Chemical Stories: Making Visible the Invisible

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Introduction

Anthropogenic chemicals like plastics, fertilisers, and resins make up our material realities. These chemicals carry histories and geographies that unfold through transformations where politics, knowledge, and technology intersect, creating *chemical stories*. Yet, everyday interactions obscure these stories, rendering them as distant, alchemic fantasies.

This essay presupposes that chemicals have stories to tell. This is of particular significance as we face an ecological emergency because denying chemicals a narrative medium would entail denying them agency in political matters (Latour, 1993).

In what follows, the essay will illustrate conceptual and material experimentation aiming to render the invisible within chemicals visible. To do so, an interdisciplinary conceptual approach is presented, drawing on media studies and design thinking. Following, a collaborative experiment is shown, where, together with designer and philosopher Kaush Kalidindi, we develop a prototype of an ordinary object to make visible its critical chemical story: the Billie Cup, a reusable cup found in most Dutch universities and introduced to decrease waste.

Space for narration: synthesising for critical visibility

What is at stake is granting chemicals a space for narration, which I see as constituting a form of what has been called molecular politics. The concept derives from Foucault's biopolitical notion, where capitalist logic and forms of control have been applied to the techniques and politics of bodies (Foucault, 1978). Yet, here I used Foucault's interpretation in association with Murphy's "alterlife" chemical relationality (Murphy, 2017), referring to the extensive cloud of synthetic chemicals that, through technoscientific epistemic and political economic visions, lead to the irreversible alteration of life.

From these two notions, I characterise molecular politics as a program aiming to acknowledge chemicals as historical entities whose identities are shaped and lost through transformative processes – referring to the different cycles, reactions, applications, uses, and combinations that chemicals are subjected to within different value chains and industries. Molecular politics, therefore, opens the chemical world to other narratives and modes of knowing, by challenging established discourses, ethics, and ontologies.

To further explore and operationalise this new discourse made possible by molecular politics, I formulate and introduce what I call critical visibility, a notion derived from a synthesis of media studies and design thinking that aims to go beyond the unity of material objects by constructing narrative mediums to render chemical stories visible.

Taking inspiration from the work of animators and designers, in the next section, I present the two notions that make up critical visibility, namely, fictional transformation derived from Studio Ghibli's animation techniques and speculative design following the work of James Auger (2013). The two are essential for developing critical visibility as a design methodology applied in the essay's third section.

1. Fictional Transformations: Lessons from Media Animation

This section briefly introduces the notion of fictional transformation. I situate the concept in media studies, taking inspiration from Lamarre's theory of media animation (Lamarre, 2009), showing how movement and relationship-making are achieved in art animation. Thus, I characterise fictional transformation as the possibility of multiplicity in the plot of the animation medium given by characters encountering and recognising.

One of the best examples of the fictional transformation schema can be found in the films of the Japanese animation company Studio Ghibli. In their productions, worlds are created where inanimate elements possess their own vitality through relationship-making, emphasised by the sensory presence and empathic projections between characters as strategies for recognition and situation-solving.

Thus, contrary to the more conventional Aristotelian fabula schema, where the narrative is structured around the opposition between the "good" and "evil" (Aristotle, 2013), fictional transformation supports a schema where each character is moved by their own story that is open to relationship-making, enriching the plot with possibilities.

This is important for the scope of the essay to recognise how chemical agency extends outside the boundaries of the chemical product. Yet, we need something more to translate these techniques for real-world ecologies. In the next section, I introduce speculative design as a tool to ground fictional transformation in the real world.

2. Introducing speculative design

To enact critical visibility, I turn to speculative design and the work of Auger (2013). Auger suggests that "crafting narratives in real ecologies is possible by taking advantage of contemporary media, familiar settings, and the complexity of human desires" (Auger, 2013:20). This requires that the sensory dimension be presented and relatable to the subjects by connecting meanings and memories. This relatability needs to occur both on the individual and the collective level. Individual relatability emerges from person-to-object connections, fostering "thinking with" (Haraway, 2016) – the object guides my thinking; whereas collective relatability frames objects as cultural symbols in broader historical and political webs.

Speculative design suggests ways for anchoring the object of design in social ecologies, focusing on three main elements to guide design activities. (i) Emphasising and associating lifestyles; (ii) engaging with the psychological dimension of the viewer for triggering emotions and self-reflection; (iii) the believability of the artefact design as it needs to be relatable and understood by the viewer.

Combining fictional transformation and speculative design creates new spaces for critical visibility. In the next section, I will apply critical visibility to explore the ordinary, focusing on chemical exploration. I will analyse the Billie Cup, marketed as sustainable but with an oil-based history.

Critical visibility for the real world

As aforementioned, the Billie Cup is found in most Dutch universities as a reusable cup introduced to decrease waste. It is made of *polypropene* (PP), a versatile thermoplastic easily made and considered hazard-free. However, its production can be traced to hydrocarbons; its primary raw material is oil. And yet, throughout industrial and market processes, this oil-based identity is lost in favour of a sustainable image. In other words, by relating exclusively to the unity of the Billie Cup, histories and identities are made invisible.

Speculative design is incorporated in the prototype by the strategic use of coffee. The substance makes the cup relatable to its daily use while also bearing a reference to oil through its blackness and viscosity. Thus, an articulation of chemical agency is performed in which a tango between the coffee and PP references the oil genesis. This is triggered by covering the prototype internally with a thin transparent membrane, allowing the Billie Cup to slowly release the coffee once it is poured. This process gives movement to the Billie Cup, creating attention and a possibility for relationship-making. Thus, the performativity of coffee has become a key element for transformation. On the individual level, the stickiness of the coffee on the hands resembles petrol, leading to a sensation of discomfort. Collectively, by locating the Billie Cup on a surface, coffee is slowly released and expands on it, simulating an oil spill.

Thus, as shown in the images of the different phases of the prototype design, applying critical visibility to the Billie Cup creates a space of transformation where an alternative story is told. Under this narrative, the chemical agency gains a new meaning, explicitly connecting the form and use of the object to its chemical composition. This is done by using the aforementioned methods to deconstruct (first) and reconstruct (after) the complex relationships of an ordinary object. Therefore, critical visibility opens to the possibility of looking beyond the sustainable image of the Billie Cup, offering an alternative story of an extractive and oil-based origin.

Conclusion

This essay has argued that chemicals are not merely passive materials but active agents with political and historical significance, whose stories are often obscured by everyday use. In a time of ecological urgency, reclaiming these stories is essential for imagining alternative futures. Through the development of critical visibility, the essay introduced a method that combines fictional transformation— rooted in relationship-making and media animation—with speculative design, which anchors narrative techniques in real-world ecologies.

Through the case of the Billie Cup, the essay explored how an object presented as sustainable is chemically tied to extractive processes. Made of polypropylene, a thermoplastic derived from oil, the cup's chemical origins are concealed in favour of its functional and sustainable image. The experimental design reactivates this hidden history by using coffee—familiar yet symbolically linked to oil—staging a performative encounter that recalls the cup's petrochemical lineage.

This experimental approach shows how design can open a space where chemical agency becomes visible and relational. By foregrounding the entanglement of chemicals in networks of extraction, critical visibility challenges dominant narratives of sustainability and invites reflection on the historical and political dimensions of everyday objects. In a time of ecological urgency, making chemical stories visible becomes a necessary gesture toward more accountable material imaginaries.

Figure 1: The Billie Cup.

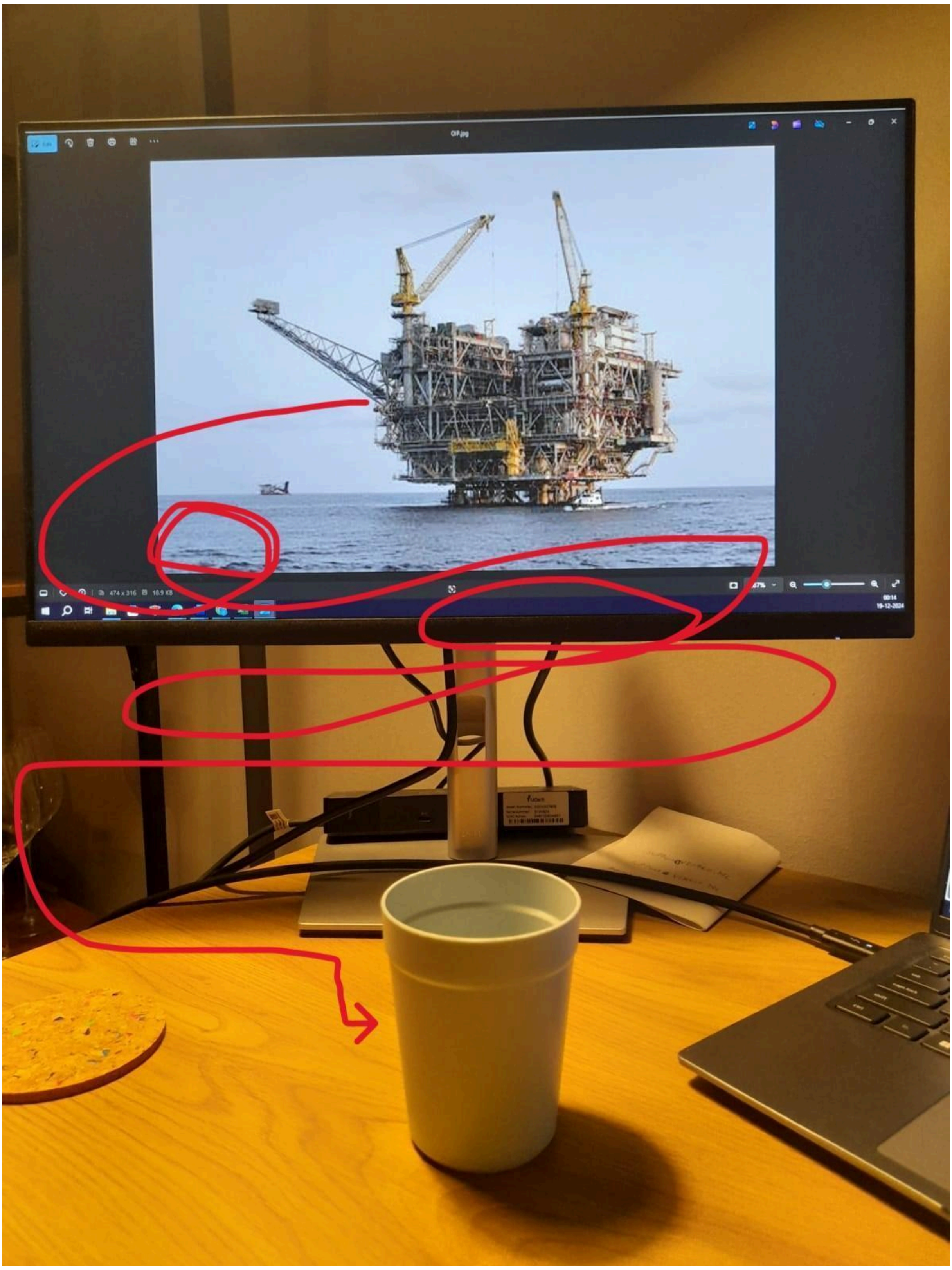

Figure 2: Tracing connections between oil fields and the Billie Cup.

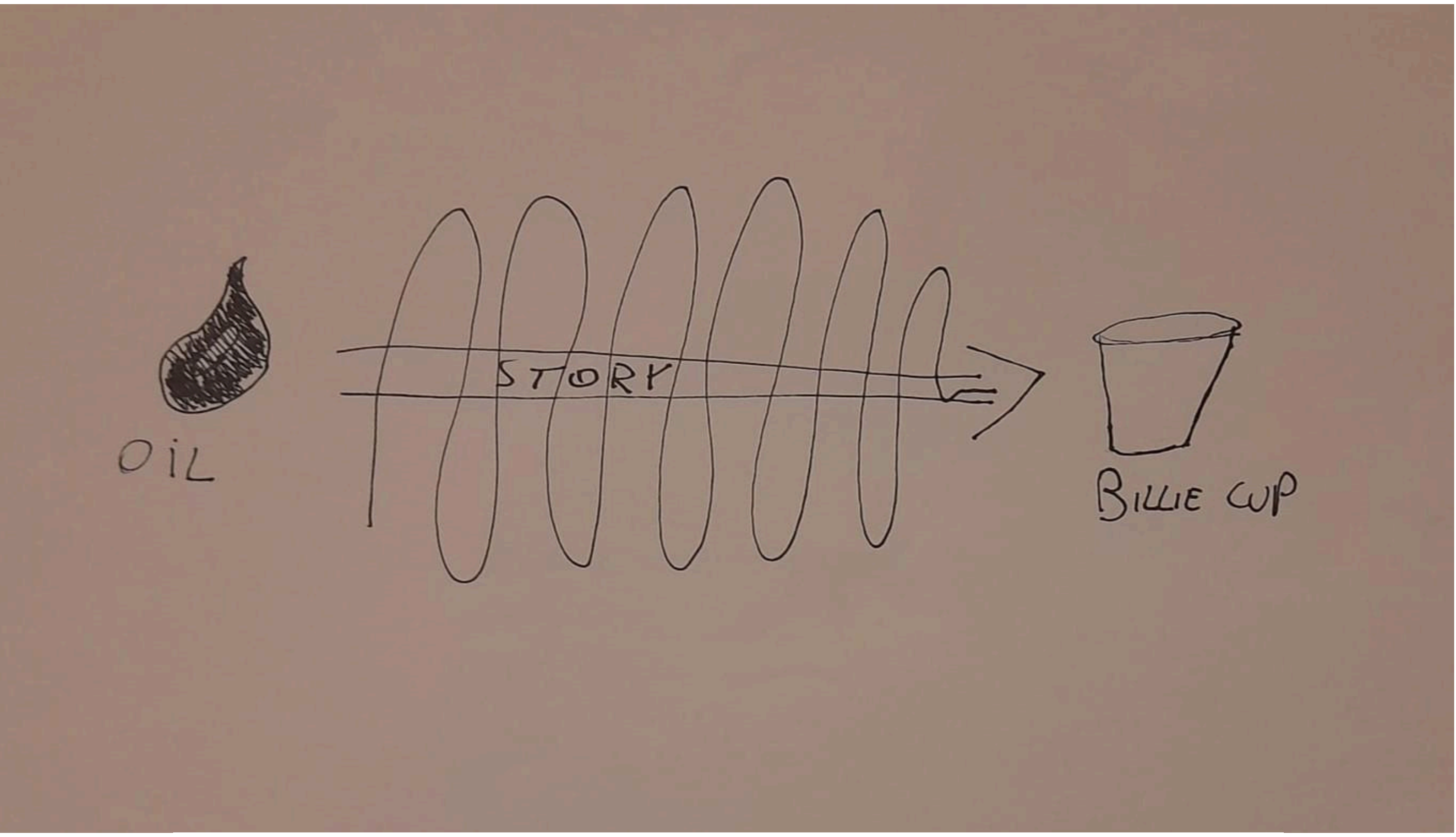

Figure 3. The sketch shows how the story of the Billie Cup is lost throughout the different industrial transformations and nodes of value chains in favour of a green image.

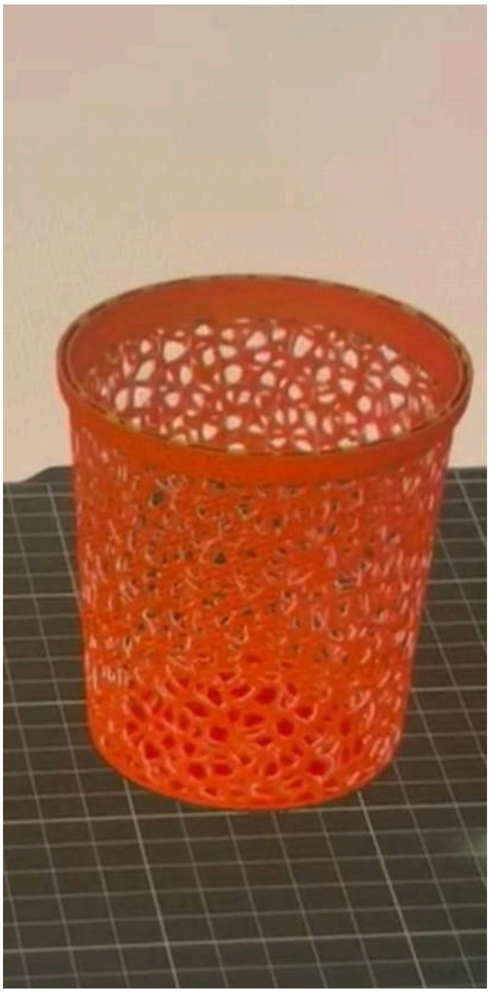

Figure 4. Prototyping an alternative Billie Cup. The design is aimed at experimenting with the sensory presence of the object for relationship-making.

Figure 5. Final prototype design for the Billie Cup alternative.

Figure 6. Poring coffee in the alternative Billie Cup.

Figure 7. Critical visibility at play. The coffee is slowly released from the Billie Cup, symbolically representing an oil spill.

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