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# The Miniature Object and the Living World

ELEANOR MARGOLIES

I.

Look up, into the branches of this huge sycamore tree, and now down towards the base of the trunk. An ant is crawling along a ridge, half hidden by a blade of grass. The tree is growing not in some imagined primordial forest but a mile outside a large English town. When we zoom in, we discover, lying close to the ant, a toy figure. It's a Lego firefighter made of red, yellow and black plastic. The ant is naturally small, but the firefighter is a miniature, a representative artefact made at small scale. While the experience of awe is typically associated with vast, inhuman landscapes, Edmund Burke suggests that the very small, the 'last extreme of littleness' is 'in some measure sublime' (quoted in Rabb 2019: 26). If merely contemplating the very small can offer an approach to the sublime, what happens when we handle a miniature, either to construct or manipulate it? The experience, I will suggest, is good for thinking about the 'life' in matter as it is revealed through patterns of interaction at different scales. In playing with miniatures,



whether in improvised children's games or in theatrical performances in the 'object animation' or 'object theatre' tradition, both manipulators and audience shift rapidly between the perception of different scales, sometimes holding more than one frame of reference in mind at once. This kind of animating play operates through miniature representation and synecdoche. These principles are closer to James George Frazer's (1915) account of sympathetic magic, operating under the 'Law of Similarity' and 'Law of Contact', than to animism as a belief that material entities can have a soul or spirit that is 'beyond nature', as in Edward Burnett Tylor's (1913) account. Instead of treating the animation of small objects as a naïve projection of lively qualities into inanimate matter, we might instead consider such play as prefiguring a deeper understanding of the complex life that is expressed in the relationships between things. Let the ant go on its way. Pick up the plastic figure.

II.

We can distinguish two types of miniature, according to their materials. The first type is made of the same materials as its full-scale equivalent, like miniature pieces of furniture constructed using the techniques, joints and finishes of full-size tables, cabinets and chairs. Examples survive from the seventeenth and eighteenth centuries, but their purpose remains obscure: it is unclear whether they were made as journeyman pieces, samples, trade signs or teaching tools (Rabb 2019). In the present day, the Vitra Design Museum produces replica chairs at 1:6 scale, advertised as 'encapsulating' the history of industrial furniture design. The chairs are

all true to scale and precisely recreate the smallest details of construction, material and colour. The high standard of authenticity even extends to the natural grain of the wood, the reproduction of screws and the

■ Miniature armchair (c. 1650 – c. 1675) made of walnut, leather and copper, 27.5 cm tall (Rijksmuseum: on loan from the Koninklijk Oudheidkundig Genootschap)



elaborate handicraft techniques involved. This has made the miniatures into popular collector's items as well as ideal illustrative material for universities, design schools and architects. (Vitra 2019)

Each of these miniature chairs costs several hundred dollars – often more than full-size originals or replicas. The 'real materials' approach to miniatures is also exemplified in the Queen's Dolls' House (discussed below), and has taken a new form in the current fashion for edible miniatures. Hundreds of YouTube channels are devoted to 'mini food': real ingredients are cooked in doll's house kitchenware, often using tools such as tweezers, syringes and culinary blowtorches to manipulate the small quantities of food. Mini food is particularly big in Japan.

For the other type of miniature, a single material is used, sometimes with added colour or surface finish. Familiar materials include plastic (Lego, Playmobil, Sylvanian Families and all their respective accessories), plaster (architectural models, doll's house food) and pixels (AutoCAD, SketchUp, Minecraft). In *The System of Objects* (1996 [1968]) Baudrillard refers to plastic and concrete as partial realizations of a 'substantialist myth' that, from the sixteenth century onwards, imagined the possibility of casting the whole world from 'a single ready-made material' (38). The elaborate stucco work of Baroque and Rococo architecture provides examples of worlds moulded from a single, infinitely malleable material, often mixing different scales to comprehend both human and divine viewpoints. The high relief stucco sculptures of Giacomo Serpotta (1656–1732) in the Oratorio del Rosario di S. Cita in Palermo include a profusion of elements from the natural and the human world – bodies, foliage, weaponry. One of the *teatrini* (dioramas) shows ships in battle at sea, with angels hovering in the voluminous clouds above. Cherubs hold up helmets, breastplates and banners. It's surrounded by five smaller *teatrini*, each framed with elaborate scrollwork. All six float against a large curtain held up by further cherubs (Bailey 2012: 180). Regardless of the scale, white stucco – with a little gold leaf for the details – provides the underlying substance. The post-war explosion of consumer goods and miniatures in polymer plastics similarly offered the promise of a whole world formed out of one

■ In Olafur Eliasson's interactive installation *The Cubic Structural Evolution Project* (2004 onwards; shown at Tate Modern, London in August 2019), visitors are invited to construct their 'vision of a future city' using a tonne of white Lego.  
Photos Eleanor Margolies

substance: 'Plastic became the material of choice for this never-ending expansion.... [It] could be molded into any shape a restless drive for novelty might conceive' (Meikle 1997: 176). The Lego firefighter is not a singular toy, like a doll or teddy bear (however mass-produced they might be), but a component of an infinitely extensible world; while each Lego item has its own definite form, in quantity it is an uncountable substance like sugar or flour (i.e. 'there is some Lego on the floor').

111.

In an episode in his lipogramatic novel *La Disparition* (translated into English by Gilbert Adair as *A Void*), published the year after Baudrillard's comments on the substantialist myth, Georges Perec describes the plight of a man attempting to interact with an environment formed of some kind of glassy, resistant substance. While other people and objects seem to behave as normal (someone pours out a whisky-and-soda; a yacht docks; a band plays a foxtrot), the narrator is unable to pick up objects, make any impression on a cushion or a rug, turn a light-switch on or off. He decides that the world in which he finds himself is

nothing but a smooth, cyclical continuum, without a fold in it, without any form of articulation, as compact as stucco or staff, as putty or Portland; an imbrication of nights without adjoining days, a total lapidification, a flat, hard, constant, monotonous uniformity in which all things, big or small, smooth or lumpy, living or not, form a solitary, global unit. (Perec 2008: 22–3)

Trying to understand this strangely uniform substance, the narrator evokes traditional architectural materials used for moulding friezes and sculptures: stucco, staff (plaster mixed with fibres), putty and limestone. In the novel, this 'twin world', a 'living mirror of our own world and just as cold, shiny and insular as a mirror' turns out to be a three-dimensional projection of a film shot in about 1930. Perec's imagining of a process in which a film can be endlessly reanimated in three dimensions anticipates how laser scanning and photogrammetry are used today to produce another form of 'total lapidification', the smooth monotony of 3-D printing in nylon or resin.

Scale models of buildings have traditionally been made from the same smooth materials that are used for mouldings, such as plaster or close-grained wood. (The use of cork for architectural models of classical ruins, like those collected by Sir John Soane, is an important exception – the speckled, irregularly grained material was chosen to evoke weathered stone.) Indeed, Adrian Forty even suggests that concrete came into prominence as a building material in the twentieth century partly for its apparent blankness as a material:

As a medium, concrete was thought to come closest to replicating the balsa or card of the models that many of the mid-century schemes began life as, with the expectation that it would prolong into the finished building the indistinctness of the model. (2012: 285)

Today, the generation of miniatures from a uniform substance has a new ubiquity with 3-D printing. Objects produced in this way have their own specific material properties and lifecycle, but their grain is minimal, there is no need to handle, carve or mould the material directly and the source appears remote, even abstract, since the material is provided as filaments or granules of 'feedstock'. Computer numerical control (CNC) milling of synthetic or composite materials like fibreboard has a similar 'hands-off' approach to an apparently neutral material. An emblematic work that suggests how complex material histories can be erased by this process is the 1:1 scanned replica of a makeshift wood and tarpaulin shelter in the Calais refugee camp, rendered in CNC-milled synthetic stone by Sam Jacob Studio (Cormier and Thom 2016: 87).

'Grain' here refers to the arrangement of fibres in wood, or fissile planes in stone – a texture that refers back to the origins of the matter: woodgrain reflects the age of the tree and the conditions in which it grew, even showing the difference between hard and kind growing seasons; in stone, grain is a geological fingerprint that reflects the characteristic strata of a particular region, the pattern of deposit and subsequent pressure. Grain indicates that materials embody processes of biological life (a growing tree) or geological transformation (the planetary life of volcanoes and tectonic shifts), complicating the meaning of the inanimate

before we even begin to explore how grain affects how we can cut or work the material. Barthes, writing about the voice, describes the 'grain' as 'the body in the voice as it sings, the hand as it writes, the limb as it performs' (1977: 188). Grain makes clear that a medium signifies in itself, and not only the message it conveys. In contrast, the instructions for additive processes such as 3-D printing are dictated to the printer without the intervention of the hand, without contact between living and inanimate flesh. Even if they cannot entirely escape it – the back and forth motion of the additive printing process can result in ridges – they promise freedom from grain, from the marks of becoming, of life.

#### IV.

In Andean animism, objects remain connected to their sources and can have an influence on them, 'just as people remain connected to their family through kinship obligations and concerns' (Sillar 2016: 450). Anthropologist Bill Sillar describes how Native Andean people have made use of small objects called *conopa*, a category that includes both carved stone figurines of camelids such as llamas and alpacas, and uncarved stones (442). According to Sillar, the principles of 'similarity' and 'contagion' are fundamental to Andean animism: 'like influences like' (a figurine of a llama can influence a living herd), and 'things that have once been in contact continue to act on each other at a distance' (a fragment of a mountain can affect the mountain). These principles are closer to James George Frazer's concepts of 'sympathetic magic' than to Edward Burnett Tylor's description of animism as the belief that an entity has a soul or animating spirit.

Sillar draws on accounts of *conopa* by Catholic priests in the Spanish colonial period and also describes the use of miniatures in present-day ritual practices in the south-central highlands of Peru and Bolivia:

Each year, starting on January 24, the Bolivian capital of La Paz celebrates the Festival of Alasitas. Traders sell a vast array of miniature trucks, houses, construction materials, food produce, computers, mobile phones, money, passports, educational degree certificates, airline tickets, credit cards, and so on.

During the festival, people can buy these miniatures from the traders with the national currency, sometimes acquiring them for themselves or giving them as gifts, but frequently people on the street exchange the miniatures with others, acting out elaborate trading banter as they swap wads of miniature dollars for model cars or houses. (446)

The miniatures are taken home as offerings to Ekeko, a hunchbacked figure of a white trader. Outside the home, pilgrimage sites include miniature houses of varying complexity, assembled from pebbles found on the hillside. Sillar suggests that Andean animism is not supernatural but ecological thinking:

Although Tylor (1913 [1871]) defined animism as the belief that an entity has a soul or animating spirit, the attribution of animate properties to nonhuman entities does not require a belief in a 'soul' that is somehow beyond nature (Ingold 2006). Animism focuses on how people are a part of their environment and able to communicate with it, with places and things having a vital force or identity that is similar to rather than different from humans. (447–8)

#### V.

The urban consumerist culture of the seventeenth and eighteenth centuries delighted in small manufactured objects, available for perusal in toy shops and knickknackatories (Rabb 2019). Melinda Alliker Rabb makes a case for *Gulliver's Travels* (1726) offering a response to this new consumer culture of miniatures. Jonathan Swift would have been familiar with a panoply of miniature domestic objects including furniture and tools. Rabb suggests that when Gulliver visits Brobdingnag, the realm of giants, and is given items appropriate to his size, Swift is evoking specific miniatures that were available for sale in London: a workman 'famous for little Curiosities, undertook to make me two Chairs, with Backs and Frames, of a substance not unlike Ivory; and two Tables, with a Cabinet to put my Things in' (Swift 1934 [1726]: 101). The Queen gives him a set of silver plates 'which in Proportion to those of the Queen, were not much bigger than what I have seen in a London Toy-shop, for the Furniture of a Baby-house' (102). In earlier times, Gulliver experienced these objects as toys placed in the palm of

the hand; now they 'fit' his scale, yet they still appear as marvellous constructed objects.

Rabb goes on to point out the link between the desire to possess pocket-sized instruments of science and survey such as globes, sextants and telescopes and the larger sweep of colonial possession in the seventeenth and eighteenth centuries. She recalls Bachelard's description of the miniature as something that 'allows us to be world conscious at slight risk' (Bachelard 1994 [1958]: 161). In this reading, the miniature gives the person holding it the sense of control and possession – 'the whole world in your hands' – even if the object is inconsequential in itself.

Elizabeth Bishop's 1973 poem '12 O'Clock News' ranges over the writer's desk, holding two scales in mind at once. On the left of the page, items are catalogued in a few words (gooseneck lamp, ashtray), while longer paragraphs on the right re-describe the same objects as part of a landscape seen from above, as if by a foreign or war correspondent looking down from an airplane. The typewriter, for example, becomes an 'escarpment' that 'rises abruptly' from the central plain of the country, with 'elaborate terracing ... like fish scales'. The voice of the correspondent mixes geographical survey and anthropology: 'What endless labour those small, peculiarly shaped terraces represent! And yet, on them the welfare of this tiny principality depends'. The way in which such accounts are put to work in the service of war becomes clear: 'We have also received reports of a mysterious, oddly shaped, black structure, at an undisclosed distance to the east.' The voice speculates that this object ('ink bottle')

may be, or may contain, some powerful and terrifying 'secret weapon'. On the other hand, given what we *do* know, or have learned from our anthropologists and sociologists about this people, it may be nothing more than a *numen*, or a great altar recently erected to one of their gods, to which, in their present historical state of superstition and helplessness, they attribute magical power ... (Bishop 1973)

Bishop views the writer's tools with an estranging eye, and at the same time engages with the history of treating animistic thought as primitive (belonging to a 'state of superstition and helplessness').

V I.

The structural properties of a particular material – its strength in tension and compression, density, hardness, viscosity and so on – restrict the size and form of the objects that can be constructed from it. Working in miniature using a uniform substance can allow makers to escape these limits: the architectural sketch in plaster or wood is not (yet) subject to engineering calculations or cost restrictions. In 1959, music critic Harold C. Schonberg described a team of six architects working on the buildings that were to form the Lincoln Center in New York. They used plasticine models to decide on the layout around the plaza, and whether to build six separate buildings or to combine them:

At the first few meetings, the architects would wrap themselves in towels to protect their clothes and carve Plasticine models of buildings. Then several large-scale models were set up. Now buildings are pushed around, grouped, separated, regrouped. What kind of a view will there be coming down Broadway? Going up Broadway? Should the façade of the dominant building face east? North? Is the opera house too large for the plaza? ... Pencils stab and cross like bayonets on the field of battle. Occasionally an architect may be pinked as, before his startled eyes, the clay model of his very own building is carved up by the tremendous swish of a palette knife belonging to an architect with entirely different ideas. Nothing personal, mind you. (Schonberg 1959)

Nevertheless, even using clay, card or balsa wood as a modelling material requires an understanding of how objects come together and are supported. As theatre designer Lizzie Clachan says: 'If it's really hard to do it in the model, it's really hard to do it in real life. If I'm finding it hard to make something stand up in the model, it's going to be the same problem in real scale.' Part of her reason for building a scale model is to think through the problems that will be encountered by craftspeople building the set at large scale, and to 'know that I haven't tried to defy physics' (Clachan 2017).

Miniature construction of the second type, using materials that are the same or as close as possible to those of the large-scale referent, introduces new problems. Through any craft activity, a maker acquires 'material intelligence',

a knowledge of the characteristics, tolerances, methods of working and social history of the material (Adamson 2018). Constructing miniature objects introduces an additional level of awareness of material properties, not only because of the challenge to dexterity but because materials behave differently depending on the size of the sample. Implications at the 1:12 scale of doll's houses are discussed below.

At the molecular level, the differences are even more pronounced. In the form of nanoparticles suspended in liquid, gold is not gold-coloured but produces a range of colours – from red to blue and purple – a property that has been used since ancient times to stain glass. Gold nanoparticles are now being used in medicine as biosensors, changing colour in the presence of particular enzymes, or helping to detect tumours (Howes and Laughlin 2012:216). One of the most surprising examples of the variation in the properties of materials at different scales is that of the new material graphene, which is a single atomic layer of carbon graphite. Everyday friction between a pencil and paper when writing can pull off a single layer of graphite, but graphene was only formally isolated and characterized in 2004. Its properties are so different from larger samples of graphite that it is treated as a new material. Graphite is a good conductor, but graphene is one of the most conductive materials ever measured; pencil leads snap easily but graphene is 'one of the strongest materials ever measured, with a breaking strength 200 times greater than structural steel' (217).

VII.

In 1921, Queen Mary, a lover of miniature *objets d'art* or 'tiny craft', commissioned a dolls' house from the architect Edwin Lutyens. Working with his friend Lawrence Weaver, Director Designate of the United Kingdom exhibits at the forthcoming British Empire Exhibition, Lutyens saw the commission as an opportunity to showcase British artistic, craft and engineering skills. The house, at 1:12 scale, was fitted out with furniture and household objects by nearly 1,500 individuals and companies. It has hot and cold plumbing, lifts and electric lights. Murals are by William Nicholson and Edmund Dulac, and as well as the framed

paintings on the walls, there is a collection of prints and drawings stored in miniature plan chests. Two hundred leather-bound volumes contain stories and poems handwritten by authors including Arthur Conan Doyle, Thomas Hardy, Rudyard Kipling, A. E. Housman and Vita Sackville-West. A garden designed by Gertrude Jekyll slides out of a plinth below the house, complete with lawnmowers, plant tubs and benches. The nursery contains a steam train, soldiers and a toy theatre wired for electricity and containing sets for *Peter Pan*. (Lutyens was friends with J. M. Barrie and designed the set of the night nursery for the first production of *Peter Pan or the Boy Who Wouldn't Grow Up*.)

As well as commissioning works from contemporary artists and writers, Lutyens and Weaver included samples of brand name products. In his essay for the lavish two-volume catalogue *The Book of the Queen's Dolls' House* (Benson and Weaver 1924), Harold Nicholson relished the house as a time capsule for future biographers, as it documented the unremarked domestic sphere, including a Hoover and a carpet sweeper. Branded packets and jars contained minuscule quantities of the advertised contents: Lux Flakes, Vim and Colman's mustard powder. In her essay for the catalogue, Dymphna Ellis emphasizes the 'realness' of the dolls' house, with a functioning drawer on the coffee grinder and real wine in the bottles:

A fairy house, one might call it, except that mortal men have made it. Carpenters and artists, metal workers and weavers, all skilled workers upon the things of everyday life, who in this adventure have applied their art to producing *real* things of microscopic size. (Benson and Weaver 1924:125)

But no one could pour wine from those tiny bottles, because of the strength of the surface tension of the liquid relative to the size of the opening. Nor, as engineer Mervyn O'Gorman points out in his catalogue essay, 'The Effect of Size on the Equipment of the Queen's Dolls' House', would hot or cold water flow through the copper piping. He notes that the properties of matter do not scale up and down evenly with dimensions. Doll's house curtains and bedcovers often appear stiff and starched rather than hanging in soft folds, because however fine the material, the threads are not scaled down at the

same ratio. Similarly, Gulliver complains that shirts made of fine Brobdingnagian linen seemed to him 'coarser than Sackcloth' (Swift 1934 [1726]: 91) and clothes made of the thinnest silk available felt like thick blankets, 'very cumbersome till I was accustomed to them' (102). O'Gorman's comments imply how makers working on the miniature scale are confronted with the constraints of materiality. While the design and scale of everyday objects such as bricks, chairs and cutlery have evolved in relation to the human body, the imposition of a reduced scale does away with any natural congruence. The force applied to familiar tools such as pliers or rasps has to be constrained to avoid damaging materials. Contemporary artists working in miniature with the help of a microscope, such as Willard Wigan, who sculpts scenes that appear on the head of a pin, describe working between breaths: 'I enter a meditative state in which my heartbeat is slowed, allowing me to reduce hand tremors and sculpt between pulse beats' (Wigan 2019). The sculptor himself becomes almost motionless, almost statue-like. Must we hold our breath to enter a miniature world? And in doing so, do we confuse the usual distinctions between living and lifeless matter?

The maker of the miniature encounters a world that is not 'made for me'. As feminism and disability studies, among others, have shown, the normative design of architecture, transport and everyday objects reflects the needs and proportions of only a part of the population. Working in miniature has an estranging effect at the level of materiality that potentially stirs this awareness.

#### VIII.

An increased awareness of the life in matter does not necessarily follow from taking smallness as a theme. The first part of the film *Downsizing* (directed by Alexander Payne, 2017), set in a 'near future', is about the announcement and promotion of a new technique to shrink humans down to 5 inches tall. Though the science is not explained, people undergoing the process have to have their bodies shaved and teeth extracted, since hair and fillings do not respond to the shrinking. (Presumably, this is based on

the familiar understanding that hair is 'dead' protein, but fingernails are not mentioned, and nor are pacemakers, stents, artificial joints or other commonplace bionic components.) The image of shaven-headed participants lying in cots in uniform gowns uncomfortably evokes the history of forced 'processing' of human beings in a way that the film itself does not acknowledge, despite a subplot about the forced shrinking of dissidents in Vietnam. The downsizing process is invented as a way of reducing human impact on the environment but sold to participants as a way of maintaining a lifestyle of North American luxury consumption. Once our hero, Paul, has undergone the procedure, the remainder of the film takes little interest in how materials behave at different scales. Any technological challenges of the sort identified by O'Gorman in 1924, such as running water through tiny pipes or power through tiny cables, have been invisibly solved. Downsized people suffer the familiar injuries of capitalism – losing a job, being in debt, status envy – and Leisureland, the gated community sheltered under a Center Parcs-style dome of permanent sunshine, inevitably has an 'outside', a slum city where its cleaners and undocumented citizens live. The inventor of the downsizing technique heads for a Norwegian community preparing to wait out in an underground vault the apocalypse of a planet made uninhabitable by climate breakdown. Yet the film shows no existential risks to the downsized population based on the disparity of scale – like the threat posed by flies, wasps or hailstones to Gulliver, or by 'human beans' to the Borrowers in Mary Norton's novels.

Reflecting on the origins of her stories of the Borrowers, Norton recalled the experience of being a very short-sighted child who was, on country walks with her brothers, 'an inveterate lingerer, a gazer into banks and hedgerows':

What would it be like, this child would wonder, lying prone upon the moss, to live among such creatures – human oneself to all intents and purposes, but as small and vulnerable as they? What would one live on? Where make one's home? Which would be one's enemies and which one's friends?' (Norton 1990: 6)

Norton's heroine, Arrietty, is 13 at the opening of the first novel, and firmly convinced that 'human beans are *for* Borrowers – like bread's for

butter!'. Yet this easy assumption that the world is given for her to use is accompanied by a sharp consciousness of material scarcity. She cannot believe that there can be many human beings in the world, given their size and enormous appetite for clothes, houses and food: 'I mean, there wouldn't be enough stuff in the world to go round after a bit!' (71). The Clock family survive under the floorboards in relative comfort, but other branches of the family have died out as the human household contracted, or have been forced to emigrate and live in the fields.

While the Borrowers are ingenious alpinists and bricoleurs, using hatpins and a length of name tape to scale curtains, or making a fireplace out of a cog from an old cider press, *Downsizing* presents no strategies for climate change mitigation or adaptation that are based on material practices in existing ways of life: the choice offered is a science-fiction escape based on not yet invented technology or business as usual. Paul makes a last-minute dash from the vault to return to romantic love and to small gestures of humanity within the existing system. As Fredric Jameson has written, 'Someone once said that it is easier to imagine the end of the world than to imagine the end of capitalism' (Jameson 2003).

I X.

In a recent short story, Ben Lerner uses 'toggling', a term from the digital control panel, to describe a rapid alternation between the perception of two scales. The protagonist recalls a miniature train set he had been given as a child:

he didn't care about the trains, he could barely make them run, but loved the scenery, the green static flocking spread over the board, the tiny yet towering pines and hardwoods. When he looked at the impossibly detailed trees, he occupied two vantages at once: he pictured himself beneath their branches and also considered them from above; he was looking up at himself looking down. Then he could toggle rapidly between these perspectives, these scales, in a relay that unfixing him from his body. (Lerner 2019:60)

Here, the 'toggling' between the miniature and the human produces a feeling of disembodiment, but the example of Andean animism suggests that moving between the miniature camelid and

the vast scale of the mountain need not involve 'unfixing' from the body. Lerner's disorientated narrator seems habituated by computer tools to a binary, disembodied alternation between two states ('toggle') rather than an analogue 'zoom' that takes the body with it, a changing of focus that does not entirely lose awareness of the wider context. When we focus on a street name on a physical map, we still hold the rest of the city in our hands; when we zoom in to street level on a digital map, the street fills the screen and the rest of the city disappears. The persistence of three-dimensional scale models in theatre design (supported but not supplanted by digital drawing) can be explained as affording this kind of embodied shift in perspective: even as the viewer focuses on a detail in 1:25 scale, their body remains aware of the whole.

Might this kind of embodied shift in perspective through the miniature be used to help relocate the human body in scales that are dizzying to conceive – even, 'sublime' – such as the microscopic scale or the 'hyperobject' of climate change (to use Timothy Morton's 2013 coinage)? One of the explanations proposed for a general inertia in responding to the evidence of climate breakdown has been the difficulty that we have in conceiving of interactions at global scales. Andean animism sees fragments of stone as having a lasting connection to the mountain from which they come, and potential to affect it; this orientation, which Frazer termed the 'Law of Contact', holds the 'here-and-now' and the distant source in mind at the same time. Could miniature objects or samples of materials – a modern *Wunderkammer* – be used to produce the action of consciously moving between the two scales? Most people reading this article carry around cobalt-rich lithium-ion batteries in a smartphone or laptop without considering their source on a daily basis. Sarah Woods' radio play *Das Kapital* (2018) revisits Marx and the concept of labour as 'congealed' in the commodity. The play gives voice to the many hundreds of people involved in making a mobile phone: 'My name is Delphine. I am eight and I work collecting cobalt that goes into the battery of your phone'. The play ends with a chorus of people from around the world leaving messages to introduce themselves: 'I am in your phone'.

When Lerner's narrator 'toggles' between scales, the representational function of the miniature is more important than the synecdochal. It is a three-dimensional model that produces this sensation, not an aerial photo – he is able to 'toggle' between vantage points because of the 'impossibly detailed trees'. Yet it is striking that he has little interest in playing with the layout ('he didn't care about the trains, he could barely make them run'). His hands are not involved. The landscape is 'static'.

In twentieth-century writing on puppetry, in contrast, there is an emphasis on how movement can be used to generate the illusion of life. Movement comes from the puppeteer who 'animates' an object with 'breath' (the rise and fall of a body produced by breathing), and perhaps movement in space (walking, jumping, etc.), and even other features defining biological life such as digestion and reproduction. In some traditions, this process of animation is conceived of as directing or acting as a channel for an animating spirit that enters or is awakened in the puppet; more loosely, puppetry is often referred to as 'giving life to things'. Theorists have also focused on movement within the spectator who shifts between perceptions of 'life' and 'matter' when watching an animated puppet – as Steve Tillis puts it, 'by creating a double-vision of perception and imagination, the puppet pleurably challenges the audience's understanding of the relationship between objects and life' (1992: 65). Henryk Jurkowski called this movement 'opalisation' after the way that the colour of an opal shifts according to the light (1988: 41–2); Steve Tillis borrowed from classical mechanics to call it 'oscillation', a binary concept that recalls Lerner's 'toggling' between scales. If the spectator's enjoyment of puppetry often involves a degree of animistic thinking, it is always tempered by awareness of materiality:

Everything is what it is, plus something else: a recognizable object and a transformed object at the same time. On the puppet stage a feather duster may symbolize a fairy prince illumined by glory, but we must never forget that it still remains a feather duster. (Péter Molnár Gál quoted in Tillis 1992: 62)

X.

Contemporary 'object theatre' specializes in holding two scales in tension. The term '*théâtre d'objets*' was coined in 1980 to describe the work of a group of artists based in France making performances that combined everyday objects and storytelling with a verbal-visual playfulness drawing on semiotics and performance art – companies such as Vélo Théâtre, Théâtre Manarf and Théâtre de Cuisine. The current usage of the term 'object theatre' has a far wider reach. In the context of puppetry, it can include work in which objects not originally designed as puppets become animated as (anthropomorphic, zoomorphic) characters, and also work emerging from a dance or performance art tradition in which human and non-human objects interact as equal partners, without attributing 'voice' or 'breath' to the non-human. Forced Entertainment's retelling of Shakespeare's plays, *Complete Works: Table Top Shakespeare*, uses jars and bottles from the kitchen and bathroom cupboard. The company website describes this as a kind of 'virtual or described theatre'; it depends on the audience's semiotic reading of the visual contrasts between familiar household objects. By bringing objects into relationship their material features become potential signs – one is tall, the other small; one rounded and generous, the other tall and pinched; one reflects light, the other absorbs it; and so on. A matched pair of salt and pepper pots become a king and queen. Though they are not made as miniatures, the objects are small-scale performers in relation to the human performer who tells the story, moves them across the table, brings them face to face or knocks them over. 'Maybe it is worth running the risks associated with anthropomorphizing', writes Jane Bennett in *Vibrant Matter*, because it 'works against anthropocentrism: a chord is struck between person and thing, and I am no longer above or outside a non-human "environment"' (Bennett 2010: 120). In *Complete Works*, the objects are not animated as puppets – it is the spectator who 'gives life' and meaning to them.

Alongside this semiotic play, object theatre also explores human relations with matter. Again, this does not necessarily involve objects made

as miniatures, but destabilizes the perception of natural congruence between everyday objects and the human body. Viktor Černický's performance *Pli* (2019) sets the performer into relationship with twenty-two conference chairs. With his feet keeping up a continuous percussive beat on the dance floor, the human becomes semi-mechanical, while the chairs become active partners in the dance. Černický responds to the weight and centre of gravity of each chair, both individually and as they are combined in a tower of stacked chairs. Černický settles the teetering tower, watchful as a parent tiptoeing away from a baby that has apparently dropped off to sleep. Later, he climbs the tower like a mountaineer, a final chair on his back. He explores the intrinsic movement qualities of this banal, normally overlooked, office furniture, but also dramatizes a human relationship to the non-human through the chairs – the desire to tidy, to control, to build, to conquer.

The Andean *conopa* discussed above were mainly made of stone, described as

a particularly evocative, powerful, and primordial material within Andean cosmology, associated with the origins of people and animals as well as the powerful mountains.... Carved stone *conopa* and *illa* made from small pieces of 'living rock' combine miniaturization and synecdoche, allowing the user to 'hold the land in their hand'. (Sillar 2016: 450–1)

While audiences for object theatre do not necessarily bring a cosmology based on materials to performances, they bring strong cultural associations. Plastic, despite its uniform substantiality, has a cultural meaning. Christian Carrignon (Théâtre de Cuisine) writes of how the post-war culture of mass-produced plastic items – what he calls 'plastoc' – coincided with his childhood:

These poor objects in plastic belonged to ordinary people, who were perhaps poor but certainly possessed of poor taste. The people I knew, my nearest and dearest, me. These objects touch me because they were bought, loved, forgotten. I touch them on stage: I touch life. They belonged to living people. We are talking about people in object theatre. Nothing else. (Carrignon and Matteoli 2009: 16)

Agnès Limbos of the Belgian object theatre company Gare Centrale also makes use of apparently banal mass-produced objects. She

goes out on daily walks to look for the objects for her performance, finding them on street corners or in charity shops. Items that have been previously used acquire what she refers to as a 'charge'; the marks of wear are, like the grain of wood, evidence of matter having lived a life.

In Gare Centrale's *Troubles*, Limbos and fellow performer Gregory Houben are seated at a table with a number of miniature objects: chairs, a wolf, dozens of pairs of bride and groom figurines designed for wedding cakes, doll's house furniture, a die-cast New York taxi. The attention moves back and forth between the human and the (various) miniature scales.

While the techniques of classical puppetry aim to give the illusion of independent life to inanimate objects through movement, 'breath' and voice, in the work of Gare Centrale, objects are deliberately 'placed', rather than 'animated'. The characteristic way in which Limbos handles objects in performance has been described as 'repositioning':

The right gesture is spontaneous yet mechanical. The repositioning is not anthropomorphised: neither walking, nor hopping, nor flying (with rare exceptions, for particular dramatic purposes). Rather, one gently lifts the object, moves it horizontally on or just above the surface (in this case the table) and sets it down. Moreover, there are no adjustments: the start and finish of actions are very clear. The gesture is precise: as in chess, one does not return to a pawn once it has been played. (Corniquet and Rhéty, quoted in Margolies 2016: 158)

Could this technique of 'placing' objects in object theatre serve as a way of regulating the powerful sensations evoked by the handling of miniature objects? Rather than foregrounding the dialogue with objects (as Černický does with his chairs), Limbos and her fellow performers keep a certain distance, reducing their own performative 'liveliness' to create a more equal relationship with the objects on stage. While the practices of 'animating' objects in puppetry (whether made as puppets or appropriated for performance) can emphasize the powers of the demiurge-performer to 'give life', blurring animation and animism, object theatre's formal handling of the object gestures towards a recognition that life processes inhere within it (and its network of relationships with other objects) rather than being added by a human animator.

XI.

The ant crawls over the plastic firefighter. From a satellite's viewpoint, the Arctic is wreathed in smoke and the Amazonian rainforest is scraped off the globe like moss from an old football. The miniature can give an illusion of dominance and reinforce the conceptual divide between animate and inanimate. For Tim Ingold, the idea of the globe, both as a vision of Earth from space and as a classroom model, is 'the epitome of deadly abstraction'. The consequences of seeing the world as merely an inanimate ball of rock are fatal; Ingold argues that we 'must cease regarding the world as an inert substratum, over which living things propel themselves about like counters on a board or actors on a stage' (quoted in Paavolainen 2017: 180).

Ingold's metaphor of counters on a board has been evoked earlier when discussing the characteristic 'positioning' action of object theatre. Practitioners like Agnès Limbos are far from regarding their objects and materials as 'inert', employing a delicate, neutral touch that does not assume the power to animate. To touch the miniature is to connect with its weight, texture and construction, whether it is made of diverse materials or a uniform substance. The example of the Andean *conopa*, in which pebbles and carved stone figures both have a role to play, suggests that both fragments and miniatures can connect us to their material sources (a mountain), as well as to their referents (a herd of llama), and that the very small can be a means of positioning ourselves within the material world.

Tim Ingold and Jane Bennett, among others, have argued for the replacement of fixed distinctions between animate and inanimate matter with an understanding of the 'meshwork' of human and non-human relationships (Ingold 2012). With this more complex understanding comes the need to replace binary terms such as 'toggling' and 'oscillation' used to describe the fluctuation of a spectator's perception of the life in things. Bennett suggests that even giving examples of the many complex assemblages of agency she discusses in *Vibrant Matter* – to note, for example, 'that the human immune system depends on parasitic helminth worms for its proper functioning or cite other instances of



our cyborgization to show how human agency is always an assemblage of microbes, animals, plants, metals, chemical, word-sounds, and the like' (2010: 120–1) – is unlikely to satisfy those most keen to distinguish the human self from the field. Part of the problem is that the material sources of contemporary miniatures such as the plastic firefighter have been concealed from users, but work like Sarah Woods' dramatization of the voices in the smartphone suggests one approach to making those connections, and renewed attention to craft practices is another, along with the experience of holding your breath and zooming into a miniature world:

What would it be like, this child would wonder, lying prone upon the moss, to live among such creatures – human oneself to all intents and purposes, but as small and vulnerable as they? What would one live on? Where make one's home? Which would be one's enemies and which one's friends?' (Norton 1990: 6)

■ Gregory Houben and Agnès Limbos in *Troubles*, Compagnie Gare Centrale. Photo collage: Melanie Rutten, courtesy Gare Centrale

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