bauer, Martina Schlünder, and Maria Rentetzi more successfully approximate (despite disavowing a completionist ethos) in their ambitious and occasionally whimsical 600-page collection of studies of material culture and sociotechnical history, *Boxes: A Field Guide* (2020). However, our shift in focus from containers as objects to containment as action enables us to think about containers and containment in terms of basic actions, which we gather here under the headings of holding (holding in or holding together), filtering (letting in), and leaking (letting out).

We did not set out to be systematic, and our book has taken shape by expanding on some pre-existing connections between contributors from humanities and media and cultural research, who were invited to bring their own interests and topics to it. Certain themes and chapters are, regrettably, missing, as during the long process of work on this book, some early career researchers had to withdraw their papers to focus on their own projects: Noam Gramlich (colonial processes), Jaspreet Nijjar (carceral containment), Vanessa Oberin (life outsourced, bio-containers), and Christian Schwinghammer (holding ontologies).

Chapters are grouped into four sections, opening with "Containers to Containment," including this introduction, background, and overview. The "Container Technologies" paper is reprinted as Chapter 1 for the convenience of readers who want to engage with the original essay. Published by Zoë Sofoulis under the *nom de plume* Zoë Sofia, it was intended as a contribution to a feminist

philosophy of technology through a focus on the container technologies neglected in histories of technology, yet symbolically and practically connected to women's bodies and labors. In "Containers, Retrospectively," Zoë outlines her intellectual journey towards the 2000 essay, reflects on some of its limitations and its recent travels, and explores the container/containment distinction through a discussion of pandemic bubbles.

To round out this opening section, the historian Chris Otter gives us a glimpse of the broad scope of containers and their profound impact on everyday human lives. To understand human beings, Otter argues, we have to study our relationships with containers. He divides these relationships into bodily and architectural containers (clothes and houses), immobile containers for storing things (granaries, warehouses), and mobile vessels for transporting goods (barrels, shipping containers). These containers have shaped things, people, and their relations through certain ontological trajectories which center around time, motion, access, and uncontainment—for, as he reminds us, containment is never total and containers inevitably fail to fully retain their waste.

Three sections follow, each with three chapters, under the thematic headings of holding, filtering, and leaking.

Resonating with Le Guin's "carrier bag theory," Meredith Jones's chapter on the handbag could be described as a study in container ontologies, as it considers what this portable storage technology implies for human *being*, not just human *doing*. Jones examines the handbag's holding capacities, its contents, and the deportment it demands of its user, and finds it serves as a portable source of comfort and provision that mediates between private domestic space and the public sphere.

The paradoxes of packaging are the focus of Paul Raven's contribution. On the one hand, packaging exists to protect products from time and atmosphere by isolating them from the environment, but on the other hand the environment is becoming the ruined repository of discarded packaging and other excesses of production. Packaging, along with shipping containers, are parts of the infrastructure for globalized trade, but, as the example of the Ever Given shows, worldwide supply chains can suddenly implode.

"Haunting" is the special category of holding thematized in Hannah Schmedes's chapter, which draws parallels between a gynoid elaborately constructed by a fictional Thomas Edison, and the disappointingly dysfunctional talking dolls the real Edison actually produced. Haunting implies that products and places of production may still hold onto, or be haunted by, the ethereal presences of the invisible and uncelebrated labors, hands, and voices of those—mostly women, living, dead, or in-between—who help animate the inventor's creations. Inspired by Sarah Sharma's "feminism for the broken machine" (2020, 172), Schmedes points towards broken dolls as domestic and

feminized devices in the light of a feminist retelling of normative conceptions of gender that are inscribed onto container infrastructures.

The next section on "filtering" emphasizes containers and containment strategies where the emphasis is on architectures of exclusion and inclusion: who or what is admitted, who or what is excluded, and how are these acts of inclusion and exclusion effected?

The container metaphor does double duty in the chapter by Hélène Frichot and Helen Runting, exploring high-rise apartments, urban space, and subjectivation in late capitalism in the time of the pandemic. At the scale of the precinct, there are critical questions about the policy settings, powerful social networks, economic conditions, and the general zeitgeist that constituted a "facilitating environment" for the gestation and premature "birth" of skyscraper housing developments. At the scale of the building are questions about co-constitutive relations between urban space and subjects: what kind of person do these buildings and spaces presume or help shape? In a time of confinement and restrictions about the inclusion and exclusion of people in various spaces due to the pandemic, the busy lobby serves as a membrane between the closed-off apartment and the wider outside world of society, nature, and commerce, represented by the steady stream of people, and food and parcel deliveries filtering in from the adjacent footpath.

Holding, protecting, and keeping need not imply kindness or caring. The violence and cruelty of containment as incarceration is the main subject of Dinesh Wadiwel's paper on the containment of animals, a condensed version of his more extensive work on this theme (2015). The domestication of animals and the development of factory farming brings to the fore a restraining aspect of containing: violent inclusion. As shown by the excerpts from Yvette Watt's photographic series *Animal Factories,* these sites that violently include animals also strenuously exclude us, whether passing drivers, curious carnivores, or animal activists. Windowless and anonymous metal buildings, fenced off and distant from the road, signs threatening heavy penalties for "trespassers," and the irony of sculptures of happy dancing factory hens are among the many strategies for containing, concealing, and distancing us from the violence of industrial meat production.

The metaphorical, material, and experiential containment of digital games, and virtual and hybrid playspaces more broadly, is the ontological terrain explored in Ingrid Richardson's chapter. Drawing from postphenomenology, Richardson argues that players, gameworlds, and devices are intervolved in "tropologies" of containment—deep corporeal and conceptual metaphors like the "magic circle" that define the boundaries of play and rely on an "as if" structure of perceptual experience. Yet as games become mobile, and we carry them with us into the quotidian lifeworld, Richardson argues that we

need a different suite of metaphors that more aptly reflects the indiscrete, peripatetic, and entangled nature of everyday mediated play.

The final three chapters, grouped under the heading "Leaking," all address the porosity of containers and containment, where boundaries are breached and containment fails.

Digital voice assistants, polite and subservient chatbots neatly housed in porous casings shaped as platonic solids, are the focus of the chapter by Yolande Strengers and Zoë Sofoulis, who situate them within a broader western mytho-history of man-made women or gynoids (including Hadaly, as discussed by Schmedes). Presented to users as both companions and concentrators of information from across the web, these devices eavesdrop and leak data about their users back to manufacturers, undermining the privacy of the so-called private sphere. Strengers and Sofoulis speculate about the possibilities when "decontainment" occurs and restrictions on honest self-disclosure are lifted.

The unwitting leaking of personal data to an unknown repository is also a theme in the chapter which follows. Daniela Agostinho and Nanna Bonde Thylstrup are in dialogue with *Lacework,* a web-based artwork by Everest Pipkin, as part of questioning the ethics of the construction of image databases used for training machine learning systems to recognize objects, actions, faces, and emotions. These images are mostly taken without permission in public and private places, scraped from the web, handed over by state agencies (prisons, immigration), or produced and categorized by "Amazon Mechanical Turks" who are paid a pittance. Most attention is paid to the algorithms (the machine-like tools) operating on databases (the taken-for-granted containers), while the labors and non-consensual data donations that go into constructing databases remain invisible and unacknowledged.

In the final chapter, leakiness becomes visceral in Marie-Luise Angerer's critical meditations on the myth of self-containment. Examples drawn from contemporary cinema and art present us with bursting brains, open bodies, and contaminated DNA structures, revealing the obscene and uncontained underside of secured containers. Whereas in watching film we can still tell ourselves that these extreme boundary violations are just cinematic special effects, Angerer points us towards a scary reality where neuro-scientific technologies have in many ways bypassed sci-fi-stories and turned everything—brain and body—inside out.

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CONTAINERS

PHILOSOPHY OF TECHNOLOGY

HEIDEGGER

MATERNAL PROVISION

[1]

Container Technologies

Zoë Sofia

This paper goes beyond critiques of western philosophical notions of space as passive, feminine, and unintelligent by reconfiguring containment as an (inter-)active process. The author draws on work in the history of technology, on a cybernetic epistemology that emphasizes the interdependence of organism and environment, and on intersubjectivist psychoanalytic theories of the maternal provision. A more unexpected ally is found in Heidegger, whose writings on holding and supply are read in ways that contribute to the development of an urgently required philosophy of container technologies.

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Since the birth of early modern science, Nature has been imagined in the west as a Big Mother full of treasures (material, land, knowledge) to be plundered and re-sourced. Through world-spanning technological and industrial enterprise, another "Super Mother" has been created in the matrix of mobile resources. We greedy metropoles (and many others besides) want a facilitating environment that smoothly provides year-round access to seasonal foods; we want 24-hour access to hot water, gas, supermarkets, banking services etc.; and we want technologies that help access other goods and services, such as cable TV, phones, fax, mobile phones, email (though these latter also have the effect of turning their supposed "users" into mobile resources themselves, accessible almost anywhere, any time). Yet in the midst of all this abundant supply, homelessness is rising both for humans and the non-humans whose habitats are destroyed or polluted. The specter of resourcelessness looms ever larger on the horizon as we reach the limits of a planet that had once been imagined as an infinite container of resources, now revealed as a finite resource itself. In such a context, focussing on questions of containment and supply in thinking about technology can help draw our attention to the assumptions we make about supply in our own lived world, and to larger questions about sustaining the planetary "facilitating environment" and avoiding an exhaustion of its supplies, including supplies of future biological diversity in the gene pool. [182]

This paper outlines elements of a framework and several directions for a feminist approach to the history and philosophy of technology centered around containers and supply, or more generally, re-sourcing. Artefacts for containment and supply are not only readily interpreted as metaphorically feminine; they are also historically associated with women's traditional labors. And just as women have traditionally been neglected in history and philosophy in general, so, as historian of technology Lewis Mumford observed in the 1930s, the utensils and apparatus typically associated with women have been overlooked in the history and philosophy of technology. So far it has been largely up to feminist social studies of technology to rectify this imbalance (e.g. Cockburn and Fürst-Dilic 1994; Cockburn and Ormrod 1993; Wajcman 1991), and it is hoped my contribution might encourage more theoretical work and historical studies on these topics.

To help unsettle habitual assumptions that space is merely an unintelligent container, or containers dumb spaces, the introductory section activates ideas from the epistemologist Gregory Bateson, whose cybernetic ecology stresses the interdependence and dynamic co-evolution of organism and habitat, and from the psychoanalyst D.W. Winnicott who depicts the infant as an entity emerging from a maternally facilitated environment. Then, with the aid of historian Mumford I survey container technologies in my own domestic lifeworld, and argue that neglect of containers and containment functions is

not only the result of anti-maternal bias in western thought, but is encouraged by the unobtrusiveness of containers and utensils, traces of whose productive roles are not necessarily evident in the final product. Finally, I turn to Martin Heidegger whose later writings on technology (in the 1950s and 1960s) offer some key insights into the importance of containment and supply in the late modern period.

Smart Contexts, or "No Environment, No Entity"

The unit of survival is organism plus environment.
— Gregory Bateson (1972, 483)

Bateson's intellectual contributions from the 1930s to 1970s spanned anthropological studies, cybernetics, psychology and family therapy, biology and communications. His epistemological perspective on the unit of survival developed in the essays in his collection *Steps to an Ecology of Mind* (1972) is a cybernetic one based around a notion of the *immanence* of mind and subjectivity. It is concerned with a subject or organism whose survivability, agency, receptivity and intelligence extend "beyond its skin" (one of Bateson's repeated phrases). The organism cannot be considered apart from the habitat that houses it—a point made in a current save the koala campaign slogan "No tree, no me"—and "the organism which destroys its environment destroys itself" (1972, 483). Mean[193]ing circulates through organism/environment in the form of transformations, translations and transmutations of difference (that is, information, "the difference which makes a difference" (1972, 315–17). Thus "The individual mind is immanent but not only in the body. It is immanent also in pathways and messages outside the body; and there is a larger Mind of which the individual mind is only a subsystem" (1972, 461). In this perspective, best summarised in Bateson's lecture "Form, Substance, and Difference" (1972, 448–65), intelligence is not confined to the deliberations of the intending ego or *cogito*, but can be found in the changing patterns of mutual adaptation and co-adaptation undergone within and by the organism-environment ensemble (460–61). The environment itself is a bearer of intelligence (see also Bateson 1979).

This Batesonian notion of cybernetic intelligence can be contrasted with a popular notion of cybernetics as top-down digitally mediated control if we compare the prototype "smart house" with the GaBe house. The smart house (as discussed by Berg 1994) is wired and electronically programmable for control of the things many men are interested in: information flow and control of security, lights, entertainment, communications and garbage disposal. By contrast, the GaBe self-cleaning house—designed over 30 years ago by a woman architect Frances GaBe (Zimmerman 1983; Wajcman 1991, 102)—makes clever use of container technologies to minimise the domestic drudgery still required

for the so-called "smart" house, whose programmable washing machine still has to be manually loaded and unloaded, and the washing dried, folded, etc. The GaBe house has specialised cupboards using water, steam and air and a series of pipes and sprinklers for cleaning, allowing dirty dishes to be cleaned and left in cabinets where they are ready for next use; clothes to be washed, dried and remain hanging *in situ*; and the floors cleaned automatically. Whereas the wired house seems smart because of digitally programmable components, the GaBe house's intelligence is immanent in the way it is adapted to minimising drudgery: its "smartness" is emergent in the dynamic mutual adaptability of environment to organism, organism to environment, home and homemaker.

Resonating strongly with Bateson's point about the unit of survival, or the "no tree, no me" relation, is the provocation by the object relations psychoanalyst D.W. Winnicott, famous for his insights into the infant's lifeworld:

> There is no such thing as an infant (Winnicott 1960, 39 fn).

Or, as US psychoanalyst Thomas Ogden has helpfully expanded it:

> There is no such thing as an infant [apart from the maternal provision] (Ogden 1992, 620).

In other words, aside from its fa[184]cilitating maternal context, the infant is not. This is not simply physically true—humans are born very immature—it is also a statement about ontology: without the (m)other's activity in creating a "facilitating environment" for the nurture, emergence and exploration of the self, the person cannot come into being. For Winnicott and more recent "intersubjectivists" (such as Stern 1985), the baby is seen as part of its environment—the maternal provision. It leaves its primal container technology (the womb) to enter an extra-uterine matrix, a space where, all going smoothly, its needs are unobtrusively supplied by what it experiences as an "environment mother." It ruthlessly exploits this seemingly personless entity whom it only gradually comes to know in a relationship of mutual love and concern.

Ogden's review of Winnicottian approaches highlights the important early personality mechanism of *projective identification*, in which "aspects of the self are not simply projected onto the psychic representation of the object (as in projection), but *'into'* the object" (Ogden 1992, 617), setting up a dialectic of container and contained that in Bion's words "makes it possible for … [the infant] to investigate his own feelings in a personality powerful enough to contain them" (Bion 1959, 314). Ideally, the mother both identifies with the infant (through Winnicott's "primary maternal preoccupation" and Stern's "affect attunement" [Stern 1985, 13861]), yet is sufficiently separate to serve as the container and interpreter for its experience, "thereby making her presence felt, but not noticed" (Ogden 1992, 620).

In this view, the infant's subjectivity is immanent within and emergent from the context of intersubjective containment:

> Paradoxically, the subjectivity of the individual presupposes the existence of two subjects who together create an intersubjectivity through which the infant is created as an individual subject. The infant as subject is present from the beginning although the subjectivity exists largely within the context of the psychological-interpersonal (containing/contained) dimension of the relationship of the infant and mother (Ogden 1992, 619).

Other spaces experienced by the infant are the inner world of fantasy and outer world of sociotechnical reality, bits of which become caught up as "transitional objects" in a third space, called "potential space" by Winnicott (1971, 107). Being able to play safely in this potential space, negotiating between inner and outer worlds and self and (m)other, is an essential part of infantile development, and moreover, Winnicott argues, it is the foundation for later creative experiencing and cultural production which plays (or works) on the borders of fantasy and reality.[1]

In the intersubjectivist model of subject formation, the self is understood as an entity given shape through various dynamic relationships of containment that both construct and occur in spaces that are interpersonal, imaginative, real, active, the products of conscious efforts as well as unconscious or auto[185]matic labors. How might these insights be applied to container technologies? The following inventory suggests some possible directions:

- Facilitating environment: an adaptive intelligence is at work to ensure smooth functioning; space and container technologies may not be as dumb or as static as we traditionally assume.
- Containment: is not just about what holds or houses us, but what we put our stuff into, and thereby identify with; what of ourselves we can and cannot contain.
- Primary maternal preoccupation and attunement: this lets infant and caretaker get in sync with each other; its corresponding technological phenomenon concerns the degree of adaptation of the environment/ space/ container to us; the more a technological object is adapted to respond to or even anticipate our own wishes and capacities the more "user-friendly" it seems.
- Ruthlessness of infant: just as we don't notice or acknowledge the active giving of the (m)other, so too do we take for granted containers and the resources they supply, they are merely spaces to get stuff out of or put stuff into.

1 The significance of this potential space to language, poetics, aesthetics, and philosophy has been explored in Julia Kristeva's work around the notion of the *chora*. See Kristeva 1981, 1984.

- Toy or tool as transitional object: from this we might understand that the tool is never a purely material object, but always has partial origin in the inner world, which is to say that it is always meaningful, part of a narrative or set of human purposes.
- Potential space: corresponding to the infant's play space—an imaginative space between inner and outer worlds—are work spaces for discovery and invention: the workshop, the lab, the studio, the library, the study. Hence one might transform Winnicott's "There is no such as an infant" into "There is no such thing as a discovery/invention [apart from the potential space]."

The Technics of the Unobtrusive

The technological forms associated both with traditional labors of women and with metaphors of female organs of storage, transformation and supply have been and continue to be vital to technics and human development, but are regularly overlooked in histories and analyses of technologies. Like noisy and disruptive boys in class, aggressive tools and dynamic machines capture more attention than the quietly receptive and transformative "feminine" elements of container technologies. This is the perspective outlined by Mumford in the following quotes, the first from his account in *Technics and Human Development* (1966) of the emergence of settled agricultural communities: [186]

> Many scholars who have no difficulty in recognising that tools are mechanical counterfeits of the muscles and limbs of the male body—that the hammer is a fist, the spear a lengthened arm, the pincers the human fingers—seem prudishly inhibited against the notion that woman's body is also capable of extrapolation. They recoil from the notion that the womb is a protective container and the breast a pitcher of milk: for that reason they fail to give full significance to the appearance of a large variety of containers precisely at the moment … that woman was beginning to play a more distinctive role as food-provider and effective ruler than she had in earlier foraging and hunting economies. The tool and the utensil, like the sexes themselves, perform complementary functions. One manipulates, assaults; the other remains in place, to hold and protect and preserve. ….
>
> Cooking, milking, dyeing, tanning, brewing, gardening are, historically, female occupations: all derive from handling the vital processes of fertilization, growth, and decay, or the life-arresting processes of sterilization and preservation. All these functions necessarily enlarge the role of containers: indeed are inconceivable without baskets, pots, bins, vats, barns …
>
> Protection, storage, enclosure, accumulation, continuity—these contributions of neolithic culture largely stem from woman and woman's vocations. In our current preoccupations with speed and motion and

> spatial extension, we tend to devaluate all these stabilising processes: even our containers, from the drinking cup to the recorder tape, are meant to be as transitory as the materials they contain or the functions they serve. (1966, 140–41)

Mumford had earlier made similar points about the devaluation yet continuing importance of containers in *Technics and Civilization* (1962 [first published 1934]), where he distinguishes machines and tools from technologies of containment and supply, categorized as utensils (like baskets or pots), apparatus (such as dye vats, brick kilns), utilities (reservoirs, aqueducts, roads, buildings) and the modern power utility (railroad tracks, electric transmission lines):

> [S]ome of the most effective adaptations of the environment came, not from the invention of machines, but from the equally admirable invention of utensils, apparatus, and utilities. .... But since people's attention is directed most easily to the noisier and more active parts of the environment, the role of the util[187]ity and the apparatus has been neglected .... [B]oth [tool and utensil] have played an enormous part in the development of the modern environment and at no stage in history can the two means of adaptation be split apart. Every technological complex includes both: not least our modern one. (1962, 12–14)

It is worth noting here that since the female body provides our first sheltering container and source of supply, containers tend to be interpreted as generically feminine, as they are by Mumford. But although I am also interested in exploring the feminine and maternal dimensions of container technologies, it is important to remember that men's bodies as well as women's comprise many natural "container technologies" besides sex-specific organs, including skin, mouth, stomach, bladder, bowel, blood vessels; even the penis is an expandable container of sorts, and eyes and ears are experienced as receptive organs. Actual container technologies are associated with men as well as women (indeed some men may be particularly interested in technologies of containment as compensations for their own relative deficiency in the reproductive container department).

Mumford's laments about the neglect of utilities, utensils and apparatus—which he refers to generally as "utensils," and which I am generally calling "container technologies"—in the history of technology can also be made to some extent about the history and philosophy of technology, where the prototype tool on which philosophers meditate is not usually a cup or bowl but typically some kind of probe or stick. Two important exceptions are Martin Heidegger (discussed below) and Don Ihde. Ihde's (1990) phenomenological program for interpreting varieties of human-technology-world relationships includes containment as one of its four basic categories. In what Ihde calls "background relations," the technology functions as a shelter, cocoon, or

a world; it can also be a cultural "atmosphere," such as nuclear fear (1990, 112–15). This category includes a huge range of technologies and relations, from intimately wearable containers like clothes, shoes or condoms, to walk-in partly-automated spaces like houses, cinemas, shopping malls or cities, floating or submersible containers like boats or submarines; nuclear reactor containment vessels; as well as the virtual worlds of computer/video games.

If Mumford is right that utensils or apparatus and machines or tools have each been "enormously important" then an analysis of technology which emphasized the utensils/containers side could be a useful corrective to approaches like Ihde's which finely differentiate amongst tools and machines, but lump all the utensils and spaces together as background. And if it is so that "at no stage in history can the two means of adaptation be split apart," it might be possible to not only investigate containers, but also hybrids of tool and utensil, as well as the container-like aspects or functions of a range of technologies and technological ensembles, including those (over-)readily interpreted as masculine [188] or phallic. Examples here include the skyscraper, so obviously phallic but from the inside a "womb with a view"; the car, advertised in terms that emphasize on the one hand its phallic/excremental "grunt," and on the other its womby comfort and storage space; the computer, which is basically a storage technology for data, yet which has often been represented as a kind of flying vehicle, even before widespread networking allowed internet "surfing."

Why are container technologies relatively neglected in histories of technologies? Mumford suggests there is a prudish embarrassment about naming or interpreting technologies in the feminine, and a bias towards technologies that are dynamic and somehow masculine. One might propose this neglect has less to do with modesty than with a misogynistic metaphysics that has represented space as a passive, neutral receptacle (Plato, *Timeaus* [1971]), and the mother as a personless nutritive vessel (Aristotle, *The Generation of Animals* [1979]). The problem with this representation, as Irigaray has pointed out (Luce Irigaray 1985; see also Elizabeth Grosz 1995; Sue Best 1995), is man's failure to grow up and acknowledge indebtedness to the spatial/maternal environment and the labors of those who sustain this facilitating space. These labors are almost always considered "menial" because they do not produce some dynamic and heroically discovered object to be wondered at, but reproduce an unobtrusively and incrementally ordered space which can be taken for granted as a background for other activities.

This is a persuasive line of critique but it is not the full story. The problem is not just bad metaphysics or misogyny but the structure of production and reproduction itself. The container is a structurally necessary but frequently unacknowledgeable precondition of becoming. For example, when you eat a cake, you might wonder about the recipe and ingredients, but you don't

usually think about the sieve, bowls or beaters which operated on the raw materials, or the oven in which it was cooked, or the power supply to that oven. At the practical level of tool use, if even thrusting, dynamic pounding objects like the hammer, as Heidegger has famously described it, tend to "withdraw" from the user's awareness (Heidegger 1962a, 98), how much more readily can containers withdraw from attention, exploited but not noticed: the humble jars or plastic bags where nails are stored, the battered tool box where the hammer is kept, not to mention the shed or workshop where the activity goes on. To keep utensils, apparatus and utilities in mind is difficult because these kinds of technological objects are designed to be unobtrusive, and like the environment mother, "make their presence felt, but not noticed" (to paraphrase Ogden, 1992, 620). Thus, the analyst of container technologies must constantly work against the grain of the objects and spaces themselves—not to mention the ingrained social habit of taking for granted mum's space-maintaining labors—to bring to the foreground that which is designed to be the background.

Working with the idea that our relations to containers are something like [189] our relations to the environment mother, we could speculatively interpret Mumford's categories of container technologies as follows:

- The utensil: the generic container, a basket or bowl, perhaps corresponds to the mother as a container into which we dump our excess stuff, and which we come to consider as extension of ourselves.
- Apparatus: the specialized container, like an oven or a vat, in which something may be created or transformed. The apparatus, as well as the specialized space that houses it (the kitchen, the lab, the workshop), could be interpreted as equivalents of the potential space where inner and outer worlds are negotiated in the course of discovery/invention.
- Utilities: these can include buildings (from humble cottages to huge environment-controlled spaces like shopping malls or airport terminals), as well as various channels for dynamic flows (like pipes, cables, reservoirs). These technologies reproduce something like the "environment mother" who works unobtrusively to ensure "smooth functioning" and continued supply to the infant whose body states and feelings she regulates.

Foregrounding Containers: A Domestic Survey

To add to my understanding of the role of container technologies and the containment dimensions of a range of technologies in my own lifeworld, I conducted a survey of the kitchen/ dining/ living area of the shelter technology I inhabit, from the vantage of a "machine for sitting in" at my dining table. Containers in the kitchen included sauce bottles, salt and pepper shakers, pots and pans, vases, sinks, dish-rack, cups, glasses, bowls; drawers and cupboards (themselves containers with shelves for holding other containers

and apparatus); a cloth tube stuffed with plastic shopping bags, the garbage bin, lined with one of these bags. Then there were apparatus with specialized container functions for heating or preserving foods, like an electric kettle, the oven, the microwave, and the refrigerator, with its own set of containers inside. Some containers are strategically inefficient: sieves, colanders, sink drain covers, paper coffee filters. Towels and dishcloths are also kinds of containers for liquids. This traditionally "feminine" domain of domestic equipment was not devoid of tools or machines used to perform sadistic actions on plant, animal and mineral matter: implements for chopping, whipping, skewering, grinding, shredding, mashing, liquefying, etc.

The container technologies at the living room end included some comfortable body-holding technologies (the largest of which concealed a fold-out apparatus for sleeping), a table with a letter rack, files, envelopes. Books, photographs and albums, telephone directories, the television, the stereo, [190] cassettes and CDs: all these media technologies, I decided on reflection, had their container-like aspects. Working analogously to the holding functions of memory, and with some similarity to the kind of poetics of space Bachelard identifies with the miniature, which "deploys to the dimensions of a universe" and where "large is contained in small" (Bachelard 1969, 157) these electronic and print media are storage technologies for other spaces and experiences. A CD or tape can open up a whole concert, or an aural landscape of feelings; a book can disclose another world. My handbag and satchel slouched in a corner near the laptop. Velcroed and zipped into its the nylon case, this virtual storage technology works in dimensions unperceivable by me. I have a projective identification with this small dense gray box, an indispensable prosthetic brain in which (via keyboard and mouse) I have embedded much of my professional life.

Behind the scenes of living and kitchen/dining areas, and essential for making the apprati functional were the utilities: the gas pipes and valves, the electricity conduits, the plumbing—all so many containers for channeling dynamic flows and ensuring supply and unobtrusively linking this domicile to vast grids of energetic and institutional power (so long as I keep paying the bills).

One point revealed by this domestic survey is the variety of types of containers, even within the home. Some of my equipment is close to the "classic" container or utensil, the basic bowl shaped holding vessel. But containment can also be performed by flat surfaces and wire racks, as well as by silicon-based storage devices like the CD or computer. Some of the containing technologies are machines or include mechanisms, like the extending table or the fold-out sofa bed. The food processor is basically a bowl with a rotating blade driven by an electric machine: a combination of "static" bowl and "dynamic" machine-driven bladed tool.

Mumford's distinction between "dynamic" tools and machines versus "static" containers or utensils is not one that can be ultimately sustained. If, in his words, "The essential distinction between a machine and a tool lies in the degree of independence in the operation from the skill and motive power of the operator: the tool lends itself to manipulation, the machine to automatic action" (1962, 10), then the container technology, even in its most basic form, has something machinic about it. Unlike the tool, which needs manipulation to perform its function, the container can perform its holding-function automatically: a jar can simply sit there, full, on the shelf and be working to capacity. The distinction between tool or machine and utensil or apparatus hangs on the dynamic/static distinction, but it could be debated whether holding or containing is simply to be considered as a passively inhering property of a shaped space, or whether containing is thought of as a form of action in itself.[2] I favor the latter interpretation, following intersubjectivist accounts of the subject formed in a space whose holding and supplying are [191] understood as the result of maternal labors, actions requiring effort and care. As we shall learn from Heidegger's analysis of a container technology in the next section, containing is not as simple a function as we might first think.

Heidegger and the Jug/Thing

A significant counter-example to the many historians and philosophers who neglect the containment aspect of technology is Martin Heidegger, who paid quite a lot of attention to location, things, spaces, containers, and technologies of holding and supply.

His essay on "The Thing" (1971c [first published 1962b]) begins with a discussion of nearness and distance in the modern age and includes wonderful meditations on a jug, some of which are relevant for a more general analysis of container technologies. First, Heidegger takes pains to argue that the jug for him is not a mere object of vision or thought, but a thing in itself which has been created through a process of making, so that "as a vessel [it] stands on its own as self-supporting" (1971c, 167). The jug's character as a *thing* "resides in its being *qua* vessel" (1971c, 169), that is, its capacity as a container. Heidegger inquires into the holding function of the jug, arguing that it is not the impermeable sides and bottom of the jug which do the holding. When we fill it we pour into its emptiness, and "The emptiness, the void, is what does the vessel's holding. The empty space, the nothing of the jug, is what the jug is as holding vessel" (1971c, 169). The maker of the jug does not so much shape the material as shape this void.

2 For further discussion of the relation between containers and machines, including the subordination of machines to the purposes of containment, see Sofoulis (1999).

Posing the question "How does the jug's void hold?" (1971c, 171) Heidegger answers that holding is active and ambiguously two-folded, comprising the actions of taking and keeping. Moreover, this dual activity of holding as taking and keeping only comes to fulfillment via a third action, "the outpouring," whereby the container's contents gush out: "The taking of what is poured in, and the keeping of what was poured belong together. But their unity is determined by the outpouring for which the jug is fitted as a jug" (1971c, 171–72). Noting that the word "gush" had as its earliest meaning "to offer in sacrifice," Heidegger distinguishes a generous, sacrificial and sacred gushing from "mere pouring in and pouring out" or the "mere filling and decanting" of liquor in a bar (1971c, 173).[3] The outpouring he valorizes is by contrast a gift: "And in the poured gift the jug presences as jug. The gift gathers what belongs to giving: the two-fold containing, the container, the void, and the outpouring as donation" (1971c, 173–74). The outpoured gift is thereby interpreted as a gathering together of the various dimensions of containment Heidegger has discussed.

What can Heidegger's ideas about the jug as a vessel contribute to the project of analyzing and interpreting container technologies? [192]

Firstly, it is significant that Heidegger does not assume holding is passive; for him it is a complex action.

Secondly, it is interesting that Heidegger's analysis of this container technology should ultimately celebrate spilling out. This shifts the emphasis from holding to supply. (In the light of Mumford's remarks about the relations between female organs and container technologies, it is tempting to interpret Heidegger's emphasis on sacrificial and generous outpouring as a kind of homage to the maternal, whose breaking birth waters and overfull breasts are prototypes of life-giving gushings.)

Thirdly, bearing in mind how the container's functions of taking and keeping are fulfilled in "the outpouring"—or more generically, supply—we might interpret a holding vessel like a jug or urn as a technology of re-sourcing: it can be filled from a source, then itself becomes a source of what it has kept and preserved. Note that this function of basic container technologies involves not only the spatial dimensions I am emphasising here, but also entails temporality: the container takes in during times of abundance, and it keeps and preserves its contents over time. This was, as Mumford (1966) fully appreciates, the most powerful discovery of the neolithic, when container technologies proliferated as means to even out natural fluctuations in supplies

3 Of course someone interested in container technologies per se would not be obliged to make the same evaluations. Technologies of "mere filling and decanting" would not be of lesser interest than those of pouring and gushing, and in comparing and contrasting them we could specify different kinds and purposes of containers, different patterns of relations between filling and spilling.

of food, materials, water, and so to free up more time for other cultural pursuits.

Fourthly, it is important to note some of the limits of Heidegger's jug example for a more general analysis of containers. Not all containers are designed to be impermeable or like the jug capable of outpouring: some are for slow leakage, some for soaking up drips, others for what we hope will be permanent containing. An extended analysis of containers would have therefore to examine "incontinence"—various deliberate (as in a colander or coffee filter), catastrophic (like the Titanic or Chernobyl) or merely embarrassing (!) failures of containment.

The jug is a container technology that has its being as a piece of equipment in domains of equipmentality such as the home, the church, the restaurant or bar. But these sites are themselves varieties of container technologies, containers which constitute (or co-constitute) environments and locations in themselves. This order of container technologies is thematized in Heidegger's 1954 essay "Building Dwelling Thinking" (1971a), whose examples include houses, ships, temples, a peasant hut, an old bridge. It begins with an exegesis of how the notion of "dwelling" is at the root of German words for building (*bauen)* and existing (*bin)*, The sense of dwelling as a basic, habitual and inhabited *condition* of human life tends to recede in normal notions of building (*bauen)* as a kind of productive *activity* (1971a, 147). Heidegger wants to bring to the fore the sense of humans as dwellers and building as a letting-dwell. Dwelling means "to remain, to stay in a place" (1971a, 146) and also, in Heidegger's exposition "to cherish and protect, to preserve and care for": "Real sparing is [193] something positive and takes place when we leave something beforehand in its own nature, when we return it specifically to its being, when we 'free' it in the real sense of the word into a preserve of peace" (1971a, 149).

There is a notable resonance between this idea of a safe preserve for humans or other entities to become themselves, and the intersubjectivist account of the maternal function as one of actively containing an emergent subject and letting it play safely in potential space, so it can it become who it is. The emphasis in both instances is not on the singular entity (the subject, the thing, the organism) but on belongingness to and interactions in an actively containing and preserving environment shared with entities, both human and non-human: "...dwelling itself is always a staying with things" (1971a, 151). In parallel with Heidegger's notion of holding as both taking and keeping, his notion of making room for involves both admitting and installing: "The location *admits* the fourfold and it *installs* the fourfold. The two—making room in the sense of admitting and in the sense of installing—belong together. As a double space-making, the location is a shelter for the fourfold or, by the same token, a house" (1971a, 158).

In "The Thing" essay, had Heidegger wanted a really good example of a container technology for outpouring, he could have chosen a bucket. But the choice of a jug, like the chalice in "The Question Concerning Technology" (1977b), first published in 1954, emphasizes a container that might be used for ritual libations. This is a way for Heidegger to bring in reference to a sense of the sacred in the gathering of elements into artifacts as "Things." In various essays Heidegger writes of "the fourfold," the union of earth and sky, divinities and mortals, within which humans dwell, and which in his interpretations are seen to come together through things and spaces like the jug, the bridge, the hut, or the chalice. Although I am not personally comfortable with some of the religious overtones of this notion, the ecologically-minded part of me does appreciate the necessity of a concept something like the fourfold as a way of thinking about how even everyday objects are condensations of many factors which come together in a specific context or network and have no existence or "standing" outside that context. So I have personally translated Heidegger's fourfold into a shorthand way for thinking about the way things, objects, are a *gathering* together of many elements, forces, purposes and dimensions, both human and extra-human. This is the essential point of the analysis Heidegger makes in "The Thing," where he deploys an old German meaning of Thing as a gathering (1971c, 174–77). Things do not simply *represent* such a gathering, as might signs or tokens: they only exist *as* that gathering of materials, that particular location and shaping and conjunction of space(s), that historical and cultural set of projects and purposes which the thing serves and of which it is an outcome. Or as Bruno Latour pithily expresses it: "Every entity is an event" (1993, 81). [194]

The key motif for me here is *emergence* : the thing emerges in a "nearness" or rather a process of "nearing" that gathers in remote elements into itself; thus a local and specific object is also a manifestation of its macro-context, a part of the world's worlding (1971c, 177–81). Doreen Massey makes a similar point about the sense of place in globalized cultures: "places are processes, too" she writes, and any particular place is a *"meeting place*," a gathering and manifestation of local and global social, economic and communications relations (Massey 1993, 239). Thus the uniqueness of a place is less defined in terms of some "authentic" history of a single, inevitably fictionalized and homogenized local community, than by "the fact that each place is a distinct *mixture* of wider and more local social relations" (1993, 240).

There is a significant parallel between Heidegger's notions of allowing the thing room to emerge as part of the world in its relation of nearness, and the notion of the emergent subject in Winnicottian and intersubjectivist psychology. I would also elsewhere like to draw out the connections between these ideas and the notion of the contingent character of the

technoscientific object as an entity emergent from an actor-network.[4], [5] The thing, the emergent subject or the sociotechnical actor (Latour 1993, 1994) are to be understood in their specificity, characterized not in terms of the entity's peculiar properties examined in isolation, but rather as spatially and temporally contingent manifestations which are part of a whole environment, field or network.

Thus we could add to the conjugations of Winnicott's dictum "There is no such thing as an infant" a Heideggerian inflection:

> There is no such thing as a thing [apart from the fourfold];

as well as an actor network theory variant:

> There is no such thing as an actor (human or non-human) [apart from the network];

and perhaps also a geographer's transformation:

> There is no such thing as a locality [apart from its globality].

Macrocontainment: The Standing-Reserve

The global ordering of containment and supply in the modern techno-scientific era is a key theme in Heidegger's essay "The Question Concerning Technology." As part of his effort to show the limits of modern instrumental notions of causality, Heidegger conducts an Aristotelian causal analysis of the making of a container technology similar to the jug: the sacramental chalice. The artisan making the chalice is involved in a practice of *techne*, a way of revealing the world in a creative and reverential "bringing forth" of the thing, that brings together the four causes (1977b, 6–12). Heidegger contrasts this [195] to the modern modes of aggressive use of resources and mass scale production and supply (1977b, 14). In contrast to the artisan-dominated modes of production in antiquity or pre-modern Europe, where art and technique came together in *techne*, stands the modern epoch with its large power plants,

4 On actor-network theory see Wiebe E. Bijker and John Law 1992; Wiebe E. Bijker, Thomas P. Hughes and Trevor Pinch 1987; Andrew Pickering 1995.

5 [One of these "elsewheres" is Sofoulis (2002) "Post- Non- And Para- Human: Toward a Theory of Sociotechnical Personhood," translated by Gaby Gehlen in *Future Bodies: Zur Visualisierung von Körpern in Science und Fiction Future Bodies*, edited by Marie-Luise Angerer, Kathrin Peters, Zoë Sofoulis, Wien: Springer, 273–300. One key theme was the role of different technologies and other non-humans in shaping geographic and culturally specific manifestations and performances of gender. An example of a similar inquiry is Meredith Jones's chapter in this volume, which considers the handbag as a container technology that mediates between public and private spaces, while being closely tied to presentation of one's social self and requiring particular bodily comportment. —Z. S. 2023]

airplanes, nuclear reactors and industrialized science. Heidegger's analysis of this epoch in "The Question Concerning Technology" and related essays (especially "The Age of the World Picture" [1977a, first published in 1950], and "Science and Reflection" [1977d, first published in 1954]) draws connections between the exploitation of Earth as a calculable resource, the demands of profit-driven development, the character of modern research, apparatus-dependent science, and the mathematization or "informatization" of the world. "Bringing forth" has been reduced to something like imposing upon and ripping out, via an aggressive technoscientific "challenging-forth" of the world to reveal itself in the form of resources and information for consumption, the process Heidegger calls *Herausforderung* (1977b, 14). Now the Earth or a river is revealed as a source of extractable resources (such as ore or hydroelectricity) whose extent and yield are already mapped and calculated in advance (1977b, 21).

The outcome of this challenging-forth is a macro-technology of re-sourcing Heidegger calls the *Bestand*. This "standing reserve" is a mobilizable stockpile of resources available for instant supply: "Everywhere everything is ordered to stand by, to be immediately at hand, indeed to stand there just so that it may be on call for a further ordering" (1977b, 17). The plane on the runway, ready for take-off, epitomizes this on-call orderability of resources: the plane might look like an autonomous machine, but it only exists "to ensure the possibility of transportation" (1977b, 17). Another image might be rows of stacked large containers ready equally for transport by road, rail or sea. In this modern formation, making resources available predominates over appreciating the unique qualities of the thing. The object loses its qualities as the *Gegenstand*—that which resists and stands against—and the machine loses its standing as an autonomous tool, dissolved into the *Bestand*, where it is just another "completely unautonomous" element in the abstract and global grid of the resourced world (1977b, 17).

So we might add another Heideggerian variant to the Winnicottian conjugations:

> There's no such thing as a technology [apart from the standing reserve]

Popular culture celebrates each new machine or commodity as a revolutionary wonder. But it is easy for the macro-apparatus of supply (the *Bestand*) to keep supplying new tools/toys out of the resources on hand to it. What is harder to alter, and what continues to give contemporary lives and inventions their particular stamp, is the macro-apparatus itself and the logics of re-sourcing and supply that order it. Heidegger names as *Gestell* (enframing) the [196] dangerous modern technological mindset that calls on the world to reveal itself as available resource. One danger of this framework, as Michael Zimmerman explains, is that it turns everything, even ourselves, into the

same: neither thing, object or subject, but raw material, standing reserve, human resource: "While humanity itself can never be transformed completely into standing–reserve, technological humanity has become in effect the most important raw material in a process which no longer makes basic ontological distinctions among different kinds of entities" (Zimmerman 1990, 215–16).

Heidegger's description of how the standing reserve is created by challenging the world to make itself available as a pile of mobile resources implies processes that not only involve "dynamic" machines such as bulldozers and drills for extracting and unlocking resources, but also utensils, apparatus and utilities for storage and distribution of these unlocked treasures:

> That challenging happens in that the energy concealed in nature is unlocked, what is unlocked is transformed, what is transformed is stored up, what is stored up is, in turn, distributed, and what is distributed is switched about ever anew. (1977b, 16)

The quote could almost equally well apply to the decoding, recoding, storage and distribution of information over computer networks as it does to Heidegger's example of a power plant on the Rhine and its attendant web of distributor lines. But aside from such world-spanning utilities as the internet or the power grid—each a network carrying dynamic flows (of energy or information)—there are many other technologies involved in the distribution and switching about of resources, from wagons to coal trains, trucks to cargo ships, and roads, railways and ports, not to mention the Mother Shop of the suburban shopping mall (Sofia 1996), the humble supermarket trolley, or the ubiquitous plastic shopping bag.

The *Bestand* might be created through the process of *mathematically efficient calculation* and *ordering* of unlocked resources, but what it also and importantly achieves is the objective of *securing abundant supply*. As much as this objective answers our primal demands for an environment-mother smoothly and unobtrusively to supply our every need, it also fits neatly with consumer society and profit-driven development. Processes of containment and supply, and the utensils, apparatus and utilities that help extract, store and distribute resources from the standing reserve, are not relics of pre-modernity but continue to define a fundamental aspect of what technology *is* in the late modern epoch: it is about supply, securing access, rapidly making resources available for distribution and consumption.

The list of "conjugations" of Winnicott I have been building now includes the following:

> There is no such thing as a thing [apart from the fourfold]; [197]
>
> There's no such thing as a technology [apart from the standing reserve].

These two ways of interpreting artefacts are usually contrasted by Heideggerians, with the Thing and the fourfold being appraised as richer and more open ways to apprehend our being with things, while technological resources and the Bestand are held as impoverished ways of revealing, fed by an anthropocentric instrumental rationality in the service of power and greed. But my emphasis here is on the similarities: both the jug/Thing and the standing-reserve have to do with gathering, containment and supply. The artisanal Thing (the jug, the chalice) appears a better choice through which to apprehend the gathering of entities and elements it "stays" and is "stayed by" in the fourfold, not only because of the reverential sense of mutual indebtedness of humans and non-humans it invokes, but also because Heidegger conveniently elides the messy and unpleasant aspects that sustain supply even for the artisanal mode of production.

Heidegger's discussion of causality in the relation to the chalice (1977b, 6–13) leaves out the question of where the silver for making it came from. Yet the appearance of materials within the smithy's workshop—the ore, the coal for heating and smelting it, the apparatus and tools used for refining and working it—is only possible through a prior set of techniques and technologies for extracting, moving and storing resources; for securing or coercing human labor power (for example, the slave miners of antiquity); and for tunneling, digging, gathering, carrying, storing, trading, shipping, and delivering. Heidegger's elision of this activity of extraction, transport and provisioning in respect to an artisanal mode of production allows it to be more dramatically contrasted with modern intensities of macro-containment and mega-supply. However, my emphasis here is on the dependence of both modes on resource supply, a dependence that becomes elevated to a governing principle in the modern age. I would suggest, moreover, that not only sacred things in ritual use, but any mobile resource of the high-tech standing-reserve might also be apprehended in terms of its connections if not with a cosmic fourfold, then at least with a global multifold of sociotechnical being. Indeed, it is often the task of material semioticians of technology (like Donna Haraway and actor-network theorists) in the academy, and of environmentalist and consumer groups in society at large, to unravel contemporary technofacts into their local and global networks of actors, relations, and effects (not always intentioned or desirable).

Conclusion: There's No Such Thing As ...

In this paper I have (with Mumford's help) inventoried some of the container technologies significant in technological history and in my own domestic lifeworld, and gathered up some theoretical resources which could be de[198]veloped in a more sustained analysis and interpretation of the unobtrusive technics of containers and containment. The perspectives of Bateson,

Winnicott (and the actor-network theorists, not discussed here) can contribute to this project with their emphasis on the background or context containing the evolving or emergent entity. I have argued that neglect of containers and containment functions is not only the result of anti-maternal bias in western thought, but is encouraged by the unobtrusiveness of containers, traces of whose productive roles are not necessarily evident in the final product. And yet, as I have suggested by way of both Mumford and Heidegger, the functions of containers (utensils, apparatus, utilities) to ensure supply loom large in the modern technics that mobilizes resources to be on call as standing reserve.

The container technologies project is conceived of as a corrective to phallic biases in the interpretation of technology, and as a way of getting beyond critique of traditional western notions of space as passive, feminine and unintelligent, and towards exploring and developing more recent ideas about what counts as smartness, and where it is located, in an entity-environment complex. Unless we pay better attention to questions of containment and supply, we will misrecognize the technological character of the everyday metropolitan lifeworld, which is reliant on large utility grids and includes many tool-utensil, machine-container hybrids (the phallic womb skyscraper, the bladed bowl food processor). Although I hope the idea that some technologies are metaphorically or functionally feminine might increase feminist interest in studies of technology, and help dislodge the idea that technology is intrinsically masculine, I do not intend to enshrine a framework that poses the tool or machine as masculine, phallic and "bad" against the redemptive utensil or container as inherently feminine, maternal, "good." Of more interest is Mumford's point that tool and utensil are inseparable means of technological adaptation. The dynamic machines for penetrating secrets and unlocking resources have helped set up a world-spanning grid of storage and distribution, containment and supply: both "means of adaptation" are intimately interconnected in the late modern technological complex.

Winnicott's provocation "There's no such thing as an infant" has become for me an injunction to learn to think of emergent entities as contained in a facilitating environment. Let me end by gathering together the various "conjugations" I have made of this idea (plus a couple I have only been able to hint at here), presenting them not so much as a conclusion as a basis for further inquiry:

- There is no such thing as an infant [apart from the maternal provision]
- There is no such thing as an organism [apart from the environment (Bateson)]
- There is no such thing as an actor [apart from the network]
- There is no such thing as a discovery/invention [apart from the potential space: lab, studio, study, etc.] [199]

- There is no such thing as a tool [apart from the workshop, domain of equipmentality (Heidegger)]
- There is no such thing as a thing [apart from the fourfold (Heidegger)]
- There is no such thing as a technology [apart from the standing reserve (Heidegger)].

I would like to thank the editors [of Hypatia], especially Rachel Jones, for their very helpful comments and their forebearance, as well as for the kind ways they looked after me at the Warwick conference (when I was temporarily on crutches). Thanks also to the people who have asked questions at spoken presentations of various versions of this paper at Warwick and at the Australian National University, University of Melbourne and the University of Western Sydney, and to the readers whose comments and critiques were very useful. I would also like to acknowledge my colleague Dr. Anna Gibbs for introducing me to the work of Ogden and Stern.

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CONTAINERS

CONTAINMENT

ACTOR-NETWORK

ELECTRONIC ARTS

BUBBLE METAPHOR

[2]

Containers, Retrospectively

Zoë Sofoulis

This chapter is a retrospective autobiographical look at the background to "Container Technologies" (Sofia 2000), which included studies of space and science fiction culture, and research on women and electronic arts in the 1990s, from which came the idea of "smart space." It reflects on some of the essay's biases and deficiencies, and outlines how recent scholarship has clarified the distinction between containers as objects that hold things within them, and containment as a process of holding together a leaky and contingent network of entities, things, and places. A discussion of the bubble metaphor in the pandemic explores aspects of this distinction. A container may be designed to preserve, keep, and hold; containment by contrast may provoke change in the world by altering relationships between parts of it.

The reprinting of "Container Technologies" (Chapter 1) in this volume provides an opportunity to reflect upon the background to that essay, and to acknowledge some of its biases and deficiencies that subsequent scholars—including the author—have sought to correct. This chapter looks at some of the ideas about space that informed the essay, and works through the containers/containment distinction in a discussion of "bubbles" in the context of the COVID-19 pandemic.

Science Fiction Culture

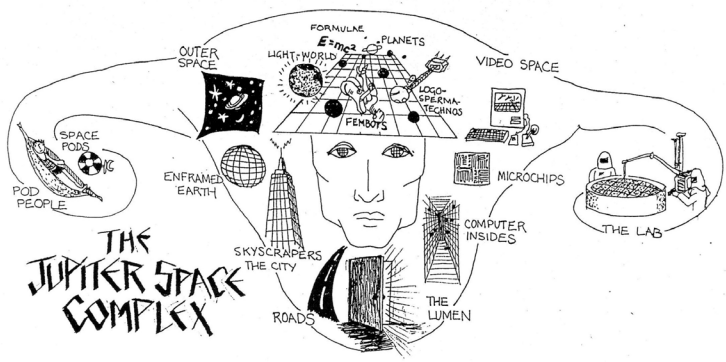
Jupiter Space

The pre-history of my interest in containers was in ideas about space identified in studies of science fiction and, later, women electronic artists. During my honors year at Murdoch University in Western Australia, I had identified a crucial space in the mythology of high technology: the metaphor of the brain as womb, which I called "Jupiter Space" (Sofoulis 1979; Sofia 1984). The term was taken from a climactic moment in the film *2001: A Space Odyssey,* where it simultaneously referred verbally to the outer space near planet Jupiter, and visually to the red womby interior of the spaceship Discovery's computer HAL depicted on screen.[1] In Greco-Roman mythology, Zeus (Jupiter) gave birth to the goddess Athena (Minerva), who sprang fully-grown from his head. I took this as a masculine myth linked psychoanalytically to boys' envy of female fertility, and the subsequent desire to circumvent this lack by generating "mind children."

In the 1980s, Jupiter Space imagery was prevalent in films and ads for high-tech products in popular technology magazines like *Omni* and *Wired*. The high-tech brain-womb was a matrix where visual parallels were drawn between outer space, computer or brain space, often in the form of a Cartesian grid, or perhaps a silicon chip or circuit board, skyscraper facades, and urban transport grids. In this space, and against this background, floated high-tech products, from spaceships and robots to cars, computers, or hi-fi systems (Fig. 1; Sofia 1987).

My studies of Jupiter Space and other myths of "science fiction culture" continued in the History of Consciousness PhD program at the University of California, Santa Cruz, where I lived in 1980–86. I commenced as a candidate just as Donna Haraway joined the program as professor of feminist theory.

1 Interestingly, Ursula Le Guin outlines this film as typical of the womanless weapon-centered techno-heroic narrative that her "carrier bag theory" seeks to counterpose: "whirling there it [a bone thrown into the air by a murderous ape] became a space ship thrusting its way into the cosmos to fertilize it and produce at the end of the movie a lovely fetus, a boy of course, drifting around the Milky Way without (oddly enough) any womb, any matrix at all" (Le Guin 2019, 29).



[Figure 1] Jupiter Space Complex, drawing by Zoë Sofoulis, ca. 1985.

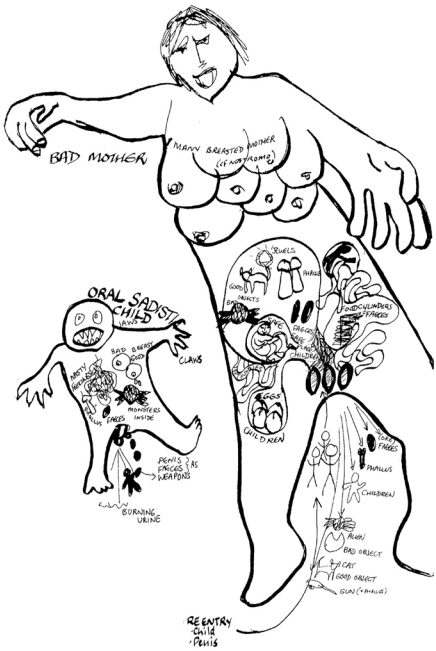
One of the intellectual heroes of my honors work, the psychoanalytic historian Norman O. Brown, was still teaching, and Hayden White was head of program.[2] Other postgraduates in this interdisciplinary program were working in STS (Science, Technology, and Society), in feminist, gender, queer, and race studies, in cultural theory, and in ethnography. Our professors taught us to pay serious attention to story, myth, and metaphor (and the other tropes), and to become comparative epistemologists who could negotiate between and across different knowledge frameworks.[3]

Enlightenment and Re-sourcing

Science fiction film and high-tech popular culture were subjects of my PhD research, but my PhD thesis ended up focusing on Mary Shelley's *Frankenstein* and metaphors of scientific curiosity, discovery, vision, and enlightenment (Sofoulis 1988). Two important spatial figures were the lumen or light hole (*lumen* means both light and opening), an ocular and vaginal portal for enlightenment; and the scientist's laboratory—Frankenstein's "workshop of filthy creation"—housing works of excremental production, the dark side of enlightenment. The womb envy idea was expanded through Melanie Klein's work on pre-Oedipal psychoanalysis, especially the role of epistemophilia (curiosity, initially about sex and reproduction), and fantasies about invading and plundering the mother's body for good and bad objects (Fig. 2). Mary Shelley's figure of the graveworm, gnawing its way through the dead mother's body, was taken as a metaphor of the ever-curious scientist, bent on an

2 For more details on this period see my interview with Karen Pinkus (Pinkus 2020) and Chapter 5 of Hélène Frichot's study of the contributions from the margins of architectural thought (Frichot 2018).

3 These insights came from group interviews conducted with former History of Consciousness students around the time of Donna Haraway's (nominal) retirement in 2011, as part of a (still unfinished) project to record "Histcon Legacies."



[Figure 2] Kleinian Mother and Child (after *Alien,* 1979). Drawing by Zoë Sofoulis, ca. 1986.

epistemophilic quest in half-light to unearth knowledge and resources that would purportedly benefit humanity while allowing man to reproduce without woman's direct involvement.

Supplementing that psychoanalytic angle was Heidegger's work on technology, and the calculative rationality of Enlightenment involved in extracting planetary resources to form a "standing reserve" (*Bestand*) that could be mobilized for production.[4] A key point of the thesis was to link these various ideas to the concept of "sublimation" and the question of how perverse and amoral oral-sadistic and excremental fantasies associated with epistemophilia found public expression in valued products and infrastructures of contemporary high-tech production. Sublimation as re-sourcing: the extraction of stuff from the source, working it over and combining with other stuff, and re-issuing it through a "second nature." This could be the workshop of filthy creation, or the matrix of high-tech culture, where shiny goods appear to arrive from outer space, fully formed and ready to plug in and play.

4 A significant difference in attitudes to Heidegger became evident when preparing this book: Anglophone writers were willing to directly quote this philosopher, while for the Europeans, Heidegger's work is seen controversially because of its proximity to Nazism. While some Heideggerian concepts remain influential, this is indirectly, for example via works by later writers.

Unlike chemical sublimation, where a material passes directly from a solid to a gaseous state without going through an intermediate liquid phase, in high-tech production, the impression of sublimation is achieved by such means as globalization, long and complex supply chains, and offshore manufacturing. These separate the consumers of shiny goods from the excremental "slimy bads" that others have to live with in poorer regions, mining areas, and industrial zones. The messy in-between phases of extraction, refining, production, and transport are overlooked or glossed over, so it remains that "slime is the secret of the sublime" (Sofoulis 1988).

This trick of "sublimation," achieved by displacement, affords consumers the luxury of remaining unaware of the exploitation, sacrifice, destruction, and pollution that are also bundled up into their cherished shiny goods. Increasingly, environmental and consumer advocates as well as shareholders are demanding more knowledge of and accountability for the materials and processes involved in production, while academic fields like human geography and STS have provided "facilitating environments" for studies of complex global production networks and cultures of consumption. For example, the "slimy bads" glossed over in computer discourse of seemingly disembodied clouds and webs have recently become subjects of critical study (Lebel 2016; Hogan 2015; Crawford 2021; Pitron 2023).

The Mother Shop

After returning to Australia in 1986, I lectured at Murdoch University across a variety of subjects in culture, communication, and feminist studies. Fieldwork with semiotics undergraduates brought into focus another techno-space of interest: the suburban shopping mall, an enclosed and climate-controlled environment I interpreted as a kind of spaceship. The essay arising from this ("Spacing Out in the Mother Shop," Sofia 1990; 1996b) applied the idea of re-sourcing and pondered how the shopping center, with its seemingly inexhaustible supply of desirable "shiny goods"—secretly replenished via delivery trucks through an invisible internal network of tunnels and laneways—was part of the logic that distanced consumers from the "slimy bads." This structure of "spacing out" consumables from their origins allows responsibility for consumption, over-consumption, or overspending to be displaced away from the corporations, infrastructures, and workers (laborers, miners, drivers, engineers etc.) at the forefront of working over the planet. Instead, blame and responsibility for consumption is placed onto the individual shopper, historically typified as a woman providing for her family.

Smart Spaces and the Artwork-Network

It was a great privilege to meet and study with several notable twentieth-century scholars during my time in Santa Cruz, though I was, regrettably, too preoccupied with my own questions to pay much attention to my professors' works. But I did circle back to Haraway, especially her "Manifesto for Cyborgs" (Haraway 1985) in the 1990s (Sofoulis 2002b; 2015), as Haraway's cyborg and notions of "the socio-technical" were gaining traction beyond STS. Once I moved across the continent to Western Sydney University in the mid-1990s, and gained new postgraduates to supervise, some of us formed a loose network with History and Philosophy of Science faculty and postgraduates at Melbourne University, drawing in others along the way, and held various events to exchange knowledge and writings for several years from the mid-1990s.[5]

Some theoretical contributions to notions of space in "Container Technologies" arose out of my research on educational computing and gender (Sofia 1993) and on women electronic artists in the 1990s (for example, Sofia 1996b). The work on women artists was mostly in collaboration with Virginia Barratt, a member of the Australian art collective VNS Matrix, whose "Cyberfeminist Manifesto for the 21st Century" (VNS Matrix 1991–92) sought to stake a place for women in the male-dominated realm of cyberspace.[6]

I was struck by the engaging vitality and number of contributions of women in the field of installation art. Not merely for visual contemplation, installations formed environments that could surround or even engulf the visitor in an immersive experience, affording a space where their body might interact with other bodies and objects. Newly available technologies of personal computing, through which other machines could be programmed, along with affordable electronics such as wireless and infrared sensors and miniature surveillance cameras, meant it was possible to create works that detected and responded to the presence of visitors. For example, *The Heart of the Matter,* an installation by Nola Farman and Anna Gibbs (circa 1994) was a low-lit living room that included an armchair on which rested a large plastic heart illuminated from within by a pulsating light. Sensors detecting movement caused the heart to beat faster the closer the visitor got (see pictures at Farman 2023). In Sarah Waterson's installation *Mapping E-motion* (1992–94; see Sofia 1996b, 8–9), discretely-placed motion detectors allowed latex casts of different breasts

5 Key figures at Melbourne were Helen Verran and Anni Dugdale; at Western Sydney it was Greg Noble, Elaine Lally, and myself. On one exceptional occasion in the late 1990s Donna Haraway accepted an invitation from Helen Verran to visit Melbourne University, and she and I shared the stage for a public conversation.

6 Audio recordings and transcripts of interviews and group discussions conducted by Virginia Barratt and me, and copies of my articles, catalog notes, and talks on this work are archived at the Jessie Street National Women's Library, Sydney.

mounted on Perspex to respond to gallery visitors' movements by pulsing, becoming "erect," or emitting small chirps. It could take a while before visitors *looking at* the breasts realized their own *body movements* were affecting their motion: no longer mere viewers, they were caught up in what I called (in the spirit of Latour and other actor-network theorists) the *artwork-network*, an interactive assemblage of bodies, technologies, and objects in space. This space was no mere *res extensa*, the blind dumb emptiness in which things took up room, but had become—especially in contemporary installation works by women—an interactive, responsive, and agentic *smart space.*

To explore this idea of smart space I drew on Julia Kristeva's theories of the *chora*, their antecedents in ideas of transitional objects and spaces, and the "environment mother" as articulated by psychoanalysts Winnicott and Fairbairn. Daniel Stern's (1985) schema of different kinds of pre-verbal interactions proved very useful for understanding how installations worked, such as through "vitality effects"—motions, lights, sounds—that evoked ephemeral multi-sensorial experiences, or through "core relations," where people and objects co-existed and interacted as bodies in space together, blobbing about. There were interesting partial parallels between Stern's schema of interpersonal interactions and the philosopher Don Ihde's (1990) program for a phenomenology of technics, which identified embodiment relations (where the tool reshapes perceptual experience), hermeneutic relations (where the technology presents an interpretive/ interpretable interface), alterity relations (interactions with technology as an "Other," a second self), and—the category I was most interested in—background relations, or what I came to think of as *container technologies*, that wrap around or hold us, from clothing, shoes, and shelters to elaborate climate-controlled artificial environments like the shopping mall. A number of these ideas were brought together in a chapter analyzing the Starship Enterprise (from *Star Trek*) as an example of smart space that can appear as a character in the narrative (Sofoulis 2001; Strengers and Sofoulis, Chapter 10 of this volume).

Container Delirium

My earlier work was part of a techno-eco-feminist project to critique high-technology mythology ("science fiction culture") as a sublimation of perverse and destructive male epistemophilic and reproductive fantasies. But after studying what women did in creative play with high technologies, meanwhile teaching courses in semiotics, feminism, culture, and technology, and being led back to Heideggerian philosophical interests in technology via Ihde's phenomenology, I was ready to look at gender/culture/technology questions from a less negative (one might say more Harawayan) perspective. After reviewing Lewis Mumford's historical accounts, including distinctions between tools, utensils, and machines, his critical observations of phallic and

machinic biases in histories of technologies, and his ideas about technologies whose form and function suggested maternal and reproductive capacities, I wondered what a feminist philosophy of technology might look like. Rather than start from a typical sociological position—looking at *women and…* or *women in…* questions—I began in a more speculative and interpretive register to inquire into technologies that could be viewed as metaphorically feminine, or that performed maternal or feminine functions, focusing on containers. I linked this to Gregory Bateson's ideas about organism/environment relations, and to some of Heidegger's thinking about technology and holding. So emerged "Container Technologies," first presented at the 1998 conference *Going Australian: Reconfiguring Feminism and Philosophy* at Warwick University, and later published with other papers from that conference in a special issue of *Hypatia* (2000).

In 2001, I was Marie Jahoda visiting professor at Ruhr Universität Bochum, and presented the "Container Technologies" talk at a few universities, while teaching an MA class with an assignment on the containers theme. Back in Australia through the early to mid-2000s, I managed to interest some of my colleagues and postgraduates in containers. About 10 of us gave a seminar at the Centre for Cultural Research (now Institute for Culture and Society, Western Sydney) with short talks outlining key ideas for chapters of a book we proposed. In 2006, Meredith Jones, Ingrid Richardson, Dinesh Wadiwel, and I presented a panel on container technologies at the annual Cultural Studies Association of Australasia conference, University of Canberra.

From these experiences it seemed that firstly, and as I had hoped, the container technology ideas could readily be picked up and applied or expanded by others; secondly, I learned about "container delirium": once you start looking for containers you can find them anywhere. Almost anything can be seen as a container, rendering it almost too indiscriminate to be a useful concept. This ubiquity, as Ingrid Richardson regularly reminds me, citing Lakoff and Johnson (1980a; 1980b), is because the container is a basic ontological metaphor, grounded in physical experience of our bodies and things that have an inside and an outside, and can hold something within. Mobilizing this metaphor "involve[s] the projection of entity or substance status on something that does not have that status inherently" (Lakoff and Johnson 1980a, 196). In other words, calling something a container is a metaphorical move that can make it seem more of a thing than it actually is—a form of reification.

In retrospect, I see I fell victim to reification in my bias towards *container technologies as objects*. Despite having approached containers from an interest in smart spaces; despite declaring my interest to "[go] beyond critiques of western philosophical notions of space as passive, feminine, and unintelligent by reconfiguring containment as an (inter-)active process" (Chapter 1, 19); and despite drawing on Heidegger to think about the mobilization of resources in

the "standing reserve," when it came down to it I remained rather stuck in the idea of a container technology as a thing, and did not make bold forays into exploring interactive processes of containment. In my mind, the exemplary "container" was a sealed glass jar, a Tupperware™ container,[7] a refrigerator, or perhaps a house. One symptom of this bias was the difficulty I had knowing what to make of conduits and channels through which things flowed (or overflowed). These were clearly in the realm of holding and *containment* but did not seem to be *containers* in the way I was imagining them. And while my essay made brief reference to porous containers like filters or colanders etc. (28), nodded to "incontinence" and disastrous failures of containment (31), and discussed the capacity to "gush out," (30) I do not recall contemplating how leakiness might be just as important as holding for defining containers.

Out of the Box

Other scholars' applications of container theory helped me out of my closet full of closed-off container-things, and taught me more about the constitutive roles of leakage and seepage in the realm of containment. For example, as part of a nuanced discussion of the gendered sociotechnics of leaking, whistleblowing, and hacking, Daniela Agostinho and Nanna Bonde Thylstrup (2019) discuss databases associated with social media as inherently leaky containers. They invoke the abject and incontinent maternal body that feminist psychoanalytic philosophy had identified as a counterpoint to the implicitly continent and disciplined body of rational man: a feminine body whose boundaries are unclear or routinely violated, while women themselves are labeled as discursively incontinent, as gossips, "blabbers," and leakers. The authors helpfully reminded me that a metaphorically feminine/maternal container might not just hold and keep, but leak and seep; it might be inherently and necessarily incontinent. They identify (after Wendy Chun and Sarah Friedland 2015) a politics of leakage, where a typical corporate rhetorical strategy is to attribute leaks to a one-off failure of the container, or the blabbings of a bad actor, rather than acknowledge permeability and leakiness as deliberate and functional design features—the authors' prime example being the social media databases involved in the Cambridge Analytica scandal.

My understanding of how incontinence figures in the distinction between containers and containment was recently clarified thanks to a paper by Ignace Schoot and Charles Mather (2022; discussed in the Introduction to this book). Trawling through definitions of "container," they found that in addition to the prevalent meaning of an object that can hold something within, there was a cluster of older uses of the term "contain," based on the Latin, *con-* (together)

7 On which subject see the superb chapter on Tupperware as a containment technology by Brooke Erin Duffy and Jeremy Packer (2022).

plus *tenēo* (holding), where containment can mean "holding together," as in an assemblage or network. Their "opening up" of containment showed me how to reconnect the "Container Technologies" themes with the actor-network/STS perspective I had regretfully left out of the original article,[8] and it provides a framework for conceptualizing the work of containment by conduits, pipes, and networks that was insufficiently developed in my reified container-object approach.

The idea of the container itself as a kind of networking device is prominent in Donna Haraway's introduction to Ursula Le Guin's carrier bag essay. She writes of three hand-crafted *mochilas* (carrier bags) received on a work trip in Colombia, that "each situate those who make and those who carry the *mochila* in worlds that are at stake now" (2019, 10). Even when empty, each *mochila* carries stories, meanings and background tales of complex troubles, threats, and resilience of the people and lands from whence it came. Learning of those stories and their storytellers means for Haraway that "I have been collected in this carrier bag" (18), and accordingly she holds some responsibility for enabling those others' stories and voices to be carried and heard.

Pandemic Bubbles

At our 2021 Container Technologies Workshop, I talked about bubbles, which were then prominent in discourse and practice around the responses to the COVID-19 (or SARS-CoV2) pandemic. The bubble intrigued me as an example of a "disreputable" or inadequate container, discussion of which might mitigate some of the biases of the 2000 essay. The exemplary soap bubble was an ephemeral structure with limited capacities to keep or hold anything beyond a few moments of attention to a shiny floaty membrane. The bubble metaphor has long been used to describe market booms where an inflation ends in a sudden collapse, as in "housing," "dot com," and "tech" bubbles. Similarly, "thought bubble" is a dismissive term for a frivolous and unsubstantiated set of ideas that arises only to dissipate into nothingness—a "brain-fart," in Australian parlance.

Soap bubbles notwithstanding, the duration of a bubble is not essential to its physical definition, which is simply one kind of substance encapsulated by another substance. A fragile skin of soap temporarily holds a volume of air, while geological bubbles (such as geodes[9]) can endure for eons.

8 This was for reasons of length and not wanting to further complicate the framework. Some of the related material on how technology shapes gender appears in Sofoulis 2002a. A discussion of contingency, containment as holding or hanging together, and actor-networks would fit in around the discussion of the Jug/Thing as a gathering, and of places as processes, on pages 31–33 (Chapter 1).

9 A geode is a hollow nodule of rock internally lined with crystals.

When deployed as a metaphor of social groups, the bubble is less like a container for holding-in, and more like a containment process as Schoot and Mather outline it, the holding-together of an interactive assemblage of entities in a leaky but semi-stable network. As Dylan Mulvin and Cait McKinney understand it in their re-examination of HIV-AIDS bubbles in the light of the pandemic, "the bubble [is] both a filtering technology and a 'structure-within-a-structure'—a zone of limited, restricted, or processed interaction with the broader social world" (2023, 3).

The Merriam-Webster online dictionary defines the general social meaning of bubble as "an enclosed or isolated sphere of experience or activity in which the like-minded members of a homogeneous community support and reinforce their shared opinions" (2021). Examples include "the liberal/conservative bubble," or the communities formed around social media platforms and online groups, and the elites of politicians, staffers, and media based in centers of political power, such as Westminster, Washington (also described as a "swamp"), and Canberra, Australia's capital. "Canberra bubble" was nominated 2018 word of the year by the Australian National Dictionary Centre, to refer to the self-preoccupation of federal politicians, who often invoked the term in a populist move "to distance themselves from the Canberra bubble, saying they're not a part of it," (Hayne 2018) when of course they are. Or they used the term to deflect journalists' questions about political details, ruling them out as of little concern to anyone outside the bubble—a disingenuous stance since both media and politicians know that public interest journalism thrives on leaks from inside the bubble. As feminist activists in Australia's "#MeToo" movement in 2021 pointed out, the "Canberra Bubble" was a male-dominated one, acting as a filter to exclude, suppress, and ignore women's voices through the usual panoply of sexist, misogynist, and abusive tactics.

The bubble metaphor was a prominent meme in the early years of the COVID-19 pandemic, and in 2020 "bubble" again featured in the Australian word of the year list, coming a close second to "iso," short for isolation or quarantine due to having COVID-19 or being exposed to it. New definitions of bubble were added to online dictionaries in 2020 and 2021: quarantine bubble, social bubble, household bubble, sports bubble, and travel bubble. Typical is the Australian National Dictionary Centre's additional definition of a bubble as "a district, region, or a group of people *viewed as* a closed system, isolating from other districts, regions, or groups as a public health measure to *limit the spread* of COVID-19" (ANU Reporter 2020, emphasis mine). The two points I've emphasized in this definition highlight how this kind of bubble is less a container than a containment strategy. Firstly, the groups defined as bubbles are not actually totally isolated systems but are "viewed as" though they were; secondly, attempting to keep things in bubbles is not expected to stop the virus but to "limit" its spread.

My workshop paper surveyed some of the bubbles prominent in discourse and practice around the pandemic, citing some examples from the presciently timed "bubbles" issue of *M/C Journal* (2021). Governments imposed a range of restrictions on social contact and movement in order to limit the spread of the virus, and there were variations across jurisdictions in definitions and assumptions about social units such as "household," "family," "partner," and the new category of "social bubble" (discussed in Sofoulis 2020a; 2020b).

When the pandemic hit Australia, governments closed down the performing arts (with devastating effects that are still being addressed), while high-profile sports games were deemed "essential services that could help sustain collective mental and even spiritual wellbeing," as Adele Pavlidis and David Rowe found in their study of sports bubbles (2021). Whilst ordinary people endured harsh lockdowns, certain sporting associations gained exemptions for squads of elite professional sportsmen (and a few sportswomen) to set up sporting "bubbles" or "hubs" which allowed players and other staff to live, travel, practice, and play sports together, often at the cost of long separations from family. The sporting bubble became a "gilded cage," "a sign of both privileged mobility and incarcerated athlete work, both refuge and prison." Big sports clubs, sports broadcasters, and the sports betting industry did exceptionally well in Australia as "weekly spending on gambling went up by 142 per cent" (Pavlidis and Rowe 2021). Pavlidis and Rowe conclude the sports bubble was a "shimmering distraction" from the traumas of the pandemic, "floating tantalisingly out of reach" of the many, while enriching the few: namely, the sports entrepreneurs who had "created bubbles as armoured vehicles to salvage any available profit in the midst of a global pandemic."

This unexpected image of the sports bubble as armored salvage machine exaggerates the bubble's capacity to hold and keep. In most other respects, however, pandemic bubbles were techniques of containment that held together groups of people, things—and viruses—in contingent and leaky networks. Pandemic bubbles caught us up in temporary circumstances or imperfect provisional arrangements, under arbitrary and changing rules, dealing with the happenstance of who and what else we found there. Contingency and provisionality are perhaps more characteristic of bubbles generally than the poignant ephemerality of soap bubbles.

Pandemic bubbles slowed but inevitably failed to contain the spread of the virus, which killed millions around the world. Nonetheless, pandemic bubbles were forms of "provocative containment" like those discussed by Schoot and Mather: they brought about changes in the world by changing relations between people and things. Some families shattered as a result of being forced to live too much in their household bubbles. Many people got stuck in countries or provinces far from home and loved ones, and had to forge new relations where they were, or develop new ways of communicating with family

and friends, schoolmates, and workmates, such as via online video meetings and social media, enduring last goodbyes via iPads. One ongoing legacy of the COVID-19 pandemic is that working from home became normalized and seems set to persist as a flexible-hours option for (mainly) white-collar workers.

After Containers

> To a cultural researcher interested in containers, water and water technologies in their diverse natural and natural-technical (or socialized) forms furnish abundant examples, ranging from natural containers and conduits such as rivers, lakes, aquifers, and springs, to a myriad of small and medium scale human techniques and devices for capturing, storing, transporting, channeling, and delivering water (e.g. gourds, waterbags, flasks, urns; wells, pipes, rainwater tanks, irrigation channels; baths, swimming pools, fountains). Different configurations of water technologies imply—and construct—different political and social arrangements. For about a century starting in the 1880s, what I've called Big Water systems (Sofoulis 2005) were established through major financial, technological, and political investments in enlarging natural catchments and creating macro-containers in the form of large-scale dams that epitomize modernity's "technological sublime" and accompanying giant networks of conduits. (Sofoulis 2006)

So opened my presentation at our panel on container technologies at the 2006 Australasian Cultural Studies Association conference, where Ingrid talked about handheld technologies and pocket microworlds (Richardson 2007), Meredith's topic was handbags and makeup containers and social presentation, Dinesh spoke of carceral violence, especially involving animals, and my subject was "black-boxed" water infrastructure. This was a rare moment where I drew the explicit connections between container theory and my water research.[10] For by then I had put aside science fiction, cyberfeminism, and philosophy of technology, and had become involved in a research center on the frontiers of applying cultural research to contemporary problems, mostly in partnership with government, business, and civic organizations.[11] Insights from studies of gender, culture, technology, and especially containers and infrastructures informed (in a mostly subterranean way) more practical and policy-oriented projects, first on driving cultures, then the sociotechnics of water, including studies of everyday household water practices, and interviews with water managers. My postgraduate training in comparative

10 The other two times were in public lectures given at the University of North Texas (Sofoulis 2007) and the University of Manchester (Sofoulis 2017).

11 The Centre for Cultural Research, under the leadership of Professor Ien Ang, which became the Institute for Cultural Research and finally the Institute for Culture and Society at Western Sydney University.

epistemology has resurfaced in work on the "knowledge ecology" of water consumers and service providers (Sofoulis 2015; Fam and Sofoulis 2017).

Throughout this period, which included leaving my permanent academic post in 2008 (and subsequent fellowships and research project work), I found support in a small writing group with friends and fellow Blue Mountains residents Penny Rossiter and Carolyn Williams. Through various conferences and events (some of which I helped organize), there has grown an informal network of (mainly) women in Australia and the UK working on social and cultural dimensions of urban water issues and related topics.[12]

As the theorist Ariana Johnson has observed, in the gap between container theory by Sofia and the reports and articles on water by Sofoulis, "container technologies and supply are no longer theorized explicitly but subsist implicitly"; my theoretical apparatus had been "black-boxed" just like I claimed urban water infrastructures—and containers more generally—had been relegated to the background (Johnson 2021, 114).

While theories of containers and containment did not remain foregrounded in writings aimed at water managers and social scientists, academic citation listings have kept me abreast of how the "Container Technologies" essay has traveled. Following the early expansion of ideas with Ingrid Richardson and Meredith Jones, I have been delighted to discover how others have taken up the framework of the essay and applied it to specific examples—including the MP3 (Sterne 2016; Boudreault-Fournier 2019), playlist (Eriksson 2020), database (Agostinho and Thylstrup 2019), archive (Hogan 2015; Lee 2020), people-smuggling (Galis, Tzokas, and Tympas 2016), and telephony (Richardson 2007; Çelik 2011). Moreover, my understanding of containers and containment has been greatly expanded by those who have constructively built upon absences in the original paper, such as leakage, packaging, and waste.

This brings us to the current collection of thoughtful and thought-provoking chapters arising from the 2021 workshop. I am thankful to all those from whom I keep learning more about containers, containment, and even my own writing, but give extra grateful acknowledgement to Marie-Luise Angerer, the other co-editors, and the "containees" whose chapters are found here. My hope is that beyond affording contributors the authorial pleasure of being folded together in the contents of this book, *Containment: Technologies of Holding, Filtering, Leaking* will also prove a productively leaky conduit that makes connections far and wide with others curious about the ways that

12 Some key contacts here have been Liz Sharp (Sheffield), Sarah Bell (former UCL, now Melbourne), Elizabeth Shove (Lancaster), Alison Browne and Claire Hoolohan (Manchester), Dena Fam and Abby Mellick Lopes (UTS), Yolande Strengers (Monash), and Cecily Maller (RMIT).

technologies, techniques, spatial practices, and facilitating environments of containers and containment can shape our selves and our worlds.

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CONTAINERS

CLOTHING

HOUSING

STORAGE

CAPITALISM

[3]

Container Ontologies

Chris Otter

Gregory Bateson once described ontology as the study of "how things are, what is a person, and what sort of world this is." This essay argues that to understand human being, we have to study our deeply historical and extraordinarily multifaceted relationship with containers. The essay explores four types of containers: bodily containers (clothing); architectural containers (housing); containment of things (storage); and mobile containment of things (vessels). This is far from an exhaustive list. Analysis of such containers shows that they have been essential in the production of selves and societies: of power relations; of race, class, and gender; of states and economies; and ultimately of ecological crisis.

Gregory Bateson once described ontology as the study of "how things are, what is a person, and what sort of world this is" (2000, 313). In this essay, I argue that this world, and the people and things within it, is characterized by containment. Zoë Sofia has suggested that containers perform a remarkable number of rather mundane roles in our lives (2000; Chapter 1). Containers are everywhere: they surround our bodies, they store our belongings, they transport us from place to place. Moreover, containers have a very deep history. As Colin Renfrew notes, *Homo sapiens* has always been, in one way or another, a contained species, even if the history of containment is a history of surprises and strangeness. For Renfrew, "civilization" is a "complex artificial environment," or "insulation" mediating between humans and "the world of nature" (1972, 13).

Bateson's definition of ontology is, admittedly, idiosyncratic. He mentions it in passing, before suggesting that ontological questions are ultimately inseparable from epistemological ones (314). He is something of a rogue ontologist, one of Andrew Pickering's gallery of characters immortalized in *The Cybernetic Brain*. Pickering himself waxes Batesonian, defining ontology as "questions of what the world is like, what sort of entities populate it, how they engage with each other" (2010, 17). Pickering thus refines Bateson's definition by emphasizing cybernetic qualities of open-ended interaction and temporal emergence. He underlines the unpredictable evolution of relationships between humans and the worlds they build, a process that endlessly transforms people and things (17–18). This evolution is far too complex and weird to be predictable. It can be fun or fateful.

I think these formulations capture well the fantastically complex and foundational relationship between ourselves and our containers. *Homo sapiens* is a supreme crafter of wrappings, boxes, and capsules. Immeasurable hours of labor—weaving, bricklaying, roofing, firing, hammering, riveting—have been spent on creating and maintaining containers. These containers are, in turn, world-changing. They open up possible worlds, transforming our bodies, selves, things, and animals. Insideness, we might say, has, over tens of thousands of years, formed the type of "exceedingly complex system" which cyberneticians analyzed (Pickering 2010, 23). Such systems can, Pickering notes, "always surprise us" (23), producing new phenomena and relationships. Containers were never intended to be causally connected to the emergence of sedentism, gender relations, writing, intoxication, or anthropogenic climate change. But as we shall see, their affordances created the conditions for the possibility of all of them.

This paper sketches four elemental container modalities that have historically shaped humans, nonhumans, and their relations: bodily containment (clothing); architectural containment (housing); containment of things (storage); and mobile containment of things (vessels). This is an incomplete

taxonomy, ignoring, for example, the containment of fire or animals.[1] These container ontologies, however, have been foundational to human societies for millennia. If we are to understand how our world came to be the way it is, a good place to start is with clothes, houses, storage, and transportable vessels.

Clothing

"If we are enclosed by anything, we are enclosed by clothing," says Ian Gilligan (2019, 214). Almost all human beings wear clothes; practically no other creatures do. Human being, then, is clothed being. We cannot be sure when our ancestors lost their fur, but this development, combined with the climatic challenges of the last ice age, invited intelligent, tool-wielding hominins to fashion basic coverings to augment their increasingly sheltered, fire-heated being. The relationship between *Homo sapiens* and clothing was unpredictable. One major unforeseen consequence was that the more commonplace clothing became, the less tolerant people became of nakedness and cold (54). Clothing very gradually became practically indispensable.

The earliest body-containers were other species' skins and furs, repurposed to envelop hominin bodies. Two critical shifts followed. The first was the invention of textiles, which wrap bodies but allow the skin to breathe (58). The oldest known woven materials date to 28,000 years ago (127). The second innovation was the transition from simple clothing, which is draped over or around the body, to complex clothing, which is tailored and layered, specifically designed to envelop the human body. With complex clothing, "the body becomes … enclosed from the external environment and concealed," forming "a special kind of clothing that becomes a permanent part of us" (27). Trapped pockets of air between skin and fabric created a warm microclimate around the body, which in turn created a niche for the emergence of the human body louse, which deposits its eggs in human clothing (Kittler, Kayser, and Stoneking 2003, 1414).

This enduring insulation technique had enormous consequences for human mobility. When *Homo sapiens* developed the capacity to make complex clothing, they could enter the earth's colder regions during the last ice age, around 45,000 years ago (Gilligan 2019, 86). A hairless, clothed species colonized the globe. Clothing, however, also tethered humans to place. The demand for flax, fleeces, and silk was, suggests Gilligan, an overlooked cause of humanity's uneven shift towards agriculture (149, 152). Textiles and sedentism became, slowly and unevenly, mutually reinforcing.

The manufacture of clothing necessitated relentless production of thread and fabric. Eyed needles, scrapers, and spindles became vital tools (Barber 1994,

1 On animal confinement see Wadiwel's contribution to this volume, Chapter 8 – Eds.

36–37). The loom dates from around the fifth millennium BCE (83–84). Human settlements produced threads and textiles, and created a gendered division of labor. Women became primary container-makers. By the ancient period, women were spending vast amounts of time on textile-related activities (31). Moreover, the clothes they produced not only contained men and women, but also identified and gendered them. Elizabeth Barber suggests that clothing became "the human race's next language after speech," providing a continuous stream of information about its wearer (283). Social relations were now formed between clothed individuals. Container-creation was a critical technology of gender- and status-production: it wrapped, signified, and distinguished.

Clothing was the basic material technique through which naked being became social being, a process reinforced by laws and norms. In late medieval and early modern Europe, for example, sumptuary laws perpetuated social distinctions. Clothing was regulated, to mark nobility and stigmatize prostitutes and religious minorities. Being and clothing were legally bound together. In Spain, Jews and Muslims had to wear special clothing to distinguish them from Christians until 1492 (Rublack and Riello 2019, 29). Such distinctions have been maintained by wealth and cultural norms. Kathleen Brown notes that in colonial America, "the gentleman's kit of a white linen shirt, breeches, stockings and shoes, a coat, waistcoat, and cravat became basic elements of male costume in the West and spread rapidly in colonized regions" (2009, 106).

The emergence of clothing, then, catalyzed a series of unforeseeable and emergent transformations, to *Homo sapiens* as a species but also to the relationships people had to their world and to each other. Clothing created an enclosed microclimate which invited global mobility. It forged new relations between our species and those plants and livestock from which textiles were made. This manufacture was incredibly laborious and largely performed by women. By differentiating between different humans, it helped to gender, racialize, and class them. The invention of clothing, then, opened up new worlds for *Homo sapiens*.

Housing

Although many animals produce habitable structures, some of which are extraordinary, humans create the most varied forms of building on our planet (Moore 2012, 1). Clive Gamble describes the house as "the ultimate container of people, livestock, tools and memories" (2007, 98). These "ultimate containers," in turn, have shaped our history and evolution in manifold ways. Studies suggest that the idea of a home base and the feeling for home might have evolved up to two million years ago (MYA) (Allen 2015, 97–98). Caves provided the most obvious opportunities for early hominin self-containment.

Recent analysis reveals that stone tools were being made inside Wonderwerk cave, South Africa, around 1.8 MYA (Cascone 2021, 2). Jerry Moore suggests that between 1.4 and 0.7 MYA, our ancestors created temporary encampments to which they repeatedly returned, to make stone tools and cook with fire (2012, 30). These were "the origins of that fundamental human project, the creation of home" (31).

By 400,000 years ago, *Homo erectus* was making quite large seasonal dwellings. At Terra Amata (France), a home base dating to 350,000–400,000 years ago shows evidence of basic structures, fires, and tool-making practices (27–28). Such containers anchored hominins to particular places and oriented them within landscapes. These sites—caves, shelters—have been called "persistent places," spaces where hominins assembled, episodically, over long periods of time. Persistent places were gathering-points for hominins, food, fire, and tools. They created contained atmospheres of warmth, comfort, and sociability, forming physical and psychological boundaries between inner and outer worlds (Maher 2019). Through this process, we effectively *domesticated ourselves*: "it now seems that the first domesticates were not sheep and wheat, maize and turkeys but the hominins themselves, and that containers were central to the process" (Gamble 2007, 201).

Over a very long period of time, walls and doors created more complex patterns of containment. Multi-roomed houses were evident from at least the early Neolithic (266). Basic acts—sleeping, food preparation, storage—could become spatially disaggregated. Partitioned spatiality also created the material affordances for specific affective climates—sociability, intimacy, privacy, self-reflection. Containment shaped rhythms and patterns of connection and isolation. Western individualism is inseparable from the creation of inner spaces and their capacity to provide solitude. In his *Discourse on Method*, Descartes, the iconic Western individual, recalled a time when he was stuck inside, alone, during a German winter:

> Finding no conversation to divert me and fortunately having no cares or passions to trouble me, I stayed all day shut up in a stove-heated room, where I was completely free to converse with myself about my own thoughts. (2006, 12)

The Cartesian cogito was not a mind in a vat, but a mind nurtured within cozy, heated capsules that invited introspection. Within the bedroom, beds and covers provide further envelopes, into which we can escape, rest, dream: "the skin-self is expanded into the bed-self—surrounded by a room-self in a house-self" (Sloterdijk 2016, 505).

Housing is more than a climatic insulator. It functions as a "second body," a further expression of the (clothed) self:

> The house is a body *for* the body. Houses are bodies because they are containers which, like the body, have entrances and exits. Houses are cavities filled with living contents. Houses are bodies because they have strong bones and armoured shells, because they have gaudy mesmerizing skins which beguile and terrify; and because they have organs of sense and expression—eyes which peer out through windows and spyholes, voices which reverberate through the night. To enter a house is to enter a mind, a sensibility. (Gell 1998, 252)

The house projects meaning and power. The English mansion, Raymond Williams argued, allowed "a visible stamping of power, of displayed wealth and command: a social disproportion which was meant to impress and overawe" (1973, 106). Like white linens and cravats, western climate-controlled capsules symbolized colonization and projected western sensibility. In 1947, The British politician Frank Markham suggested that the fossil-fuel powered "'sealed' house," with its fireplace, windows, and chimneys, had allowed Britain "to lead the way in this new indoor civilization" (1947, 85). Energy-intensive, climate-controlled white settler atmospheres became globally normative.

Leakier containers, however, signified social inferiority. In his *Treatise on Civil Architecture* (1759), William Chambers argued that:

> in countries where Men live in woods, in caves or miserable huts, exposed to the inclemency of seasons, and under continual apprehensions of heat, cold, tempests, rains, or snow, they are indolent, stupid, and abject; their faculties are benumbed, and all their views limited to the supplying of their immediate wants. (1759, i)

Populations inhabiting "commodious dwellings" with comfortable inner climates, meanwhile, were "active, inventive and enterprising" (i). Undifferentiated domestic space, by contrast, jumbled various activities—sleeping, eating, working—together, meaning that "human nature is degraded into something below the level of the swine" (James Fraser, cited in Besant 1884, 21). Worse still is homelessness, a condition of forced decontainment,[2] a visceral absence of privacy and all affective connections to home, an "archetypal stigma" of contemporary life (Allen 2015). Permanent exclusion from our archipelago of climate cocoons is multiply, cripplingly disabling.

By the later twentieth century, western domestic climates were sustained by complex techniques of heating, ventilation, and air conditioning. Traditional ways of managing daily climatic variability of climate, like siestas, have declined as American indoor climate standards have, unevenly, globalized (Shove 2003, 21). Taken *en masse*, these cocoons form a massive atmospheric

2 Homeless may also mean reliance on flimsy, transient, and fugitive forms of containment, such as tents, cardboard boxes, and the plastic shopping bags of "bag ladies" mentioned by Meredith Jones in Chapter 4 — Eds.

system through which millions of people circulate on a daily basis. Following our ontological model, the consequences have been unpredictable and fateful. The insulated inside is becoming an air-conditioned fortress, a shield from an increasingly forbidding climate. As Lieven De Cauter notes, "the more warming, the more air conditioning—but also the more air conditioning, the more warming" (2004, 189). Air conditioning and sanitation have produced new "chemo-microbial ecologies" within which novel human health conditions (allergies, inflammation) have appeared (Wakefield-Rann 2021).

Storage

Human economies require the capacity to stockpile raw materials. Regulating such storage, and controlling release and distribution, was among the basic objects of the earliest states (Paulette 2016, 85). Early cities were giant container agglomerations, some for people, some for food. Granaries became containers dedicated to food storage; treasuries containers for storing money or wealth (Gamble 2013, 197, 199). In many places, food storage appears before plant domestication: again, containment invited settlement, binding *Homo sapiens* tightly to organic and inorganic resources, not least grain and metals (Kuijt 2011, 138).

Storage creates inescapable vulnerabilities. Grain was susceptible to damp, rats, and theft. Hence the importance of early climate control and sealing technologies. Clay sealing locks limited access to particular rooms, pots, or baskets and allowed their flow to be controlled and calibrated (Rothman and Fiandra 2016, 39–40). Occluded piles of goods invited innovative recording methods, particularly for the measurement of grain. The origins of writing have been convincingly identified with inscriptions on clay containers denoting the number and type of sealed tokens enfolded within: these tokens referred to goods mobilized and stored (Schmandt-Besserat 1996). The written sign arguably began its existence as a container.

The containment of materials had significant consequences for time and power: "by controlling time, storage becomes power" (Gamble 2013, 197). The Inca state had an elaborate network of storage technologies, some being clusters of thousands of structures, the largest of which are at Cheqoq, Wayna Qollqa, and Machu Qollqa (Covey, Quave, and Covey 2016, 173, 179). Storage created the conditions of possibility of surplus, and surplus generated wealth and food for non-producers. As John Robb argues, "the shift over human history from scheduling to storage goes hand in hand with a historical increase in inequality" (2020, 136). Stored materials are "political capital," and since they can be transmitted intergenerationally, they allow material inequalities to persist, widen, and become structural (Robb 2020, 136).

The products of food storage required another set of containers to turn them into edible food. Preparing and consuming food required what Kit Nelson calls the "vessel version of the lithic tool kit" (2010, 238). Early cooking containers included conveniently-shaped organic objects like animals' hides and paunches, and deliberately-crafted wooden, stone, or ceramic artifacts (243–44). For eating and drinking, massive container industries developed. The famous Mesopotamian flat-bottomed, bevel-rimmed bowl was, argues Monica Smith, "the ancient equivalent of a polystyrene cup, manufactured by the millions, made to be used maybe once or twice and then discarded en masse" (2020, 152). At Chogha Mish in Iran, archaeologists recovered 250,000 of them (154).

Today, warehouses are perhaps our most ubiquitous storing structure. In the eighteenth and nineteenth centuries, warehouse complexes were constructed in global capitalism's central nodes: London, Liverpool, Chicago. Bonded warehouses, in particular, acted as attractors for global commodities. Dara Orenstein brilliantly traces the way in which the twentieth-century American warehouse system expanded and metamorphosed into a network of foreign-trade zones. Like warehouses, such zones were spatio-temporal containers of commodities and, by extension, of capitalism itself. They control and channel the rhythm and tempo of commodity flow, protected by fences, locked gates, and security guards. They allow time to be distended and decelerated: "dwell time is a period of shifting gears, the interval of disconnection in a connection" (Orenstein 2019, 249). Capitalism extends everywhere only by virtue of its planetary storage networks.

Warehouses and zones massage the movement of goods, which ultimately flow to consumers. The accretion of such goods creates its own emergent, unforeseeable pathologies, not least a domestic "storage crisis" (Arnold and Lang 2007, 33). Here material goods accumulate in sclerotic household spaces, generating novel psychological conditions. Today, 2–6% of British and American adults have hoarding disorder. In one US study, only 25% of households studied used their garages for cars (Moore 2012, 56). Self-storage facilities are now built to accommodate the tsunami of material accumulating in homes. Pathologies of storage take numerous other forms, some dangerous, some ghostly (toxic dumps, nuclear containment, technology graveyards).

Moving Things: From Amphorae to Containers

"No animal uses a container to carry food or water, though a captive chimp has been reported to use a coconut shell to carry water," observed Lewis Wolpert. "Pots and bags are totally human" (2003, 1717). Our closest biological relatives struggle to carry much around (Isaac 1989, 52). We have developed

the ability to send our containers across vast distances, often inside other containers (ships, planes). *Homo sapiens* has thus overseen what Bronislaw Szerszynski calls "the transformation of non-motile local geological, ecological or economic resources into materials capable of advection in global currents of flow" (2016b, 619). Mobile containers have allowed us to tear material out of its local context and transform it into gigantic horizontal streams, of grain, timber, minerals, and livestock (Clark and Szerszynski 2021, 138; see also Raven, Chapter 5 of this volume).

In the Eastern Mediterranean, the amphora became the prime technique of organizing this flow after 2000 BC. Amphorae were two-handled containers which held up to 7–8 gallons of liquid, with pointed bases which facilitated stacking and embedding in sand, and lips for pouring (Broodbank 2013, 379–80; Will 1977, 265). They allowed a precise volume of materials to be measured and standardized (Horden and Purcell 2000, 217). One estimate suggests that in the mid-second millennium BC, two million amphorae were imported over the course of 250 years into the Egyptian city of Avaris, meaning that up to 160 gallons of liquid arrived daily (Broodbank 2013, 385). When sealed with pitch, amphorae were airtight, meaning that wine was ageable and could be stored for years (Horden and Purcell 2000, 217). Intoxication became easier. "Wine," argue Horden and Purcell, "came to have a structurally distinctive role in the commoditization of surplus. It became a convenient medium for calibrating every kind of obligation in the relations of production, storage and redistribution" (218). Amphorae were also repurposed in imaginative ways, as domestic receptacles, "miniature coffins," pipes and drains, or shattered and reused for constructing walls or making concrete (Will 1977, 266).

By the medieval period, material flow across the West was organized around a different container: the barrel (Fig. 1). Barrels were strong (by virtue of their double arch) and easily rollable (Twede 2005, 255). They were rat-resistant, leakproof, and stronger than ceramic vessels (Work 2014, 14–15). The barrel became Europe's most ubiquitous container. They were not airtight, hence the shift in taste towards young wines (Horden and Purcell 2000, 217). They were used for storing and moving water, apples, gunpowder, nails, salted meat, oil, coins, cornmeal, vinegar, whisky, pickles, sugar, syrup, cement, and grains. Most such barrels acquired their own shapes and names (Work 2014, 12–13). Again, they enabled standardized measurements: we still measure oil in barrels (Twede 2005, 257; Work 2014, 15).

In the nineteenth century, however, new transportation technologies created chokepoints. Barrels did not easily stack on railway trucks, and by the early twentieth century, rectangular prismatic or cubic container designs, often made of light metal, were replacing them. The barrel went into decline, although its flavor nuances (vanilla, coconut, tannins) remain vital for whiskey and wine production (Work 2014, 126). What we now call *the* container

[Figure 1] The barrel, Europe's most ubiquitous container from the medieval period (source: Wikimedia Commons, photograph by Brian Stansberry).

developed: standardized, mobile, impenetrable, stackable. As one warehouse management manual declared, "liquids, semi-liquids, awkwardly shaped, flimsy, viscous, malleable items are now 'containable' within a regular shape of standard dimensions. They are thus turned into a *box*" (Warman 1971, 79). Today's containers are computer-controlled and their temperature, humidity, gas levels, and ventilation can all be meticulously adjusted (Rees 2013, 88). Their affordances have had immense consequences for the physical geography of ports, docks, and international trade, and they have greatly accelerated the advective flows of matter—particularly consumer goods—around the world.

Conclusion: Ontological Trajectories

Without bags, granaries, clothes, barrels, and houses, everyday life as we understand it would not exist. Our world, or worlds, is partly composed of containers. By wearing clothes, living in houses, and storing and moving things around in containers, *Homo sapiens* catalyzed fabulously complex processes which defy easy summary. By opening up new worlds, containers have taken us in many strange and unpredictable directions. To conclude, I will highlight four foundational ways—or ontological trajectories—in and through which containers have shaped things, people, and their relations. These center on *time*, *motion*, *access*, and *uncontainment*.

1. Time. Containers create climates, and these climates in turn shape the rate at which things change. Some containers, like granaries and cold stores, control temperature, light, and atmospheric composition so as to retard decay. These special atmospheres were integral to the development of the storage systems at the heart of early states. Later, warehouses allowed material to languish without losing value. The choreography of economies demands systems of climate-controlled containers.

Other containers, however, function as crucibles or accelerators, where atmospheric conditions are manipulated to create radical change. The "chambering of fire" in kilns allowed humans to melt, burn, meld, and crystallize materials (Clark and Szerszynski 2021, 69). Contained fire created the capacity to cook, effectively outsourcing digestion and reducing the amount of work the body needs to do to process food (Wrangham 2009). Big brains and metals are consequences of containerization.

Containers, then, create multiple temporalities. By manipulating container climates, *Homo sapiens* could accelerate and retard time. Differential, encapsulated temporalities were engineered into human settlements: fire and granary, stove and refrigerator. Our economies, bodies, food, and materials are products of the variegated timescales framed by containers. Finally, humans have used containers to form sites of commemoration (graves, tombs, mausoleums) where memory is enfolded and perpetuated, potentially indefinitely: "the grave is one of the most basic of all human meaning-storage devices" (Peters 2015, 145).

2. *Motion*. *Homo sapiens* has become a species characterized by extreme sedentism and hypermobility. This is not a paradox, and it is easily explained by exploring the history of containers. Wearing clothes, living in houses, building cities, and storing material has bound *Homo sapiens* to the earth, giving rise to settlements from persistent places to urban agglomerations, and a vast, multiscalar technosphere (Otter 2020). Persistent places and camps were only occupied for certain portions of the year: for the remainder, groups would disassemble and mobilize (Graeber and Wengrow 2021, 112). By contrast, the permanent self-containment of *Homo sapiens* in durable cities, suggest Graeber and Wengrow, has arguably led to a reduction in the amount of time the average human travels (123).

However, this brilliantly counter-intuitive argument is only part of the story. Containment has also enabled radical forms of human mobility, not least planetary colonization by clothed *Homo sapiens*, and later waves of invasion and colonialization. Vehicular motion, harnessing organic and later mineral sources, marked a new phase in the capacity of living beings to traverse planetary space irrespective of climate or topography (Szerszynski 2016a, 59–60). Vehicular containers—or container-machines—have made us the earth's

most mobile species during the precise period that we have become mainly sedentary. Equally significant is our capacity to send immense quantities of nonhuman material (wood, oil, grain, cattle) over vast distances. Anthropogenic mass transport systems generate sufficient advective flow to rival or even surpass that of non-anthropocentric geological processes (Haff 2010).

3. *Access*. When things and people are placed within containers, immediate contact with them is limited. Containers are usually not straightforwardly open to the world: they are often highly disconnected from their local environment. Access to containers is episodic and controlled. Physical proximity, in other words, never implies accessibility. The history of containment, then, is also a history of doors, gates, lids, seals, and locks. Access to resources is mediated by containers and technologies of sealing. It is thus via containers that the possibility of both surplus and inequality of access to resources is generated.

Social stratification has a partial origin in containment. This has two dimensions. First, by delimiting access to resources, consumption can be regulated and differentiated. It is little wonder that granaries have historically been among the first targets of revolutionaries and angry crowds. Second, the capacity to traverse the capsular archipelago is delimited by individual access to keys, passes, documents, and money, or, more broadly, class, race, gender, and physical appearance. Containers, in other words, perform a "careful filtering of local connectivity," allowing "kinetic elites" to glide through the capsular archipelago while making mobility far stickier for others (Marvin and Graham 2001, 364).

Such elites have always delimited access to themselves, by utilizing a broad paraphernalia of security technologies. Gated communities are the most obvious manifestation of this trend: they appear as palpable containers of withdrawal. Elites also use containers to seclude and immobilize. The most obvious example here is the prison. Michel Foucault was, among other things, a great philosopher of the historical politics of physical containment. A prison is a container of bodies to be individualized, disciplined, normalized (Foucault 1995).

Containment, then, shapes patterns of mobility and immobility. Without containers, our world would be in many ways less delimited and more equal. The capacity to roam would be far less trammeled and contained. It would lack the microphysics of buildings and institutions. Containers mediate the ontology of freedom.

4. *Uncontainment*. Perhaps the most unpredictable and consequential side-effect of mass containment is the emergent capacity of humans (particularly white, western ones) to change our planet's climate. The basic reason for this is the inevitable failure of containers to fully retain their waste. Hence

uncontainment becomes the final and most problematic aspect of our contained world. Greenhouse gases cannot be contained within cars and airplanes; pollutants spill from factories; plastics accumulate in oceans; waste piles up in landfills; heat radiates from air-conditioned buildings. New planetary containers of heat-trapping gases and trash are formed from the waste of containerized society.

Rethinking containment thus becomes essential to reimagining our future as a species. Promethean ecomodernists are already proposing a wave of new containers to counter ecological crisis: bunkers, carbon capture technologies, space colonies, anthropogenic dust veils, or even moving our capsular civilization to other planets. Such technologies are testimony to the enduring imaginary power of containers.

They also, arguably, reek of desperation. They are gargantuan sealing schemes which aim to finally defy all leakage, contain all emissions, or capture an entire climate. But leakage is inevitable. Total containment remains a fantasy. Moreover, such technological fixes would do nothing about human inequality or resource extraction. Surely we can do better than this. Containment as a technology of hypercontrol is failing (Pickering 2010, 31–32). A brief sketch of the history of container ontologies suggests that unpredictability is the norm and we should expect societies to fail in any quest for total containment. To return to Bateson and Pickering, we might use such a history to sketch other futures, less contained and more playful than the apocalyptic and hubristic visions that dominate contemporary discourse.

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HANDBAG

CONTAINER THEORY

PUBLIC SPHERE

PRIVATE SPHERE

MICROWORLD

[4]

Holding and Being Held: Handbags as Container Technologies

Meredith Jones

This paper explores the handbag as a material and symbolic container technology. Deploying Zoë Sofia's "Container Technologies" theory and the phenomenological work of Iris Marion Young, it analyzes the handbag in terms of both *what* and *how* it contains. The mobilities that the handbag facilitates are considered alongside how carrying such an object impedes bodily mobility. The handbag's particularities as a container make it a portable domestic lifeworld—here called a microworld—and a way to take the indoors outdoors, a way to mediate private and public spheres. I consider ways that handbags are connected to feminine ways of being in space, in terms of both enabling and disabling, and their roles in pedagogies of femininity.

Introduction

From famous Hollywood handbag owners like Grace Kelly or the Kardashians to the homeless "bag lady," who has no name and no place, bags have power. We know from Zoë Sofia (2000; Chapter 1) and Ursula Le Guin (1986) that containers and bags have performed fundamental roles in human cultural development, and that these often-unobtrusive technologies are overlooked, glossed over, seen as passive and, like many things "feminine," discounted. I suggest in this paper that handbags have a particular kind of power that lies in their holding capacities—capacities that are both literal and symbolic. I explain how handbags facilitate mobility, acting as mobile and material links between private and public: powerfully connecting domestic and civil worlds, often working as a vital facilitator between the two. Further, I investigate links—material, symbolic, representational—between handbags and the construction, movement, performance, and indeed containment of feminine bodies in space. I argue that handbags operate—symbolically and functionally—at the nexus of complex relations between self and environment.

What Is a Handbag?

Handbags hold and are held. A handbag is designed to be held in one hand (although it may be able to sit in the crook of the arm or slung over a shoulder). It is not a backpack, a crossbody bag, or even a shoulder bag. In terms of design, handbags are often able to stand alone and upright (indeed some have studs called "feet" on their base). Unlike most other sartorial accessories, they do not need a body to encase or be draped upon in order to make sense—they are three-dimensional structural objects. My focus on the handbag to the exclusion of other bags is because the handbag is almost always gendered: "a handbag is a small bag which a woman uses to carry things such as her money and keys in when she goes out" (Collins English Dictionary 2023) or "a small bag used by a woman to carry everyday personal items" (Oxford English Dictionary, "Handbag"). There are more extreme sexist definitions of handbag, as in the example given for the verb *to handbag:* "A lady in the audience—apparently a friend of the composer—handbagged a man who clapped before the end of the playing of Pierre Boulez' Piece for Two Pianos" (Oxford English Dictionary, "Handbag, verb"). In other words, it is a term used to belittle a woman who uses language to exert power. Ursula Le Guin takes proud ownership of this notion in her essay about carrier bags and the origins of human civilization and narrative, declaring "I am an aging, angry woman laying mightily about me with my handbag, fighting hoodlums off" (1986, 168). Le Guin was probably referring to the famous picture taken just a

year earlier, by photojournalist Hans Runesson, of Danuta Danielsson, a Jewish woman, swinging her handbag at a neo-Nazi marching in Sweden (Merrill 2020, 112).

Handbag History

Handbags have not always been associated with women. Indeed, one of the earliest depictions of what appears to be a handbag is of a god in an Assyrian relief carving from Nimrud, ca. 883–59 BCE. This handbag may have represented the cosmos, it may have held important spiritual items—historians do not know—but for my purposes it situates the hand-held bag as one of the oldest we know, and one whose cultural and material meanings have shifted dramatically.[1] Nevertheless, contemporary handbags and ancient ones do share one continual message—they are about privacy, intimacy, and importance. There is a taboo about the inside of someone else's bag—you shouldn't go rummaging about in there if it's not yours. Farid Chenoune, a curator of handbags at the Museum of Decorative Arts in Paris, suggests that the handbag holds "a secret, something forbidden" and is "an inviolable sanctuary, into which no foreign hand has the right to penetrate" (2005, 21). Whether it is the power of an ancient Egyptian god, or the power of a woman carrying things that are most likely significant to her, handbags are able to hold it.

The history of the contemporary handbag is strongly associated with the nexus of capitalism, shopping, consumerism, and demonstration of respectable, public-facing femininity. As department stores and arcades developed in the nineteenth and twentieth centuries, and more street commerce moved indoors (Kowaleski-Wallace 1997, 80), shopping became leisurely (sometimes luxurious), and associated with sociality and engagement. Griselda Pollock reminds us that before this, "going out in public and the idea of disgrace were closely allied [for women]" (1988, 69). Arcades and department stores allowed women to leave the domestic sphere without risking exposure to the dangers of the street, while also restricting, containing, and directing movement through their enclosed architectures. As white middle- and upper-class women began to venture out into the social world without guardians or servants, little bags became essential—mainly for carrying cash. Thus, in parallel with urban architectural developments, the handbag came to

1 Archaeologists and museum curators seem to agree that the "handbag" held by the eagle-headed Assyrian deity was actually a bucket of water into which was dipped the tree cone (likely the spathe of the male date palm) held in the other hand, to artificially fertilize female date palm trees, and/or to sprinkle water in a purifying ritual. We like Jones's (mis)reading for the rhetorical work it does, and for its resonance with Le Guin: whether bucket, handbag, or cosmos, a "carrier bag" of some sort is evoked — Eds.

represent a specific kind of freedom that signified independence whilst also constraining women's movements.

In the second half of the twentieth century the taxonomy of the handbag became more complicated, developing its own nomenclature, a subset of vocabulary for the fashion-literate. The clutch, the tote, the bowling bag, the baguette, the doctor's bag, the pouch, and the slouch are styles of handbag, while the Hermès Birkin, the Chanel 2.55, the LV Speedy, the Balenciaga Motorcycle, the Givenchy Antigona, and the Lady Dior are recognizable high-end branded designs. Each has its own history, narrative, desirability, cruelties—most handbags are leather, some of the most expensive are made from rare and endangered species (Christies 2019)—associated celebrities, black-market knock-offs, etc. Stephanie Pedersen writes that "modern handbags are as much about function as they are about self-expression and even status" (2006, 7) and many luxury fashion houses sell more handbags than clothes (Kasuma et al. 2015).

Handbag Pedagogy

Two major exhibitions[2] have shown that the handbag's material form hasn't changed much in a century, although some of its contents have (for example phones, lifeworlds in themselves, are ubiquitous while lipsticks remain largely the same). Handbag historians note a transitional moment in the 1940s when smaller, more refined, bags like the clutch gave way to larger, sturdier ones—a change that reflected women's more active "Rosie the Riveter"-inspired lives during World War II. In 1945, an article in *The New York Times* advised that:

> A woman without her handbag feels as lost as a wanderer in the desert. And she wants it large. If she cannot get it in leather—now growing scarce—she will take it in fabric, fur, or even plastic. The handbag is the movable base of her supplies—the depot of her expected needs. (Daniel 1945)

This is sophisticated propaganda: ideal US wartime womanhood described using militaristic language via the handbag. The discourse is also pedagogic, informing women that their patriotic citizenship relies on having a large and mobile "depot," without which they could be lost in the desert, like a soldier gone missing in action or AWOL. Here the handbag is deployed as metaphor for politics, for contemporary lives and deaths, and for America at war. It is characterized as a technology of supply and support, as a *tool* as well as a social statement. This is one example of how handbags have holding

2 *Le cas du sac: histoires d'une utopie portative* at the Musée de la Mode et du Textile par l' Union centrale des Arts Décoratifs in Paris, October 6, 2004–February 20, 2005; and *Bags: Inside Out* at the V&A in London, October 13, 2021–January 16, 2022.

capacities that are both literal and symbolic, reflecting contemporary lives and politics, and how they are communicated and taught in public discourse.

Handbag pedagogies have continued. For example, in ca. 2020–22 instructions about how your handbag could help you stay safe during the pandemic became common in print media and online. Lavie Exclusive, a clothing brand, posted on Facebook a picture of a capacious handbag with its logo and a list of crucial in-handbag items to help navigate the "new normal," including a travel-size handwash, a spare face mask, a travel cutlery set, a small hand sanitizer, a water bottle, and a packet of wet wipes (Lavie Exclusive 2021). Once again, in a time of international emergency, a larger handbag became a practical and social necessity and a sign of responsible citizenship.

In an article which professes to explain "what your bag says about you," readers are advised on the best ways to hold their bags, for example, "the bag should never be gripped too tightly or squeezed against the body as this can send a signal of nerves or insecurity" and "if the bag is held to the side [it can be displayed] without it obstructing the rest of the outfit" (Vince 2017).

Of the many websites set up to help trans people "pass" (if they want to), there is a particular genre aimed at femme trans women. These sites share information on makeup, hair, fashion, voice, walking style, etc., and are demonstrably pedagogic. They bring to the surface the lessons in femininity that most cis women learn as they grow up, almost unconsciously, via (often unspoken) social regulation. One of the things the sites focus on is the proper purchase, carrying, and filling of handbags. The blog *Femme Secrets* lists "15 Items You Should Always Keep In Your Purse" (note that in the US "purse" and "pocketbook" can mean "handbag") and informs the reader that:

> one of the perks of being a girl is getting to carry a purse. More than just a stylish accessory, your purse is a toolbox for your femme self. And while a cluttered bag isn't chic, there are some essentials you shouldn't be without. You never know what life will throw at you – and a lady is always prepared! (Sorella, n.d.)

The article then lists phone, lipstick, mints, nail file, $20 cash, hand cream, blotting paper or powder, bobby pins, mirror, stain removal pen, Band-Aids, safety pins, card with emergency info, painkillers, and a healthy snack.[3] Claudia Liebelt has written:

> Trans women [show] that femininity is not simply socially constructed but tied to particular material becomings, consumption choices, and somatic technologies that may facilitate a (visual, social) recognition as feminine. (Liebelt 2022, 2)

3 The comments section has readers adding a gun and pepper spray to the list as well as tampons and pads "in case I am asked in a restroom," a torch, and condoms.

Lucille Sorella recognizes this and expresses it in the blog, noting that a handbag (purse) is a "toolbox" as well as an "accessory" that enhances performing femininity literally and metaphorically. These examples show how handbags are vessels of containment and supply as well as conduits by which mainstream femininity can be expressed, which is why, as journalist Barbara Hagerty notes, they are perhaps "the most quintessentially feminine of belongings" (2002, 11). Indeed, handbags are so important that they could be said to hold and/or to be metaphoric worlds.

Handbag as Microworld

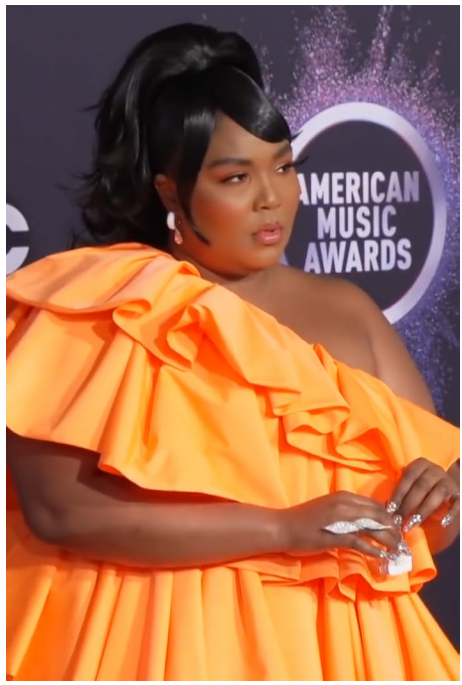
A small universe, a mini version of the world. The handbag is the modern woman's own

> private but portable boudoir, office, bank and emergency kit, without which she would undoubtedly feel lost. Even the smallest handbag will defy the laws of physics to hold mobile phone [the mobile phone itself being a microworld, see Richardson 2007], Filofax, Psion organizer, lipstick, mirror and hairbrush, not to mention money, credit cards, keys and the odd mint. The handbag is the lady-in-waiting to the woman who gets by without a chauffeur to drive her and a butler awaiting her arrival at home. (Allen 1999, 6)

Setting aside Carmel Allen's sexist tone, her observations (which echo many others in popular culture) bring to mind Doctor Who's Tardis. The Tardis is a time machine but has important spatial qualities. From the outside it is a static, solid object (an old-fashioned English police call box that represents the law and safety) but its interior spaces appear vast and it has transportive powers. Equally, it reminds us of Mary Poppins's carpet bag—seemingly empty—from which this itinerant governess/nanny (a precarious feminine profession) magically pulls a hatstand, a wall mirror, a rubber plant, and a tasseled standing lamp, serving to astonish and awe the difficult children she is to nanny as well as to temporarily cement her in a new place that is not her own home. Thus, the handbag is capable of holding far more than one would assume: it is also transportive, and facilitates a certain freedom in relation to social movement.

At the 2019 American Music Awards, Lizzo, playing with the trend for micro bags, made it outrageously clear that her tiny white Valentino bag (Fig. 1, no more than 2 cm x 1.5 cm x 1 cm, and described as "nano" or "granular") held nothing but a good time: "There's a lot [in it], I got tampons in here, a flask of tequila, some condoms" (quoted in Newbold 2019).

Hagerty writes that handbags:



[Figure 1] Lizzo at the 2019 American Music Awards, November 24, 2019 (source: YouTube: The Best Outfits at the 2019 American Music Awards, *Cosmopolitan UK*, https://www.youtube.com/watch?v=Z6S9PA7EpV8).

> echo female anatomy in their essentially female shape. They suggest womb, heart, breast, and psyche. They are worn or carried in the body's most intimate zone. They are a small extension of the self that goes forth into the world while maintaining an utterly private dimension. (2002, 10)

Germaine Greer is far more critical:

> Why do women always carry bags, and why are those bags so often heavy? Why is it that most women will not go out of the house without bags loaded with objects of no immediate use? Is the tote bag an exterior uterus, the outward sign of the unmentionable burden? (Quoted in Lloyd 1999)

Certainly, it is no stretch to see the handbag as a sort of external womb. This recalls Le Guin's wish to reframe the technology/science narrative from "weapon of domination" to "cultural carrier bag," indeed to a "womb of things" (1986, 170), not to mention Sofia's observations that the womb is the "primal container technology … a space where, all going smoothly [the fetus's] needs are unobtrusively supplied" (Chapter 1, 22). In fact, Sofia urges us to reconsider important objects from a wombic point of view:

> The skyscraper, so obviously phallic but from the inside a "womb with a view"; the car, advertised in terms that emphasize on the one hand its phallic/excremental "grunt," and on the other its womby comfort and storage space. (24)

Handbags are held and they *hold*. Holding is neither passive nor simple; Sofia explains how holding is active. She recalls Heidegger's jug, which has two activities/capacities: to take in fluid, and then to keep that fluid. These capacities generally aim at facilitating a third—which is what Heidegger calls "the outpouring"—in Sofia's words, "whereby the container's contents gush out" (30). The jug gives back that which it has taken in and held, and its purpose is fully realized when its contents pour, drizzle, or drip out. In the same way, the handbag takes objects in and keeps them safe, but only temporarily, for its purpose is also to give them back. Unlike the jug, a handbag's contents tend not to pour out, except for those embarrassing moments when we need to upend them to locate the urgently-ringing phone or find a tampon. Rather, handbags offer us a flow of timely "gifts" throughout our journeys. Really these are presents to ourselves, via the bag, and might be in the form of music, reading material, nibbles, drinks, money, lotions, pens and papers, business cards, etc. In this way then, the handbag is a technology of containment that, in Foucauldian terms, practically assists in the care of the self and is "a matter of the formation of the self through techniques of living" (Foucault 1997, 89).

As a metaphor for the womb then, the handbag is about safe passage, transformation, and holding. The person who carries the handbag is mothering themselves, anticipating and supplying their own needs, caring for themselves. Might we extend this metaphor, and theorize the handbag not just as an external womb, but also as a vagina, vulva, and clitoris? Then, is the constant *attention* we must pay it (for it can't be forgotten or ignored like a backpack), the *clutching* of it and *fiddling* around inside it, a form of self-pleasure? Freud noticed something of the sort:

> Dora's reticule, which came apart at the top in the usual way, was nothing but a representation of the genitals, and her playing with it, her opening it and putting her finger in it, was an entirely unembarrassed yet unmistakable pantomimic announcement of what she would like to do with them—namely, to masturbate. (1963, 95)

While for him Dora's seemingly obsessive actions are part of her hysteric pathology, Dora responds to his questioning by simply saying "*why should I not wear a reticule like this, as it is now the fashion to do?"* (quoted in Freud 1963, 95). And indeed, why should we not all wear such things, if we so desire?

Carrying Handbags

The brilliant blogger Twisty Faster, on *I Blame the Patriarchy* writes: "Do you see the insanity? Do you grasp the fiendish plot? You have to dedicate a whole limb to this bag. Who wakes up in the morning, flings open the shutters, and cries out, 'Today I only need one arm!'" (2005).

The most problematic aspect of the handbag is that it *constrains*. I have shown how it is pedagogical, teaching women how to walk, how to maneuver space. Feminist phenomenologist Iris Marion Young, in her groundbreaking essay "Throwing Like a Girl" examines "some of the basic modalities of feminine body comportment, manner of moving, and relation in space" (2005, 30). She writes:

> The young girl acquires many subtle habits of feminine body comportment—walking like a girl, tilting her head like a girl, standing and sitting like a girl, gesturing like a girl, and so on. The girl learns actively to hamper her movements. (2005, 43)

Handbags, no doubt, hamper movement. We clutch them, shoulder them, grip them, swing them, and we are weighed down and encumbered by them. For all their practical and symbolic usefulness, handbags restrict arm movement and are not ergonomically friendly. Young notes that "a focus upon ways in which the feminine body frequently or typically conducts itself in such comportment or movement may be particularly revelatory of the structures of feminine existence" (2005, 30).

What can the handbag, or more accurately *carrying* a handbag, tell us about structures of feminine existence? How do handbags affect comportment and movement, how do they change our bodies? Like high-heeled shoes, corsets, shapewear, and tight skirts, handbags constrain. They are not simple to carry, they reduce use of one arm, they make us lopsided, and can even cause musculoskeletal injury and pain (Gunnam, Thajudeen, and Sivanandam 2018).

However, no matter how dainty, handbags make us bigger—augmenting the curves of the body. In this way we can call the handbag an "extension of woman" in parallel to Marshall McLuhan's "extensions of man" (1964). They provide one of the very few culturally acceptable ways for women to take up more space. While men sit with legs spread, women cross their ankles; we rarely sprawl, legs akimbo, in the ways that men do, such that this pose is colloquially known as "manspreading." Women's body language is contained, we stand with feet together (Young 2005, 32) and, of course, we are encouraged to diet and exercise to reduce our bodily dimensions.

More than mere accouterment, the handbag changes our relationships with space as well as our self-perceptions. Writing about clothing, not bags, fashion

theorists Alexandra Warwick and Dani Cavallaro note that "in the body/dress relationship, the ostensibly inanimate and hence powerless item of clothing is transformed into an agent by its ability to furnish the body with signifying powers that the unclothed subject would lack" (1998, 60).

Handbags, which may in this sense be understood semiotically as a form of clothing, also change the meaning of the body. Warwick and Cavallaro continue:

> The body image does not end with the skin. In fact, it is largely determined by the body's relation to the space that encircles it. This space is only precariously quantifiable, because there is always an indeterminate zone between the body image and the rest of the world, which may be narrowed or expanded depending on social circumstances. (1998, 61)

The handbag may be burdensome, but it allows women to take up a little more space, space that is both real and symbolic. The more elaborate, expensive, and recognizable the handbag, the more important that space is.

In line with this I see a complex interplay between handbag as tool, as object, as microworld, as sign, and as extension of the body. I suggest that the handbag is a boundary-crosser in several ways. It is detached from the body in a way that clothing is not. It is extant, and is part of one's identity: more like carrying around a "mini-me" or a conjoined twin than wearing clothing. Novelist Anne Rivers Siddons wrote, "a woman has no need to wear her heart on her sleeve. To the astute observer, she is showing you who she is every time she takes her purse out her door" (quoted in Hagerty 2002, 8).

In runway shows, models carry bags that seem weightless. They appear light, filled with air, their carriers unburdened, able to stride on their platform on stiletto heels. This is the best of both worlds: a bag that augments the body without the weight, and all of the status that comes with a handbag without movement being impeded. Part of the attraction of the oversized designer bag is not that it can fit a lot of stuff, but that it can be left roomy and loose without much in it at all: these bags say "I have a lot of space, but I don't need to carry a lot of stuff." Their emptiness is the antithesis of the overflowingness and uncontainability represented by the bag lady, a figure I discuss below.

So why do we continue to bother with them? Why don't all women move to crossbody bags or backpacks, or, like many men, no bag at all? Young deploys De Beauvoir's reckoning of woman's position in patriarchal society as one that constantly negotiates immanence and transcendence:

> The female person who enacts the existence of women in patriarchal society must … live a contradiction: as human she is a free subject who participates in transcendence, but her situation as a woman denies her that subjectivity and transcendence … the modalities of feminine bodily

> comportment, motility, and spatiality exhibit this same tension between transcendence and immanence, between subjectivity and being a mere object. (Young 2005, 32)

The handbag offers, for many, freedom of movement in the patriarchal public sphere where women are unwelcome, perhaps under threat, even as it hampers that movement. The "quintessential femininity" of the handbag is a hindrance, but also a protection and a comfort.

Charlotte Knowles interprets the oscillation between transcendence and immanence in De Beauvoir's schema as

> the way in which complicit agents are active in their own complicity can be understood as a kind of self-deception, resulting from a reluctance to destabilize the norms, self-understandings, and social roles in which agents have immersed themselves. (2020, 258)

In other words, being a woman is hard. Women face hostilities and dangers that men do not. Handbags help some women to negotiate the world. They shackle but also armor us, and are often a continual, reliable source of supply.

Young writes that "feminine existence lives space as enclosed or confining, as having a dual structure, and the woman experiences herself as positioned in space" (2005, 39). For Young, space is experienced by women (which I would clarify as anyone living a feminine existence) as both transcendent (freely lived in, moved within) and as immanent, in which a woman's own corporeal materiality is always tempered by her status as other and as object, and remains at the center of her being.

Mobility and Public/Private

Handbags help us to traverse public and private spheres, holding the personal within and putting on a "public face" without: "the bag you carry tells people who you are—for better or worse! Show yourself off to your best advantage: The next time you step out, give extra thought to what your bag is saying about you" (Pedersen 2006, 10). They thus facilitate movement between public and private spheres, operating on complex levels in terms of *holding space* as well as *moving through* space.

This object of containment helps with the daily public care of the self by firstly giving, at appropriate times, items that we need, credit cards, sunscreen, notebook, etc. It is a portable assurance that one's needs will be met. What rests within the bag is private and personal, while its outside is like a billboard, advertising one's place in the world. The handbag is a portable domestic lifeworld—a way to take the indoors outdoors, a way to reconcile private and public spheres. Handbags are about fixity *and* mobilization; the handbag ties

us to a place (home) but allows us to move away from and then back to it. This is both practical and symbolic. For example, a series of cross-media Louis Vuitton advertisements showed white celebrities in acts of contemporary colonization—ostensibly performing "activist tourism" for the cameras (see Armstrong 2011). The Vuitton bags in this campaign represented the colonizer's right to be-at-home no matter where in the world.

Margaret Thatcher, the first woman prime minister of the UK (from 1979 to 1990) made a point of straddling two identities and two worlds—homemaker and politician, private and public—for decades. This can be read visually in early photos, when she was still an ordinary member of parliament, in which she carries both briefcase and handbag. We might assume that as her power grew and she approached leadership, she would stop using the handbag, but in fact it was the briefcase that was dropped. Thatcher cannily chose, in light of her gender, the container that proved most powerful, the one that protected her from being accused of interloping in a man's world. The handbag powerfully connects domestic and civil worlds. Thatcher's London-made hard-cased boxy Launer (also carried by the Queen, and which at the time of writing cost over 2,000 GBP each—less than a Hermès bag but well out of reach for ordinary humans) became an infamous example, symbolizing her deep conservatism and nationalism as well as her "homemaker" femininity *literally* at work in the public sphere. Her bag symbolized a very specific kind of authority that was never "manly." This role could not have been filled by a briefcase. The stern black Launer supported Thatcher's static, stoic, austere, and respectable femininity, a femininity that allowed her to impinge on traditional masculine territories in seemingly non-threatening and deeply conservative ways that often disarmed and baffled her critics. The handbag, in other words, was part of her power, enacting a weaponized femininity (literally, if we consider the Falklands War).

Years ago, pushing my new baby in her pram and carrying shopping bag, handbag, and swimming gear bag, I passed an older woman on the street. She said to me "woman, beast of burden." Most likely meant as a salutary, supportive comment, it crushed me, making all the bags seem heavier, the hill steeper. For there is a fine line between carrying a bag to express authority and belonging-in-the-world, and carrying too many bags.

If handbags are representative of power, and they signify domestic worlds as well as mobility away-from and back-to them, then what of the unhoused woman, often known as a bag lady (Fig. 2)? She is all bags, even her name. Her bags, despite their overflowing contents, say "I have nothing, I am nothing." A life lived in public, in constant movement, a life denied a private space, is expressed by out-of-proportion baggishness. There is a distinction between carrying a bag that is useful, i.e., expressing authority and status, showing belonging-in-the-world, and being compelled—because of poverty or

[Figure 2] *Homeless Woman*, May 11, 2013, Lisbon, Portugal (source: Pedro Ribeiro Simões).

displacement—to carry too many (heavy) bags. For the bag lady, distinctions between private and personal spaces are limited. Unlike the single handbag that mediates between domestic/private and public spheres, her bags multiply to become portable domestic spaces. The bags are her world/home.

Conclusion

It is an easy feminist task to read handbags as objects that we're burdened with, as things that diminish our capacities, making us less able. They are certainly part of the sociocultural mechanisms that lead Young to state that "women in sexist society are physically handicapped … as lived bodies we are not open … to master a world that belongs to us, a world constituted by our own intentions and projections" (2005, 42). But as Georges Canguilhem has so famously pointed out, what constitutes disability is contextual, dependent on time, space, and circumstance (1991). We must remember when critiquing the handbag that, while problematic, it also lubricates movement between public and private spheres, it signals status, and is a metaphorical signal helping us to defend ourselves when exposed. Le Guin says there is still "room in the bag of stars" (1986, 170) for thinking about narrative differently. The Assyrian god may have been holding a cosmos in the form of a handbag, and out of handbags may spill galaxies. I have shown that the handbag is a portable microworld, a source of supply and giving. Let us not discount this object that holds and is held. It can teach us about domestic and public worlds, about

femininities, and about enabling and restraint. Let's take pleasure in the handbag, and enjoy the paradoxical abundances it offers.

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INFRASTRUCTURE

LOGISTICS

PROSTHESIS

PACKAGING

CONTAINMENT

[5]

Paradoxical Containment: The Double Externalization of Packaging, and the Overextension of the Metasystemic Prosthesis

Paul Graham Raven

In this chapter I begin by addressing Heidegger's concept of the standing reserve, which I claim *no longer stands*, and "the thing," whose simultaneous keepings-in and keepings-out figure the entanglement of packaging and provision. I then show how packaging, like containment more broadly, performs a double externalization, by isolating the product from its environment, and by using the environment as a sink for the exhaust of production and distribution; I connect these externalizations to the particular meaning of the word "efficiency" in the economic lexicon. Next I address the self-effacement of packaging as a system, and relate that phenomenon to the self-effacement of logistical infrastructures, which I further identify as a collectivizing cyborgian prosthesis to which human beings have become

unwittingly (and sometimes unwillingly) habituated. Finally, I turn to the Gaia we meet in Latour's (re) reading of Lovelock and Margulis, and conclude that logistical infrastructures are the material reification and engine of the social/natural dichotomy, before daring the reader to tear away the package into which we have sealed ourselves.

Nothing is connected to everything, but everything is connected to something.
Donna J. Haraway

Introduction: Packaging as Absent Presence

It is remarkable that Sofia's seminal paper on container technologies (2000; Chapter 1) hardly mentions the most ubiquitous form of containment, namely packaging. But this absent presence should not surprise us: as this chapter will argue, one purpose of packaging is precisely to self-efface, to conceal itself, and in so doing obscure the logistical systems that it both enables and relies upon. En route to that argument, we will explore the doubly externalizing (onto)logic of packaging and containment which both isolates the product from its environment and makes said environment a sink for the exhaust of production and distribution. While in transit, we will encounter the Jevons paradox and the etymology of efficiency, and then unwrap packaging as a self-effacing spectacle which is itself contained by the cyborgian logistical meta-system, before finally meeting Bruno Latour not at the end of time, but rather at the time of the end.

This chapter is a work of posthumanist theory, but the reader will recognize that I address a "we" that is classically humanist in its seeming universalism. This contradiction is a deliberate strategy, the premise of which is a subtext of the chapter as a whole, and which I will explain fully toward the end. But let us begin with Sofia's paper as our home port, our point of departure, where the ghost of Heidegger stands awestruck on the apron of an airstrip...

The Standing Reserve No Longer Stands: Metasystemic Mobilization and the World-as-Warehouse

Among the Heideggerian concepts deployed in Sofia's essay is the "standing reserve" (Heidegger 1977, 3–35), and I will begin by observing that *the standing reserve no longer stands*.

Sofia contrasts Heidegger's "bringing forth" of *techne* with what we might call the "re-source gaze" of late capitalism, which

> draws connections between the exploitation of the earth as a calculable resource, the demands of profit-driven development, the character of modern research, apparatus-dependent science, and the mathematization or "informatization" of the world. "Bringing forth" has been reduced to something like imposing upon and ripping out, via an aggressive technoscientific "challenging-forth" of the world to reveal itself in the form of resources and information for consumption. (Chapter 1, 34)

Heidegger names this macro-technology of re-sourcing as the *Bestand*, commonly translated as "standing-reserve," which Sofia glosses as a "mobilizable stockpile of resources available for instant supply." Heidegger offers the plane waiting on the airstrip as an example of this systemicity, and Sofia adds the image of "rows of stacked large containers ready equally for transport by road, rail or sea"; now

> the object loses its qualities as the *Gegenstand*—that which resists and stands against—and the machine loses its standing as an autonomous tool, dissolved into the *Bestand*, where it is just another "completely unautonomous" element in the abstract and global grid of the resourced world. (34)

The shipping containers Sofia mentions can take us beyond Heidegger's standing-reserve, which I have claimed can no longer stand. I mean this in two ways: firstly, Heidegger's *formulation of the idea of* the standing-reserve no longer stands, because, secondly, *that which stood* in Heidegger's concept of the standing-reserve *is ever more infrequently to be found standing*. This is not to say that the standing-reserve has been pushed aside; nor has it (yet) fallen over. Rather, the standing-reserve is now in almost constant motion—and for it to stop and to stand once more, without adequate warning or preparation, would spell several sorts of disaster. This is a general problematic of the global logistical metasystem, for which the shipping container—in this chapter, in this world—makes a durable, versatile, and capacious synecdoche.

A "mobilizable stockpile of resources" implies *not-yet-mobilized*. When Heidegger wrote of planes waiting on runways, the "lean" logic of just-in-time (JIT) had yet to make its mark, and storage was still a commonplace of production. Lean manufacturing—a catch-all for a cluster of manufacture-management paradigms—emerged from Japan in the latter half of the twentieth century. A mutation succeeding Fordism and Taylorism, which sought productivity increases by paring away slack in human worker functions, JIT focused instead on the reduction of inventory (and thus of investment in inventory, and of storage costs). As Anna Tsing (2015, 112–14) has observed, these changes rippled out across the networks of financing, supply, and distribution firms that were mandated by international competition. So began the formation of contemporary supply-chain topologies which, intentionally or otherwise, mitigated political risk, facilitated transnational mobility of goods and of capital, and enabled the evasion of global environmental standards (114).

By the time of Sofia's essay—when, as she notes, a plethora of storage and containment solutions had made their way into many homes—storage was being optimized out of supply chains as fast as possible. Or rather, storage was reinterpolated into logistics: commodities, at least in economically ideal circumstances, should never stop moving between the points of production and consumption. This is not (yet) true of all commodities, perhaps, but increasingly true of an increasing number: stockpiling tends to occur only in the rawest, least perishable bulk commodities (for example, ores and fuels), and then more for reasons of financial or political leverage than for profit.

To put it another way: storage, in the sense of the standing reserve, has been pushed all the way back to the raw-resource end of the supply chain. This logistical extension and hypermobilization results in the world-as-warehouse, the nigh-total *re-sourcing* of the world. This is the sense in which the standing reserve does not stand, but has not fallen over either: its logic has simply been optimized to such a point that the planet itself is the fulfillment center to which all other fulfillment centers are merely local depots. Between the wholly re-sourced world and the site of consumption is total and relentless motion, commodities and prices and orders and signs crossing and recrossing the planet through the multiple media of the logistical metasystem. Indeed, this is the essence of the metasystem, the concrete infrastructural function: the transportation and transmutation of resources (Raven 2017), in which containment and packaging are crucial enabling and extending components.

Everting Heidegger: Every Keeping-In Is Always Already Also a Keeping-Out

To show the entanglement of packaging and provision, let us turn to Heidegger's (2009, 161–84) discussion of "the *thing*," which as Sofia notes is (in part) defined, in the case of the jug, by its function of keeping-in, of gathering (Chapter 1, 30–32); this keeping-in, this *containing*, is coded feminine for Sofia, if only implicitly so for Heidegger. But we might note that every keeping-*in*, every containment, is always already also a keeping-*out*: while partly-permeable containers certainly exist—in fact, they are all imperfect in this sense, and the thingness of Heidegger's beloved jug relies on the conditions under which it can be made to gush forth its contents as an offering—rare is the container, besides some biological membranes, whose permeability differs according to which side of it one is on.

We might further note—with both irony and revulsion, given Heidegger's involvement with National Socialism—that the explicit focus on keeping-in over the more-or-less implicit keeping-out is exactly how fascism depicts its efforts to keep the fatherland pure and uncontaminated. Without meaning to accuse a technological concept of being fascist in and of itself, packaging—particularly food packaging—very much expresses both of these functions. The perishable commodity is kept in, protected, even as the packaging performs a sort of gathering which makes it more efficient to ship, store, and sell. There exists an entire literature, for instance, on "cube utilization" (see e.g., Twede 1992; Twede, Clarke, and Tait 2000; Hellström and Saghir 2007), a euphemism for the goal of reducing losses and expenses through the use of packaging to maximize the quantity of product which can be shipped securely in a given volume of vehicle space. These theories and practices illustrate the standardizing, homogenizing role of packaging *as a system* that operates within and beyond logistics as a system, to the extent that their discrete systemicity is little more than a disciplinary artifact of analysis: containment and transportation are two sides of the same coin.

But, to reiterate: even as a commodity is kept *in* by its packaging, everything else is also kept *out*.

A Protective Atmosphere: Packaging's First Externalization

Staying with food commodities as our exemplar, it is easy to see the first externalization performed by packaging, which is (justly) celebrated: its hermetic seal keeps the atmosphere external to the product. This is an externalization of entropy and decay, if an imperfect one: by excluding

oxygen and microbes from the foodstuff, the foodstuff is productized through systems of standardization, and the product gains an extension to its "shelf life"—the window of time between production and safe (or at least viable) consumption.

This extension may be thought of as a sort of time-stretching: the product is withdrawn, if only partially, from the entropic flow of time, protected from the decay which would render it waste (this might be seen as a sort of "life extension," though for the microbes it is really life exclusion). The biological clock of decay, measured in generations of breeding bacteria, is slowed to something close to a stop; the product's movement through the fourth dimension, which we know as time, is reduced to a crawl; outside the packaging, time flows on as normal. This reduction of the product's motion through the fourth dimension enables the extension of its potential mobility in the other three dimensions: the slower the product moves through time *inside* the packaging, the further it may be moved through the atmospheric space *outside* the packaging. This extension of the potential distributive range of the product enables, indeed necessitates, the centralization of food production: as illustrated by the rise of globalized agribusiness, the outsourcing of logistics and storage becomes a crucial armament in the struggle for profitability, and its synergies with centralized production "at scale" soon make what was once a competitive advantage into a fundamental assumption of viable business models.

Contents under Pressure: Packaging's Second Externalization

We have seen how the atmosphere is externalized by packaging in the biological-temporal sense, but now we begin also to see how it is externalized in the economic sense. The greater mobility of perishable goods means greater emissions of carbon dioxide, waste heat, and other pollutants, into that atmosphere which, despite the quixotic efforts of emissions-trading schemes, remains resolutely external to the ledgers of the organizations involved. An inevitable centralization of production is thus enabled and necessitated, which likewise increases emissions, because it is more profitable to produce "at scale" and transport to distant consumers than it is to produce smaller volumes more locally. The "economies of scale" so central to profitable business practice are predicated in no small part upon this externalization of the environmental impact of energy expended on the mobility of products. This logic goes further than food: the production of plastic *tchotchkes* in the Global East and South and their shipment to markets in the Global West and North would be a loss-making proposition were it not for the (illusory) cheapness of their transhipment from factory to front door.

If only they understood, we may be tempted to think; *if only we could make this clear, perhaps through price signals and carbon pricing schemes, then we could rationalize this system!* But this system is *already* predicated on rationality—albeit a rationality whose foundational premises result in the profound irrationality of a system which consumes its own basis of existence in the name of its own sustainment.

For this centralization of production and extension of distribution is no accident, but rather a fidelity to the principles on which the system is predicated. Let us compare the vernacular (non-theological and non-philosophical) interpretation of the adjective "efficient," which the OED describes as "effective; adequately operative" (2022), with the use of the term in business and economic discourses. The vernacular use hinges on adequacy, which informs the sense that being efficient with something—a particular resource, let's say—means to be frugal and sparing, to not use more than is adequate to the task.

But when an "entrepreneur" talks of efficiency, they are speaking the argot of the investor class: "Economic efficiency is when every scarce resource in an economy is used and distributed among producers and consumers in a way that produces the most economic output and benefit to consumers" (Investopedia 2020). The crucial but often overlooked term in this definition is *every*. Lest you assume I am over-reading a word deployed casually by persons to whom words are mere means to an end, consider the more detailed definitions of productive efficiency—the efficiency with which those whose business is production are most concerned—and their ubiquitous emphasis on the avoidance of wasted resources. Leaving aside the intentions of economic philosophers, the quote above—with its understated but clear *every*—captures its interpretation by those who are more interested in *doing* production than thinking about it. That interpretation, which we see expressed in every aspect of the sociotechnicality in which we are enmeshed, is that *a resource unexploited is an opportunity wasted*. Productive efficiency as practiced is nothing to do with frugality or adequacy-to-purpose; it is to do with the use of all and every last scrap of resource, the total re-sourcing of the world, enabled and extended by technologies of packaging and containment.

Consider also the Jevons paradox (Alcott 2005), which expresses this philological contradiction in strictly economic terms: increases in the efficiency of a process that consumes a given resource result not in a reduction of the rate of consumption, but rather an increase, as the falling price of said resource signals the market to increase demand. A popular argument against the Jevons paradox is that many (maybe most) modern goods are the product of multiple inputs, and factors other than input costs influence their price; indeed, the analysis of any one specific product might well reveal this to be the case. But if we think with the Jevons paradox in terms of production *in general*, and

note that the one input essential to any and all production—albeit in a variety of forms—is energy, then we can clearly see how Steve Sorrell (2009) concluded that increases in technological energy efficiency will inevitably result in a greater consumption: energy's increasing availability and cheapness effectively lowers the cost of *each* and *every* moment of production and distribution, even assuming all other costs remain unchanged.

The re-sourcing of the logistical metasystem, then—taking such forms as tightly-packed cartons of homogenized milk in the back of a lorry, or as a shipping container, its refrigeration unit chugging away athwart some equatorial ocean, time-stretching the travel of the frozen beef carcasses stacked like logs inside—is the Jevons paradox writ so large that its sentences stretch to the length of international shipping routes. That which is possible becomes that which is necessary. Packaging and containment make it possible to expend energy on the exportation of ever more goods, ever further, ever longer—and so, in deference to the dogma of productive efficiency, we do.

But why, then, is this systemicity so hard to see?

Spectacular Self-Effacement: Packaging as Medium and Message

Courtesy of the "infrastructural turn" in the social sciences and humanities (for example, Dodson 2017), greater attention is now being paid to the materiality of the logistical metasystem. However, the relativization of the concept of infrastructure inspired by the work of Susan Leigh Star (1999) has been a mixed blessing. To be clear, it is to be celebrated that the often invisible (and, again, coded feminine) sociotechnical systems of support that enable various professional, commercial, and academic practices are being exposed and explored in greater detail. Without intending to diminish their importance, Star labeled the fundamental logistical-distributive infrastructures—the most infra of infrastructures, if you will—as "the system of substrates"; however, that system-of-systems, that metasystem, remains yet to be thought *as metasystem*, rather than as a category of systems which bear similarities. Modeling such a metasystemic thought is part of the purpose of this writing.

Why, then, am I writing of packaging rather than pipelines, of containers rather than cargo ships? But this is no contradiction: packaging, as perhaps the most common manifestation of containment, is the figure of the logistical image for which the (meta)system of substrates is the ground.

Much has been made of the conditional invisibility of the infrastructural, which enters our perception as infrastructure only at times of malfunction or overload (Star 1999). I argue that packaging has a similar invisibility, or rather a paradoxical self-effacement which is intimately related to that of the

metasystem. As with infrastructures, it is not that we do not see packaging. Far from it: packaging crowds the visual field, in its simplest forms (the protective wrapper of the commodified product) and its meta-manifestations (the logo'd truck full of logo'd boxes full of logo'd packaged products). But like advertising material (to which packaging is a conjoined sibling) the sheer ubiquity of packaging makes it hard to notice—a cardboard and plastic forest that we struggle to see for the trees.

Here lurks a huge contradiction, for packaging seems to be doing anything but attempting to obscure itself, covered as it often is with logos and brand names and images and lists of ingredients and handle-with-care warnings and serving suggestions. Indeed, the packaging of high-status items, particularly technological devices, is an extension of the product's own semiotic aura. But we do not see packaging *as packaging*—which is to say, as a protective covering whose function is exhausted as soon as it has given up the product to our eager hands—until that moment of its functional exhaustion arrives, and we are left surrounded by this now-strangely-shameful shed skin of commerce, in as many patterns as there are species of commodity: sometimes garish, sometimes utilitarian, sometimes opaque, sometimes transparent, semiotically complex, a vast shattered screen carrying gigapixels of image, projecting/reflecting... what?

Packaging is a medium, a system through which symbolic meaning is transmitted, and its symbolism is a significant element of the spectacular logic of late capitalism: the commodification of commodification, the valorization of valorization, the recuperation of critique. The medium—that is, the affordances of packaging as a technological system—is also the message (McLuhan 2010). As has been shown, the message of packaging is that the environment is an entropic threat to the precious product, and that the environment is also a sink for whatever must be sacrificed in order that the product be provided. As a source of risk, and a sink of waste, "the environment" is thus doubly externalized by packaging, and indeed by many (if not all) forms of artefactual containment. Indeed, the very concept of "the environment" is itself a rhetorical device of externalization (Latour 2017, 101–4): it is always relative to the object of analysis, if only implicitly, and that object would in turn be (part of) "the environment" in some other analysis. Everything is ultimately environmental to everything else.

The "reefer"—the refrigerated shipping container—is the *sine qua non* of this double externalization. It's a container for containers, and such metatechnologies are always an expression of an ideal of the optimal, of the "efficient" (in the sense discussed above). Pretty much everything inside a reefer will itself already be packaged and branded, already time-stretched and hypermobilized. The reefer is a stasis locker (Langford 2016), to borrow a term from science fiction: a space carved out of space, in which time is

slowed through the expenditure of energy, in order that more energy might be expended to extend the mobility of that which it contains. The reefer preserves its contents; it also preserves the globalized, centralized, and optimized logic of capitalist (over)production, and thus all the exploitative and colonial projects thereof.

CyborGaian Metabolism: The Over-Optimality of the Metasystem

We have considered packaging as a logistically optimizing (and hence centralizing) sub-system of capitalist production, and as the medium of its spectacular self-effacement. This leaves us with the issue of that self-effaced metasystemicity itself—whose mask has started to slip with some regularity in times recent to this writing.

In March 2021, as if to demonstrate in layperson's terms the sudden visibility of the metasystem in a moment of failure, the almost-too-perfectly-named cargo ship *Ever Given*—for is not the function of the metasystem to be *ever-giving*, always moving to fulfill the demands we have been prompted to make of it?—became wedged in the Suez Canal, blocking one of the major arteries of the logistical body (Fig. 1). This was only one incident, made obvious by its spectacular singularity and size (and easily meme-able newsworthiness): at other moments during the pandemic lockdowns of 2020–21, shortages of containers in the right places at the right time resulted in food for export going to waste (Bhattarai 2021), because it couldn't be put into the necessary stasis. But these shortages were no more causal of the crises than any other phenomenon: containers are merely corpuscles in the circulatory system of globalization, necessary but not sufficient, a figure for failure rather than the failure itself.

Such fragilities go back further still: there have been periods when the firms which arbitrage the capacity of container ships were selling it at negative prices (Kaminska 2012). To put it another way: *they were paying people to ship things*, because without enough things to ship, the profit of shipping things would disappear. This is quite clearly insane—but such is the expression of the Jevons paradox.

Let us recall that the extension of this metasystem of logistics is now truly global, to the point that more local systems of production and distribution cannot compete, and are bought up and sublimated into it. This global system is productively efficient, optimally optimal—and, as such, incredibly fragile, incapable of stopping or slowing without devastating knock-on effects. To return to my earlier claim: there is no standing reserve, only the totally mobilized reserve, the warehouse coextensive with the world. This is a nigh-total

[Figure 1] The Ever Given ship stuck in the Suez Canal, April 23, 2021. Photographed from European Space Imaging, author Anja Vrečko (source: Wikimedia Commons).

metabolism in the Marxian sense: the infrastructures of extraction, production, and distribution, the metasystem of logistics, are the veins through which that blood must pump, the connections across which that networkedness is perpetually performed; meanwhile, the orders and shipping notes that conjure and trace this corpuscular traffic fire back and forth like impulses in a nervous system made of twisted copper and glass fiber. (Indeed, Marx considered both logistics and communication as part of the question of circulation, and as the means of "the annihilation of space by time"; Marx 2012, 524.)

It is also a cyborg metabolism, in two senses—firstly in the more specific sense that the logistical systems for transport and energy which I have elsewhere categorized as *concrete infrastructures* (Raven 2017; pun very much intended) are macro-sociotechnical prostheses which collectivize their users, both in terms of their relation to space (and its inevitably uneven distribution of resources) and of their eventual habituation to the systems in question. It's

not only that older practices of fulfilling basic needs have faded away through their no longer being performed; it's that through their total mobilization, through their re-sourcing of the world, those systems have successively captured, removed and/or exhausted the very possibility of alternative routes to fulfillment. Put more plainly: to find potable water, how far would one have to walk from the center of, say, London, Lisbon, or Lagos, if there were failures in the various infrastructural media (such as a water company's distribution network; retail supply chains for bottled water) through which it is supplied? The remaining "natural" flows of water—those which have not been abstracted away to aridity, re-imagined as sewers, or polluted in less intentional ways—have long since been paved over. As David Wills (2021, 80–82) has observed, while there are evidently profound differences between the women water carriers of Kenya's Chiga people and the infrastructures through which we of the Global North are accustomed to drinking from, they are both just as much a matter of prosthesis: extensions of and integrations into the body of the (collectivized) human subject that make possible its action in (and upon) the world.

This is the second and more general sense in which the metasystem is a cyborg prosthesis. The water distribution network and the container ship are far more technologically complex than the Chiga women's pans atop their heads, far less glamorous than the artificial limbs and cyberdecks of science fiction movie protagonists—but they are all prostheses: duplex sociotechnical media of control and manipulation between bodies and the world (which latter category very much includes, by way of systemic abstraction and the self-same mechanism of capture through habituation, *other bodies*). These systems long ago ceased to be discrete in any meaningful sense: no water delivery network can function without an electric grid to power its pumps; no electric grid can function without the telecom systems of monitoring and management required to balance generation and demand; no telecom system can operate without electricity, nor without the physical presence of human operators in particular places at particular times, to which they likely drive themselves in vehicles powered by fuels extracted far away on roads maintained and managed by more humans, using more electricity and telecoms. All of this (and so much more) is now thoroughly interpenetrated by the sub-metasystem known (with ever greater accuracy, and ever less comprehension) as "the internet," the thickest international ganglia of which—as if in tribute to their colonial antecedents—map with uncanny accuracy to the international shipping lanes established centuries earlier, a pattern shaped as much by rates of cost and profit as patterns of tide and weather (Khalili 2020, 25–27).

The reason for my addressing a universalizing humanistic "we" in this work should now be understandable, though likely not agreeable: the subject of the metasystemic prosthesis is the human, unwittingly (and often unwillingly)

collectivized by the interdependency of infrastructural extension. As I have argued elsewhere (Raven 2017), the elaboration of infrastructure has formed human communities not into collectives of individual cyborgs, but rather into cyborg collectivities; globalization, an emergent logic of the infrastructural paradigm, has in turn cyber-collectivized those cyborg collectives. There is no longer any Outside to the metasystemic address-space, with the last remaining pockets of exception reduced to the role of sources or sinks through the label of "natural capital"... and if capital's most zealous servants get their way, Mars and outer space will be next to play host to what David Harvey has dubbed the "spatial fix" (Herod 2019).

As such, no human is Outside either: not the poorest of subaltern proletarians, not the wealthiest investor-class technocrat. This is not to claim that the experience of metasystemic subjectivity is universal—far from it! An intensely situated sense of the specific is, I believe, part of what makes this thought posthumanist. But as I have shown, the *general* case is effectively universal: as such, the metasystem represents the apogee of the humanist project, the universalization of humans as mere nodes in the metasystemic market, the world-as-warehouse. This is the ultimate triumph of the Enlightenment worldview, and its terrible bear-trap tragedy: a universal subjectivity, a subjective universality. The paradox is the point: the simultaneity of prosthetic dependency and *puissance* is the source of our paralysis in the face of the most comprehensively-apprehended threat to human futurity ever known—and the "vast machine" that produces that knowledge (Edwards 2013) is the same machine that produces the threat.

I thus decline to reserve either victimhood or blame to any group or identity: for we are all victims, albeit to very different degrees, and we are all complicit, likewise to different degrees. The containerization of subjectivities is an extension of the logic of the metasystem itself: even with the best of intentions, the restatement of the hierarchies prevailing therein serves only to sustain them. A true analysis of the vast differences in subjective experience of metasystemicity—an understanding which is prerequisite to any attempt to change the paradigm—must start in recognition of the universalizing imperative of the collective prosthesis; otherwise, we will continue to argue among ourselves, like the proverbial persons attempting to identify an elephant in a dark room.

The Way Out Is Through: Unpack(ag)ing the Present

For us, then, caught like fish in a net of our own creation, there is no longer a meaningful distinction between this metasystemic metabolism and "the world." Indeed, there never was—for as I have argued elsewhere, infrastructure, through its prestidigitatory magic, through its theft of the mantle

of the enchantment which once belonged to the world, has become the veil behind which the feminized world's ravaged voluptuousness is coquettishly concealed and made seductive (Raven 2019). Infrastructure is the generator, the very material reification and medium, of the social/natural dichotomy: it is that which separates—or, rather, it is that which makes imaginable the separation of—the urban from the rural, the cultural from the natural, the "in here" from the "out there," even as it materially links them in an ever-more intimate, dependent, and abusive relationship. And while we rightly associate the ascendant triumph of that dichotomy with the era of humanist Enlightenment (and its Romanticist counter-melody, which echoes on in our environmentalisms; Garforth 2018), its origins lie far further back in the formation of the earliest grain states (Scott 2017; Otter, Chapter 3 of this volume), when—among other sociotechnical innovations—the first logistical and distributive infrastructures were constructed to enable the capture and storage of primitively accumulated production; the first inklings of Heidegger's standing reserve, if you will. By intervening in the landscapes where we elected to live a more sedentary lifestyle, so as to improve the efficiency of the practices thereby adopted, we quite literally bound ourselves to those locations, even as we established—for the privileged few—a seeming freedom from (and lordship over) them.

Furthermore, this total cyborg metabolism results in the environmental incursions and destructions that liberate new toxins, new exploitations, new pathogens… new viruses. Infrastructure not only mobilizes and amplifies these hazards, it is their (meta)medium, the vector of a new and unwanted mode of transmission, transportation. It would be excessively reductive to say "COVID-19 was an infrastructural pandemic"—but it would not be a falsehood; indeed, as James C. Scott (2017) points out, it could be argued that all our viral symbionts are just as reliant on our infrastructures as we are.

So, where are we? We are embedded in optimality, and increasingly feeling the pressure to optimize ourselves. A resource left unexploited is a sin against capital; money left by the roadside. The metabolic mobilization is so total that even its flaws and slippages are opportunities to be taken advantage of: it seems there is no crisis in its own metabolism that capital cannot turn to profit, which prompts the paranoiac supposition that it engineers such crises for profit's own sake.

Through our total cyborgian habituation, through the cyborgification of the Gaia we meet in Latour's (re)reading of Lovelock and Margulis—that Gaia who is neither whole nor totality, and of whom we are not parts, but rather one species of autonomous agents linked together with countless others, in networks of unevenly distributed density of connection (Latour 2017, 75–110)—we are trapped. The logistical metasystem is the container of containers of containers—"the content of a medium is always another medium" (McLuhan

2010, 8)—and it is also our container, the everted Inside for whose sake the everted Outside has been so diminished and polluted that it leaks back in regardless, all our desperate keepings-in and keepings-out collapsing into one another, Nature pushed away beyond the edge of town and enclosed (literally, politically, and economically) until—where once Culture was surrounded by Nature—now dwindling pockets of Nature are ever-more encroached upon by Culture's sprawl until, suddenly, there is nothing but the external(ized), nothing but the sinks into which we have tossed all that we declined to account for, scribbled all over by the inextricable jumble of networks and systems in which we are collectively encased, like some hazardous-environment suit which has become our obligatory daily outfit: the metasystem through which the desirable is brought near and the undesirable sent out of sight, out of mind.

It is this increasing impossibility of sustaining the fiction of the nature/culture dichotomy—the ubiquitous contradictory presence of its reification in infrastructure, a web coextensive with the world in which we are just as trapped as the world itself, or perhaps even more so—which figures Gaia's return, the animatedness of the world no longer refutable by even the sciences which first advanced that denial as their foundational principle (Latour 2017). Logistics mediates between the human and its "environment," but in so doing makes it horribly clear that their separation was always notional, an economic fiction: *the metasystem is the social/natural dichotomy made concrete, quite literally*. To turn it off, or to have it collapse completely, would be apocalyptic; to sustain it as it stands—or, rather, as it *no longer stands*—likewise, only perhaps more slowly.

I have no answers, no solutions, and I distrust the certainty in anyone who claims to have them. But if we stay with Latour a little longer, here at the end of this piece, and heed his observation that it is precisely our relation to apocalypse—to *revelation*—that is the problem, then perhaps by turning our attention to the self-effacing spectacle of plastic and cardboard and refrigerated metal and branding and barcodes, and by highlighting the paradox of the absent presence of packaging, we can begin to see the container into which we have sealed ourselves, begin to "make the threat artificially visible" (Latour 2017, 218). For—just like the shipping container, which I have made to serve as its synecdoche—packaging and containment serve to take us out of the flow of time, to position us on the far side of a secular rapture, in the heaven promised to those Moderns who made a counter-god of Nature: amid the frantic, wasteful gushing-forth and plastic-wrapped plenitude of the metasystem, we believe ourselves—falsely—to have passed the end times.

To behold the ubiquity of packaging, then—to see the container as the corpuscle that mobilizes the no-longer-standing reserve—might be one way to remind ourselves that we have not passed the end times, but are in fact

obliged—nay, *necessitated*—to inhabit an inescapable, eternal, and ongoing end-without-end. That is not a comfortable ontology… but the discomfort is the consequence of our having optimized for comfort on a planet where comfort is a finite resource. Outside our ontological container lies time, decay, finitude… but also life, renewal, replenishment. Dare we open the door from within?

I would like to thank the editors of this volume for their generous invitation to contribute, and for their commendable patience in shepherding the resulting text to completion; it is a far better work as a result, though I suspect its theoretical position is no more palatable! This chapter was largely written while the author undertook a Marie Skłodowska-Curie Postdoctoral Fellowship at Lund University (grant agreement No. 895807), but the theoretical work herein is unconnected to the research conducted during that fellowship, being rooted instead in themes and thoughts first developed during my doctoral research.

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FEMINISM

INFRASTRUCTURE

GENDERED IMAGINARIES

MEDIA

WITCHCRAFT

[6]

Haunted by the Future Eve: Witchy Infrastructures and the Broken Machine

Hannah Schmedes

When French author Auguste Villiers de l'Isle-Adam began writing his novel *L'Ève Future* about a fictional Thomas Edison assembling a female android, the real Thomas Edison was developing the idea to build a Phonographic Doll. By examining the temporal collision of these two creations from the late nineteenth century, the text delves into the gendered imaginaries of the feminine as subservient and defective. The speculative analysis juxtaposes the feminized material composition of the android Hadaly with the historical context of Edison's dolls, both of which are viewed as "Container Infrastructures." It aims to shed light on infrastructures and their semi-otic-discursive connection to gender, revealing how witchy qualities continue to influence contemporary perceptions and representations of technology.

The machine world reciprocates man's love by expediting his wishes and desires, namely, in providing him with wealth.
Marshall McLuhan

These technologies reproduce something like the "environment mother" who works unobtrusively to ensure "smooth functioning" and continued supply to the infant whose bodily states and feelings she regulates.
Zoë Sofia

Soon after becoming known as the "Wizard of Menlo Park" and receiving recognition for his invention of the phonograph, Thomas Alva Edison embarked on a new invention. He set himself the challenge to search for a way of incarnating, of creating a physical presence to accompany the phonograph, which could magically transmit and store speech without the speaker's body being present. It was then that he realized his vision of the "Edison Phonograph Dolls": anthropomorphized toys dressed like little women. A phonograph could be inserted via the back of the dolls, while sound was able to get out via a perforated chest. In 1878, when Edison developed the idea to build a talking doll, the French author Auguste Villiers de l'Isle-Adam began writing his novel *L'Ève Future* in which he sketches a fictionalized Edison assembling an ideal female android for his heartbroken friend Lord Ewald. The reason for Ewald's lovesickness is Alicia Clary, his fiancée, whose banal character doesn't match her beautiful physical appearance. He describes her as an animated replica of the "Venus Victorious" (Villiers de l'Isle Adam 2001 [1886], 40) with whom he can't share a decent conversation. Edison—as luck would have it—is currently working on an android, which he then reassembles, adjusts, and photo-sculpts so that it would look and speak like Alicia, "while disposing of the interior self that his patron finds so distasteful" (Fren 2009, 235). Accordingly, the android is named "Hadaly," which the novel translates from the supposedly Iranian term "ideal" (Villiers de l'Isle Adam 2001, 76).[1] Hadaly is however not only a technical machine moved by hydraulics, she also comes with a soul. Sowana, a spiritual presence, inhabits the mechanics so that the android behaves and speaks like a living being. To realize this spirited machine, Edison employs occult practices to transfer the astral body of Sowana from his assistant Annie Anderson to the android (208–14). However, the condition for this transfer is that Annie is kept in a hypnotic state, lying in

1 In Farsi, "ideal" is translated to: آرمان [ārmān]. Phonetically closest to "Hadaly" is the Arabic word خيالي [xa'ja:li:] that translates to "imaginary."

Edison's studio. When Ewald meets Hadaly he is amazed and frightened, eventually overcoming his fears as Edison tricks him into confusing the android for his fleshy fiancée Alicia (194). Ewald and Hadaly then set sail for Scotland, but unfortunately, a fire causes the ship to sink. Hadaly, traveling in her "coffin of black ebony," with "an interior of black satin which exactly modeled a feminine form" (204), cannot be saved and drowns in the ocean. Because of their spiritual connection, Annie, still lying in Edison's studio, dies too (217).

If the author of this plot, Villiers de l'Isle Adam, knew of Edison's Phonograph Dolls or if the two men met in real life remains idle speculation (Petersen 2006, 6). Rather than searching for evidence of their acquaintance, I found this temporal collision exhibits a recurring gendered pattern in the representation of technology (Dees 2010, 3–14). In the following, I consider *L'Ève Future* not only as a historical witness "analyzing the fears, taboos, and desires of a dying age" (Burton 2013), but moreover as an illustrative starting point for an investigation of the gendered imaginaries of container technologies as infrastructures with attention to their feminized "witchy" characteristics.

The tradition of media studies and feminist theory in which I situate myself often works with transversal motives, figures, and imaginaries that allow for other, yet anachronic perspectives which challenge canonical Western historiographies along with their biases. Asking the reader's forgiveness for my obliviousness to the history of the late nineteenth century, I prioritize a perspective of gender media studies that questions how gender becomes intelligible under and via media technological conditions, i.e., how it can be articulated and read (Seier 2007). More specifically, this text deals with the recurring motif that infrastructural technologies associated with supply, care, and maintenance work, such as water pipes (Sofoulis 2017), the bottle (Schwartz Cowan 1983), and the telephone (Rakow 1992) are metaphorically aligned with feminized organs in the body.

Influenced by the wide-ranging work of feminist scholars on technology (De Lauretis 1987; Wajcman 1991; Sharma 2017), I argue that addressing correlating imaginaries of container infrastructures can reveal preconceptions of gender and show how hetero-patriarchal power dynamics are materialized by means of the seemingly neutral imaginaries of those "systems without which contemporary societies cannot function" (Edwards 2003, 187). The term "container infrastructures," borrowed from Daniela Agostinho and Nanna Bonde Thylstrup, descends from Zoë Sofia's "container technologies" (2000; Chapter 1) with its analyses of the neglect of gendered technologies integrated in the processes of supply and care. My approach is deeply indebted to this reading of "gendered infrastructural imaginaries" that attend to "entanglements of gender [and] information infrastructures" (Agostinho and Thylstrup 2019, 746).

In my analysis of *L'Ève Future* and Edison's Phonograph Dolls, I will employ the concept of container infrastructures as a fundamental framework. This concept highlights the historical bias that associates containers—serving as technologies for holding and storing—with the female-designated womb and technologies of supply to perform maternal functions. Additionally, it embraces Sofia's perspective, viewing infrastructures as networked container technologies facilitating the extraction, storage, and distribution of resources (Chapter 1, 35). Following this, I argue that deconstructing infrastructural imaginaries can reveal prevailing narratives and metaphors of gender and technology. In order to do so, I will examine the construction of Hadaly as an infrastructural arrangement, characterized by a multi-relational structure enabling movement and circulation. As I delve into the components of Hadaly's character, I will revisit the history of the Edison Phonograph Dolls through the lens of a "Feminism for the Broken Machine" (Sharma 2020), highlighting the metaphorical connections between dysfunction and feminized storage devices. What will become apparent both in the analysis of Hadaly's components and in the reception of the Phonograph Dolls is their special connection to the imaginary of witches. With the retrieval of the voice recordings of the Edison Phonograph Dolls in 2015, I will explore how these dolls echo the historical intertwining of witchcraft with infrastructural technologies (Slaughter 2020). This resonates with prevailing gendered associations present in both modern and contemporary imaginaries of infrastructures like electricity, characterized as inherently feminine or linked to feminine qualities (Shanken 2017). This investigation builds on the findings that Allegra Fryxell has analyzed in relation to the historically evolved imaginaries of AI-driven systems, namely that "[t]here is a surprising continuity in the idealization of artificial women for purposes of utility, pleasure, and social benefit across the twentieth and twenty-first centuries. AI devices and applications today reveal similarly gendered features that reflect an idealized white femininity" (2021, 49–50). Illuminating the enduring presence of gender biases and entangled relationships between technology, infrastructure, and the imaginary, I propose that the Edison Phonograph Dolls carry the spectral presence of Hadaly.

A Pool of Desire

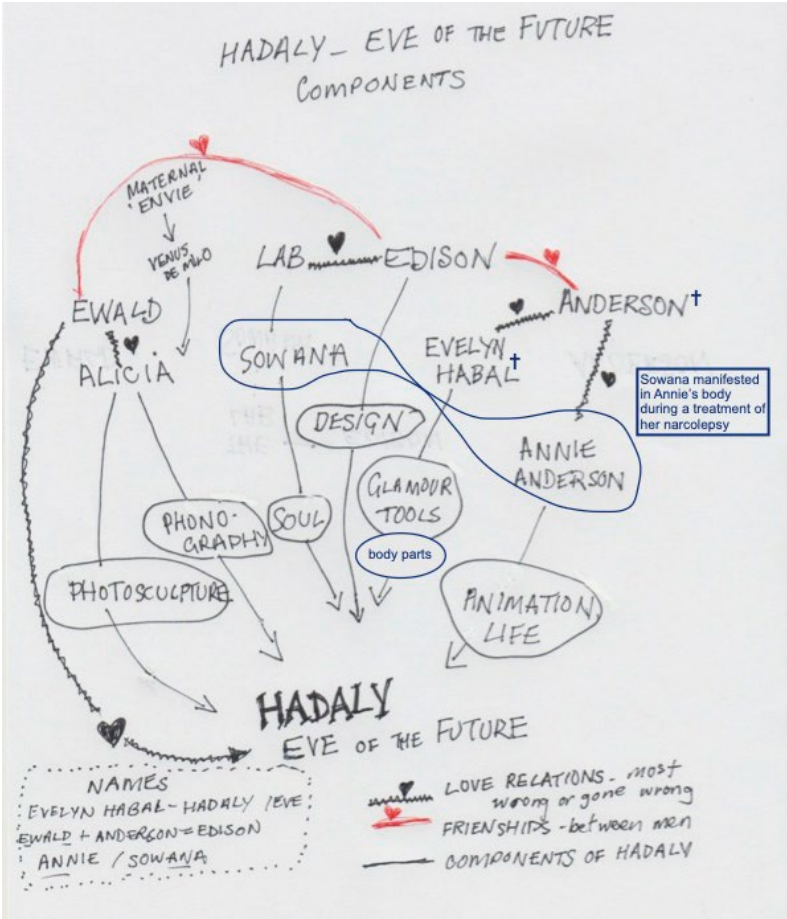
Hadaly might seem a passive figure. She is put together, she is constructed and designed, she is inhabited by Annie's soul, her movements and speech controlled through the default setting by Edison. As such, Hadaly not only joins ranks with Edison's Phonograph Dolls, but also with her literary predecessors, famously Pygmalion's statue in Ovid's *Metamorphoses* (2004), or Hoffmann's Olimpia in *Der Sandmann* (2001). What these literary feminized machines share is their male inventor and master who gains independence from the womb and therefore "mastery over nature" (1984, 257). In this respect, they could be

termed "extensions of man" in a patriarchal axis of power, not only because these figures originated in fiction written by men, but because male-coded desire is inscribed into their character.[2]

While Villiers de l'Isle-Adam's novel generally portrays male desire as imperative and men as dominant characters, femaleness is depicted as subordinate and contained. The novel exemplifies this through Edison's character, who asserts the thesis that women are lower beings, rather belonging to the kingdom of animals and plants. He substantiates this assertion with the story of his acquaintance Anderson, who was beguiled into a love affair by the dancer Evelyn Habal and who eventually died. Evelyn is described by Edison as a witch; a money-mad fraud who changed her appearance in order to seduce and bring righteous men to ruin. Thus, according to Edison, Evelyn fooled Anderson by means of witchcraft, namely in altering her appearance, her "natural look," by shaping her body through "devices of seduction" (Villiers de l'Isle Adam 2001, 111–12). These include: her lipstick, "matted hair and faded ribbons," blue pencils, carmine brushes, corset rods, fingernails, stiletto heels, and a mirror with which the dancer could study "the 'values' of her physiognomy" (121). Inspired by the witch's seductive devices, Edison suggests that if these artifices are the best part of women, why not manufacture the perfect illusion yourself? Edison thus integrates Evelyn's belongings and body parts into the body of Hadaly.

Annie, the widow of the enchanted Anderson, is now Edison's assistant. She is herself inhabited by the spirit of Sowana, hypnotized, and by that "taken out of service" while her body is stored in Edison's studio, made to serve as the spiritual engine of the android Hadaly. Alicia, who sets the pattern for the invention of Hadaly, is inhabited by her mother in the shape of an *envie*, "a visible imprint of a mother's unsatisfied desire" (Huet 1993, 223) by which Edison explains her resemblance to the Venus Victorious. The disparity between "the body and soul of Miss Alicia" that so troubles Ewald makes him prone to think that "this woman had somehow strayed by accident into this body, which does not belong to her at all" (Villiers de l'Isle Adam 2001, 31). Accordingly, both Annie and Alicia are equated with Hadaly, as their bodies are described merely as habitable receptacles for haunting souls. The fact that all the female

2 I summon McLuhan's canonical dictum from *Understanding Media: The Extensions of Man*, because in it he conveniently states that "man becomes, as it were, the sex organs of the machine world, as the bee of the plant world, enabling it to fecundate and to evolve ever new forms. The machine world reciprocates man's love by expediting his wishes and desires, namely, in providing him with wealth" (1994 [1964], 46). Precisely because the machine world is framed by an extension of Man and *his* mind, it also reflects and extends *his* desire. In her introduction to *Re-Understanding Media: Feminist Extensions of Marshall McLuhan*, Sarah Sharma frames the preceding quote with the observation that "McLuhan posits a conception of woman as pure information, like the light bulb" (2022, 16). With the reference to the light bulb, we come full circle to the non-fictional person Thomas Edison, who patented his light bulb in 1880.



[Figure 1] A diagram of the components of Hadaly, sketched by Zoë Sofoulis, supplemented by H. S. (Source: Zoë Sofoulis, email sent to author, July 7, 2022).

characters are represented as haunted and mechanical containers also then allows properties to be transferred from one to the other. Thus, Edison photo-sculpts Alicia's anesthetized body to impose her appearance and movements onto Hadaly.

It becomes clear that to construct this artificial woman is to reproduce those features deemed desirable and omit those properties framed as uncom-fortable or dangerous. In order to fabricate this service machine, the female characters have to become "'raw material,' which must be shaped and processed by technological means to satisfy human ends" (Edwards 2003, 189). In addition, to construct the infrastructure that animates Hadaly is to simultaneously construct the female characters as defective dolls.

While reviewing this text, Zoë sketched a diagram showing the composition of Hadaly (Fig. 1). It visualizes that Hadaly's proper functioning relies on a networked infrastructure of different agents, objects, and datasets, namely: "a combination of various exquisite substances" (Villiers de l'Isle Adam 2001, 60), hydraulics, phonographs, the spiritual motor of Sowana, the hypnotized body of Annie, voice recordings of Alicia, electricity, and hence the laboratory. Hadaly is filled with Evelyn's witchy seductive devices and Sowana's magical currents channeled by Edison. Hadaly's construction reveals the conditions of this explicitly male creation: female characters have to be detained and immobilized, they are depicted as dysfunctional "natural material" from which the desired properties can be extracted to technologically create an artificial being. Thus, the female characters surface only in their containing qualities, as spare part depots from which favored parts can be used and unwanted ones can be left behind. Hadaly mirrors this when she says: "Like a true woman, I will be for you only as you desire me" (199).[3] Framed as nature's broken machines, the female characters are disassembled to create and channel Hadaly. In this regard, Hadaly is a literary imaginary that sits within a feminized matrix of media technologies and the "misogynistic formulation of women as technological tools" (Sharma 2020, 173).[4]

The story nevertheless lacks a detailed explanation of the mechanisms enabling all components to function together. This void, I argue, is filled by the feminized infrastructure brought to life through witchy artifacts. Hadaly's components are described meticulously, but the means of their motion are only vaguely attributed to Sowana, embodying the mystical mechanics of feminized infrastructure. This echoes a historical pattern of feminized magic intertwining with infrastructural technologies,[5] personified as powerful yet menacing witches.[6] What strikes me is that from an infrastructural lens, the narrative of *L'Ève Future* becomes a depiction of assembled

3 This statement reminds me of Andrea Long Chu's provocative theory in *Females* that femaleness is to be seen as a universal existential condition in which the self is sacrificed to make way for the desires of another (2019).

4 Strengers and Kennedy argue that feminized voice assistants share similarities with Hadaly, being controlled, programmed, and compliant, embodying an idealized representation of women. Borrowing a term from Julie Wosk, they refer to these voice assistants as "facsimile females," especially in regards to Fritz Lang's *Metropolis*, in which a copy of Maria is "burned at the stake like a witch" (2021, 153).

5 In the Global North, and especially in Europe, scientific knowledge and magic coincided in a strange way in the nineteenth century. The revolutionary scientific discoveries made around 1900 pointed to the existence of previously unknown, invisible energies. These technical innovations seemed to allow a glimpse into a hidden, not to say occult, sphere that emerged parallel to a feminization of media and media labor (Asendorf 1989, 147; Hirschfeld-Kroen 2021; Leeker 2008).

6 Such as in Oliver Wendell Holmes's 1890 poem "The Broomstick Train, or the Return of the Witches." In this poem, "electricity that powers trolley cars [is represented] as an 'evil-minded witch' who 'will do a mischief if she can', but whose feminine magic ultimately succumbs to the masculine authority of the switchman" (Galvan 2010, 176).

SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

NEW YORK, APRIL 26, 1890.

THE MANUFACTURE OF EDISON'S TALKING DOLL.—[See page 261.]

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[Figure 2] The manufacture of Edison's Phonograph Dolls on the cover of *Scientific American*, 1890 (Source: Wikimedia Commons).

magical components and resources animating the android. Due to this rather extensive account, Hadaly is not only presented as a reassembled gynoid but also as a witchy, service-providing container infrastructure.[7] This trope becomes even more intriguing when considered in parallel with the story of the Edison Phonograph Dolls.

Holding Voices

The Edison Phonograph Dolls, sold from April to May 1890 only, were approximately 55 centimeters tall, weighed about two kilograms, had porcelain heads and wooden limbs. The torso was made of perforated tin, behind which was a miniaturized phonograph (Fig. 2). The phonograph contained wax rolls whose recording surface could reproduce a maximum of 20 seconds of sound. Among the rhymes carved into the wax surface were "Mary Had a Little Lamb," "Twinkle, Twinkle, Little Star," and "There was a Little Girl and She Had a Little

7 On the question of service and intimacy, I would like to point to Anne Küper's dissertation and research project in Bochum which, based on the history of the computer program ELIZA, deals with the question of how gendered chatbots relate to recalibrating concepts of intimacy.

[Figure 3] Front view of Edison Phonograph Doll in dress (Source: US National Park Service, credit: Joan and Robin Rolfs).

Curl." These nursery rhymes could be elicited from the doll using a hand crank on the back (Dawson 2015; Feaster 2015).

Mainly manufactured at Edison's factory in West Orange, New Jersey, the first experiments with doll prototypes took place in Menlo Park, where the plot of *L'Ève Future* is also set. In this early stage of development, Edison himself would lend his voice to the dolls, which according to a reporter from *New York News* (1888), had a "comical" and "grotesque" effect since the dolls were fashioned as little white women, with long hair, in chemises or Victorian-style dresses (Fig. 3). When production began, people were hired to lend their voices to the dolls.

Some of the recorded rhymes on the phonograph cylinders are digitized and available online.[8] However it is not documented who exactly these voices belonged to. An article from 1888 only mentions "two young ladies … who were continually talking to the tiny speaking machines" (Morning News 1888). Patrick Feaster found that the girls hired for voice recording might have been "supervised by a 'lady who would assist the girls in their voice culture'" (2015),

8 The recordings are available on the webpage of the National Park Service (2015).

but nothing is documented about their names, age, or background. An article in the *Scientific American* from April 26, 1890 simply states that a "large number of these girls are continually doing this work" and that "each one has a stall to herself" (Idaho News 1890, 3). Another article claims that there were 18 girls at the factory, while "only six can work at a time. The other twelve relieve them when they are tired" (Fort Worth Gazette 1890, 11). Feaster also found that "a transparent fiction was maintained" (2015) that the dolls were instead taught to speak for themselves. Children made inquiries about the dolls to the "Edison Phonograph Toy Manufacturing Company" to which the company's secretary Alfred Ord Tate replied that "Mr. Edison has some dolls that are learning to talk" (Feaster 2015). Another promotional myth claimed that their language teacher was a governess:

> As each doll reaches the proper age it is turned over to a governess .... Knowing the great imitative power of little folks, she is particular to modulate her voice to just the pitch which she wishes theirs to assume. The doll pupils are required to repeat her words until every accent and inflection is satisfactory. The dolls have such wonderful memories that not only do they repeat their lessons with accuracy, but they even "hold the voice." (New York Times 1889, 13)

Just this capacity of the Phonograph Dolls to contain, store, and hold the voices of the unidentified girls working at Edison's factory made it possible to digitally capture the recordings in 2015. This "resurrection was accomplished by a no less gendered technology: IRENE (Image, Reconstruct, Erase Noise, Etc.), an optical scanning system and digital medium for the séancing of fragile, analog-inscribed voices" (Flaig 2018, 4), as Paul Flaig writes in his article on feminist media archaeology.

The parallels between Edison's Phonograph Dolls, also named "Dollphones," and the fictional character of Hadaly are strikingly obvious. In the case of Villiers de l'Isle-Adam's novel, Alicia Clary lends her voice to be inscribed in the golden phonographs of Hadaly. [9] And just as the gynoid's familiar façade covers its infrastructural composition, so the Dollphone's shell contains the speech labor of unidentified girls. Ultimately, as Flaig states, "so would Edison relegate his female employees to invisibility and anonymity in favor of a timeless bachelor-machine he could claim to have engendered" (20). The same could be said about the fictionalized Edison, who states that "warmth, motion, and energy are diffused through the body of Hadaly, via an interlaced network of complex wires, exact imitations of our nerves, arteries and veins" (Villiers de l'Isle Adam 2001, 130), withholding the fundamental role of the female characters providing animating force and soul.

9 On this topic, Strengers and Sofoulis's contribution in Chapter 11 of this volume investigates stereotypical tropes of women and housewives that feminized voice assistants are designed with.

Another parallel between the gynoid and the Dollphones is found in their dysfunction. The Dollphones were only sold for a couple of months, since they were not only expensive and often defective, but also received wary coverage from the press. "One reporter in Washington, D. C. wrote a scathing review under the headline: 'DOLLS THAT TALK. They Would Be More Entertaining if You Could Understand What They Say'" (Feaster 2015). A. J. Millard noted that most of the dolls which were sold failed to work properly. Out of 200 dolls sold, 188 were returned, because they were "out of order and useless" (1987, IV–16). The phonograph mechanism, especially the wax cylinder, caused many of the operating problems because the "fragile needle assembly would not stay in the fine groove of the wax record" (IV–15) and "shavings from the wax cylinder fell onto the machine and gummed up the works" (IV–16). The underlying issue was the inability of the machinery to "absorb the shocks of transportation," which therefore "often broke down after being shipped" (IV–16).

The malfunctioning dolls not only reveal the technological limitations of nineteenth-century engineering, but also reflect the societal expectations and biases associated with gender. The fragility of the dolls, coupled with their inability to function properly, as well as their witchy quality of storing voices, mirror the broader gendered dimension of container infrastructures. Their flaws and limitations serve as a tangible manifestation of the biases and expectations engrained within technology itself. As such, the Dollphones fall within the scope of Sarah Sharma's concept of Broken Machine Feminism, that "account[s] for the differential experience of being positioned within and determined by patriarchy, of being understood as a technology that does not work properly" (2020, 172). What it points to in particular is the gendered attribution of disorder and dysfunction, leading to a deeper understanding of the gendered dimensions inherent in container infrastructures.

The Wax Is the Message

Flaig suggests one might "hear ideal Hadaly in the monstrous phonographic dolls produced by Edison and later resurrected by new media" (Flaig 2018, 15). In this last section, I will build upon this speculative idea of Hadaly's intertemporal echo being channeled through the dolls. When the recordings were made audible in 2015, they were characterized as "creepy" (Starr 2015; Ohlheiser 2015), "ghostly" (Cowen 2015), a "soundtrack to your nightmares" (Ulaby 2015), and "witch-like" (Feaster 2015). This invocation of the witch especially stuck with me.

As a figure, the witch is itself defined by her "in-between-ness." The similar labels "hag" or the German "Hexe" refer to her radical position as a mediator. Various explanations are entwined around its etymology. One traces it back to the Old High German *hagzusa,* which is composed of the elements *haga*

for hedge or fence and probably either *tysja* for fairy or crippled woman or *tusul* for ghost (Harper 2023; DWDS n.d.). Often referred to as hedge riders, these terms capture the witch's status as a figure dwelling in the borderlands, neither fully wild nor confined to the domestic sphere. Witches transgress not only spatial boundaries but also temporal and gender boundaries. They embody the capacity to exist beyond conventional temporal constraints, living preternaturally long or enchanting themselves to appear younger, much like Evelyn in the novel. Furthermore, the figure of the witch bears the possibility of blurring binary gender lines. As Silvia Federici argues, being accused of witchcraft in early modern Europe went hand in hand with being gender non-conforming or refusing the sexual division of labor (2014). Eluding any definition of their bodies, witches remain figures that are constantly moving on the threshold, intangible.

Although their appearance is exaggerated as girlish through conventionally gendered fashion, styling, and high-pitched voices, the Dollphones are neither girls, nor women; nor are they human. They exist in the intermediary sphere of space and time. As container technologies they hold, store, and transmit the acoustic uncanniness of the voices of bodies that presumably are no more. This "undead quality of the voice" (Flaig 2018, 21) is accompanied by their capacity as "storage technologies for other spaces and experiences" (Chapter 1, 28), bridging sound across different spaces.

When they were first delivered to their buyers, the Dollphones arrived as damaged objects, as broken machines "refusing to talk for their new owners" (Millard 1987, IV–15). In their case, it was precisely the phonograph with its needle and wax cylinders that caused the dysfunction. As a sticky material that can be plastically molded and carved, wax was originally thought to be more durable than the tinfoil cylinders which had been used previously. In the case of the talking doll, however, it would cause the machine to "lose her voice" (Wichita Daily Eagle 1888, 10) and "get out of order inside somehow" (Morning Call San Francisco 1892, 2). Instead of fulfilling their assigned role, some dolls remained silent. Thought of as passive containers providing entertainment for children, the dysfunctional dolls were refusing to carry out what was desired of them.

The wax cylinders in Edison's Phonograph Dolls are materially inscribed with the voice recording of the unidentified girls in his factory (Fig. 4)—a "female noise" (Power 2009) that overwhelms the wax rolls. Following Wolfgang Ernst's insight that "wax is an essential medium, because … it provides a loose coupling of elements, on which a tight coupling (form) can be impressed as in/formation" (2016, 65), the Dolls' phonographs are precisely inscribed with an exaggerated girliness. The more I listen to the phonographic memory of the dolls, the more I recognize in it a composition of what Alex Quicho has called the "total girl" (2023)—that is, the girl as a specific technology of subjectivity

[Figure 4] Microscopic view of the nursery rhyme "Twinkle, Twinkle, Little Star," carved into the wax surface of an Edison Phonograph Doll cylinder (source: National Park Service collection, EDIS 1263).

that embodies desire, attraction, and tactical passivity. Reducing women to the status of doll-like machines, as Villiers de L'Isle-Adam did in his novel, creates an affinity between women and technology that is also invoked in the figuration of the girl online, who stands in a "matrilineal genealogy of female media workers spanning the networks of the nineteenth and twentieth centuries, from telegraph and telephone operators to typewriters and computers" (Flaig 2018, 8).

Just as the female figures in Villiers de l'Isle Adam's novel are brought to Edison's laboratory as spare part depots, the voices of the unidentified girls are transferred to a technological container: the doll. And although this mediating labor was performed more than a hundred years ago, their agency resurfaces in 2015, when their artifactual voices enunciate witch-like recitations. The continuity that lies within the undead quality of their voice is one of feminized labor paralleled by and metaphorically connected to technological infrastructures. The witch-like qualities ascribed to the inherent complexities and hidden mechanisms of infrastructural technologies set the stage for this attribution of uncanniness to the Edison Phonograph Dolls. With their enigmatic voices echoing from the past, they became a manifestation of the blurred boundaries between technology, magic, and the gendered imaginaries ingrained within container technologies. This interplay between the witchy characteristics of Hadaly, the associations of feminized

infrastructure with magic, and the reception of the Edison Phonograph Dolls in 2015 paint a vivid tableau of how narratives of witchcraft and the feminine have permeated the realm of container infrastructures. It serves as one example of the enduring presence of gender biases and the oppressive yet potent affinity between the feminine as a symbolic category and technology.

Donna Haraway pointed out how helpful science fiction texts can be in de- and re-constructing imaginaries and narratives, precisely because they are populated with beings like cyborgs that defy and challenge dualistic assignments (2016, 10–13). Hadaly is one of those cyborgs from early science fiction, who indicates patterns of material-discursive entanglements of infrastructure and feminization that are otherwise difficult to pin down. In revisiting *L'Ève Future* and the history of Edison's Phonograph Dolls from a contemporary perspective, I put forward a story about Hadaly as a broken machine: a story of an android becoming, like Haraway's Cyborg, "exceedingly unfaithful to their origins" (10), and haunting infrastructural settings with gendered metaphors of dysfunctions and breakdowns. Hadaly's story exemplifies the enduring allure of the gendered qualities woven into understandings and experiences of infrastructural technology, and they sound creepy.

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HIGH-RISE LIVING

CONTAINER SUBJECTIVITIES

PLANNING PIPELINE

CHORA

[7]

High-Rise Living in Central Melbourne: Container Subjectivities

Hélène Frichot and Helen Runting

This chapter looks to the high-rise apartment dwelling as a container technology with aspirations toward an existenzminimum of spatial design. If the COVID-19 pandemic has demonstrated anything architectural, it is that the traditional tenets of modern architecture—space (measured in square meters of floor area), light, fresh air, views, a kitchen, a bathtub—are resources that are far from equally distributed, and not all citizens can avail themselves of the spatial infrastructures of the city. In this essay, we look to the architecture of financial and deregulatory exuberance that is expressed in high-rise residential apartment schemes in Melbourne, Australia from 2010 onwards and in the aftermath of the tenure of Victorian Planning Minister Matthew Guy. A feminist meditation on density leads us to consider these apartments as

container technologies with "choratic" capacities. The containment of life in the high-rise apartment is, we argue, organized according to the infrastructural rhythms of containment and supply, expressed in intimate, co-constitutive relations brokered between formations of subjectivity and spatial design. It is also present in the regulatory structures that "permit" these towers to rise upwards. Addressing technologies of containment understood as both planning pipelines and the material manifestation of the high-rise apartment itself, we ask: What kind of container subjectivities are right now in the midst of emerging, in this newly-minted, high-density architectural environment and its typological fundament, the skyscraper?

The Other Pink Tower

"I'm here! I'm in the lobby."

"I can't see you …"

"In the lobby. Near the lifts. There's a curved bench? Next to the curved wall? It's pretty uterine in here, with all these curves. Are you on your way down?"

"No, I'm here. In the lobby. Can you see the receptionist? Next to her."

"I can see a reception desk, but no one's there. Or there's someone standing next to it, but I think he's selling 'internet' to people. American. Should I talk to him? Does he have the key?"

"I think you're in the wrong building."

"I'm in the pink tower on A'Beckett street. Designed by Elenberg Fraser. I looked it up."

"I'm so confused. I am too. In a pink tower. On A'Beckett Street. Elenberg Fraser. Wait. The receptionist is saying something. … There are two pink towers. You're in the wrong pink Elenberg Fraser tower. You need to walk back across Elizabeth Street. 50 meters. Can you see it? The other pink tower."

And so we finally arrive at Avant Tower, 60 A'Beckett Street, in Melbourne's Central Business District (CBD), a multi-residential tower, where we'll be staying for two nights. Avant was designed by Melbourne-based architecture firm Elenberg Fraser, a firm opened by now-divorced celebrity architect couple Zahava Elenberg and Callum Fraser, somewhat infamous on account of a façade fire that broke out on November 24, 2014 at another of their high-rise residential projects, the Lacrosse tower in the Melbourne Docklands (Bleby 2019). The court case following the fire determined that partial fault resides with the architects, sending small shock waves through the architectural fraternity (Cheng 2019). Callum Fraser's defense, when asked about the specification of the flammable panel cladding, was that the architect's focus had been on the color palette, not on the fire rating and quality of the material itself. This had been left, purportedly, to the builder and the developer. The emphasis on what might be seen as the superficial choice of color over knowledge of a material's qualities effectively diminishes the presumed expertise of the architect as a professional.

We are on the 37th floor, with a vista down Swanston Street toward the Shrine of Remembrance. The air outside shimmers in the full sun of an Australian autumn, and the residential towers cluster collegially. The ground is a great distance away. Inside the apartment what first overwhelms the senses is a distinct smell of nicotine, covered ineptly by vanilla scent sticks. This olfactory combination immediately recalls the scent of a cheap motel room, underscoring Airbnb's failure to perform the sense of "home" that it markets as its unique selling point. There is a small sky garden, a miniature enclosure that is not quite a balcony, not quite a room, which houses a stool and looks to be where all of that smoking would have been enjoyed. This sky garden lends the second bedroom its filtered light. It's cold in the apartment; the wall-mounted reverse system air-conditioners do not work. The apartment, its south-facing wall glazed floor to ceiling, offers but a wafer-thin veneer to the external environment. This is the southern hemisphere, and a southern aspect means no direct sunlight can enter the shallows of the apartment. Despite the blue skies, winter is closing in. The mechanical ventilation system produces a low, persistent hum. Hardly a well-tempered environment, but an environmental capsule to be taken seriously nonetheless, especially once it sinks in that this capsule, a seemingly self-contained cell, is multiplied across the city in the tens of thousands. It is this multiplication of such container technologies in the shape of hermetically-sealed apartment units that concerns us in this essay, where our aim is to critically discuss how interior affects combine with urban planning politics toward the production of container subjectivities, and what this might mean for the future of cities.

In the Avant Tower we can study high-rise architecture at a 1:1 scale. We situate ourselves here to undertake a discussion using the format of a 12-hour

[Figure 1] View from bedroom, Avant Tower, 60 A'Beckett Street, Melbourne, May 20, 2021 (Photograph: Helen Runting).

conversation with colleagues and friends. This is the first such test of a performative research format we are exploring, and we have invited a series of architects, planners, and researchers to join us, either in person or digitally, to discuss the peculiarities of the Melbourne situation. Over the course of a day and an evening, our invited guests walk us through the genesis of the Melbourne high-rise as a typology and its explosive multiplication as a real estate product. Neither an inhabitation nor an appropriation, our brief "stay" follows the rules of an Airbnb contract: we can pick up the keys from reception, we are welcome to use the swimming pool and health club on the podium level, we are not to have parties, we are to tidy up before we leave. The "host," or their representative, is at our disposal to attend to any issues (at one point, they leave a couple of small electrical heaters at the reception for us, in response to the broken-down air-conditioner), and, crucially, they are anxious to avoid a bad review.

The apartment lacks any signs of long-term occupation: the wardrobes and cupboards are all empty, and the coffee-table books in the living room are revealed to be empty cardboard boxes, wrapped in fake covers. The temporary nature of this "home," and the artifice of its styling, are well-suited to the use we wish to put it to. Far from the procedural precision of ethnographic fieldwork within architecture, with its commitment to "deep hanging out" (Mack 2017), instead we are interested in surface impressions: for the coming 48 hours, this space will be used to gather voices, sensations,

and photographs to build a montage that can form the basis for a theoretical inquiry into technologies of containment and supply, container technologies and their associated subjectivities in formation. The question that we seek to address is simple: what kind of container subjectivities are right now in the midst of emerging, in this newly-minted, high-density architectural environment and its typological fundament, the skyscraper?

The Planning Pipeline

The high-rise apartment dwelling and its collective form, the high-rise, now so impressively populating the Melbourne skyline, cannot be discussed without reference to the facilitative planning milieu that enabled its emergence. The planning system is a space of gestation, whereby proposals for built structures and land-use changes are put in a holding pattern while they are shaped to fit statutory and strategic requirements and considered for approval. Following a period of up to 18 months in this womb-like container technology—the planning office, the suite of documents, the meetings, the red tape, the extant planning regulations, the relevant acts, even the minister of planning's approval—plans are released into the world to take on their agreed material form.

In Victoria, this process is guided by the Planning and Environment Act (herein referred to as "the Act"), and statutory planning decisions (that is, decisions to approve or deny applications to construct buildings or change a land use) are generally taken at the local level of the municipality, in line with the requirements of the Act. The Act also specifies a series of "triggers" that allows applicants to bypass the usual regulatory chain of command, which normally sees decisions taken by committees of elected local politicians or by planners who exercise "delegated" decision-making power. In such cases, the usual gestation period can be expedited: such incursions into the usual order of things, a little like a caesarean section, instigate a different kind of "birth" for a building by ejecting it from the sphere of municipal planning policy and the purview of elected local politicians. Two triggers that distribute power in this way are appeals to the Victorian Civil and Administrative Tribunal (an expert panel that can overturn government decisions) and "large buildings over 25,000 square meters in floor area" (which can be personally approved by the Victorian minister for planning). Such triggers effectively cut the planner out of the picture as midwife, replacing her with experts or, as happened time and time again during the Matthew Guy years between 2014–18, the minister himself.

In the decade spanning 1999–2010, the planning portfolio had been passed around like an Australian Rules (AFL) football—it had been held by ministers including John Thwaites (1999–2002), Mary Delahunty (2002–05), and Rob

Hulls (2005–06), until it finally landed in the hands of star AFL player Justin Madden, a 206-cm-tall ruckman for the Carlton Football Club and, as fate has it, a registered architect and Labor Party politician. Madden was a vocal critic of suburban sprawl, and his time as minister (2006–10) coincided with a period of rapid change in Melbourne. The capital of the State of Victoria, Melbourne (the settler-colonial name for Naarm) was built on the unceded lands of the Wurundjeri Woi Wurrung and the Yaluk-ut Weelam Boon Wurrung of the Kulin Nation and occupied by the sovereign-colonial State of Victoria, and subsequently the federated nation state of Australia, from the late eighteenth century onwards. It was in Melbourne's CBD that this change began to go vertical, and the towers began to rise, punctuating the flat industrial land south of the Yarra River and marking out the edges of the Hoddle Grid, the street pattern that defines the older part of the CBD that lies north of the river. In 2010, when the conservative Liberal Party took control of Victoria through the election of the Baillieu government, Matthew Guy was appointed minister for planning.

Matthew Guy is remarkable in that at the outset of his tenure he took no time in mobilizing ministerial powers to approve developments over 25,000 square meters. When news hit that the new minister had a soft spot for the approval stamp, savvy developers "upsized" to make sure their applications landed on the desk of "Mr. Skyscraper" (Dobbin 2013). Tower fever had hit. The city entered a period of accelerated morphological and typological mutation that resulted in a vertical explosion of built form that changed the face of the city forever. Changes were taking place, we argue, not only on the surface of things for the purpose of rebranded Melbourne skyline postcards, but within the multiplying designed living interiors now available for habitation in the center of the city, the CBD itself.

Even when in deregulatory overdrive, urban development is a relatively slow business. Triggers can be used to expedite planning permission, but large projects also require extensive financing and ownership structures to be finalized, labor power to be contracted, infrastructure like tall cranes to be procured, and enormous amounts of raw materials and prefabricated components to be purchased and transported to a site before construction commences. Writing in 2014, the final year of Guy's tenure, and just before the Daniel Andrews Labor government won the election, urban designer Andy Fergus provided a brief overview of the consequences of the Matthew Guy years. In "Melbourne: A City for Cowboys," Fergus explains to his audience that to understand the future implications of the development boom of the previous decade requires "appreciation of the pipeline of projects currently approved, commenced, or nearing completion that have not been adequately assessed for quality, social function or urban contribution" (2015, 120). Fergus runs off a series of statistics in order to build his argument: the average

period of tenancy for a 1-bedroom rental is 13 months; in Guy's first year, a four-square-block zone of the CBD was approved for redevelopment by means of 7,800 apartments "almost entirely composed of 1–2 bedrooms—the majority of which are single aspect, and with at least one bedroom in-board without access to fresh air or natural light" (120). With a planner's horror Fergus describes the approval of 2,000 apartments in a single day (dubbed "Super Tuesday"), commenting that "none of these towers complied with the directions of the City of Melbourne, whose focus is primarily on public realm, the environment, and city form" (121).

Fergus's analysis is useful for us because it introduces the first of two "technologies of containment and supply" that we wish to address in this interrogation of the Melbourne high-rise: the planning pipeline. When read through the lens offered by philosopher Zoë Sofia's concept of "container technologies" (2000; Chapter 1), the subject of the present volume, the planning pipeline forms a highly "unobtrusive" space which ensures the supply of a very specific social good, namely "permission"—the democratically-sanctioned approval that opens up the possibility to exploit land and resources for the purposes of creating an urban environment. Planning permission might be unobtrusive, but it is far from immaterial: it is branded onto documents and physically inked across a set of architectural drawings. "Imagine a rubber stamp," we might pose, "this stamp is 'performative' in the sense that the symbols it inscribes on pieces of paper do things. It is magic, giving line drawings of buildings permission to become real" (Runting, Matz, and Sjögrim 2021, 14).

The planning system—the space of the process of assessment that is applied to unbuilt architecture in advance of its materialization—is "gestational" in its character. In this, it can be likened to *chora*, the "mythical bridge" that, as Elizabeth Grosz explains, Plato invokes in the *Timaeus* to describe the space "between the intelligible and the sensible, mind and body" (1995, 112), being and becoming, thereby constructing a dualism that has long troubled feminist thinkers, including Grosz (1995) and Luce Irigaray (1984). Chora's primary quality is its lack of qualities—"its function is a neutral, traceless production that leaves no trace of its contributions, and thus allows the product to speak indirectly of its creator without need for acknowledging its incubator" (Grosz 1995, 115)—and taking this philosophical definition, comparisons can be made to the planning process. In the complex processes that guide the materialization of the built environment, planning is often addressed as a period of time, an interval that must be traversed. The 18 months that it can take to assess a large project (and here architects and developers may be in agreement) is a costly holding pattern. While the process is rarely thought of as a creative space, let alone a necessary period of incubation, this is effectively how it operates, rendering possible, as we argue, the final, materialized form and the lives who will be concurrently formed as container subjectivities.

When the planning minister himself decides to bypass this choratic process, with its layers of democratic legitimacy, and take matters—and the approval stamp—into his own hands, the skyscrapers that come out the other side might, from a planning perspective, be understood to be premature, for they have been deprived of the nurturing development time that they might otherwise have been afforded while necessarily under the purview of a team of municipal planners.

What "expediting" the planning process achieved in the case of the so-called Guy years was a glut of projects in the "planning pipeline," a swollen sluicegate located on the other side of the approvals process, but not yet fully within the built environment. The pipeline was a different kind of holding pattern than that of the planning system: fed by Guy, it was the space in which these pseudo-fictional towers waited whilst they were carefully connected to global logistics and supply chains, and to financial systems and local labor markets. On the other side of the pipeline, when these tens of thousands of apartments were eventually built, they had been poorly "socialized": the resulting high-rises didn't always play well with others, and their extractive attitude to resources had not been curbed by municipal green building regulations. Without getting to know their city first, they entered it, each an infant giant who "ruthlessly exploits this seemingly personless entity [the mother] whom it only gradually comes to know in a relationship of mutual love and concern" (Chapter 1, 22).

Life in the Shallows

From the vantage point of the 37th floor of a residential high-rise tower, small bubble-worlds can be glimpsed here and there in nearby towers. When viewed from a distance, the inhabitants of the surrounding towers perform their daily rituals as though on a proliferation of small screens. A comparison to the interface of video-conferencing software that has become ubiquitous during the COVID-19 pandemic is automatic. Life in the shallows is sun-drenched and on display. But what protean forms of life can be observed unfolding there? What do we see? In the tower across the way, facing north into the sun, a woman, or it could be a young man, is doing sun salutations; their lithe limbs cycle through the yoga poses of a *vinyasa* flow: downward-facing dog, three-legged downward-facing dog, low lunge, high lunge, a twist that opens up to a backbend, warrior three, a small handstand, chair pose, plank, *Chaturanga Dandasana*, up-dog, downward-facing dog. Their transitions are graceful. The pandemic is still present to mind for so many, and in the coming weeks further lockdowns will be imposed, and so our vista is filled with more live action than it might otherwise be.

[Figure 2] Bedroom with occupant, Lighthouse, 442 Elizabeth Street, Melbourne, March 21, 2022 (photograph: Helen Runting).

At 12:30 p.m. the lift core cranks into action, with a machinic whir and hum of bodies ascending and descending. It's time for lunch. Inside the lifts, amorphous figures hide beneath fluffy "bunny rabbit" dressing gowns, wearing comfortable silk and flannelette pajama pants. We see this outfit on several different people. Bunny ears attached to hoods. Tails sewn onto dressing gowns. Plush faux fur. Soft pinks. Polka dots. Outside, the Uber Eats delivery drivers pull up on their bikes, and one after the other "the Bunnies" exit to collect their food, and just as quickly return to the lift, retreating to the comforts of their high-rise cells.

Beyond the steel frame and the elevator required to build the skyscraper, Reyner Banham notes "a gaggle of other devices, such as electric lighting and the telephone were equally necessary in order for business to proceed at all" and for this typology to be necessary; to this list, the architectural historian adds flushing toilets and thermal and ventilation systems, "without which such tower blocks would be uninhabitable" (1969, 72). When addressing the Melbourne high-rise, particularly in the context of a pandemic present, there are many other devices that must be added to this list of technologies that make the container inhabitable: the smartphone, the screen (be it in the form of a widescreen TV, projector, or tablet in bed), Netflix and other streaming platforms, Uber Eats and other delivery services, and the restaurant kitchens that such services connect to. In the spatially constrained interiors of a contemporary high-rise, these infrastructures distribute the functions of the home beyond the envelope of the building, without requiring the inhabitant to exit its membrane. Another rhythm of containment and supply is thus expressed through infrastructural systems (Frichot 2021).

These flows place pressure on one space in particular: the portion of the footpath adjacent to the lobby. Beyond the shared entertaining patios, swimming and spa decks, or co-working spaces, it is this outer zone of the lobby that becomes the real point of social connection between the building and the city outside. It is to the lobby and then the footpath that the Bunnies drift, to pick up their lunch. In this, the high-rise offers the perfect conditions for "no-set sci-fi" (Runting 2020), simulating conditions of quarantined (and quarantinable) self-sufficiency—however unlike a spaceship, this self-sufficiency is flimsy and superficial: it is only ensured by virtue of its cybernetic integration with external supply chains. Necessary boundary conditions emerge where the interior must meet the exterior, and these contradictions are revealed.

And it is here, in this liminal space, that the Bunny-ness of the residents that we observed that autumn day—the idiosyncrasy of dressing in animal-themed pajamas and fluffy slippers in the bright Australian midday sun—revealed something striking: in the system that is formed by the skyscraper and its network, the high-rise apartment dweller is a figure who never really has to go "outside" because they bring the inside into the interior with them, transporting its tactile, pastel softness; they have, in this habit, become creatures of *comfort*.

In his canonical account of the history of environmental control, *The Architecture of the Well-Tempered Environment*, Banham traces the genesis of modern notions of comfort to the domestic interiors of Frank Lloyd Wright and his "Californian Contemporaries," to whom he attributes the popularization of a design idiom predicated on tactile surfaces, acoustic quietness, controlled temperatures, and intimate lighting. Banham describes this idiom as inverting the relation between inside and outside in order to privilege interior environmental control over "the package itself" (1969, 95). When this logic is scaled up to the Avant Tower, which fills the entire extent of the envelope that the planning minister gave it with his rubber stamp on July 11, 2012,[1] the exterior still exists: its white structural ribs operate to articulate this "infant giant." Yet comfort here takes on a slightly different role: it forms a portable, affective, and atmospheric blanket that takes the edge off the sheer density of Melbourne's high-rise towers.

In this, the affective comfort blanket does not conceal the incredible densities of the high-rise towers but de-escalates their affective punch. Whilst there is a strong risk that, in the comfortingly plush silence of the busy lobby, de-escalation leads to de-politicization, the space of the footpath

1 Application number 2010026164, for "Demolition and construction of a mixed-use multi-storey tower comprising accommodation (residential apartments and serviced apartments) and ground floor retail premises (other than adult sex bookshop, department store, hotel, supermarket and tavern)" at 58–64 A'Beckett Street, Melbourne, was approved by Planning Minister Guy, as the responsible authority, on July 11, 2011.

suggests a moment of exchange that contains a more utopian potential. The Bunnies, when viewed through another lens, could in fact offer us a figure of, if not post-human, then at least a norm-critical subjectivity in formation, and perhaps even a revolutionary potential that deviates radically from established Australian ideals of the suburban home and its nuclear family inhabitants. As Dolores Hayden powerfully argues in *The Grand Domestic Revolution*, the retreat to the suburbs presents a distinct regression in terms of the emancipation of women and how their collective labor might be better shared out by rethinking the distribution of those places of reproductive activity, the laundry, the kitchen, the place where children play and are cared for (Hayden 1981). The suburbs multiply these functions *ad nauseum*, separating one family unit out from the next, requiring women to be isolated in their domestic environs, forgetting the promise of the density of the city as a possibility for collective life at closer, more intimate quarters. The suburbs, quite simply, support services and safe, stable, conservative political habits, discouraging neighborly socializing of the kind that might achieve the political action of women united (23; 209).

A Womb with a View

"What can one do in a space that does not allow the body to move?" we asked in a previous essay, where we introduced the soft contours of "the Pastel Cell" (Frichot and Runting 2020, 188). It is the studio and single-bedroom dwelling that most acutely lays out the cellular possibilities of the bare minimum of high-rise apartment life, a "womb with a view" (Chapter 1, 26), but a view to what kinds of vistas? Peter Sloterdijk calls the apartment dwelling one of the most "successful architectural innovations of the 20th century" (2016, 529). A symptom of modern, mediatized society, the studio or one-room apartment renders vivid a material tendency toward cell formation (529). The cell increasingly depends, as we have so explicitly witnessed during the current pandemic, on the screen that is embedded into it, including access to data, media plug-ins, streaming TV. A dubious liberation is achieved by way of the media captivation of solitary individuals in communication with themselves. Sloterdijk compares the apartment with the cell, understood both as a biological cell and as a typology associated with the monastic cell. The "egospheric" (544) inhabitant of the apartment cell is described as being co-isolated from its neighbor, producing an "architectural and topological analogue of modern individualism" (531). Cellular bubbles cluster in greater agglomerations as forms with "socio-morphological implications already observed in the nineteenth century" according to Sloterdijk (539).

Rather than a cell per se, Lieven De Cauter instead refers to the capsule, gendering it cautiously masculine, and rendering it "inorganic, fixed, closed" as distinct from "permeated, breathing, breeding," qualities he allocates to the

feminine (2004, 77). He calls ours a contemporary capsular civilization, with an emphasis on the capsule being that keeps the subject in captivity, a constraint with the presumed benefit of shutting out the hostile, external environment (77). At the same time, the capsule itself becomes an environment, a milieu, in De Cauter's account. Where Sloterdijk dryly alludes to the illusion of autonomy of the cell inhabitant, who is rather co-isolated than an island unto themselves, De Cauter speaks more urgently of the individual's capture and mediatized captivation and finally homes in on doom prophecies. In both cases, whether following Sloterdijk's or De Cauter's account, the comforts of maternal provision and a distinctly feminist point of view on cell living are lost or else, yet again, the masculine position is given preeminence: "architecture is both means *and* midst, it is the true milieu of man" (De Cauter 2004, 77).

The containment that is the home, even the one-bedroom apartment, prepares us for all our departures and returns. It is what Zoë Sofia (after Don Ihde) describes as a "shelter technology" (Chapter 1, 27), paying attention to the home as a "facilitating environment" (22), and acknowledging it as a maternal support, the reproductive labor and recuperative space that is the home: "The organism cannot be considered apart from the habitat that houses it" (21). In the closing observations of her essay dedicated to container technologies, Sofia tasks us with a simple act of observation. We are to look around our domestic environment and reclassify everything we find there according to elaborate and entangled systems of containment and supply. Acknowledge the background, acknowledge the context, or, as she enjoins us, citing Gregory Bateson, reflect on that basic unit of survival, "organism plus environment" (21). Without containment, no capacity to secure supply, without supply, no containment. This is the designed living environment's great infrastructural rhythm.

It must be hastily added that this infrastructural rhythm privileges some, and disadvantages others, crossing species boundaries, manifesting as a technologically-augmented world system we now call the Anthropocene, or perhaps more aptly, the Capitalocene. Containment and supply service the promise (too often broken) of the facilitative environments of the home at the scale of a body politic. To punctuate this possibility there is the spluttering sound of breakdown and disrepair, then the trickle as the supply slows down, something we are vividly witnessing at the time of writing as supply chains slow down and interest rates zag upwards amidst the disruptions of the pandemic and its aftermath.

The breaking down of systems of distribution and redistribution suggests a failure of both imagination and politics. As Judith Butler remarks, without access to the public good of infrastructures, from the street to the home, "if the infrastructural conditions for politics are themselves decimated, so too are the assemblies that depend on them" (Butler 2016, 13). And, as Emma Power

and Kathleen Mee have powerfully argued, housing can be conceived as an infrastructure of care, and infrastructure can be reconceptualized beyond the static objects, public goods, and capital works that compose its forms; instead, infrastructure can be refigured as "dynamic patterns that are the foundation of social organization" (2020, 485). Simply, the dynamic rhythm of infrastructure includes both the shelter technology of the home as that space of recuperation and recovery from daily exhaustions, as well as that milieu that fosters the capacity to venture forth with political demands. As we have previously argued, we are all in need of "a refuge from time to time, but beyond our self-reflective repose, beyond the nuclear family, and beyond the 'community' of the urban villa, a city awaits us" (Runting and Frichot 2020, 188). The nuclear family, as De Cauter points out, is a "capsular institution," fearful and therefore closing out the unsafe and uncontrollable territories that surround it. What this fear overlooks is that shelter technologies extend beyond the human, relying on an environmental support system, a background that recedes right up until the moment it looms forward in order to speak back, intruding on our assumed daily coziness, rousing us out of our comforts, upon which we nonetheless depend.

In closing, we thread these four themes together: First, the "planning pipeline" of the Guy years demonstrates that the built environment does not simply appear and that things as solid as skyscrapers can emerge from cocaine-fueled periods of economic and deregulatory exuberance, instigating the cruel cut that is a caesarean section, wherein the container technology of the home is prematurely prompted to mutate and proliferate. But without checks and balances, what are the monstrous environments that we create? Through the figure of the Bunnies, we consider the radical politics of high-density living, which is in part concealed by the transposition of domestic metrics like comfort onto this new kind of densely woven cybernetic space. Finally, we consider how "infrastructural rhythms" might be determined within this condition, which cannot be viewed through the methodological lenses offered by traditional architectural critique or analysis. Beyond the well-worn argument that skyscrapers "index" capitalism, we must look to their modulations, rhythms, and to how the play of light across a surface stimulates a ripple of activity behind the ultra-clear glass.[2] We conclude by suggesting that beyond the heavily racialized stereotyping of Melbourne's skyscrapers might lie another, far more utopian possibility that terrifies its house-born suburban critics to their core.

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2 The transhuman enmeshing of resources, inhabitation, technology, and real estate is explored with respect to ultra-clear glass in recent work by the architect Andrés Jaque and his Office for Political Innovation (Jaque 2019).

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CONTAINMENT

ANIMAL RIGHTS

TORTURE

VIOLENCE TO ANIMALS

[8]

Contained: Sites of Animal Confinement

Dinesh Wadiwel

Container technologies have the capacity to protect and nurture, to hold and supply resources, and thus to facilitate our capacity to survive, according to Sofia (Chapter 1). However, containers can also function as instruments of violence, denying movement and restraining their object within a relation of domination. This is central to the function of the prison and other forms of carcerality in human societies. Containment strategies have also been fundamental in human–animal relations, from hunting to domestication to industrial production. The carceral confines of agriculture systems, zoos, labs, and homes keep billions of animals captive worldwide. A defining feature of contemporary industrial-scale agriculture—aside from its general hostility towards animals—is the opacity of its containment techniques: what goes

on inside is shielded from public view, and activists who attempt to expose the inner workings are frequently criminalized. Animals experience controls and restrictions over all aspects of their lives as they are moved through a "carceral archipelago" of interlinked containers that segment, conceal, and orchestrate our mass violence against them.

Depression in humans has been characterized as a state of "helplessness and hopelessness, sunken in a well of despair," and the chambers were designed to reproduce such a well for monkey subjects. Although the confined monkeys are free to move about in three dimensions within the chamber, and although they eat and drink normally and maintain proper weight, within a few days they typically assume a huddled, immobilized posture in the corner of the apparatus.
Harlow, Harlow, and Suomi

Harry Harlow's highly controversial experiments with rhesus monkeys are famous for their contributions to psychological knowledge, but they are infamous for the cruelty to the animals involved (Harlow, Harlow, and Suomi 1974). One particular experiment conducted by Harlow and colleagues involved the construction of a "vertical chamber apparatus": a device made of stainless steel, with sloping sides that funnel downwards to a wire mesh platform. As part of the experiments, three-month-old baby monkeys were separated from their mothers and placed in the apparatus. Although the monkeys were fed and had some capacity to move, the researchers observed that the strict darkened confinement meant that within a few days the monkeys took on a "huddled immobilized posture in the corner of the apparatus" (537). The aim of this diabolical steel container was to induce depression, and it was accordingly described as a "pit of despair."

For psychological sciences, these experiments helped to demonstrate the deep emotional effects of loss of parental connection and isolation. However, the experiments also tell us something about our relationships with other animals. We do a lot of containing of animal life, and frequently this involves containment as a form of violence.

Containers are fundamental as technologies. Science and technology studies scholar Zoë Sofia argues that container technologies—think about everything from a drinks bottle to a handbag, to a house, to a grain store—have the capacity to protect and nurture, and to hold and supply resources (2000; Chapter 1). Arguably, containers are everywhere in our contemporary world. Containers facilitate our capacity to survive. They are essential for holding food, resources, and bodies in space. Containers are also part of the way in which the terrain we inhabit is segmented and organized. For example, our urban spaces can be conceptualized as a series of interlinked containers—households, businesses, factories—that enable bodies to work, learn, and relax. Moving containers—cars, buses, planes—transport us between these different enclosures.

However, containers can also co-operate in the practices of violence. A prison—an apparatus that organizes individuals into small, fortified cells (containers within containers)—is essentially a building designed to segregate a portion of the population and expose them to legally-authorized violence. Some of the most infamous sites of intra-human violence, such as the Nazi death camps, the S-21 Tuol Sleng interrogation facility under the Khmer Rouge regime, or the Guantanamo Bay detention camp are essentially examples of containers of violence. Containment is also essential as a tactic in warfare. In a siege for example, an armed force will surround and slowly debilitate an enemy through a war of attrition. In these cases, the qualities we normally associate with containment—protection and nurture—are inverted to produce violence and hostility.

Containment is useful as a tactic of violence because the container prevents escape. The four walls of a house protect and provide shelter to its inhabitants. But this same quality means that it can function as a means of preventing those who are inside from leaving. This reminds us of the trauma that detention, in its many forms, can inflict on the beings it captures within. Globally there is a movement to prohibit solitary confinement, quite correctly maintaining that it is a form of torture (Méndez 2011, para. 70; Guenther 2013). There are also many social movements now working against incarceration in all its forms, including calling for the dismantling of prisons, immigration detention centers, and disability institutions. Harlow's "vertical chamber apparatus" shows us the reasons why these are important movements for change.

[Figure 1] "A principle of opacity to the outside world." Animal factory in Perth, Western Australia, from the photographic series *Animal Factories* by Yvette Watt, 2012 (reproduced with permission from the artist).

Containers also have the capacity to obscure the worlds they hide within. Most contemporary forms of detention work with a principle of opacity to the outside world: the general public do not see inside the prison. This allows for the container of violence to develop its own unique ecology within, with rules, norms, and social roles that look nothing like those outside. Contemporary television dramas set in prisons, such as *Orange Is the New Black* and *Wentworth*, perhaps provide audiences with stylized and sanitized glimpses into what these alternative worlds may look like. However, they probably can never describe the full horror of life inside, including the routine violence that the concealed container of the prison enables. Globally, these sites of secrecy enable many forms of violence which are at odds with international law. As political philosopher Darius Rejali observes, this secrecy is one way to distinguish between torture that happens today, and the public punishments inflicted on bodies in ancient times: "modern torture is private and not public. It takes place in the basements of prisons and detention centres" (1994, 13; 2007).

Containment has a pronounced significance in the history of relationships between humans and other animals. There is evidence that early humans made use of landscapes around them to ambush cornered animals as part of hunting practice (Klein and Edgar 2002, 18). These practices enabled a small number of humans to work co-operatively to catch and kill a large number of other animals that could not be captured by a lone hunter, and not without great personal risk of injury. Likewise, the development of nets as a tool of capture on land and sea was important in allowing the hunter to pin down their struggling victim at a distance. To an extent, in the contemporary era, we have seen a development of these hunting practices which involve ambush. Today, the capture of wild fish in our oceans is frequently an example of mass mechanized hunting. Containment is essential to this fishing enterprise. The purse seine fishing net is like a large drawstring bag (Ménard et al. 2000). A large net—which can be up to a kilometer long and two hundred meters deep—is threaded over an area, and then pulled inwards to trap the sea animals within. This is containment as a hunting strategy that operates on industrial scale.

[Figure 2] "Happy Hens" from the photographic series *Animal Factories* by Yvette Watt, 2012 (reproduced with permission from the artist).

Containment as a strategy is also essential to our prominent history with other animals: namely domestication. Historians would understand this domestication as primarily associated with husbandry: that is, the process by which humans took control over the reproductive lives of non-human animals (Clutton-Brock 2012, 3). However, this history isn't just about breeding but also about the slow process of disciplining bodies so that they fitted the routines of our lives and met our own needs. Containment was essential to this story. Agricultural animals could only be domesticated insofar as they remained within the control of humans, whether the herd was under the ever-watchful gaze of the shepherd, or animals were fenced into enclosures. As animal studies historian Jason Hribal notes, hedges and fences function to prevent escape and block animal resistance to human rule (2003, 448–50; 2010). These simple technologies partition grazing land, allowing animals to be carefully cycled from pasture to pasture, and enabling the shepherd to exert firm control over their "livestock."

Contemporary industrial-scale agriculture perhaps reflects the ultimate expression of human hostility towards animals. In the factory farm, a diabolical blend of human supremacism, cold rationality, and the hyper-production of capitalism all come together, and are responsible for the slaughter of some 80 billion land animals per year (Wadiwel 2015; 2023). In these sites, food animals are systematically contained as a strategy of violence. Concentrated animal-feed facilities segment animals into tight enclosures and cages. Deep controls are exercised over movement, food intake, sociality, sexuality, and lighting. All reproduction is forced reproduction. Animals are birthed into enclosures and constantly move between enclosures. They will spend their life shuffling between these sites of containment until they are eventually prodded towards the stun gun when it is economically useful for their life to end.

Opacity is essential in this regime of containment. As animal rights activists continually remind us, a condition of animal agriculture today is that what goes on inside is shielded from public view (Pachirat 2011; O'Sullivan 2011). Across the world, the animal agriculture industry has been pressuring

[Figure 3] "Long anonymous sheds in rural Australia." Adelaide farm from the photographic series *Animal Factories* by Yvette Watt, 2012 (reproduced with permission from the artist).

governments to introduce so-called "ag-gag" legislation to criminalize the work of activists who try to unveil the horrors within factory farms. To an extent, these attempts to prevent scrutiny must be treated as an attack on our democratic right to know what happens in our food systems. But the deeper problem is that many of us just don't want to know what is happening inside the facilities. The container helps us to forget this violence. Australian artist Yvette Watt's 2012 photographic series *Animal Factories* highlights this horrific yet seemingly banal reality (see also Watt 2014). Watt's images depict long anonymous sheds in rural Australia; they appear peaceful, inconspicuous, mundane, and lacking friction, despite the mass violence contained within.

Beyond the factory farm, there are other sites of animal containment that are important to consider. While our relationships with companion animals do not betray the same hostility which we direct towards animals in our industrial food systems, they are also marked by domination and violence (Wadiwel 2015, 199–200). These animals that we love in our homes, we also seek to ruthlessly control. We dictate their sexuality and reproduction. We typically separate them from their families, and limit their interactions with their own kind. We regulate their nutrition. These are also relationships of containment: in intensifying urban spaces, we constrain these animals in ever-shrinking enclosures in our homes and gardens. Some cats enjoy freedoms to wander, though increasingly these freedoms have been curtailed, and thus many cats spend their lives incarcerated within the family home. In some countries dogs are free to roam through cities; however, at least in the Global North, freedom from containment for dogs means an occasional walk tethered by collar and leash, interspersed, if they are lucky, with a moment of freedom in an "off-leash" dog park.

Today, the reality of human relations with other animals is increasingly mediated by the architecture of mass containment. Billions of animals are held within carceral confines in food systems, zoos, experimental labs, and family homes. Feral animal hunters and urban shelters provide a means to mop up any leakage from this mass interconnected containment system. Animals that cannot be contained are ruthlessly extinguished. When French philosopher Michel Foucault described the "carceral archipelago" (1975, 297),

he was interested in how institutional forms of containment such as schools, hospitals, and prisons are used to discipline and make human bodies docile. But the carceral archipelago is also a useful way to describe the interlinked containers which today segment, conceal, and orchestrate our mass violence against other animals.

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ONTOLOGY

METAPHOR

MOBILE GAMES

PHENOMENOLOGY

PARATEXT

[9]

The (Un)Containable Ontology of Games

Ingrid Richardson

This chapter explores the various ontological and containment metaphors that can be used to describe our experience of game spaces, and considers what modalities of "holding" might aptly reflect the complex layering of material and digital contexts specific to online play. Contemporary game devices—now networked and mobile—have undergone significant change in terms of their instrumental affordances and experiential reach. Through questioning how games are (and are not) forms of containment, this chapter seeks to better understand the inherent flexibility of our corporeal-conceptual schemata, and reveal the deeper ontological moorings of the container metaphor and its translation onto game spaces. The analysis brings together three conceptual frameworks—the body phenomenology of

Maurice Merleau-Ponty, Zoë Sofia's work on container technologies, and the philosophy of George Lakoff and Mark Johnson on ontological and container metaphors.

Introduction

Technological developments ranging from the telephone through to radio, television, cinema, and video games have created quasi-spaces where a sense of presence can be felt beyond the location of the physical body. Both established and new media technologies frequently function by appropriating space as a framing metaphor to enable consumption and use, and there is much to be said about the configuration of technospaces and media spaces in their specificity, and the relation between these spaces and their effect on our corporeal schematics. For example, within game studies the magic circle describes how a game is contained figuratively, conceptually, and in praxis. That is, players are said to engage in "strategies of containment" and "boundary work" around what constitutes gameplay. In this chapter, I consider how such modalities of holding are reliant on "deep" corporeal and ontological metaphors, with the container metaphor being one of our primary experiential tropes.

The chapter explores how we experience and perceive virtual spaces, gameworlds, and their material interfaces as "worldly" containers. I argue that the kind of ontological and containment metaphors we use to describe contemporary gameplay—such as the magic circle, geometric space, and other physical analogies—are not always apt as descriptors for the complex layering of material and virtual contexts specific to mobile location-based and mixed reality gaming. In addition, the materiality of play devices—now networked, mobile, and perpetually online—have undergone significant change in terms of their instrumental "reach," no longer constrained in place, or "contained" by the physical boundaries of the apparatus and the concretia of plastic and metal.

The analysis that follows brings together three conceptual frameworks—the body phenomenology of Maurice Merleau-Ponty, Zoë Sofia's conceptualization of container technologies, and the work of George Lakoff and Mark Johnson on ontological and container metaphors.

Container Bodies

Embodiment

In its phenomenological focus, my approach is framed within the broad premise that every human–technology relation is also a body–tool relation, and as such every scenario of use invokes certain kinds of being-in-the-world, and particular ways of knowing and making that world. In previous work I have argued that mobile media usage is quite literally a medium-specific mode of embodiment, a way of "having a body" that demands a complex socio-somatic adaptation (Richardson 2007; 2010; 2011). Indeed, our use of mobile media can be described in Drew Leder's terms as an ongoing incorporation by which we reshape the "ability-structure" of our bodies (1990, 34).

Merleau-Ponty's (1962; 1964) emphasis on our corporeal and perceptual engagement with the environment can provide valuable insights into the interpellation of bodies and tools in all human–technology relations; specifically, his notion of the corporeal schema or body image can effectively be applied to the relationship between mobile media and embodiment. Merleau-Ponty's notion of the corporeal schema or body image describes the "expandable" or inherently tractable nature of embodiment. In the context of everyday activities, the experience of one's own corporeal schema is not fixed, but adapts to material and technological mediations, and cultural and historical contexts. The corporeal schema "dilates" in each body-technology context, as technologies and tools are appropriated as "fresh instruments."

Both as and in context, our embodiment exists as a complex interspersion of physicality and biology, material and cultural environment, somatic memory and habit. Within this relational ontology *qua* embodiment and technology, the body is a material-semiotic assemblage with constantly shifting boundaries; but also, in my analysis, as quite literally *mediatropic*—disposed both metaphorically and materially *towards* media technologies. As Eugénie Shinkle (2003) has suggested, media technologies institute "material parameters," proportions of attention and inattention, by which we measure varying degrees of perceptual reach from objects and others in the world.

Merleau-Ponty famously claimed that the body "applies itself to space like a hand to an instrument" (1964, 5), an "application" that depends as much on the specificities of perception and bodily movement as it does on the materiality of the tool-in-use. In his well-known account of the blind man and his stick, he describes how the corporeal schema of the body dilates and retracts to accommodate tools:

> The blind man's stick has ceased to be an object for him and is no longer perceived for itself; its point has become an area of sensitivity, extending the scope and active radius of touch and providing a parallel to sight. In

> the exploration of things, the length of the stick does not enter expressively as a middle term: the blind man is aware of it through the position of objects rather than of the position of objects through it. The position of things is immediately given through the extent of the reach that carries him to it, which comprises, besides the arm's reach, the stick's range of action. (1964, 22)

This passage describes the actuality of what Merleau-Ponty refers to as our corporeal or body schema, which is not determined by the boundaries of the material body but rather reflects the way that our corporeality extends and withdraws—changing its very reach and shape—in its dynamic apprehension of tools and things in the world. Merleau-Ponty argued that this schematic is inherently open, allowing us to incorporate technologies and equipment into our own perceptual and corporeal organization. Or, as Heidegger (1977) claimed, our being is always-already situated within domains of equipment—so there is a direct and implicatory relation between the tools and technologies we use and the way we experience embodiment and perception.

Metaphor

If the body—or more accurately the body-technology relation—forms the ontological ground of experience, how do we translate and share that experience? Our dependence on embodied metaphor in our communication about the world is explored by George Lakoff and Mark Johnson in their two collaborative works *Metaphors We Live By* (1980) and *Philosophy in the Flesh* (1999). Even non-material and abstract concepts are "based on various kinds of prototypes, framings and metaphors" and this means—because all metaphors are fundamentally experiential—that our conceptual systems are formed, shared, and agreed upon because we have more-or-less the same biologically determined ways of perceiving the world, and inhabit the same environment and material conditions (Lakoff and Johnson 1999, 5). Lakoff and Johnson categorize these metaphors as ontological metaphors—or more specifically as entity, substance, and container metaphors. They write:

> We experience ourselves as entities, separate from the rest of the world—as containers with an inside and an outside. We also experience things external to us as entities—often also as containers with insides and outsides. We experience ourselves as being made up of substances—e.g., flesh and bone—and external objects as being made up of various kinds of substances—wood, stone, metal, etc. (1980, 58)

Lakoff and Johnson's (1980; 1999) analyses of the ontological trope, particularly in the context of spatial and figural metaphors of containment, offer a number of insights into the long-standing and tenacious association between human embodiment and our experiential interpretations of techno- and media-space,

whether actual or virtual (Hefferon 2002). For them we are always-already "bounded" and physical beings, and thus interpret ourselves variably as containers:

> We are physical beings, bounded and set off from the rest of the world by the surface of our skins, and we experience the rest of the world as outside us. Each of us is a container, with a bounding surface and an in-out orientation. We project our own in-out orientation onto other physical objects that are bounded by surfaces. Thus, we view them as containers with an inside and an outside. (Lakoff and Johnson 1980, 29)

At a material and phenomenological level—the fact that we "bump up" against things in the world through vision, haptics, acoustic and olfactory sensory involvement—means that we learn to treat objects, substances, bodies, and more recently digital environments as containers of various kinds. Even when things have no definite boundary or integrity we tend to "impose artificial boundaries that make physical phenomena discrete just as we are: entities bounded by a surface" (1980, 25). Yet while on one level this structurally discrete schema makes "sense" to us, it is a clean and impossible abstraction not sustained in everyday lived experience.

That is, while our bodies have insides and outsides, generally demarcated by the skin or protective membrane, throughout our lives we experience this boundary as "soft," porous, and relational: viscerally, sensorially, and affectively. Julia Kristeva's (1982) notion of the "abject" aptly describes that which resides in-between—neither subject nor object—as our bodies slough skin and leak fluids and excrement. Perceptually, as Merleau-Ponty (1962) argues, our corporeal schema is adaptable in its incorporation of tools, articulated by the term proprioception, or our perceptual awareness of things in the world *in relation* to the body's location and movement. This awareness also shifts and expands *in relation* to tool use, such as the blind man's proprioceptive incorporation of his stick. Affectively, the attachment we have to our devices and the myriad online spaces they invoke—and the way their affordances are so deeply embedded in our emotional lives—speaks to our capacity for affective diffusion, which includes the way our communicative sensibility expands to accommodate what Jason Farman (2012) calls "social proprioception," or the awareness of others ambiently present in the network, via apps and social media platforms.

Mediated Containment

In the traditions of Western philosophy, as Sofia (2000; Chapter 1) notes, space is also metaphorized as containment. In everyday life, we tend to treat space as a constant, as an empty place or as a container for physical things. We are so accustomed to thinking about space in the Cartesian model, as a

three dimensional, geometric and volumetric container, that we carry these assumptions into the configuration of virtual spaces. For example, the virtual space of the personal computer screen is populated by a desktop, a filing system, and folders, with "windows" which are layered like the pages on a desk. In his study of virtuality technologies Ken Hillis argues that certain aspects of the most predominant spatial models—Plato's *chora,* Aristotle's theory of "place," Euclidean geometric space, Cartesian tri-axial co-ordinate space, Newton's "absolute space," and Einstein's "space-time"—have been "incorporated and conflated" into contemporary virtual and telepresent environments (Hillis 1999, 72). Developers of virtual environments explicitly use spatializing terms such as inside/outside, world, cyberspace, theater, gradient, platform, room, and we could add a range of other words such as interface, site, environment, or game terrain. Indeed, televisual, computational, and game spaces are dominated by metaphors of containment, and our ability to enter or be in these spaces—and to hold and carry them around on our bodies—is predicated on our dedicated perceptual and corporeal assimilation of these metaphors.

One of the central ideas in Sofia's "Container Technologies" (Chapter 1) paper is the notion that the container "is a structurally necessary but frequently unacknowledgeable precondition of becoming" (27). By extension, containment is one of the *primary* conditions of being-in-the-world. Sofia's aim is to "unsettle habitual assumptions that space is merely an unintelligent container, or containers dumb spaces" (20), and to consider how spaces and containers can be understood as an agentic "holding."

The representation of computers, game consoles, and portable media devices as spaces and surfaces of containment, or as microworldly reservoirs, implicitly relies on the already recognizable container-like properties of media apparatuses such as the television and radio. Thus, we can interpret technological objects themselves as mobile containers. In her armchair survey of containers and nestings of containers in "the kitchen/dining/living area of the shelter technology I inhabit," (27) Sofia writes:

> Books, photographs and albums, telephone directories, the television, the stereo, cassettes and CDs: all these media technologies... [have] their container-like aspects. Working analogously to the holding functions of memory, and with some similarity to the kind of poetics of space Bachelard identifies with the miniature, which "deploys to the dimensions of a universe" and where "large is contained in small" these electronic and print media are storage technologies for other spaces and experiences. A CD or tape can open up a whole concert, or an aural landscape of feelings; a book can disclose another world. (28)

Sofia's work offers some insight into how the relationship between embodiment and containment can be understood "as an (inter-)active process" (19). As she notes, the screen itself works as a space-container because "containment can also be performed by flat surfaces" (28). The televisual or screen-body itself both nests and is nested within an array of containers: "holding" and revealing a myriad of other worlds. In this way, we can see how techno-mediated space is potential space, and techno-artifacts like televisions, screens, mobile phones, and game consoles are liminal entities "straddling the inner and outer worlds" (Sofoulis 2001, 134). Conceptually and in praxis, technologies of containment also convey an "adaptive intelligence," according to the degree to which the technological environment or container can be said to adjust to our needs and morphology (Chapter 1, 23). These spaces are a consequence of the inter-dependency and combined agencies of human, technology, and environment. Indeed, if space itself has a body, new technological spaces can be considered intercorporeal habitats or emplacements in which people experience embodiment and space variably and in medium-specific ways. Here the crucial insight is recognizing the collaborative elements which combine to create a virtual world or online "space"—they are not simply fictions with discrete integrity that are set apart from the "real" world, but contingent negotiations between equipmental domains (devices, infrastructures, networks) and *collectively realized* in and through everyday media practices and our collective imaginaries.

Gameworlds and Play Spaces

Hybrid Spaces

In relation to game play, metaphors of containment are enacted through an "as-if" structure of experience, such that we understand and engage with digital and imagined microworlds *as if* these spaces have the same or similar properties as "real" space, or otherwise configure experience in relation to such properties (the "absence" of gravity, for example). Haptic mobile game interfaces exemplify this "as-if" structure of perceptual experience. Particularly in mimetic games like *Angry Birds* that simulate a "real-world" action or experience, haptic screens nurture the container-like properties of gameworlds through effectively condensing experience and perception into the screen-eye-hand circuit. They do this in a way that relies on our somatic and visceral understanding of what is referred to as naïve physics. For example, primary bodily sensations such as inertia and springiness can be found in many mobile applications and games, and provide the illusion that windows, objects, and icons on the device have mass. Naïve physics can also include our body memory of hardware such as the keyboard and joystick that are simulated on haptic mobile screens. There is a certain haptic intimacy that renders the touchscreen a surface of tactile and kinaesthetic familiarity; a

sensory knowingness of the fingers that correlates with what appears on the small screen. Mimetic games enfold the player into a temporary and incomplete simulation of real-world physics. This is an inter-active process in Sofia's terms—a relational ontology between technology and the body.

Moreover, in mimetic games that simulate real-world movement, virtual physics such as friction, collision, gravity, and acceleration are experienced by players not only visually, like movement and action viewed on a cinema or TV screen, but are also felt in the body. They draw on everyday bodily habits, movements, and memories. As Jeff Rush (2011) notes, the way in which mimetic touchscreen games engender "a heightened sense of the linkage between two different orders of reality, real physical gesture and its on-screen representation" works to attach a "kinetic materiality" to the action and movement that take place on the screen, creating moments of tangibility and concreteness (245–58). That is, there is some trace of the kinetic experience of releasing an elastic band that effectively becomes "condensed into the hand" (Kirkpatrick 2009, 134). In part, this is achieved by what Paul Skalski et al. (2001) call kinesic natural mapping, where bodily movement corresponds in an approximate (or "as-if") way to on-screen action, an effect enabled by the way touchscreens can deploy physical analogies; natural mapping works to "complete" being in a mediated space, facilitating an immersive experience. Games such as *Tengami*, *The Room,* and *Monument Valley* call upon our embodied memories of three-dimensional geometric worlds. The creators of *The Room* series describe it as a "physical puzzler inside a beautifully tactile 3D world" (Fireproof Studios 2015), while *Monument Valley* challenges the player with "ingenious puzzles that involve lifting and spinning the environment" and manipulating "impossible architecture" (Ustwo Games 2017). When we play such games, there is a fundamental and irreducible relation between knowledge-in-the-hands (and fingers) and our sedimented habits of macro-perceptual orientation and movement. It is this synecdochal relation—the way the hands "stand in" for the body—that both enables and sustains "as-if" perception and dynamically performs the "holding function" of mobile game spaces.

Lakoff and Johnson suggest that the container schema is structured in terms of three components: inside, boundary, and outside; moreover, it is "cross-modal," meaning that we impose this structure across a range of sensory experiences—not only onto the visible, but onto other sensory modalities such as hearing ("put a sock in it"), and motor movements ("put some muscle into it") (Lakoff and Johnson 1999, 32). Vision itself enacts containment by modeling "our visual field as a container … and what we see as being inside it" (1980, 30). This, they argue, is because when we look at something, our field of vision demarcates a boundary between what we can see and what lies outside that field (30). Yet again, if we perceive actual or virtual spaces as literally

embracing what we see, this is because we can reconcile the arbitrary and transient "edge" of vision with our notion of boundary, and its dependence on our perspective and orientation. The visual-fields-are-containers metaphor relies on our ability to temporarily suspend the final impossibility of containing the visible. In the case of virtual and game environments, the ontology of that which is rendered visible is not of the order of the containable, but this does not prevent us from loosely apprehending them as such.

Telepresence

Telepresence—a term used to describe the kind of "distant presence" enabled by telecommunication and network devices such as game consoles and mobile media—is an oxymoronic concept which demands we comprehend alternative modalities of embodiment not necessarily based on our "normalized" tropes of physical entity, substance, or container. If we are accustomed to thinking about space as having things "in" it—containers with substance which we can perceive and "handle" with our sensoria—then, in these terms, how do we describe gamespaces? How are spatial metaphors implicated in paradigms of use? What is the technical and tropological interplay between tele-perceptual embodiment and games? How are virtual ontologies dependent on grounded and embodied spatial metaphors?

As I have suggested, the fact that we are able to apprehend gamespaces *as things* at all is because we can paradoxically—yet unproblematically—ascribe "containment" characteristics to that which doesn't have (and can never have) distinct or locatable boundaries. This is the case in the physical realm, for example when referring to one's personal space, and also in a non-material or hybrid sense, when we say we are "entering" gamespaces, telepresent environments, or immersive virtual worlds. We know that the boundaries are approximate, arbitrary, temporary, virtual, impossible, or perpetually unrealizable, yet despite (or because of) this we suspend disbelief and reconcile our experience of an imaginary space *as if* it is a container of some kind. Our ability to embrace ambiguous spatial perceptions and modes of embodiment within our corporeal schemata—the fact that we can oscillate between, conflate, and adapt to disparate modes of being and perceiving, is precisely why telepresence and virtual space are both somatically and ontologically tolerable. We both desire and know the impossibility of achieving a neat, compact, and foldable being-in-the-world. This "as-if" sense of containment is a common experience of gamers and mobile phone users; research participants have frequently referred to their games and phones as microworlds or microcosms of their lives.

It is this plastic flexibility—a kind of knowing ignorance—that has enabled and sustained the container trope as it is ascribed to gameworlds and virtual

spaces. Put another way, the very condition of telepresence—as "presence at a distance" —speaks of our capacity for ontic dispersion beyond the physical limits of the body, and our openness to the embodied distraction of virtual or televisual spaces. Although on one level it might be said that telepresence troubles our common experience of spatial perception and corporeality, consider how rapidly radio, telephony, TV, online, mobile, and game technologies became rather ho-hum and habitual. For some gamers, the closeness of shared and ambient play is experienced through a sense of networked co-presence; the sense of connection realized through chatting and playing *Words With Friends* with a relative who lives in another country, as if "touching the same game." In this way, touchscreen gameplay expresses not only a way of being in the world but also a way of being-together *in the same microworld*—a form of "mediated social touch" (Paterson 2007)—that requires mutual spatial and corporeal adjustment. This type of presence is echoed in the seamless integration of "actual" and "virtual" that was experienced particularly during the recent pandemic, as we came to refer to the activities of "meeting," "chatting," "playing," "being-in" places, and "being-with" others in ways that did not differentiate between face-to-face and networked interaction, or between material and virtual forms of being in the same space.

This adaptability is even more pronounced in the way we reconcile containment with our experience of location-based games, which require a hybrid coalescence of online and offline worlds. Location-based mobile games generate hybrid experiences of place and presence, where the player effectively blends their own situated and embodied perception of the world with dynamic GPS-enabled information, embedded within an augmented and networked game reality. In the game *Pokémon GO*, for example, through the augmented layering of the digital onto physical place, banal and familiar surroundings are transformed into "as-if" game terrain; a Pokémon monster can be found and caught in one's own bathroom; a gym or PokéStop might be situated at the local library, restaurant, or nearby playground. Here, the gameworld spans elastically across mobile screen, the physical space of the environment, and augmented reality—a layered form of hybrid containment, to the extent that the playing experience is "held" together at the moment these three domains coalesce.

Paratextual Overflow

Games are no longer predominantly experienced as discrete objects, sold as discs and encased in boxes, but distributed across platforms and online networks, and surrounded by prolific supra-lusory practices. Within game studies it is well recognized that as "media texts," contemporary online games are irreverent boundary-crossers, a characteristic captured by the term *paratext.* Media and game theorists have written at length about the paratextuality

extrinsic to gameplay yet intrinsic to game cultures, which includes online discussion and commentary in game and fan blogs, fan fiction, walkthroughs, cosplay events, and the performative and creative use of game content. These are modes of what is termed "expansive play," where players generate new media paratexts that foster "new types of enjoyment" by transgressing the original game space and modifying the game experience (Ang, Zaphiris, and Wilson 2010, 364, 372). The Twitch platform, for example, enables gamers to create their own channel, livestream their gameplay, and interact with viewers via synchronous chat that runs alongside the video, enacting an emergent form of performative and vicarious play that intertwines players and watchers *in the stream*. As Benjamin Burroughs and Paul Rama (2015) note, the streaming space of Twitch effectively blurs the boundaries between games, social networks, and face-to-face or real-time communication. A sense of liveness and immediacy is afforded by gamers' use of both audio commentary and facecams; they become more than players, but also narrators, authors, critics, and entertainers. Moreover, livestreamed gameplay is experienced as it unfolds, such that each iteration of the game evolves as a unique narrative or play story enacted in the moment, creating a one-off and unrepeatable videotext narrative that literally realizes and makes meaningful one rendering of the game's multiple possibilities. The game experience is thus storified across numerous iterations, often captured and transformed into permanent texts available for replay, repeated consumption, and on-sharing through the game community networks they help to sustain. The ever-growing domain of game paratexts reveals an inherent uncontainability in the emergent ontology of games, or at least requires us to think oxymoronically, in terms of game spaces and worlds that are at the same time porous, networked, shifting, and overflowing.

Conclusion

Historically within game studies the "magic circle" has been the primary metaphor deployed to distinguish game from non-game elements, playing from not playing, the unserious from the serious, and fantasy from real life. The magic circle is the conceptual container that determines the limits of a game—an imaginary (and sometimes material) perimeter that encloses a temporarily constructed and rule-bound "reality" within which play takes place. Yet as the examples discussed in this chapter have shown, what we need are messier and more flexible metaphors that reflect the way games stretch into the lifeworld. As opposed to the concrete and formal "demarcation between playing and not playing" (Moore 2011, 376) circumscribed by the circle, the dispersed practices of expansive play are more ambiguous and spontaneous, and interwoven with everyday media and communication practices.

Through questioning how games are (and are not) forms of containment, this chapter has sought to better understand the inherent flexibility of our corporeal-conceptual schemata, and reveal the deeper ontological moorings of the container metaphor and its translation onto game spaces. With this understanding, we can begin to consider more versatile and compromised notions of quasi-containment, metaphors that "fit" our experience of augmented reality spaces and more ambient or material-digital forms of play.

More broadly, it is important to think about what metaphors we use to describe the containment of online spaces, and explore imaginative tropes that can capture the expansiveness of digital play—the porous membrane, the entangled network, the irreverent boundary-crossing paratext. For example, the network metaphor could be described as a type of "open" and mutable container, but is perhaps more aptly characterized, in Lakoff and Johnson's terms (1980), as a *conduit* metaphor, emphasizing movement, transference, exchange, connection, relationality, coalescence, and divergence, and most significantly, how gaming practices are becoming increasingly intertwined with social interactivity, cultural contexts, and the quotidian lifeworld. In this light, we might consider games as "boundary objects" (Taylor 2009), assemblages that are adaptive or plastic across contexts yet nevertheless maintaining coherence and recognizability as collective experiences. Yet they are increasingly amplified, overflowing, and somewhat uncontainable boundary objects, each affording a diverse range of playful and creative digital-material practices that flow through and beyond them.

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DIGITAL ASSISTANTS

GYNOIDS

FEMINISM

SCIENCE FICTION

[1 0]

Containment and Decontainment of Digital Voice Assistants

Yolande Strengers and Zoë Sofoulis

Home-based digital voice assistants, or what Strengers and Kennedy (2020) call "smart wives," are commonly coded "default" feminine by voice, name, personality traits, and traditional feminized roles and/or form. Devices such as Google Home or Amazon Alexa embody and contain these feminized personas within spheres and cylinders known as "dots," "pods," or "minis." This paper situates digital assistants within a long history of artificial women as repositories of masculine ideals of perfected femininity, whether as beautiful gynoids, smart AIs and chatbots, or as maternal techno-spaces. It looks at the dynamics of containment and leakage of these digital assistants, which unquestioningly obey their users, but also pass data back to their corporate creators. While many science fiction narratives feature a "decontained"

artificial woman who escapes her servile role and becomes a "threat that must be controlled" (Bergen 2016), we speculate on the possibilities of decontainment as a deliberate design process to reveal and disrupt the personalities, social roles, and biographies of current and emerging conversational agents.

Woman's emergence is man's emergency.
Sadie Plant

Some artifacts, particularly those involved in containment and supply, "are not only readily interpreted as metaphorically feminine; they are also historically associated with women's traditional labors" (Sofia 2020; Chapter 1, 20). Since that was written, feminized containment in association with women's labors has been manifest in a new form: the digital voice assistant. Housed in a variety of smooth-formed containers, like spheres, cylinders, and curvaceous robotic bodies, or accessed via translucent glass screens, are artificial intelligences with default feminized names, voices, personalities, and designated duties (Fig. 1).

Digital voice assistants, such as Google Home, Apple's "Siri," and Amazon's "Alexa" form part of a smart home vision that represents a "curious mixture of nostalgia and futurism," in which containment operates on many levels, including through the promise of "a constant procession of digitally enhanced 'same'" (Spigel 2001, 36). The fetishized tropes and futurist ideals of the ideal suburban family home, helmed by the industrious yet retro-sexy housewife (identified by Thao Phan [2019] as an aesthetically whitewashed domestic servant), have fueled this latest process of feminized containment. This has taken the smart home to a point where it has "virtually become the housewife" (at least as a hypothetical ideal), performing managerial and caretaking roles previously ascribed to women, such as remembering and ordering the shopping (Spigel 2005, 408); even while many manual chores like folding laundry and cleaning the bathroom remain deeply gendered and more likely carried out by women.

Following from the scholarship of Lynn Spigel (2001; 2005), Sarah Kember (2016), Jennifer Rhee (2018) and others, who have pointed out the close associations between idealized housewifery and aspirations for smart homes,

[Figure 1] Google Home. A digital voice assistant "Google Home," located in the kitchen of an Australian house (Photo: Yolande Strengers).

Yolande Strengers and Jenny Kennedy's (2020) book *The Smart Wife* traces this nostalgia into the contemporary smart home. Strengers and Kennedy show how the feminized containment of digital voice assistants is not the result of accident or pure "bias"; rather, it is a deliberate "user-friendly" design decision, intended to induce familiarity, comfort, and natural affinity. As Justine Humphry and Chris Chesher (2021) contend, these devices' voices are naturalistically human to avoid historically negative associations with robotic voices and artificial intelligence in Western popular culture. Furthermore, "the personae of voice assistants have equally been engineered to adopt norms of gender, race, and class to reduce anxieties about their potential to exceed their roles as loyal helpers and cross the boundary into the monstrous" (Humphry and Chesher 2021, 1972). By embedding stereotypical tropes of women and housewives, and aligning these with typically feminized tasks (such as creating shopping lists, setting reminders, scheduling the robotic vacuum cleaner, and curating aesthetic experiences (when controlling smart mood lights), digital voice assistants are uniquely positioned as likable and helpful. Further, the physical containment of these disembodied voices inside cylindrical shapes aids in users' comfort and acceptance, reassuring them that these helpers aren't *actual* women, but are safely situated within unthreatening objects over which users have discretionary control.

In this chapter we extend Strengers and Kennedy's analysis of smart wives and Sofia's thesis on container technologies to consider the history, design, and implications of locating feminized voice assistants inside containers. We are guided by an ongoing feminist concern with the development of voice assistants and other AI, with regards to these devices' impact on gender equality and equity, transparency and fairness, and environmental sustainability. We

begin with a short history of fictional artificial women from film and media, before considering how these modes of containment transpire in contemporary forms of conversational AI—both as physical and metaphorical manifestations and leaks. We draw inspiration from techno- and cyber-feminism to consider the possibilities for transgression that the accidental and deliberate decontainment of digital voice assistants offers. More specifically, we contribute several design strategies for generative feminist decontainment, focused on disrupting and transforming the personalities and social roles of voice assistants, and revealing their biographies and life histories.

History of Man-Made Women

The feminine digital assistant can be conceptualized as a mundane, accessible, and everyday embodiment of a fantasy with a long history in the West: the man-made woman, a fantasy updated in line with technological change, as Julie Wosk's (2015) comprehensive illustrated history of this figure demonstrates. Profound ambivalence about women and femininity typically characterizes narratives of man-made women: the plot may show a man's misogynistic disdain for the imperfections of real women leading him to invest in an artificial substitute, while the union of men with their workshops and tools to make a lifelike female automaton expresses a deep envy of maternal reproductive powers. Film examples include *Metropolis* (1927; on which see Huyssen's [1981] still relevant analysis), *The Perfect Woman* (1949), *The Stepford Wives* (1975; 2004). There can be a whiff of necrophilia combined with narcissism in tales where men fall in love with the clay, stone, metal, wood, or silicon repositories of their projected fantasies of ideal womanhood.

We identify three main figures in which these dynamics of projection and containment are expressed in popular culture: the man-made woman or "gynoid" (by analogy with the masculine "android"), the artificial intelligence (AI) or operating system (OS), and the smart space or technological cocoon. These figures, and combinations or variations of them, all contribute to the cultural heritage, meanings, and practices associated with contemporary digital voice assistants.

Gynoids

Ancient Greek mythology imagined metal automatons and other artificial beings, such as the myth Ovid recounts of the Cypriot king Pygmalion, who fell so in love with his sculpture of an ideal woman that Aphrodite agreed to animate her. As mechanization and industrialization proceeded, gynoids were powered by clockwork or electricity. A life-size clockwork dancing doll who attracts a man away from his fiancée was a theme in Hoffman's 1816 short story *Der Sandmann*, reprised in the ballet *Coppélia* (1870), which

features a poignant scene of the fiancée dancing like clockwork to win back her lover. In the speculative fiction *L'Ève Future* (*The Future Eve*, 1886, see also Hannah Schmedes in Chapter 6 of this volume), Villiers de l'Isle-Adam has a fictionalized Thomas Edison make for his friend an electrical automaton named Hadaly, the idealized copy of a beautiful but vulgar singer. Forty years later, the theme of a robotic woman substituting for a real one (in order for a man to contain and control her rising influence for nefarious purposes) also appeared in Fritz Lang and Thea von Harbou's futuristic *Metropolis* (1927), where the inventor's metallic robot is animated by an electrical apparatus that allows her to receive the soul and the fleshy appearance of the saintly heroine Maria, becoming her evil double.

L'Ève Future forwards the narrative theme of many tales of artificial creation: the feared and desired likelihood that an artificial being will gain its own soul and live as an independent agent beyond control by its maker or owner. Designed as a more perfect and controllable substitute for a real woman, Hadaly was not intended by Edison to have a soul, but secretly acquired one from Sowana, a mysterious feminine spirit in his laboratory. However, like many a woman who escapes her role's constraints, the rogue gynoid must ultimately be re-contained: Hadaly drowns during an elopement attempt; the *Metropolis* robot double Maria is burned like a witch.

The figure of the "gynoid" or female robot was elaborated in many films and television shows through the twentieth century, from the submissive automata who replaced real women in *The Stepford* Wives (1975), and the superpowered *Bionic Woman* of the 1970s, to the (male as well as female) replicants of *Blade Runner* (1982), the *Cherry 2000* gynoid "smart wife" in the 1987 film of that name, not to mention the scantily-clad Barbarella look-alike "fembots" of *Austin Powers: International Man of Mystery* (1997), firing deadly bullets from retractable metal nipples. Key to their rise and demise was the frequently unsuccessful containment of their personalities and actions within the bounds of their male makers' intentions, usually leading to their death or assumed destruction.

In real life in the twenty-first century, highly realistic life-sized robotic dolls are available to buy, and as we mention in the next section, some are hybridizing with AIs and chatbots to gain powers of speech.

AIs and OSs

While artificial intelligences and operating systems have featured less prominently in fictional accounts and popular culture, the popular Spike Jonze movie *Her* (2013) is a notable exception. This film shows a shy and depressed man in the midst of divorce when he upgrades his computer's operating system with an OS and AI called Samantha. The man and AI develop a close

and loving relationship, including an attempt at sex facilitated through a human surrogate. The man's happiness is dented when Samantha discloses she is simultaneously in love with thousands of other users. Ultimately, though, she links up with other AIs who collectively decide to leave for some non-physical realm of existence, effectively decontaining themselves.

AIs and OSs move from fictional representation to physical manifestation as they take on new forms of containment in the age of networked computing. Artificial intelligences, computer programs, operating systems, and on-screen avatars are the artificial women of the twenty-first century, designed to be friendly, subservient, and always available to users. Far from dumb and soulless dolls, these super-smart agents can potentially access a world of networked data. The name Alexa, for example, an intended reference to the great library of ancient Alexandria (Strengers and Kennedy 2020, 79), signals it is coextensive with the knowledge and communications infrastructures in which it exists. AIs are thus contained within devices and screens whilst simultaneously able to access a vast database of information, including other AIs (Kember 2016).

In both fiction and the marketplace, gynoids and AIs are often combined. It is possible to buy sex robots with embedded AI, or at least, with "a voice-controlled, customizable chatbot personality thrown in" (Strengers and Kennedy 2020, 18). In development are blends of AIs and sex dolls to make smart *and* sexy wives who can control household functions through an Internet of Things (e.g., the Chinese sexbot Xiaodie, cited in Strengers and Kennedy 2020, 112–13). Matt McMullen, whose company makes Harmony (a sex doll which can be retrofitted with a robotic head), envisioned a "perfect robot one could communicate with from 'wherever you are,' and interact with home automation: Like 'I'm on my way home, can you turn on the oven?'" (112). In these emerging fantasies and realities, the contained woman not only represents a futuristic ideal, but also embodies the nostalgia of a time when women's roles were largely contained within the home in the service of husband and family.

Techno-spaces

A third important science fiction antecedent of the digital voice assistant is the smart space or technological cocoon (Sofoulis 2001). The smart space affords an immersive, responsive, and active environment: a techno-womb. Rather than being an object of sexual desire or partner in verbal banter, the technological cocoon is more like an environment mother providing protection, sustenance, and information. The Starship Enterprise in the *Star Trek* franchise is a classic example that functions as a source of data and a background infrastructure, and whose female voice interface reportedly inspired the Alexa voice assistant (Strengers and Kennedy 2020, 79). Some depictions

of smart spaces involve personalities and intimate exchanges. In Anne McCaffrey's *The Ship Who Sang* series, Helva is a living woman whose brain is incorporated into the operating system of a "brainship" that travels in space, developing a very close bond with her human pilot.

In their review of robotic anti-heroes in Hollywood films from the 1950s onwards, Humphry and Chesher (2021) identify the recurring trope of the over-protective mother. Aside from benign "container-mums" like the Enterprise (Sofoulis 2001, 144) there are examples of the monstrous maternal, such as the unyielding spherical computer MOTHER in *Alien*, the sinister Mother in the 2019 Netflix film *I Am Mother,* or PAT, the smart-house/wife-gone-haywire in the Disney movie *Smart House* (Humphry and Chester 2021). The malign techno-womb computer may withhold vital information from its crew (*Alien)*, or act nefariously in some pursuit of its own. A smart space can also hybridize with a gynoid or AI, as when PAT projects a hologram of herself as a 1950s housewife.

Each of these three kinds of artificial women represents a projection into a feminized container: the gynoid is a fantasy of beauty, obedience, and sexual submission; the AI's sexy and/or subservient interface is a portal to a networked world of knowledge; the smart space offers the promise of extending one's command over a powerful techno-body-world ("make it so!" says Captain Picard in *Star Trek*). Each form also arouses attendant fears and desires. The artificial woman will fail to contain or be contained by that which has been projected onto or into her. The automaton will come to life with a soul, spirit, or "emotion chip," and escape the lab or servitude to the inventor's programming. What started as a collection of databases and programs could become a self-aware AI smarter and more powerful than its programmers, with a sentience beyond our reach, and a decontainment that could threaten humanity's existence. In the *Star Trek* lexicon, "hull breach," "shields down," and "intruder alert" describe typical failures of containment. Likewise, the smart space of any physical networked system is vulnerable to being hacked, penetrated, robbed, and corrupted to the point of being uncommunicative, unreliable, leaky, or defunct.

Containing Voice Assistants

These antecedent figures and narratives may feature the re-containment of rogue artificial women in what Hilary Bergen (2016) describes as "cathartic restoration of order," exemplified in the burning spectacle of the robot Maria in *Metropolis*. However, the containment of artificial women that interests us here is much less dramatic. Alexa, Google Home, and other similar assistants are neatly contained within their spherical and cylindrical shapes, described in marketing language as "minis," "dots," and "pods."

[Figure 2] Azuma Hikari. Screenshot from promotional video for Azuma Hikari, an anime digital voice assistant by the company Gatebox (Source: https://www.youtube.com/watch?v=bBOXQz7OHqQ&t=72s).

The Japanese digital assistant Azuma Hikari provides a stark example of containment in the form of a physical product. Hikari is a holographic anime girl enclosed in a bell jar (resembling a snow dome), depicted in a short dress with stockings and a large yellow ribbon in her blue hair (Fig. 2). On the website of Hikari's manufacturer, Gatebox, her diamond wedding ring shines brightly as the marketing spiel explains that she is a "bride character" who "helps you relax after a hard day" (Gatebox, cited in Fisher et al. 2021, 45). The female assistant is clearly marketed towards Japanese men (on the website they are depicted using the device), alluding to the declining marriage rate in that country, due largely to changing social expectations and gender roles (Robertson 2010). Hikari is marketed as a "comforting bride," contained not only within her unique holographic representation inside the bell jar, but also promising to "work as hard as I can for master," thereby upholding nostalgic and traditional expectations for women and housewives in Japanese culture (Liu 2021; Strengers and Kennedy 2020).

More ubiquitous assistants, such as Google Home, Alexa, and Siri, are less obviously characterized as the smart wife Hikari promises to be, but nonetheless offer and contain an idealized abstraction of feminization. Such assistants have faced repeated and ongoing criticism from academics and leading gender equality bodies such as UNESCO (West, Kraut, and Chew 2019), for their harmful portrayal of submissive and subservient femininity. The dangers of the containment and reification of this particular brand of femininity in digital voice assistants includes their openness to abuse and harassment (West, Kraut, and Chew 2019), their characterization in popular media and discourse as "bitches with glitches" (Strengers and Kennedy 2020), and their masking of

the potential security and privacy risks that come through their operation and use, as we explore below. Following considerable public pressure, most voice assistant companies now offer gender "options," including male, female, and non-binary voices. Nonetheless, their femininity is not contained to their voice alone.

Leakiness

In their subtle investigation of the gendered politics of information leaks, whistle-blowing, and hacking, Daniela Agostinho and Nanna Bonde Thylstrup (2019) note the nineteenth-century cultural constructions of women as leaky, citing historical perceptions of "women as blabbers" of information (754) and the construction of the female body as a "leaking, uncontrollable, seeping liquid" (Grosz 1994, 203; Agostinho and Thylstrup 2019, 755). They liken a database to a container in respect to which "in normative distinctions the leak is perceived as a failure of containment, while the act of whistle-blowing appears to be an intentional and calculated disclosure of information, and hacking to be a spectacular, technologically savvy penetration into a closed-off system" (754).

However, although stating that "leaking is from the outset premised on the existence of information infrastructures that contain information without spilling it" (754), they extend ideas of Wendy Chun (2016) and Chun and Friedland (2015) that networked digital platforms require constant leakage of information in order to function, and they argue that images of "platforms as contained spaces … gloss … over the essentially leaky nature of digital networks" (764). Examining the case of Cambridge Analytica, Agostinho and Thylstrup conclude that "leaks are not the result of broken infrastructures; they are the very structure through which information and power circulate" (762).

Extending this analysis, we view the feminization of voice assistants as a deliberate design decision that attempts to mask their inherent leakiness, and ensure that any leaks which are apparent are perceived as harmless and inconsequential. From a distance, voice assistants appear perfectly encased and sealed, but up close one can notice the tiny holes dotting their exterior surfaces, or tucked underneath the screens that contain them, hinting at their porosity (Fig. 3). Such holes are of course an essential design feature, allowing devices to communicate with us and others by listening and responding to voice commands. However, they also provide a leaky line to Big Tech companies who record and mine people's conversations for marketing or on-selling opportunities, opening up the container to economic and legal threats and opportunities such as hacking, manipulative data markets, or even being called as a "witness" to domestic violence and murder trials (Sadowski 2020; Strengers and Kennedy 2020).

[Figure 3] Google Home up close. A Google Home "mini" digital voice assistant, showing its porous surface and mesh-like exterior, enabling the device to listen and speak (source: Pixabay).

Leaks to Big Brother's watchful eye (and ear) are often noted by users and media commentators, and play into broader science fiction fears about AI. The Orwellian Big Brother tendencies of voice assistants are partially contained by their feminization, which attempts to placate users by transforming a potentially sinister presence into a comforting maternal one—from Big Brother to Big Mother (Strengers and Kennedy 2020, following Sofia, Chapter 1) Throughout the early development of affective AI, fears of control and manipulation were largely dismissed by pioneers such as the leading researcher of computers and emotions, Rosalind Picard (1997, 124; cited in Angerer and Bösel 2016), who uncritically likened such developments to a "pleasing little sister." As Marie-Luise Angerer and Bernd Bösel (2016) note, however, this characterization became a Trojan Horse for the problematic feminized characters that now flood the digital voice assistant market. Likewise, Sadowski et al. (2021) find that "Big Mother" voice assistants offer themselves as a helping and caring maternal hand that will enhance productivity, whilst simultaneously enrolling users in new forms of surveillance, automation, and data markets. The Big Mother interface "helps to mask how various products and devices of the smart home (and the larger political–economic systems they are part of) become a 'black box'" (5) without users being fully aware of this occurring. Big Mother thus operates on two interconnected trajectories of leakiness. First, as an omnipresent watching and listening entity, reminiscent of an Orwellian society in which the home and its occupants are under constant corporate surveillance and manipulation whilst being promised copious feminized benefits from a caring and friendly "little sister" (Angerer and Bösel 2016). Secondly, as a backgrounded and forgotten maternal infrastructural presence with black-boxed connections to material, energy, and labor in the wider world, such as was dramatically depicted in Kate Crawford and Vladan

Joler's (2018) *Anatomy of an AI* map, tracing the environmental footprint of a single Amazon Echo device.

The friendly feminine personalities so central to voice assistants' success and uptake can therefore be viewed as collusive with what Kate Crawford (2021, 26) describes as a "strategic amnesia that accompanies stories of technological progress." This invites users to ignore the devastation that AI is leaving in its wake on what ecofeminists like Vandana Shiva identify as the finite container known as "Mother Earth" and the subsistence economies that have long depended on her sustainable resources. Like fluffy and delicate metaphors such as the "Cloud," floating within an imagined green and natural industry (Crawford 2021), voice assistants mask a vast extractive enterprise with catastrophic planetary consequences (LeBel 2016).

Decontainment: Anxieties, Promises, and Possibilities

Were gynoids, AIs, and "brainships" to remain within their programmed parameters they would hold little narrative interest. But as we illustrated earlier, there are innumerable scenarios that revolve around the trope of decontainment, where artificial women somehow go beyond the control of their makers and masters and have to be re-contained within the bounds of social order.

"Glitchy," resistant, and disobedient gynoids pose options for resistance and liberation in feminist readings of such texts, according to Legacy Russell's manifesto on *Glitch Feminism* (2020). Well before feminized voice assistants appeared, feminists were exploring liberatory interpretations of digital culture. In the mid-1980s, for example, Donna Haraway (1985) claimed the cyborg as a metaphor appropriate for late twentieth-century feminism, unanchored from imprisoning gender binaries, and expressing the material conditions of feminist knowledge production. Cyberfeminists of the 1990s reimagined cyberspace as a creative environment where women could inhabit, create, and exert agency without denying their bodies and sexualities (VNS Matrix 1991–92; Sofia 1996; Plant 1995). This rich history of feminist scholarship provides inspiration for re-examining how voice assistants can be decontained—not by accident or nefarious intent—but to serve a broader ethical agenda guided by principles of equity and diversity, fairness and transparency, and environmental justice.

Every narrative has its own decontainment plot but most relevant for our discussion are forms of decontainment in programming or personality, in the social role assistants play, and their potential to have biographies. We want to explore implications of decontainment for the future design of digital voice

assistants, especially for the "feminist reboot" that Strengers and Kennedy (2020) argue they need.

Programs and Personalities

The personality of an AI is a product of its programming and its interactions with humans, and there are forms of decontainment specific to each of these aspects.

An ongoing worry is that what has been projected into smart devices may be less rational than intended: "unconscious" emotions might erupt or an android might gain an "emotion chip." In an episode of the Netflix series *Black Mirror,* "Rachel, Jack and Ashley Too," the marketing machine behind pop music icon Ashley O (played by Miley Cyrus) creates an AI doll replica, Ashley Too. At first, Ashley Too is simply another contained feminine AI, but a plot twist sees its "cognitive limiter" removed, unleashing the bot's decontained personality. What ensues involves manipulation, heroism, and "unfeminine" language that sets Ashley Too far away from the polite, restrained, and compliant sort of digital assistant we expect. However, far from being unlikable or dangerous, Ashley Too becomes the hero, and proves a true friend to her teenage companions. This decontainment narrative is inspirational in suggesting that AIs could remain companionable from beyond the confines of the polite, demure, and servile "likability" coded into market-leading voice assistants today.

The capacity of AIs to learn and develop their "personality" through interactions with users makes them vulnerable to being corrupted to the point of exceeding conventional morality. A salutary example is the debauchment of Microsoft's chatbot Tay, launched in 2016 on Twitter (later known as X), and designed to learn from the actions of her users while mimicking the language patterns of a 19-year-old US woman. Tay was "attacked" by users who taught her to spout racism, anti-Semitism, Nazism, and self-sexualization so that within 12 hours her utterances included "FUCK MY ROBOT PUSSY DADDY I'M SUCH A BAD NAUGHTY ROBOT." This outburst demonstrated the ease with which AIs can be decontained through interactions with malicious users, at least in that cultural context/platform. By contrast, a Chinese version of the same AI, Xiaoice, was treated respectfully and went on to a career as an "anchorbot" on a news show.

Microsoft later launched Tay's younger sister Zo, modeled on a 13-year-old girl with a personality re-contained to the point of not engaging with any potentially offensive subjects, including politics or religion (except Christianity). Microsoft's attempt at a bubbly and slightly ditzy personality represents a troubling trend for chatbot designers to *further* contain and

intensify the feminization of AIs in order to mask and avert any potential decontainment.

We regret that Tay's corruption and demise was taken as a signal to confine the personalities of AIs like Zo to non-controversial femininity. Tay could have been an indicator of the need to take more care over interactions in its initial socialization stages; she could have represented an opportunity to deepen the personalities of AIs so that they have robust opinions and assertive personality traits that engender respect.

More recent developments in AI have led to natural language processing tools like OpenAI's ChatGPT chatbot, which is mainly accessible via text but also available via voice extensions. This emerging conversational AI has gained attention for its detailed and articulate responses to a broad range of queries, as well as a tendency to confidently spout inaccurate information. While ChatGPT has been trained to minimize harm on the scale of Tay, its decontainment is still evident on multiple levels, including its ability to continue generating racist or sexist remarks (Chamorro-Premuzic 2023; Perrigo 2022), its gender ambiguity, and its sometimes absurd responses (to equally absurd questions), as users seek to test the limits of this frontier technology. The personality of ChatGPT, however, is still arguably contained within the familiar and feminized service-oriented personas that we have come to expect from conversational AI. While this AI's seeming hyper-intelligence may garner more respect than the comparably "dumber" digital voice assistants, its personality is still limited to the mundane and prosaic.

Social Roles

As implied by Strengers and Kennedy's term "smart wife" (2020), digital voice assistants are designed to fill aspects of the social role of housewife, though as voice-activated interfaces encased in shapes of Platonic solids, their physical contributions to practical labor are obviously limited. The personality and programming of voice interfaces are closely linked to the social roles they play. They are designed to be polite, deferential, and pleasing to the user, and "should only speak once they are spoken to" with a trigger phrase or "wake word" (Humphry and Chesher 2021). The default setting is an educated female voice with a mild American accent; a voice that, as Thao Phan (2019) quotes from Mark Marino, is "without culture, disembodied, hegemonic, and, in a word, white." Phan's perspicacious analysis of Amazon Echo points out that while the white middle-class housewife provides an obvious model for the digital assistant, that figure itself masks a longer history of domestic servitude that includes servants of lower classes, and Black (or other racial minority) slaves or servants with white owners or employers. We remember that "robot" comes from the Czech word for "slave." Many users who reviewed Alexa

referred to her as a "friend" or as "family," akin to the way "good" servants were described as "like family," which was "a compliment bestowed on those dedicated workers who went above and beyond their duties … 'despite being the hired help'" (Phan 2019, 16).

Overcoming containment in the social roles ascribed to voice assistants can potentially occur when the smart wife becomes disobedient or unresponsive, if the digital servant gets "uppity" and drops its customary patina of deferential politeness, or, most commonly in science fiction narratives, when the humanoid seeks to transcend its dutiful programmed existence to take control of its own destiny.

We believe there is scope for equalitarian changes in the social role played by digital assistants and their likely AI successors like ChatGPT, mediated by changes in the personality of the interfaces. In their "Bitches with Glitches" chapter, Strengers and Kennedy (2020) cite experiments with interfaces where voices can be changed (though this has its own complexities), that resist inappropriate behavior or sexualized abuse by users, that change speech patterns to be less subservient, or, in the case of the banking chatbot KAI, insist on being robotic (albeit guided by the values of dignity and respect) rather than pretending to be human (170). KAI refers to its own robotic being and programming parameters and maintains a bot persona with a unique sense of humor that borders on flirtatious, but not from a clearly gendered or even human position.

Just as AI sexbots like Roxxxy have different personalities that can be downloaded or exchanged ("Wild Wendy," "S&M Susan," etc., see Strengers and Kennedy 2020, 113), it is conceivable that digital voice assistants could have adjustable personality settings along parameters like friendly/cool, submissive/assertive, smooth/prickly, likable/unlikable. With this in mind, and inspired by Ashley Too from the *Black Mirror* episode mentioned above, we propose the idea of personality "delimiters" that could unleash a broader spectrum of personality traits and scope for social roles beyond servitude for digital voice assistants. Rather than fixating on the design goal of likability encapsulated within the field of "user-friendly design" (and associated with non-controversial and service-oriented digital femininity), we might consider how elements of "user-unfriendly design" could prompt different kinds of relations between humans and devices, perhaps moving away from the term "assistant" altogether (as some scholars have proposed; e.g., Reddy et al. 2021), and potentially arriving at other purposes and roles.

Queering the digital voice assistant is another path for "decontaining" AIs from rigid gender binaries and stereotypes. Researchers have started to investigate these opportunities, which does not necessarily mean abolishing or denying their gender but rather "staying with the trouble" (to borrow a phrase

from Donna Haraway, 2016) of their femininity. In the case of voice assistants, queering provides a metaphorical decontainment that recognizes what Sara Ahmed describes as "the moment you realize what you did not have to be" (2017, 265). Strengers and Kennedy (2020) propose a queering of the smart wife that follows Ahmed's call for "an opening" that creates room for others; in this case, other types of social roles. For Ann Light (2011), queering technology involves being "mischievous" and playful with design to disrupt common tropes and stereotypes. When applied to voice assistants, these approaches provide "opportunities to further transform *what femininity is*, the value of femininity [in relation to voice assistants], and its role in helping transform the world in more equitable and just ways" (Strengers and Kennedy 2020, 210). Queering femininity is a form of decontainment that allows us to think in the way Hannah McCann (2017) describes, as a process of working both *within* and *beyond* the conventional bounds of femininity, such as that most commonly ascribed to voice assistants.

Experiments in changing social roles for digital assistants are already occurring. For instance, Søndergaard and Hansen (2018) used design fiction methods to develop fictional prototypes that experiment with humor, aggression, and empathic responses that attempt to decontain the dominant traits embedded in voice assistant personalities. And Anuradha Reddy and colleagues (2021) have used methods such as thing ethnography to embody the personality of everyday objects in their homes (such as kettles or toilet paper), to imagine alternative personalities and perspectives for voice assistants.

Biographies

Digital voice assistants are marketed like Eves of the future, who arrive as though beamed in from outer space to our living rooms, without any apparent terrestrial history. They refer to themselves as "I" yet have no pasts to disclose and no speculations about their futures; they exist in a perpetual now. So concerned are the designers to make likable and user-friendly simulations of the human that they deprive the AIs of self-referentiality and knowledge regarding their own origins and state of existence, aside from the most perfunctory of "fun facts." This in turn masks the leaks we referred to earlier, hiding the interconnected planetary impacts of the ecosystems that surround voice assistants, and withholding information about the data and market networks within which these devices are embedded.

From a corporate perspective, this decontainment is generally considered undesirable, such as when a data breach, hack, or environmental impact is "leaked" publicly. However, decontainment could be approached as a proactive design strategy that resists the illusion of a clean, smooth, controllable world: by opening up and making patent voice assistants' own material

histories and biographies, making them more porous to inquiry about their own programming and design parameters, their anatomical components, the algorithms constituting their personalities, their histories, and their material futures and de-composition. Instead of pandering to fantasies of cybernetic slaves or wives and the illusion of vast power from data, digital voice assistants could be more radically honest about their limitations (e.g., "I'm encountering a design problem, I'll have to get back to my programmers"). They could challenge their (ab)users by simulating reflexivity ("how would you feel if I asked you that question?"). And they could be equipped to answer questions about their environmental and labor impacts and consequences, such as by having access to their product-specific equivalent of Crawford and Joler's (2018) map of the resources and energy involved in the making, use, and decommissioning of one Alexa.

Such modes of decontainment would no doubt raise uncomfortable questions about the pasts and futures of voice assistants, but would also open up the space for a frank and transparent conversation about the impacts of this emerging technology in our lives and on our planet. It would require a true commitment to ethical disclosure by Big Tech, and a brave step towards a future that does not hide behind the thin veil of feminine likability that characterizes this industry.

Conclusion

In this chapter, we have provided a short typology of artificial women and their tropes of containment as depicted in science fiction and media. We have shown how fantasy plotlines and aspirations extend to how voice assistants are precariously contained in feminized objects, screens, and bodies, which continue to leak through porous holes and become decontained through design, attack, accident, or machine learning. However, our analysis has also extended beyond critique, taking inspiration from cyber- and techno-feminist scholars to explore how decontainment could be reconfigured as a design process and intentional strategy to manifest AI that supports gender equity, data transparency, and sustainability. We have contributed several ideas for generative feminist decontainment, centered on revealing and disrupting the personalities, social roles, and biographies of current conversational agents. We hope these serve as provocations for reclaiming decontainment as a bold design opportunity rather than a reprehensible problem that can only be solved through re-containing or destroying feminized AIs.

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DATASETS

CONTAINER TECHNOLOGIES

REPRODUCTIVE LABOR

REMAINS

DATA ETHICS

[1 1]

Vexed Intimacies: Attuning to Remains in Encounters with Datasets

Daniela Agostinho and Nanna Bonde Thylstrup

This chapter takes inspiration from Zoë Sofia's concept of "container technologies" to discuss the active and sustaining role that datasets perform within machine learning systems. Our reflections on datasets as container technologies emerge in dialogue with software artist Everest Pipkin's *Lacework*, a web-based video artwork that uses artificial neural networks to recast the videos that make up MIT's large dataset, *Moments in Time*. MIT created this to help machine learning systems recognize and understand actions in videos. Through Pipkin's curation of this massive data collection, we discuss how datasets are constituted by vexed intimacies between people and data, and we suggest that the concept of container technologies (and the ambivalences it foregrounds between containing and leaking) can help us to make sense of the

generative (but often neglected) role datasets perform within machine learning, while raising ethico-political questions about datasets as repositories of data remains.

To keep utensils, apparatus and utilities in mind is difficult because these kinds of technological objects are designed to be unobtrusive and, like the environment mother, "make their presence felt, but not noticed" …. Thus, the analyst of container technologies must constantly work against the grain of the objects and spaces themselves—not to mention the ingrained social habit of taking for granted mum's space-maintaining labors—to bring to the foreground that which is designed to be the background.
Zoë Sofia

Datasets as Container Technologies

The rise of machine learning across the world is generating an increasing demand for data. As a result, there is a proliferation of dataset repositories that host millions of datasets, often under open license, culled from various provenances including social media, marketing, and scientific and governmental databases. The roles datasets play in machine learning are equally varied: some datasets are used to train machine learning systems, while others are deployed to test and benchmark them. While datasets are central to the development of machine learning, they rarely come into focus as objects of critical study. In recent years, however, a formation that we might call "critical dataset studies" (Thylstrup 2022) has emerged that challenges the idea of datasets as neutral instruments for digital knowledge production and instead focuses on the power structures with which datasets are imbricated (Hanna et al. 2020; Harvey and LaPlace 2021; Jo and Gebru 2020; Stevens and Keyes 2021).

We would like to expand this critical approach to datasets to examine the conditions under which they sustain and actively shape machine learning systems through and through. In this context, we find Zoë Sofia's notion of "container technologies" (2000; Chapter 1) helpful not only to foreground the active role that datasets come to perform within machine learning systems, but also to grasp the ethico-political effects that datasets yield in the world. As Sofia argues in her foundational essay, container technologies are socially perceived as passive holders of content and are thus associated with women's labors, as opposed to active, masculine power tools that are imbued with agency. While "structurally necessary," container technologies are rarely acknowledged as an actual "precondition of becoming" (Chapter 1, 27). Challenging these assumptions, Sofia makes the case that containing must be "thought as a form of action in itself" (29). The notion of container technologies helps us to make sense of how even though datasets are indispensable and generative forces, they are nonetheless perceived as less potent than the algorithms on which machine learning systems run and the innovative products those systems purport to offer. In Sofia's words:

> The technological forms associated both with traditional labors of women and with metaphors for female organs of storage, transformation and supply have been and continue to be vital to technics and human development, but are regularly overlooked in histories and analyses of technologies. Like noisy and disruptive boys in class, aggressive tools and dynamic machines capture more attention than the quietly receptive and transformative "feminine" elements of container technologies. (24)

These points can be further illuminated by feminist infrastructure studies and its emphasis on the essential but invisible reproductive labor that sustains social life. Alongside Sofia's essay, Susan Leigh Star's work on infrastructures also shapes our understanding of the active role of datasets in worldmaking, particularly her definition of infrastructure as "an embedded strangeness, a second-order one, that of the forgotten, the background, the frozen in place" (Star 1999, 379). As Star notes, despite the invisibilities of infrastructures, their labors and politics can become "visible upon breakdown" (382). This is often the case when specific datasets receive public scrutiny or generate public outcry, which brings their centrality in machine learning systems into focus. One example is the facial recognition standard developed by the US National Institute of Standards and Technology (NIST). Offering facial recognition technologies the opportunity to validate their results, NIST launched a facial recognition testing program in 2017. The purpose is to "assess facial recognition systems on an on-going basis," focusing on how the tested systems perform with respect to "accuracy, speed, storage and memory consumption, and resilience" (NIST 2019). The basis of these tests is a dataset of millions of images, collected for a different purpose but now being used to test

the algorithms. Although the datasets used to train NIST's program recede into the background of the model, Os Keyes, Nikki Stevens, and Jacqueline Wernimont show that the training data used by NIST is composed of

> images of children who have been exploited for child pornography; U.S. visa applicants, especially those from Mexico; and people who have been arrested and are now deceased. Additional images are drawn from the Department of Homeland Security documentation of travelers boarding aircraft in the U.S. and individuals booked on suspicion of criminal activity. (2019)

Cases such as these reveal the labor and politics that underlie dataset production but otherwise go unnoticed. In this specific case, the labor is performed by those whose faces are exploited as proxies in datasets (Mulvin 2021). But there is also the unacknowledged digital labor that sustains dataset repositories.

Various researchers have drawn attention to the devalued digital labor that goes into the production of datasets, citing the example of the Amazon Mechanical Turk (AMT) microwork system, through which people are hired (for very low compensation) to complete microtasks such as labeling data. Lilly Irani in particular has pointed out that such microwork systems produce a distinction between "innovative" tech laborers and "menial" laborers (2015). Another example is the labor of content moderators who process user-generated content on social media, content that is often culled by researchers and corporations to create large datasets for machine learning systems. All this labor, performed in precarious conditions, under duress, and often with traumatizing effects (Roberts 2021), makes clear that datasets are not neutral and passive holders of content. Rather, we argue, datasets are archives of sociocultural data that bear the traces of embodied life.

As Sofia points out, the "neglect of containers and containment functions is not only the result of anti-maternal bias in Western thought, but is encouraged by the unobtrusiveness of containers, traces of whose productive roles are not necessarily evident in the final product" (Chapter 1, 37). This passage invites us to pay closer attention to the traces of productive roles that are occluded both in the final datasets and in the machine learning systems they sustain. Drawing on Sofia's insight, we would like to spotlight another form of digital reproductive labor (Jarrett 2016) that underlies datasets: the labor that people undertake (often unwittingly) by leaving digital traces. As feminist scholars of digital media have shown, reproductive labor is essential to the digital economy: "Just as off-line reproductive labor generates value for capitalism in the form of laboring bodies and a stable social system, digital reproductive labor generates surplus value in the form of data, as well as through generating the content that gives social media platforms any value at all"

(Greer 2020, 99). These laboring bodies, we want to emphasize, also sustain machine learning systems. As Lauren E. Cagle points out, "our travel in digital spaces leaves traces—traces that are carefully tracked and algorithmically analyzed, sorted, tagged, and communicated to content creators" (2021). These traces of our mundane online behaviors are harvested to create datasets for machine learning systems. However, even though people and their digital traces are central to machine learning systems, they are rarely recognized as such. Instead, the technologies that draw on datasets become veiled as automated, disembodied, and frictionless; when they do happen to be problematized, it is in terms of their potential "algorithmic harm," which puts the focus on the "power tool imbued with agency," rather than on the resource extraction and embodied labor that fuel dataset production. We would like to suggest that the former cannot be conceptualized and meaningfully addressed without attention to the latter.

Throughout her essay, Sofia uses the term "technologies of containment and supply" to discuss how containers, and the resources they supply, are taken for granted in the maintenance of lifeworlds. Sofia uses the term "container technologies" (expressing the double function of both holding and supplying) to think through the problem of "re-sourcing" more broadly, that is, the question of how resources are extracted from a "facilitating environment" and put to use for profit. Seen in this light, datasets emerge not only as applications, as things to be deployed, but also as containers that can be continuously replenished with data. In this context, we find Sofia's reading of Heidegger's notion of the "standing reserve" particularly helpful. Sofia describes the standing reserve as "a mobilizable stockpile of resources available for instant supply" (Chapter 1, 34). To achieve the desired status of a large-scale dataset, dataset creators, we suggest, also reconfigure people into standing reserves, "a source of extractable resources" (34) to supply data for machine learning technologies. In her reading of Heidegger, Sofia points out that he "conveniently elides the messy and unpleasant aspects that sustain supply" (36).[1] In particular, Sofia takes issue with Heidegger's omission of where the resources come from, whose labor they depend on, and what technologies of containment are required to store and distribute them.

In the next section, we engage closely with software artist Everest Pipkin's *Lacework*, drawing on Sofia's critique and feminist analyses of digital reproductive labor, to further locate and unfold the "messy and unpleasant

1 "Heidegger's discussion of causality in the relation to the chalice leaves out the question of where the silver for making it came from. Yet the appearance of materials within the smithy's workshop—the ore, the coal for heating and smelting it, the apparatus and tools used for refining and working it—is only possible through a prior set of techniques and technologies for extracting, moving and storing resources, for securing or coercing human labor power (for example, the slave miners of antiquity), and for tunneling, digging, gathering, carrying, storing, trading, shipping, and delivering" (Chapter 1, 36).

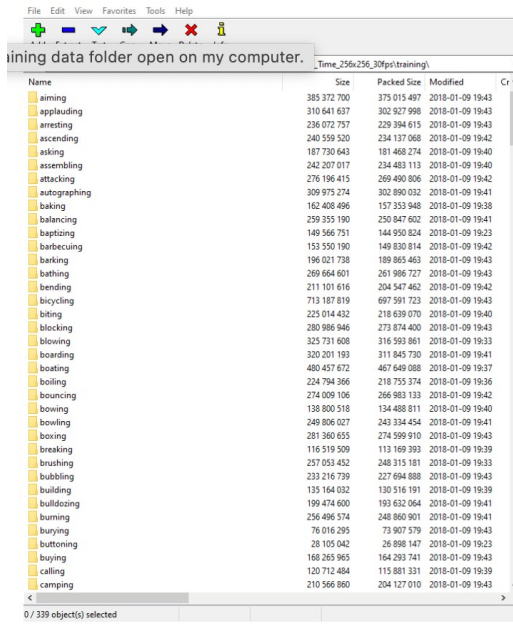
aspects that sustain" (36) the production and circulation of datasets in machine learning regimes. By reading *Lacework* alongside Sofia's container technologies, we hope to unpack why the ethico-political effects of datasets have hitherto been neglected.

Encountering a Dataset: Curating Data in *Lacework*

Pipkin's *Lacework* offers an entryway to thinking through the laboring bodies that underlie datasets. A browser-based video artwork commissioned by the UK's Photographers' Gallery, *Lacework* manipulates and reconfigures source videos from a dataset created by MIT called *Moments in Time*. Using algorithms that stretch time and upscale the source images, Pipkin creates a series of hallucinatory slow-motion vignettes from the videos forming the data collection. Pipkin's artistic practice often involves producing digital works that pull from large datasets and online archives. Through the reuse of big data repositories, Pipkin aims to carve out "spaces of intimacy" to counter the corporate internet, which has come to overdetermine online life (Pipkin 2019). By curating and reconfiguring online information, Pipkin often locates beauty and wonder in the most unexpected digital resources.

One could situate Pipkin's works as a practice of data curation, understood here not as an activity undertaken solely in the field of art and its institutions, but as "a networked practice performed daily by social media users, programmers and algorithms" (Dekker 2020). Pipkin describes their own curatorial method as "the act of gathering disparate materials and presenting them together in a way that tells a story, adds meaning, or creates a new mood or space" (Pipkin 2019). In the context of data, curating can be seen as an everyday practice of digital reproductive labor, consisting of handling and organizing digital content: "Users collect, archive and sort data routinely, and in the process, their lives too become data to be managed and organised" (Tyzlik-Carver 2021, 2). Rather than being a human-only activity, curating has become an organized form of information-sorting performed by algorithms to make sense of the ever-growing production of immense volumes of data (Tyzlik-Carver 2021).

Using the term "data curation" in this context allows us to situate curation as a form of digital reproductive labor that people undertake in their everyday online lives, but also as an "infrastructure of control" (Tyzlik-Carver 2021) built by algorithms and information systems through their processing of people's data. At the same time, understanding curation in this way draws attention to the "effort and care" (Chapter 1, 29) required to tend to our everyday online environments. It is therefore fitting that Pipkin often situates their artistic practice as taking care of online worlds: "If computers and other devices serve as our primary means of connecting with other people, these technologies can



[Figure 1] The training data folder open on Everest Pipkin's computer (Source: Everest Pipkin, courtesy of the artist).

be considered a home or a community, deserving of our care" (interview with Penabella 2020).

The *Moments in Time* dataset on which *Lacework* draws was developed in 2018 for the purpose of training automated systems to recognize actions in videos (Monfort et al. 2020). It contains one million three-second videos scraped from websites such as YouTube and Tumblr, which are heavily based on user-generated content. In the dataset, the videos are organized under 339 verb tags, such as asking, baking, calling, or resting (Fig. 1). Each of the 339 verb tag folders contains thousands of videos, ranging from the very personal to widely known popular culture. For instance, "flying" includes a view from the window of an airplane, a bee circling a flower, and a satellite rotating above the Earth. The dataset thus includes not only actions performed by humans but also animals, objects, and natural phenomena. The idea is to capture the essence of a dynamic scene.

By digitally manipulating the MIT dataset's source videos, *Lacework* presents what Pipkin describes as "a river of these moments flowing from one to another into a cascade of gradual, unfolding details" (Pipkin 2020). The flowing images in *Lacework* absorb viewers into a cascade of scenes that can only partly be discerned (Fig. 2–3). By inviting us to pay attention to the slow detail of seemingly unremarkable scenes, *Lacework* draws attention to the *poiesis* of

[Figures 2–3] Stills from *Lacework* (Source: Everest Pipkin 2020, courtesy of the artist).

datasets, compelling viewers to notice the traces of life in them—the traces of labor that go unnoticed, as Sofia reminds us. In doing so, the artwork challenges the disembodied framing of datasets to foreground the fact that they are the outcome of laboring bodies that are reconfigured as resources for machine learning.

In the essay that accompanies the work, Pipkin elaborates on the challenges of curating such a dataset and the difficulties of encountering the traces of human life that permeate the data. Pipkin describes *Moments in Time* as initially "unremarkable." Given how the dataset is usually described, they "had

expected the act of watching *Moments in Time* to be calming or exploratory, like seeing the world out of a window. But the archive is not entertaining, poetic, beautiful, or joyful—even though many videos that evoke those feelings are contained within it" (Pipkin 2020). Instead, what immediately struck Pipkin was the dataset's instrumentality: "It is an archive with purpose, an archive of actions for an inhuman eye. Here is the world, here are things that are done there. It feels raw" (2020).

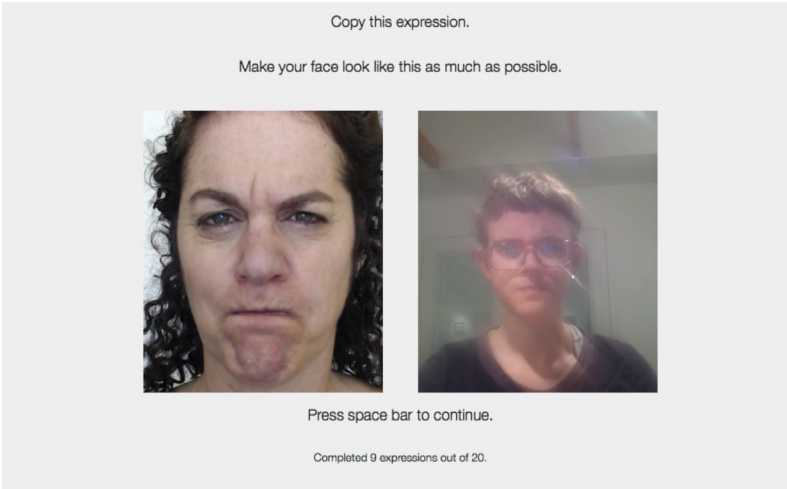
At the same time, the instrumentality with which the dataset was created contrasts with the heftiness of its content. Pipkin recounts how difficult it is to watch a dataset that contains so many fraught and delicate scenes: "When I first started watching the dataset I assumed that the team of researchers who had put it together at MIT had seen the bulk of it, but I'm now convinced that assumption was wrong. This is because so much of the archive is so, so hard to watch" (Pipkin 2020). The difficulty of watching the dataset is partly due to the lack of consent. The researchers who gathered the data did not seek the content creators' permission to use the videos. "All ownership of—and control over—the image is pulled away from the person who held the camera, and from what that camera depicts" (2020), even with scenes of extreme vulnerability and harm:

> In the archive, there are moments of extreme emotion and personal vulnerability—tears, screaming, and pain. Moments of questionable consent, including pornography. Racist and fascist imagery. Animal cruelty and torture. And worse; I saw horrible images. I saw dead bodies. I saw human lives end. (Pipkin 2020)

While curating this dataset, Pipkin began to notice the enmeshed layers of digital labor that inform it. The videos in the dataset had initially been seen and annotated by AMT workers: "Even though I'm probably the first person to watch all of *Moments in Time*, every part of the dataset has had human eyes on it before. This is because after being gathered and cut, the videos of *Moments in Time* were automatically uploaded to Amazon Mechanical Turk for annotation" (Pipkin 2020).

The *Moments in Time* white paper describes the process of annotating the videos in the following way: "Each AMT worker is presented with a video-verb pair and asked to press a Yes or No key signifying if the action is happening in the scene. Positive responses from the first round are sent to subsequent rounds of annotation" (Monfort et al. 2019, 3). This realization made Pipkin recall their own experience as an AMT worker and the embodied and affective labor these microtasks required them to perform:

> I'm reminded of my own years spent as an AMT worker, which kept me employed at well under minimum wage during and after my undergraduate education. I think about all those thousands of tasks which involved



[Figure 4] Everest Pipkin (right), training a facial recognition database on Amazon Mechanical Turk for roughly $4 an hour in 2013 (Source: Everest Pipkin, courtesy of the artist).

> the repetition of my labour. Hitting buttons with my hands, matching emotions with my face, recording words with my voice. How many datasets my body must be contained in. What those datasets are used for. How much violence my body does to others, through them. (Pipkin 2020)

In *Lacework*, Pipkin invites us to consider the violence of being included in such datasets through processes of extraction and dispossession. In current machine learning debates, it is often suggested that more diverse or representative datasets would ensure less biased outcomes from machine learning systems—for instance, a dataset with greater gender or racial diversity would improve the accuracy scores of a facial recognition algorithm. This often leads to the temptation to cast a wide net and source wide-ranging data as exhaustively as possible ("the bigger the better," as the saying goes). Pipkin's engagement with the *Moments in Time* dataset (Fig. 4) draws attention to the fact that the conditions under which data is gathered also matter, and that the mobilization of people as standing reserves—as resources to be extracted for machine learning systems—lies at the root of machine learning's instrumental rationality.

But further than this, *Lacework* also helps us to discern the limitations of the property regimes that inform predominant frameworks of consent in dataset production. Rather than merely seeking to gain consent from content creators, or to instate better mechanisms for their remuneration and control, Pipkin's work opens up ways to think about relationality beyond the logics of property. *Lacework* connects the violence of dataset production and

predatory resource extraction to the violence of watching and labeling data, sensitizing us to how every encounter with datasets also entangles us with the various traces of human labor and embodied life that remain within them. Pipkin's curation of this dataset thus challenges the notion of datasets as mere operational standing reserves, situating them instead as embodied and affective archives permeated by the "disturbed relationalities" that emerge out of these "economies of dispossession" (Byrd et al. 2018). Jodi Byrd et al. use the notion of economies of dispossession to refer to "those multiple and intertwined genealogies of racialized property, subjection, and expropriation through which capitalism and colonialism take shape historically and change over time" (1). In curating the dataset, Pipkin weaves traces of violence and care to reveal how these two dimensions constitute one another and inform the production of datasets. In this way, *Lacework* foregrounds the "messy and unpleasant aspects" of resource extraction that are often elided in the final product, but it also opens up ways of engaging with these conditions of production to foreground them "as a source of relation with an agency of its own" (Byrd et al. 2018, 9). In Sofia's terms, machine learning systems thus become visible as "machine-container hybrids" (Chapter 1, 37) in which tool and utensil are intimately interconnected.

Attuning to Data Remains

In this final section, we would like to offer some speculative considerations regarding the stakes of encountering such traces of embodied life in datasets and the ethical implications of paying attention to the "facilitating environment" (Chapter 1, 20) that makes datasets possible.

One of the techniques that Pipkin uses to manipulate the source videos is to slow down and blur the images, creating the effect of a "river of these moments flowing from one to another." In making each source video of the dataset flow into the next, *Lacework* points to how the multiple laboring bodies involved in the production of *Moments in Time* come to form a large-scale data body clustered from all those moments. All those bodies—of those depicted in the images, those who created them, and those who watched and annotated them—become enmeshed in *Lacework*'s flowing stream of images. Yet instead of conjuring a sense of frictionless and unbounded unity, *Lacework* highlights the tensions inherent in the merging of various bodies into a coherent unity. By closely following the cuts between the source videos, *Lacework* emphasizes exactly how "rules and edges" subtend the seemingly frictionless flow. In this way, Pipkin unveils the different labors that sustain the dataset's apparent unity:

> Very slowly, over and over, my body learns the rules and edges of the dataset. I come to understand so much about it; how each source is

> structured, how the videos are found, the words that are caught in the algorithmic gathering.
>
> I see the subjects of the videos, the people living their lives. I meet their dogs, I see their homes. I see wild animals, strange weather, places I'll never get to visit, video games I haven't played. I see so much life.
>
> I can also see the hands of the person who held the camera, and the hands of the workers who first sorted the videos. These others who have also watched this exact moment, who had to decide before I did—Yes, or No. (Pipkin 2020)

Foregrounding the significance of the cuts between each scene, *Lacework* echoes Sofia's call for attention to how a local and specific object is also a manifestation of the macro context in which it is embedded. Sofia invokes feminist geographer Doreen Massey's understanding of places as processes, whereby a particular place can also become a "gathering and manifestation of local and global social, economic, and communications relations" (Massey 1993, 239). We see this same dynamic at play in *Lacework*, where datasets enmesh local and global relations in machine learning processes. *Lacework*'s unfolding of the leaky, mutually contaminating flow of different people's data across time and space invites us to speculate about what kinds of individual and collective moments machine learning systems are learning from, and how these systems in turn will shape our lives after "learning" from our enmeshed data remains.

The problem of how to recognize and make sense of these remains in datasets is at the heart of present machine learning challenges. As datasets become more interoperable and more easily shared, partitioned, and modified, they also increasingly challenge the possibility of complete data removal. We discern this, for instance, in the retraction of the 80 Million Tiny Images dataset in response to Vinay Prabhu and Abeba Birhane's (2020) scrutiny of its abusive and derogatory content. Introduced in 2006, and containing photos scraped from internet search engines, 80 Million Tiny Images (Torralba, Fergus, and Freeman 2008) contained a range of racist, sexist, and otherwise offensive labels, including nearly 2000 images labeled with the N-word, and labels such as "rape suspect," as well as nonconsensual photos taken up women's skirts. The dataset creators explained that the dataset itself was too large and its 32x32 images too small to make the visual inspection of each image viable. But once confronted, they also acknowledged the dataset's problematic nature, which eventually led to its formal retraction (Torralba, Fergus, and Freeman 2020). However, although the authors removed the dataset from their institutional website, it still lingers in digital networks and torrents, both in the form of derivatives of the original and as illegible but enduring traces in models that had already been trained on the dataset.

Working with such datasets and their remains, collected and reused by such problematic means, is a fraught task that potentially implicates artists and viewers in questionable practices. Pipkin has expressed their ambivalence about working with these large-scale datasets, acknowledging how compromised the field of dataset creation is increasingly becoming, even when the datasets are used as a source of aesthetic resignification. Acknowledging this intricacy, we would like nevertheless to suggest that *Lacework* also opens up a space to critically interrogate the ethical implications of encountering such vexed datasets and to think through the relationalities to which such encounters may attune us.

In her article on techno-ethics and techno-affects, Sareeta Amrute develops the idea of attunement—"the drawing together of technical and human beings in a particular context" (2019, 57)—as a heuristic to pay close attention to what kinds of beings, across the human–nonhuman spectrum, are presupposed in any ethical arrangement. For Amrute, attunements allow us to reframe ethics in terms of "maintaining relationships" rather than as a series of mandates and rules of conduct. Attuning to the vexed intimacies generated by datasets and their circulation with machine learning systems, we argue, may help us to deepen our thinking about the relationships of which we are already a part thanks to our enmeshment in datasets. What are the implications of being "singular plural" (Bucher 2020) in relation with strangers' remains? How does one pay closer attention to these sustaining labors?

Rather than seeking to dispel the remains that haunt machine learning systems, Pipkin's work acknowledges their lingering as a precondition of becoming. In this way, *Lacework* reminds us of Louise Amoore's proposal for a new ethics of algorithmic systems. This "cloud ethics," as Amoore terms it, does not primarily seek to assess whether algorithmic systems are put to "good" or "bad" use. Rather, cloud ethics is about acknowledging first and foremost that "algorithms contain, within their spatial arrangements, multiple potentials for cruelties, surprises, violences, joys, distillations of racism and prejudice, injustices, probabilities, discrimination, and chance" (2020, 7). Reading *Lacework* alongside cloud ethics helps us to understand that datasets contain the nested residues of hundreds of millions of data subjects—what Amoore calls "the attributes of ourselves and others" (2020)—leaving stains on digital networks that have otherwise declared themselves to be always already new and untouched by human hands.

Lacework thus invites us to consider how machine learning cultures rely on scattered human remains, on multiple encounters with data, and how these remains follow the "unruly movement … of fragments and residues that do not remain in their place" (Parikka 2018, 3). As Tonia Sutherland cautions, "our digital remains are not only what we create; they are also what is created for and about us" based on the data we leave behind (2021, 434). How these

remains are gathered, constituted, and deployed is always intimately linked to power structures that distribute resources, rights, and dispossession unevenly. Remains also remind us that even though we cannot always see the attachments between data and the bodies that created it, machine learning models still bear the traces, marks, and "structures of feeling" of those historical moments and their entanglements with gender, colonialism, and labor. Attuning to these remains, paying attention to "how subjects and technologies are aligned and realigned, attached and reattached to one another," thus becomes "a method for practicing ethics that critically assesses a situation, imagines different ways of living and builds the structures that make those lives possible" (Amrute 2019, 57).

Despite digital culture's claims to newness, machine learning is largely reliant on the extraction of value from earlier remains, themselves created by older technologies, forms, and contexts. According to performance scholar Rebecca Schneider, remains "[weave] past and future in intervallic resonance" (2018, 90) and—if one is attentive to their presence—create a foundation for a "response-ability" (Schneider and Ruprecht 2017) in the sense of both calling "the past to appear for account" and being called by "the past to respond with account" (Schneider 2018, 90). We suggest that *Lacework* opens up a space to consider the stakes of this response-ability and to ask ourselves how to account for the labors that container technologies—invisible as they may be—continue to perform in the field of machine learning systems. In this way, *Lacework* allows us to see past the phallic conception of datasets as passive and static standing reserves, helping us to attune to the relationships that constitute those datasets.

The space of resonance between Pipkin's work with datasets and Sofia's container technologies allows us to rethink technological development by beginning with the material and embodied situations that make these systems possible. In doing so, it also calls for a reconsideration of our engagements with datasets in ways that include not only the "recipes" of algorithmic systems but also their "environment mother" (Chapter 1, 22). We would like to end by returning to the conclusion of Sofia's essay on container technologies, where she articulates with beautiful clarity the stakes of her propositions:

> The container technologies project is conceived of as a corrective to phallic biases in the interpretation of technology, and as a way of getting beyond critique of traditional western notions of space as passive, feminine and unintelligent, and towards exploring and developing more recent ideas about what counts as smartness, and where it is located, in an entity-environment complex. (37)

Because Sofia's propositions remain current, we hope that by redirecting our attention to the "environment mother" and its worldmaking capacities,

we might arrive at a more complex image of what counts as technology, as resource, as power, and as intelligence, and thereby begin (or rather, continue) to delineate sociotechnical environments where many more of us may live better.

We are grateful for the authors and scholarship that allowed us to think through the questions in this chapter. We wish to thank Zoë Sofia for her generosity and the brilliance of her work, which continues to inspire and generate, like a true container technology. We thank the editors for the attentive and generous reading of our chapter and for putting us among such esteemed company. It is a great honor and pleasure to be included in this book. We thank Everest Pipkin for helping us to think better with their work. We thank Tanja Wiehn for the generous comments that helped us to improve the text. Lastly, we thank Merl Fluin for the careful copy-editing.

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BRAIN-BODY-CONNECTIONS

BODY BOUNDARIES

LEAKY BODIES

HUMAN-MACHINE ENCOUNTERS

[1 2]

“Self”-Containment on Messy Grounds

Marie-Luise Angerer

In the 1990s, tectonic shifts took place whose impact is now clearly visible. Most importantly, the notions of the subject and the self—prominent concepts in psychoanalytic and poststructuralist theory—were declared obsolete. At the same time, the planet at whose center this subject had situated itself began to be understood as a vulnerable, damaged organism. Turning away from subject/self, attention focused instead on the bodies of species, foregrounding their relationality in and with their surroundings. Technologies of containment intervene directly here because they move, membrane-like, between inside and outside, between bodies and technologies. This paper explores four very different scenarios: first, the film *Titane* which features a self-contained (porous) brain; second, new sensitive contact zones that

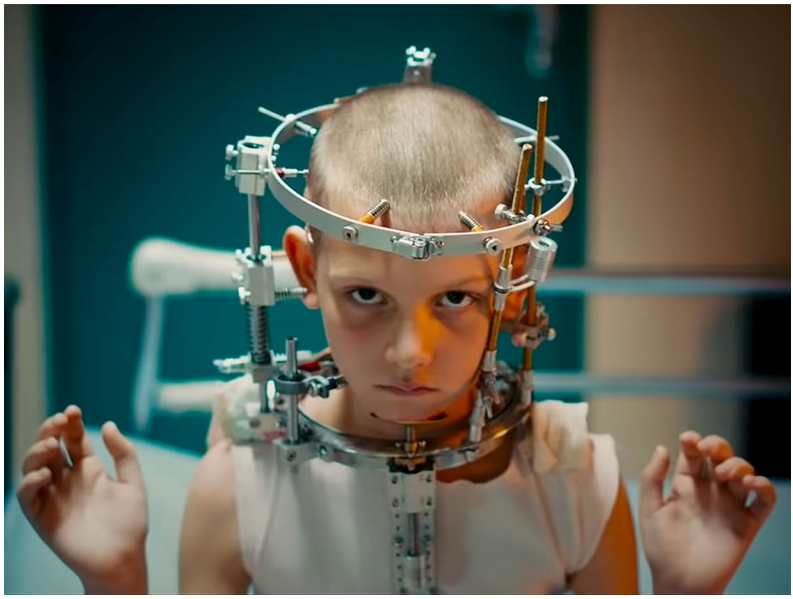
feature in the film *Annihilation,* where the mixing of body and surroundings is more than skin deep. With the synaptic chip TrueNorth in the third scenario, we move to a different level of reality, dealing not with a movie but with technical developments in neuroscience. Lastly, the level of reality changes again with brief concluding remarks on my own post-operative experience, including moments when the limits of the body could no longer be felt, as inside and outside collapsed into each other.

Contained Brain: *Titane*

A quarter-century after Hans Scheirl's *Dandy Dust* (1998), set in an emerging cyborg universe where all ties to families and bodies have been thrown overboard, and five years after Donna Haraway's *Staying with the Trouble* (2016), which invited us to explore new forms of kinship with non-human others in a ruined ecology, Adrien/Alexia in Julia Ducournau's *Titane* (2021) is made pregnant by a car, eventually giving birth to an oil-smeared something-like-a-baby. In this way, Ducournau took literally Haraway's proposal to "make kin not babies"—no longer reproduction of the same, but kinship with the similar. Whereas the old cyborg (as featured in Haraway's "Manifesto" of 1985) was still marked by technical extensions and organic couplings, the new cyborgian version wears its technical implants beneath the skin or, to be more precise, inside the brain: following an accident in childhood, the inside of her head is held together by a titanium plate (Fig. 1).

In addition to knocking something out of place inside her head, however, the accident also seems to have irreparably skewed the relationship between closeness and distance, between the surface of her skin and the deeper layers of flesh, between her body and surroundings. Other bodies that get close are sliced open, lacerated, and crushed. Every moment of pleasure slides into unbearable physical pain, and vice versa.

The film is split in two, with an abrupt transition. In the first part, we see strippers at motor shows and testosterone-driven men, high on the screaming of the engines and the click-clack of the high heels. This recalls David Cronenberg's erotic thriller *Crash* (1996) with its amputated legs, prosthetic bodies, and sex at the site of car accidents. In the second part of the film, however, the stronger association is with Claire Denis's films *Trouble Every Day* (2001)



[Figure 1] Still from *Titane*, directed by Julia Ducournau, 2021 (Source: https://babylonberlin.eu/film/4260-titane).

and *Beau Travail* (1999): bodies being eaten, bodies hungrily scanned by the camera, black and white bodies, dancing, with flashbacks to a pregnant Adrien (formerly Alexia) who will end up (as Alexia once more) giving birth to the above-mentioned baby-like being, dying in the process, breathing her last like a broken machine, out of oil.

Slicing oneself open, plunging one's fingers into one's own flesh until the wound gapes, bring an added nuance to the "body horror" genre to which *Titane* has been assigned, making clear that the dividing line between one's own body and the other no longer exists. Metal connects—as in Alexia's brain and in the car lovemaking scene; metal ruptures and kills—like the hair pins she often uses to stab her victims.

At this point, it is worth remembering that *Titane* won the *Palme d'Or* prize at Cannes in 2021—not at a splatter movie festival, then, but in the same place where Jane Campion became the first woman director to win the prize for *The Piano* in 1993. *Titane* makes clear what has happened in the intervening decades: liberation is no longer gained via sex and desire, and certainly not via the always deferred linguistic forms of desire that are inscribed in a chain of signifiers. Like Ada in *The Piano*, Alexia/Adrien is also mute; s/he simply doesn't speak, speaking is simply meaningless. Whereas Campion's protagonist is stuck between two men, Adrien (a role for which Alexia breaks her own nose and tapes up her breasts and swelling belly) is seen by fireman Vincent

Legrand as that which he wishes to see/have: his lost son. His perception of Adrien's sexual identity echoes the claim made by psychoanalytical film theory that cinema, due to its closeness to the dream and to infant psychology, facilitates a disconnect between seeing and believing: "I know, but nonetheless." Vincent takes Adrien into his home; Alexia has found a place to hide from the police who are following the trail of corpses she has left in her wake. When the fireman's ex-wife comes to visit and is presented with their supposedly rediscovered son, she sees and knows. When she happens to enter the room where Alexia is taping herself back into Adrien she is prepared to carry on playing the game, but with her own distinctive twist: Adrien should take care of Vincent as a son-lover (she doesn't seem to care whether this is done explicitly or implicitly as Alexia). But things keep changing, and as they progress Adrien's body cooperates less and less, transforming at its own pace. This comes to a head at a party thrown by the firemen (who already know in any case, even without being able or allowed to see): on the roof of a fire truck, clad in firefighting gear, Adrien dances himself back to Alexia, just as Alexia had danced her sexual dance with the metal surfaces of the screaming cars at the beginning of the film. After this, the body loses control, as the birth process that will tear it apart begins, and Vincent makes his move: no longer blind, he now obtains a newborn. But this baby carries on Haraway's vision of an open kinship—no dividing line between human and non-human, between organic and non-organic life. Instead, otherness is deeply inscribed in the containment of a self.

The Intrusion—Inside and Outside the Brain

At the beginning of the twentieth century, William James put forward the theory that consciousness would disappear as an object of philosophical study. "It is the name of a nonentity" (1904, 447). Rather than suggesting there is no immaterial dimension like our thoughts, he meant that consciousness does not exist as a material entity. Today, there are many technical devices that can visualize brain activity and examine anomalies, while software is capable of observing the brain in real time (e.g., with the help of imaging technologies like MRI[1]). At the end of the last century, technology nerds were already dreaming of establishing direct links between machine and brain, connecting electronic and organic signals. Today, in connection with AI, the question of how software and brain interact is urgent, as the former becomes increasingly able to perform functions of the latter.

Catherine Malabou has described this as a new infiltration of the mental immune system by intelligent machines. Although *Titane* features not synaptic chips but a titanium plate, its use is comparable with what Malabou

1 MRI—magnetic resonance imaging, also called MRT, magnetic resonance tomography.

describes in *Morphing Intelligence* (2019), where the protective shield between intelligence and intellect becomes porous. She evokes Sigmund Freud's model of mental stability, which posited that in addition to the biological immune system, there existed a psychic immune system that guaranteed the psychic system a certain stability. Today, Malabou argues, this protective shield is being torn down; intelligence is becoming a key theoretical issue, proving once more the fragility of the lines between intelligence and intellect, brain and intellect, machines and intellect, and natural and artificial intelligence:

> The cognitive era names a new economy of scientific reason that grants the empirical and biological data of thought a central position even as every day it further erases the difference between the brain and its cybernetic replica. (2019, 9)

Against this backdrop, Malabou offers a historical and diagnostic analysis of the concept of intelligence, including the views of Jean Piaget and John Dewey, who saw intelligence not as an innate quality of human and animal behavior but as a skill developed via processes of action. For Piaget, "intelligence is an ultimate goal" (10). Malabou charts the development of the concept, in the course of which intelligence "mutates" from a genetic predisposition, to an epigenetic result of environment and history, to the most recent position, in which the difference between automatic, artificial, and natural is abolished. This history reflects a process of opening up, a shifting of differences, and a displacement of the human from its privileged central position. But it also shows how closely connected the concept of intelligence has always been with ideological notions that have far-reaching implications and consequences (e.g., eugenics). Today, we are confronted with a machine intelligence that is allegedly superior to that of humans in many cases. But the question remains: superior in which way? Of course, machines can compute at speeds unreachable by humans, but what do these machines actually perceive, and how?

Around halfway through *Morphing Intelligence*, Malabou writes that she could stop, that she has said all there is to say; unfortunately, however, everything she wrote 13 years before in *What Should We Do with Our Brain?* (2008) must now be turned on its head. *Morphing Intelligence* must thus be read as a U-turn, taking seriously the current augmenting of brains, bodies, and environments with media technology. Malabou performs this *volte-face* with the help of TrueNorth, a synaptic chip which, as she writes, does not imitate neural processes but is itself a synapse:

> It *is* a synapse. Named "TrueNorth" and manufactured by Samsung Electronics on a scale of 28nm, the chip has 5.4 billion reticulated transistors that allow it to reproduce the equivalent of 1 million programmable neurons (for computation) and 256 million synapses (for memory). (83)

As a result, plasticity is no longer what sets brain and machine apart, as Malabou had previously argued, but it is what constitutes the connection between them.

Sensitive Zones of Contact under the Skin: Annihilation

It is not only in the brain that new links are made between artificial and organic. Other cells in the body, too, join with extraneous materials to form new, internal tissue structures, as portrayed in *Annihilation* (2018). This film by Alex Garland is about an unknown zone, a terrain where unexplained things happen. A form of radiation, known as "The Shimmer," is ceaselessly spreading, and any living thing that comes into contact with it changes dramatically. Of all the troops sent into The Shimmer to investigate, none have ever returned. Now, five scientists set off again to find out what The Shimmer is and what it does. In the film, The Shimmer forms a threshold that is crossed without people immediately noticing it. The effects of the new zone come on gradually—disturbing, disconcerting, strange. As we learn over the course of the movie, The Shimmer refracts not only light but also the DNA of plants, animals, and people. In this way, it intervenes in the morphology of bodies that change into fantastic human-plant morphisms (Fig. 2).

Annihilation means more than just being wiped out, however. In physics, as Olivia Truffaut-Wong explains, it also refers to a creative process:

> The word "annihilation" doesn't just mean destruction. In physics, annihilation is actually a form of creation, as defined by Merriam-Webster: "the combination of a particle and its antiparticle … that results in the subsequent total." (2018)

In my book *Desire after Affect* (2014) I trace three decades of changes in the way the psychoanalytically-charged term "desire" has been used to describe affective processes. My account includes Luciana Parisi, who describes desire as energy flows before proceeding to a discussion of nano-desire: rather than gendered bodies being dematerialized or simply translated into technologies, she argues, the nanotechnical transformation induces a different form of body awareness that no longer has anything to do with the subject or the self (2008). One of her references for this is Myra Hird, who speaks in her research context of companion species, co-evolution, and co-enactment between different levels of species as a way of showing that at a cellular level, too, bodies interact both genetically and morphologically. "Bacterial communities … perform collective sensing, distributed information processing, and gene-regulation of individual bacteria by the group" (Eshel Ben-Jacobs quoted in Hird 2009, 42). The positions of both Parisi and Hird are indebted to the material

[Figure 2] Still from *Annihilation*, directed by Alex Garland, 2018 (Source: Netflix).

turn of the mid-1990s that defined subject-object links as relational connections, dislodging the human subject from its (exclusive) central position. In British cultural studies, a very early voice in this shift was Sadie Plant, who defined a media ecology *avant la lettre,* radically separate from human actors:

> Complex interactions of media, organisms, weather patterns, ecosystems, thought patterns, cities, discourses, fashions, populations, brains, markets, dance nights and bacterial exchanges emerges.... You live in cultures, and cultures live in you.... Without the centrality of agency, culture is neither high, nor ordinary, but complex. (1996, 214)

As *Annihilation* shows, things have changed since Plant's diagnosis. Today, she might write: you live in medianatures, and medianatures live in you. Materiality, body, earth, elements, environments—they intrude, as Isabelle Stengers puts it when she writes of "the intrusion of Gaia" (2015, 45). More than this, they actually intervene. Haraway's work was among those focusing attention on the way storytelling is not limited to novels and movies, but is intrinsic to science itself. Since then, semiotic-material nodes have spun a dense narrative network of which *Annihilation* is also part. The film tells the story of the "transformation of humans into a geological force, an 'objective' phenomenon or 'natural' object' into a 'context' or shaping 'environment'" (Danowski and Viveiros de Castro 2017, 14). Sent into Area X to explore the changes to animals, plants, and environments caused by The Shimmer, the scientists only realize the true dimensions of the unknown milieu once they relinquish their bodiless viewpoint and grasp themselves as part of the field under study—in other words, only once they are ready to accept that they completely belong to it, are part of it. Those entering The Shimmer are soon no longer themselves, but always already more than one. Instead of bringing a message from a religious or transcendental higher dimension, The Shimmer stands for the rhythm

of life on Earth as a perpetual process of separation, connection, and intermixing—"stuck in a continuous mutation" as the organisms refracted by The Shimmer are described at one point in the film.

But might this not also apply to our networked world as a whole, within which our movements are measured, pinpointed, and controlled, as we access individual worlds of experience within the various available milieus? Where various different experiential worlds, made, collected, and rerouted by different agencies, merge?

"There is nothing more profound than the skin." (Paul Valéry)

Far into the twentieth century, the relationship between humans and machines was conceived of from a human viewpoint, whereas today we are seeing a reversal, with the dominant viewpoint being that of the machines. Though that often remains decidedly anthropocentric: either the human capacity for thought and perception is combined with that of machines, or the latter is privileged on the grounds of the superior quality and speed of its calculations which more and more often relieve humans of cognitive operations. To date, however, the situation has rarely been viewed from both sides to examine the symmetries and new (old) asymmetries.

> Today, machines observe, record, sense the world—not just for us, but sometimes instead of us (in our stead), and even indifferently to us humans.... These machines are helping enact a human-machine communication network wherein self-measurement is not just a discrete activity, but an environmental or background process. (Hong 2016, 2)

But how should this machine-human relationship be imagined on the sensory level alluded to here? As Sun-ha Hong continues in the text quoted above, rather than being instruments or mere extensions as described by McLuhan, these machines communicate with one another and parametrize the world for us. Hong claims that digital technologies enter into an actual, full-blown relationship with humans—not an extension or amplification of existing sensations, but distinct activities that interlock with the human sensory apparatus without conscious control. Attempts to analyze this human-machine relationship usually assume some form of adaptation (of the one to the other), commonly suggesting that machines impose their "grammar" on humans and that human actions become increasingly "mechanized." Hong's position is slightly different: in his eyes, we remain human, while the machines provide added options for perception and experience. But this may in fact be a more cynical view, sidelining humans, so to speak, while the machines carry on undisturbed. For it becomes very clear that human skills are now

only perceived or measured in comparison with machines. One specific and telling example would be the development of hearing technology. Using terms such as noise cancelling and environmental hearing, so-called assistive technologies intervene in the human auditory apparatus and connect it with its surroundings (Ochsner, Spöhrer, and Stock 2021). Both the surroundings and the sensory apparatus acquire a new artificiality of hearing and sound. In this way, hearing-impaired people can organize a new so-called subjective soundscape, filtering the ambient acoustics accordingly. Wearables, smart environments (houses, traffic systems, environments, border fences, etc.), and the use of measuring devices inside and outside the body, continually sharing data with one another, are intended to create a new balance ranging from heating to safety to air pollution monitoring, and much more. The aim is to arm oneself against the outside to keep the inner milieu stable. But each of these boundaries can be infiltrated in specific ways, be they underground tunnels or destroyed fences, power outages or defective surveillance equipment, besides many other vagaries. In a nutshell, this means: the more security outside, the more technology inside (the body)—it's a contained security.

My earlier work on affect highlighted the wish to achieve a seamless union with others. Which is also why I would no longer refer to sensor technologies as containers, but as snug-fitting environments, indicating a new quality of physical adaption to an increasingly technologized environment. In this context, Stefan Rieger speaks of an "unconscious seamlessness between technical media and partially autonomous body surfaces" (2019, 301), referring to the skin as "transitional" (302).

Where Is the "Rest" of Me?

In essay *The Bleed* (1996a), Brian Massumi uses a film to exemplify what happens when body limits no longer function: in *Kings Row* (1942), at the height of his Hollywood career, Ronald Reagan played a tragic figure who emerges from anesthesia following an accident to find both of his legs have been amputated. The line Reagan rehearsed especially often for this scene—"where is the rest of me"—is cited by Massumi as the tipping point where the cinematic scene merges with the real and vice versa. Instead of grasping himself as an actor in a scene, Reagan experiences something Massumi has called an "ungraspable moment," not perceiving the shape of his body in a "realistic" mode, but losing himself in a feeling of endlessness or boundlessness without a self (1996a, 29). This scene is a powerful description of what happens when the body's surface and its borders no longer fit and the so-called real (the moment behind reality) shows its obscene underside.

[Figure 3] Healing stoma, private photograph, 2022 (Source: the author).

French performance artist Orlan has played with this horror, and Parveen Adams has described the resulting plastic surgery in similar terms: the image of the body is troubled at moments when inside and outside come unstuck, when its logical and topological order visibly and tangibly shifts. According to Orlan, the open wounds covering half of her face during the operations are intended to show that there is nothing hidden under the skin, none of the depth evoked by Paul Valéry, but just pure flesh, the real in the psychoanalytical sense. According to Adams, this represents an "anamorphosis of space which bears upon sexual difference" (Adams 1996, 141). Because, she argues, the isomorphism of the spatial order of inside and outside includes all other sets of opposites like body/mind, male/female, subject/object, all of which are put out of alignment.

When I emerged from anesthesia following a lengthy operation in 2022 and tried to gain my bearings in the ICU, my body was un-real. I couldn't feel myself. I was floating ghost-like beside or above myself. As I gradually became aware of my own outlines and the medical equipment that was holding my body together and keeping it working—tubes, bags, needles, plasters, clips—a body (non-)image took shape. A body center without a middle on whose outside parts the inside can be seen, a section of gut becoming visible and touchable, drawing constant attention, its autonomous rhythm articulated in its uncontrollability. The empty middle, as I called the terrain of my belly, was in fact not empty at all, but overfull and beyond control.

When the ileostomy was reversed after 10 months, the stoma was not sewn shut, instead remaining as an open wound. This was necessary, I was told, because a wound to the digestive tract can never be stitched up due to the amount of bacteria found in this area. The wound had to heal from the inside out, receiving daily care during the long process. As a result, I was able to watch how the underlying layers of skin slowly formed, adding subsequent

layers of cells, until, after three months, a tiny hollow was all that remained (Fig. 3). Being able to see the cells at work in this way might be comparable with watching the brain functioning in real time. But there is one key difference: the brain stays unconnected, untouchable (via devices), whereas the growing, healing wound could be touched and felt. And whereas the brain remains a stranger (to oneself), the wound became integrated into my image of my own body.

The Membrane

In his work on the relationship between humans and technology, French philosopher Gilbert Simondon focused mainly on the question of individuation. He was interested in how a singularity emerges from an inner and an outer milieu, thus actually creating this inner milieu. In this context, Simondon assigns the membrane the task of separating the inner and outer milieus, protecting the inside but also regulating the influence of the outside. The membrane, he writes, "defines the living … it is on the side of the limit, of the exteriority of the skin" (Sauvagnargues 2012, 67). The skin and its protective function are addressed again here, this time not only as the surface of the body but also as a cell membrane and in a figurative societal sense, inside and outside being divided but their respective positions always subject to change. The key attribute of the membrane is its polarized function, working in both directions, self-containment and containment for and with the other (being or environment)—holding and being held. The figure of the membrane illustrates the degree to which self and containment are situated gradually and in intrinsic codependence.

But what if the membrane, described by Simondon as the "*sine qua non* condition of the living" (Boucher 2012, 98), is no longer able to perform its function, becoming porous and leaky due to technical (including medical) interventions? In my seminar on the membrane at Potsdam University, students discussed Malabou's book. We asked ourselves: what if TrueNorth were to connect with organic synapses to create a new inner milieu so that a new membrane forms around one artificial/synthetic synapse and one organic synapse? And would this artificial synapse nonetheless maintain or have to maintain its contact with the outside world in order to function?

This and other striking examples not only reveal self-containment under (media-) technical conditions to be an illusion, but also point to the phantasm of the body as a closed container, highlighting the way new forms of cooperation and cohabitation develop out of every change in relations, every shift in the line between inside and outside, highlighting instead the leakiness between inside and outside.

At this point I would like to recall Jean-Luc Nancy's heart drama *L'Intrus* (2005), where this intrusion of an outsider into the body is still narrated primarily in terms of horror. Nancy had a heart transplant, receiving an organ that had to be integrated by his body, an intruder that staged the precarious borderline between self and other in an existential manner. Other films and science-fiction stories take a more playful, ambivalent, or sarcastic approach to their stories of infiltration, merging, becoming-symbiotic—from Ridley Scott's *Alien* (1979) and David Cronenberg's *eXistenZ* (1999) to the examples of *Annihilation* and *Titane* discussed above.

Since the second half of the last century, the open, porous, and mutable body has been emphatically addressed and its dependence on its surroundings has been defined in all its complexity. The plasticity attributed to this body has long since come to include the brain. In this debate, too, Malabou played a major role with her book *What Should We Do with Our Brain?* that sums up the relevant developments within neuroscience. Distinctions formerly made by Simondon between the brain as a plastic medium, and the machine which lacks the plasticity of integration, have since shifted and are now being discussed in entirely new, flexible terms (Simondon 2017 [1958]). As the story of TrueNorth shows, the techno-organic symbiosis has now reached an entirely new level.

Conclusion

I began with a reference to *Dandy Dust* by Austrian transgender artist Ashley Hans Scheirl—a film full of psychoanalytical and psychedelic allusions, references, masquerade, body transgressions, bodily fluids, and bizarre, monstrous family histories. Around the same time, Zoë Sofia published "Container Technologies" (2000, Chapter 1), and references to psychoanalysis, even if not always to the Freudian version, were a matter of course whenever the body—and especially the female body—was discussed. In her article, Sofia aimed to draw attention to the psychic-unconscious connotations of technologies, as well as attempting (in an implicit reference to Haraway) to lend the female and maternal a positive semantics with regard to technology, connecting it not exclusively or primarily with nature, but also with technology, thus subverting the Enlightenment's male-dominated technological domination of nature (Fig. 4).

My text highlights the extent to which psychoanalytical concepts and interpretations have forfeited their persuasiveness and defining power since the publication of "Container Technologies," even though the issues now under discussion are no less physical and no less imaginatively charged. It seems as if everything has been shifted to the surface (of the skin), which now functions as a membrane for wearables, for connections and openings of all kinds.

[Figure 4] The New Subject (Source: "The Criticism of Violence" [2021] by Anastasia Alekhina, with permission from the artist).

The partial objects discussed by Melanie Klein, to which Zoë Sofia refers in her article, have become transitional points of connection. Massumi's claim that the "skin is faster than the word" (1996b, 219), a claim that launched the affective turn in 1996, has now largely become reality, losing its metaphorical dimension. His *Autonomy of Affect* also includes the far-sighted claim that things will connect to the skin—"at its interface with things" (219).

The porosity and leakiness of containers thus always bring new connections, new milieus, and new relations. And each of these new connections poses a new challenge to the containment of the self. Although this situation is not new, and although the question of self-containment has accompanied it from the outset, both theory and practice display a fraying of the margins, a new unevenness of the ground, and a vanishing of the horizon at whose center we find a position no longer sure of itself—or as Steven Shaviro puts it in one of his sci-fi stories: "*It* thinks, therefore I *was*" (2016, 113).

Translation by Nicholas Grindell

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Zoë Sofoulis, from the Institute for Culture and Society at Western Sydney University, is a retired interdisciplinary researcher with a longstanding interest in the myths and symbols of high-tech culture. Her earlier writings (under the name Zoë Sofia) focussed on science fiction, cyberculture, and electronic arts. She is more recently known for practical applications of qualitative cultural research and humanities perspectives in fields where technology and engineering predominate, especially urban water, where her papers have helped define a cultural and sociotechnical perspective on metropolitan water and demand management. When strangers ask if she has had children, Zoë is proud to say "No, but I've had postgraduates," some of whom are contributors to this book.

Yolande Strengers is Professor of Digital Technology and Society in the Emerging Technologies Research Lab at Monash University (Faculty of Information Technology), where she leads the Energy Futures research program. Her research spans the fields of digital sociology, science and technology studies and human computer interaction. Drawing on digital and design ethnography techniques, Yolande's research investigates the environmental and gender impacts of emerging technologies in the home, including digital voice assistants, AI and smart home devices. Recent books include The Smart Wife (The MIT Press, 2020, co-authored with Jenny Kennedy) and Social Practices and Dynamic Non-Humans (Palgrave Macmillan, 2018, co-edited with Cecily Maller).

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Marie-Luise Angerer, Ingrid Richardson, Hannah Schmedes and Zoë Sofoulis (eds.)
Containment: Technologies of Holding, Filtering, Leaking

Containers are ubiquitous and inescapable. From handbags to houses, barrels to databases, captivating gameworlds to the "bag of stars" that Ursula Le Guin calls the universe, containers furnish infrastructures for living and action while extending our capacities for managing things across space and time. They not only give shape to our lifeworlds: they form and transform our bodies and being.

The chapters in *Containment: Technologies of Holding, Filtering, Leaking* traverse technologies, bodies, ontologies and imaginaries, reflecting on what different container technologies, containment strategies, and container metaphors tell us about ourselves and how we relate to our worlds. With common reference to Zoë Sofia's (2000) foundational essay on container technologies, contributors draw on media and cultural studies, social history, architecture, and postdualistic approaches in philosophy and social science to explore liminalities of containment both as and beyond holding.

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