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The Quest for Purity, 'Clean' Design and a New Ethics of 'Dirty Design'

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The contemporary designer is forced to grapple with an ever-increasing range of forces and agencies, which may be revealed or concealed in the design process. In this chapter, I analyse a cluster of design paradigms that hover around the idea of 'clean design'. Though my ultimate pursuit of tricky design is an ethical one, I begin with a historical excavation of the ways that the modern ideals of hygiene and purity conceal malevolent and anti-ecological design agendas. As I see it, 'clean' design arose in relationship with the rise of hygiene science and though the latter has been significantly revised, the former has not yet seen the same level of critique. In this chapter, I will follow some of the historical tributaries of clean design, noting some of the ways in which seemingly benevolent intentions, towards accessibility and clarity can mask a much broader (and more problematic) range of cultural mobilizations like purity and hygienic mass-death. I will commend an alternative 'tricky' approach – *dirty design* – in order to promote a mode of design that may promote social innovation in design while upholding a more broadly ecological result.

There is an unavoidably complex web of agencies at work in design and I will contend that the designer will either react to encounters with foreign presences and the tricky agendas of non-human other by grasping for control, and by extension some measure of exclusion and sanitary killing, or choose to accept the task of accommodating the lively relationships that tricky substances promote. Through three design case studies that engage with a range of tricky substances, I suggest that this *dirty design* offers a re-orientation which ultimately comes as an acceptance of 'growth' and the extension of welcome to the unpredictable other.

The birth of clean design

In the early twentieth century 'streamlining' also went by another name, 'cleanlining'. Alongside the new awareness of aerodynamics and the desire for speed, streamlining was driven by anxiety about dirt and cleanliness, generated in part by new scientific knowledge about disease and immunology. Miasma theory of disease had given way

to the germ theory of disease just before the turn of the twentieth century – Louis Pasteur's experiments ran between 1860 and 1864 and Robert Koch confirmed the causative relationship between microbes and disease in 1890. In Britain, the Public Health Acts of 1874 and 1875 emphasized public sanitation as an avenue towards health. These discoveries and public policy innovations implanted an awareness of bacteria and its relation to disease in the popular imagination. Concurrently, the early decades of the twentieth century (Hoy 1995: 104ff) saw the rise of aerodynamics, with scientific work on aerodynamics and gliders by Otto Lilienthal between 1891 and 1896 and the first flight by the Wright Brothers in 1903. The increased influence of streamlining in design is evidence for an emerging partnership between science, social welfare and design stimulated by knowledge of dangerous bacteria.

Several examples demonstrate designers working to promote purity and hygiene. As Adrian Forty points to the paradoxical streamlining (or cleanlining) of stationery objects like Raymond Loewy's redesigned refrigerator:

> Loewy's design, the Coldspot, with its pressed steel casing and seamless finish … conveyed an image of absolute cleanliness and hygiene. The seamless exterior and rounded corners, the brilliant white finish, and the absence of dust-catching crevices and mouldings … all meant that when it was clean, it looked the physical embodiment of health and purity. (Forty 1992: 156)

The thinking behind cleanlined design held that pure surfaces were those where 'flow' that allowed for efficient movement (i.e. speed) might repel dirt, and eventually by extension, microscopic life, providing 'pure' surfaces which generated healthful living conditions. Le Corbusier's design principles in his 'Manual of the Dwelling' demonstrate the comprehensiveness of this vision for design as a vehicle for hygiene:

> Demand a bathroom looking south one of the largest rooms in the house or flat … One wall to be entirely glazed … An adjoining room to be a dressing-room in which you can dress and undress. Never undress in your bedroom. It is not a clean thing to do and makes the room horribly untidy … Demand a vacuum cleaner … Demand ventilating panes to the windows in every room … Bear in mind economy in your actions, your household management and in your thoughts. (Le Corbusier 1986: 122–123)[1]

There isn't space in this brief chapter to unpick all the associations and collusions that arose with the rise of modernism, but it is important to note that these seemingly benign associations between clean space, hygiene and dwelling seen in the late nineteenth century also saw a more sinister deployment in the form of 'racial hygiene'. It is here that the association of an aesthetic of cleanliness is explicitly connected to 'whiteness', but as Judith Williamson and others have noted, the integration of an ideology which brings together 'clean', 'white' and 'hygienic' works across science, advertising and design in more subtle ways as well (Hector 1988; Williamson 2001).

Alongside this designed hygienic exclusion of the non-white there is a second less well-documented exclusivity, and this lies in the forms of design which deliberately

sought to exclude other-than-human agencies. Just one generation before Le Corbusier, before it became widely understood that pathogenic microscopic life might dwell on surfaces, Alois Riegl argued for a positive appreciation of the accumulation of things on surfaces, that is, patina as part of the so-called 'age value' of a building (Riegl 1982). A number of Romantic theorists emphasized the importance of the accumulation of patina as part of the beauty of a designed object.[2] Perhaps in an even more fundamental way, this early association of bacteria exclusively with disease and not also with healthfulness (as I will suggest below may now be more appropriate) underwrote a new perception of the other not only as malevolent but also as *implicitly distinct from oneself*.

Charles Taylor suggests that the premodern conception of self was a 'porous' entity, that is, it was generally accepted that other creatures and consciousnesses could traverse the boundaries of an individual person. In Taylor's view, the modern Western view of the self replaces this porosity with a more bounded conception – what he calls a 'buffered self': 'As a bounded self I can see the boundary as a buffer, such that the things beyond don't need to "get to me" … This self can see itself as invulnerable, as master of the meanings of things for it' (Taylor 2007: 38ff). One of the results of this, in Taylor's analysis, is a resulting sense of 'the utter flatness, emptiness of the ordinary' (Taylor 2007: 309). The crucial point here is not that our domestic reality is actually flat or empty, but that hygiene and purity-driven rationalist design paradigms seek to create this condition by establishing a new boundary around the self, policed through design interventions. Yet, as I will go on to suggest below, the world is full of 'tricky substances' which defy this desire to keep all the forms of life in airtight containers.

This newly 'pure' self has a range of consequences. Bruno Latour argues that the drive towards purification resulted in an array of dichotomies which eventually accumulated into a 'great divide'. As he puts it, 'moderns are serious bifurcators' and this tendency facilitated a wilful cultural separation of art and science, facts from values, theory from practice and nature from culture (Latour 2013: 174). This quest for purity was worked out in the domestic space, on the national political stage and in the space of self-consciousness. What theorists such as Latour and Taylor along with others such as Michel Foucault, Donna Haraway, Deleuze and Guattari have shown us in the latter decades of the twentieth century is the degree to which this sense of the bounded self represents a self-destructive and self-denying quest. The modern imagination describes the human body as a site which does not bear co-inhabitation, and hygienic narratives defend, often violently, the purity of the body against infiltration. By denying the tricky hybridity that defines human agency and liveliness more broadly, hygienic, 'clean' design undermines life itself.

In recent decades, the sciences of immunology and bacteriology have provided the basis for a decisive reconsideration of hygiene and health. As regards the former, recent discoveries regarding the human microbiome suggest that the human body is not only inhabited by a majority of foreign DNA, but that the other creatures which it includes are not merely benign presences but are essential to basic human health and likely co-evolutionary partners (Dethlefsen et al. 2007). There is a growing body of examples which show that the homogenizing and cleansing work of hygiene described above undermines human well-being (Cho and Blaser 2012). In a resonant scientific

discourse, late-twentieth-century immunologists struggled to take into account the seemingly strange tolerance of the human body for 'foreign' inhabitants. This resulted in a revision of the general theory of immune system function. Our immune system does not function on the basis of a distinction – as F. M. Burnett influentially framed it in 1949 – between 'self' and 'non-self'. Rather, the body's immune system works on the basis of perceived danger (Crist and Tauber 1999; Matzinger 2002; Medzhitov and Janeway 2002). In essence, over the course of the twentieth century, immunology has come full-circle, concluding that our bodies are a lively meta-community and that only those community members who misbehave are candidates for killing (Leibold 2011; Mihaljevic 2012).

These discoveries about microscopic life challenge modern dichotomies of bodily integrity and design's campaign to exclude the 'non-self', and are in contrast to the hygienist's desire to protect the human body from invasion. Consequently, I will argue for a form of design that can convey an ecological appreciation of tricky hybridity and otherness alongside a re-appreciation of the porous self and the enchanted world. In seeking to mobilize this way of thinking based on this critique of the ideological roots of clean design I have outlined above, I will argue for a form of 'dirty design' and tricky hybridity that I connect back, in the conclusion of this chapter, to the *tricky* focus of this book in terms of the understanding of complex designed systems. As I will go on to suggest, this is not merely meant to serve as a mirror image of clean design, rather, dirty design seeks to reshape design practice in several overlapping ways. Dirty design is characterized fundamentally by the acceptance of two things: hybrid space and death. In seeking to demonstrate this I turn to three examples from design practice that illustrate dirty design, each in a different way.

Inhabiting hybrid space: Shared mineral narratives

As I have argued above, at the heart of the clean paradigm is a sense of policed boundaries, rendered purity and bodily integrity. Looking back a century we can now see many ways in which this modern impulse, which rested on theory which was formalized in the late nineteenth and early twentieth centuries, represents a profound mismatch with the ecological rhythms and structures which the human animal inhabits alongside other forms of life. Ironically, a design paradigm which was built on cutting-edge scientific insight is now significantly at odds with the suggestions of immunology, ecological science, bacteriology and earth systems science. What a host of voices across all these domains of inquiry are suggesting is that life and all its patterns cannot be enclosed by pure categories nor its mechanisms described by well-bounded relationships. 'Clean' has become an anachronism. One way of promoting a more ecological (and by implication also a more relational) approach is to highlight the ways in which the world is saturated with hybridities (Whatmore 2002). The first step towards a dirty design lies in embracing this fact of tricky hybridity.

In recent decades, a range of scholars including Donna Haraway, Bruno Latour, Michel Foucault, Gilles Deleuze and Felix Guattari have argued for a reconsideration of the nature of agency. Their approaches have generally been described as non-

essentialist or post-dualist (Haraway 2008). The significance of the post-dualist turn for this chapter lies in an awareness of the presence and activity of non-human others in the *agency* of designs and the importance behind acknowledging these others in the *activities* of design. Another way of putting this is that we make things in ways which are inextricably entangled with other creatures. As Bruce Braun puts it, 'attending to the "double circulation of objects that create social relations and social relations that create objects" … has meant placing non-humans in our stories from the start, as part of the collectivities within which human life is constituted' (Braun 2008: 670).

Scottish Artist, Ilana Halperin, designs objects which explore this entangling of agencies on a geological scale. This is a particularly helpful example here, given the ways in which supposedly inanimate matter, as expressed in soil, rocks, mountains and other geological forms can so often be mistakenly distinguished from animate *life*. In describing her collection, Between Formation, which includes a sustained reflection on body stones, Halperin teases apart this distinction:

> I am a biological organism. I am alive. I am not rock, or earth, though now my father is. Last week my sister was in the hospital for risk of possible gallstones. They found traces of a stone in her body; a process of erosion had taken place and the stone was gone. We expect that we are not made of geology, but our bodies produce mineral evidence that says otherwise. Elephants, snails, horses, dogs all form stones. We are animal and mineral at the same time. We form geology. (Halperin 2015: 21)

In an era where we are confronted so frequently with problems of 'deep time' and resource extraction, exploring tricky hybridity with mineral creatures is quite helpful. As Halperin presents the collection, Between Formation, it represents a kind of narrative or an excerpt from a 'library of rocks and minerals – composed of books of mica, limestone volumes laid down in sheets, etched stone surfaces 800 million years old' (Halperin 2015: 22). Halperin's attending to the work of rocks and the hybrid ways in which humans and minerals co-exist provides a helpful critique of the myth of human power. It points to a mode of design which seeks to surmount the purification of human agency by integrating 'found' narratives, that is, those which are constituted outside the realm of human action and are told within a particular place and time. This principle of tricky hybridity can be exposed in a variety of other design contexts and is threaded through my next two examples.

Designing with death and life: Cor-Ten steel and plastic-eating bacteria

Another example of co-creation can be seen in the earliest use of Cor-Ten steel by neo-futurist architect Eero Saarinen in his design for the John Deere World Headquarters in Moline, Illinois. What is often seen as a key design problem for steel is that it will eventually rust. Showing signs of decay is a particularly sharp problem for the 'clean' ethos and thus steel has proved to be a problematic material. As Cairns and Jacobs

observe, modern architecture has oriented much of its work around the idea of a 'persistent natalism' (Cairns and Jacobs 2014: 24). The notion of a human product which might never decay, developed and refined in the Renaissance, represented the ultimate creative achievement for some early modern thinkers. One can see many ways in which the desire for immortal creation culminated in the twentieth century.

In the early 1930s US Steel Corp. developed Cor-Ten as a low-cost departure from the tendency to manufacture steels (as with 'stainless steel' or other alloys) to avoid rust through treatments and painting, by designing a steel intended to rust in a particular way. What George Smith called 'weathering steel' oxidizes for a particular duration and eventually produces an outside layer which protects the remainder of the material from rusting any further. On paper, the benefits of Cor-Ten are numerous: it resists corrosion without being costly, requires little maintenance and the process of oxidization actually improves the mechanical strength (Smith 1971: 211). In spite of the benefits Cor-Ten, which was patented in 1932, it wasn't used for several decades outside specialized industrial applications. It seems likely that a material which was designed to weather ran directly counter to Le Corbusier's vision of 'white cathedrals' and struggled to find appeal in the midst of design hygienists. Saarinen took design rationalism to a logical conclusion, and in his own tricky way initiated 'dirty design'. In approaching the headquarters of John Deere, an agricultural equipment manufacturer, Saarinen sought to design a building which would suit the rural locale and clientele of John Deere. This was not an easy sell, either to his client or to the material supplier. Yet Saarinen persisted on both fronts and was successful in making his case on the basis of an aesthetic argument. Rust need not be considered unlovely, especially when designing in symmetry with nature. As Smith explains in a *New Scientist* article extolling the aesthetic virtues of Cor-Ten:

> These steels weather on exposure to the atmosphere to form an adherent protective oxide coating of a dark attractive colour. The exact tone depends on the time of exposure and the kind and amount of atmospheric contamination present, and ranges form a deep reddish brown to a warm purple grey–somewhere between pine bark and rosewood. These steels are likely to prove of particular value for construction work in rural environments, for they blend unobtrusively into a natural background of trees and shrubs. (Smith 1971: 211)

Seen in this way, Cor-Ten offered a decisive break from the tendency within clean design to make use of materials and structures that eschew environmental inhabitation. This design intervention went on to generate what Lowenthal calls 'a taste for rust' (1985: 163).

In their marvellously provocative book, *Buildings Must Die* (2014), Cairns and Jacobs present Cor-Ten as an example of decay which they contrast with the 'persistent natalism' embedded in modern architecture that their book seeks to critique. This is certainly true to a certain extent, but I am not entirely satisfied with the juxtaposition of organic and mineral agencies as they present it (as my mention of Halperin's work above already indicates). I agree with their critique of natalism but want to resist the temptation to conflate natalism with liveliness – a category which might well include

both birth and death as part of a wider cosmological understanding of entangled creaturely agencies. On this basis, I would argue that as a material which deliberately embraced weathering as part of its aesthetic and function, Cor-Ten fits the criteria of what sculptor Oliver Andrews calls 'living materials'. As Andrews suggests:

> The concept of 'living materials' acknowledges that every material has an active presence, a character, a capacity for change, that entitles it to be considered 'alive'. Any piece of wood, though no longer part of a growing tree, has a grain pattern and a resiliency that causes it to respond characteristically when struck, bent, or cut. Every stone has its structure, granular or crystalline, flawed or sound, which will make it chip or split in certain ways, but not in others. Steel has its rusty willingness, silver its penetrating molten fluidity. To understand and work with these living qualities, and occasionally to counter and transcend them, is the task of every artist and craftsman. (1988: 1)

While Andrews remains focused on the designer who *acts upon* materials (with a nevertheless more astute understanding of their liveliness), Jennifer Gabrys resituates material attentiveness in the broader context of more-than-human politics. Focusing on the often-maligned material, plastic, Gabrys seeks to transcend the critique of synthetic materials as toxic, invented and ultimately *other* in order to appreciate 'materiality as process'. Seen in this way, causality is not merely linear, instead, as Gabrys argues, 'our material processes and politics are always undertaken in collectives. These collectives are sites of ethical relation and obligation' (Gabrys 2013: 218). In this way of thinking, the designer's response to environmental change should accommodate the work already underway by more-than-human carbon workers such as microbacteria which are breaking down plastics, and move beyond life-cycle thinking which seeks to disappear the unruly other and find a way of reclaiming materials which 'works with those historical remains of our lived plastic materialities to begin to generate new approaches to how plastics orient material practices and politics in the present' (Gabrys 2013: 220).

Ultimately, it is important to appreciate how any embrace of 'living' materials implies an acceptance of death and decay as latent within materials and ultimately part of the telos of any designed object. This stands in some contrast to the desire to design 'new immortals' as Michelle Bastian describes them (2017), or in Timothy Morton's words, 'hyperobjects' (Morton 2013). The twentieth century encompasses a radically changing perspective towards persistent designed objects, whether those early plastics which seemed to innocuously repel dirt and bacteria, or in the more sinister forms we now see in the form of radioactive waste, islands of plastic floating across the ocean, persistent organic pollutants such as DDT or indissoluble microbeads from scented liquid soaps. Morton goes so far as to suggest that these 'hyperobjects … are directly responsible for… the end of the world' (2013: 2). What he means is not that they have literally destroyed terrestrial life (though it remains to be seen whether this might be the case), but rather that these objects generate logical and scalar paradoxes as they congeal into larger and more incomprehensible wholes which render our comprehension of a concept such as 'the world' epistemologically impossible. With its

focus on lively entanglements, the mode of dirty design shown in rusting steel provides a more robustly coherent material paradigm for design which might offer a way around some of these plastic paradoxes.

Reconciliation ecology through living walls and roofs

My first two examples of tricky hybridity focus on the need for designers to accept that we design in cooperation with (or in opposition to) other-than-human agencies. In this sense, dirty design is about playing in the midst of a mess of divergent intentions and possibilities. However, the flip side of this hybrid coin is an ethical one, namely that acceptance of the other-than-human should be paired with an intention to make space for them. In this way, I would argue that we *should* make things which provide space for and account for the agency of these others. In this sense, dirty design is also about opening the door to invite a messy encounter. A group of urban ecologists and geographers have recently begun using the term 'reconciliation ecology' in an attempt to capture the dimension of hospitality that this self-extension represents.[3] For my final example of dirty design, I would like to present the living roof as a form of design which reconciles.

Given all the discussion I have already presented surrounding what is some form of 'ecological' design, it is important to appreciate the plasticity of the term 'sustainability'. Sustainability has tended to work out in variety of sometimes opposed ways, though two primary modes could be distilled down to (1) sustainability through (often hubristic) management or restoration schemes which appropriate other-than-human creatures as a 'resource' and (2) sustainability through preservation programmes designed to avoid anthropogenic impacts on 'wild spaces' which often conversely establish urban spaces as anthropogenic reserves. The latter of these two can often be found expressed in a form of sustainable design which is really just eco-consumerism, producing products which are less harmful than their alternatives, but do nothing in themselves to promote 'sustainability' in a broader sense. This kind of sustainability-"lite" shows the influence of 'clean' thinking inasmuch as it reveals a tendency to discount urban space as an ecological context. Inhospitality towards other-than-human creatures is indicated through urban design in a variety of ways, from the act of architectural outfitting of buildings with spikes to prevent birds from roosting to the design of landscapes filled with pesticide-washed urban plant monocultures primarily for decoration (with the lawn as the most pervasive example). Against this tendency to bifurcate space into human/other-than-human realms, a growing range of writers in both sciences and humanities have begun to argue that we must begin to treat every corner of the earth as recently put by Pope Francis as 'our common home' (Pope Francis 2015).

One of the basic tenets of reconciliation ecology is the recognition that any space represents a possible habitat. This stands in direct contrast to the clean sensibility that any space, particularly if it is proximate to human living or working space should be made into a biological vacuum. Following a more thoroughly hybrid notion of human living space, reconciliation ecologists are particularly interested in urban spaces as a site for the regeneration of ecologies. Thus, Francis and Lorimer define reconciliation

ecology as 'the modification and diversification of anthropogenic habitats' (Francis and Lorimer 2011: 1429). As these authors suggest, a paradigmatic example of dirty design at work in architectural design practice is the living roof. There are a range of options for building design which can integrate a living roof; this can accommodate an existing structure, though increasingly green facades and roofs are integrated into the design of a building's envelope. The advantages of this kind of design are numerous. As one study reports:

> Covering buildings with vegetation, when applied in a significant urban scale, can improve the urban environment by contributing to urban biodiversity, stormwater management, air quality, temperature reduction and mitigation of the heat island effect. At the same time, the application of greening systems can have, besides the environmental aspects, social and economic benefits. These systems encourage the fruition of urban areas, have a therapeutic effect by inducing a psychological wellbeing through the presence of vegetation, improve cities image [sic], increase property value and function as a complementary thermal and acoustic protection. (Manso and Castro-Gomes 2015: 864)

There are additional benefits which are political in nature. A wide range of conservation principles require top-down delivery and thus are politically very costly. The deployment of living roofs and facades can be coordinated on a small local scale and then stitched together into a network forming ecological corridors. It is important to keep in mind the tricky principle which lies behind dirty design here, as my deliberate use of the term 'living roof' over 'green roof' already implies. As Henry and Frascaria-Lacoste note, green roofs have been deployed for purely aesthetic purposes without necessarily having a positive ecological impact (2012: 91). As these authors imply then, it may be possible to design a green roof to be quite literally green – and by extension decorative – but not *habitable*. In this way a green roof may represent a literal form of green-washing, and akin to the whitewashed and 'cleanlined' surfaces I described above. In terms of conservation priorities, many of the creatures that are threatened are not those which thrive in the liveliest habitats, but actually in brownfield sites, that is, more marginal habitats. In this way, reconciliation ecology can be as its progenitor Michael L. Rosenzweig suggests a 'win-win' option, but only if designers avoid the temptation to create a new form of hygienic green space which is decorative but not habitable. The appeal of bright green may need to give way to a 'dirtier' brown.

A new dirty design ethic

As I have already hinted above with my discussion of Cor-Ten steel and the use of lively materials, dirty design implies that designers must come to terms with death. One of the advantages of a design paradigm which places tricky hybridity at the centre is that it compels an appreciation of the necessary cohabitation of humans with other creatures. This will necessarily include some measure of 'terminal literacy' within one's design practice (Cairns and Jacobs 2014: 47). But it is important to emphasize that dirty

design is not exclusively about death, grime or bacteria, but rather about expanding our design to express a wider and more holistic range of liveliness. It is my hope that this broadening out for design in a deliberate departure from emphasis on 'clean' will deliver two important step changes. First, it may promote a transition away from the design paradigms that underwrote so much of the hygienic mass-death which was a result of modern manufacture in the twentieth century and instead give way to more complex understanding of lively entanglements. Second, in embracing hybridity as part of design discourse, it will help give way to more complex understandings of lively and tricky engagements that recognize complex systems and wicked problems (Rittel and Webber 1973). Here, no single design definition exists as to the causal mechanisms of the problem I have identified in this chapter. Further, any attempt to find a solution will invariably fail if such proposals do not accept the complex interplay of diverse actors as well as the complex interplay of discourses such as hospitality, violence and cohabitation that lie at the heart of dirty design.

Notes

1 It is interesting to note that for Le Corbusier cleanliness ultimately resulted in an architecture which showed no signs of ageing, as outlined in Le Corbusier (1964).
2 Cf. David Lowenthal, *The Past Is a Foreign Country* (Cambridge: Cambridge University Press, 1985), 149–82.
3 For more on the philosophical underpinnings to reconciliation ecology, see my article 'Hybrid Encounters in Reconciliation Ecology' in *Worldviews: Global Religions, Culture, and Ecology*, vol 20, issue 3, (October 2016).

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