IMPRINTS

Glenn Adamson and Joshua G. Stein

Imprints:
Scale and the
Maker's Trace

Big Clay #3 (2008–2011), an outdoor sculpture by the Swiss artist Urs Fischer (b. 1973), is a mighty impressive sight (fig. 1). Ten meters high and rendered in dull gray metal, it towers over its viewers. Yet it began as a gesture of remarkable slightness. The artist simply squeezed a lump of modeling clay in his hand, creating an impromptu maquette. Then things got complicated. Fischer digitally scanned the amorphous object and sent the scan to Kunstgiesserei, a model-making company in Switzerland. The skilled technicians there used the file to create an enormous version of the same shape in Styrofoam, more than one hundred times the size of the original. The next steps were to cut the huge model down into pieces and then to send them half a world away, to China. There, a foundry was tasked with copying the form in a custom aluminum alloy. The finished result is an object both gargantuan and absurd, ribbed all over with Fischer's giant-sized fingerprints, each fine whorl and ridge amplified to a deep ridge.

The process of making *Big Clay #3* involved just one shift in scale but several acts of translation. First, there was the initial forming of the clay inside Fischer's palm, a basic and intuitive form of casting that could be done by any child. Next, the physical object was turned into digital information. A third state, requiring Kunstgiesserei's computer-driven five-axis carving machine, gave substance to the form once again — this is the moment of "scaling up." Fourth, a mold was taken of the full-size model, rendering the positive negative; and finally, in

a performance of indexicality that recalled Fischer's originating squeeze but was done only at huge cost and with the aid of many fabricators, the sculpture was cast in molten metal, the aluminum creating an exterior shell that was then assembled over a steel armature. Reportedly, the artist was at pains to prevent the foundry workers from cleaning up the surface. He wanted the metal rough, with the casting marks clearly evident.[1]

When Urs Fischer had a midcareer exhibition at the New Museum in 2009, he included no less than five other works from the *Big Clay* series (2008–), none quite so large as #3, but still massive. The *New York Times* critic Roberta Smith noted their "geological scale," and the concomitant suggestion that the artist had recast himself as something like a force of nature: "It is the artist's touch writ very, very large."[2] But of course, the artist's touch was by no means present. Fischer's hand, his actual fingerprints, were remote points of reference, seen through a fog of overlaid procedure. (For comparison, we might imagine a text translated into German, then into Chinese, then back into English.) Even as he brings new magnitude to the mark of the artist's hand, long considered the signature of fine-art authorship, Fischer indicates the complex range of his dependencies. Recall the offhand quality of the original "squeeze" of clay that initiated the sculpture's passage into being; this is intrinsic to Fischer's satire. He has done as little as possible, pointing to the extended networks of relationality that so much art today requires. In this way, he is poking fun at the history of expressionist sculpture (large-scale bronze works of Willem de Kooning (1904–1997), for example, which similarly involved the use of handmade prototypes), paradoxically using enlargement to deflate the pretensions of the heroic artistic gesture.

Critics writing about Fischer's sculptures tend to underrate this point, because they neglect to explain how these extraordinary objects have been made and who has done the making. This is entirely typical in the reception of contemporary art. As the achievements of artists have become ever more prodigious, the audience has become ever less informed about what they are looking at. It is an ironic state of affairs. Art today is hugely successful by most measures: highly marketable, prominent in the media, and influential in the broader creative culture (as can be seen in innumerable crossovers to fashion, film, architecture, product design, and other fields). Yet in comparison to earlier moments in the history of art, its transparency about its own means of production—and arguably, its capacity to enlighten and challenge, rather than entertain and distract—has declined precipitously. Certainly, there is no

simple equation between transparency and criticality. Art that hides its own tracks may be politically engaged, and the decision to reveal process is entirely compatible with the conception of art as a pleasant diversion (rather like the commentary track on a DVD). Yet, in the aggregate, the art world's refusal to acknowledge the conditions of its own production is inextricable from its tendency toward power plays, and a hierarchical structure that disproportionately rewards a few central players and diminishes the possibility of communitarian engagement.

Much of this unwelcome situation is due to the single issue of scale. Big art has an inherent power of self-mystification. Not only does it tend to dominate through its sheer monumentality, rendering its viewers as passive as people watching a Hollywood blockbuster, but its practical execution is so complex that it is very difficult for the non-specialist to decode. An ever more important problem with respect to scale lies in the matter of production. Bigness is a big problem for artists, who ignore the opportunity of working at large scale only to the possible detriment of their careers. Given the high stakes of contemporary art—the necessity to stand out in the incessant round of biennials, gallery openings, and museum shows—size is a competitive advantage second to none (perhaps only the use of precious materials like gold and diamonds comes close). Fischer manages to wear grandiosity lightly, treating it as an elaborate joke. But for any artist, scaling up is a very serious matter. It may involve career-jeopardizing financial risk, and in any case requires navigating technical complexities previously within the domain of engineering.

Both ethically and aesthetically, then, it is important that we pay close attention to large scale as a determinant factor in contemporary art. More broadly, we should insist on a critical view of art that considers specific physicality as a part of meaning. The timeworn presumption that technique is only a pathway to meaning ("just a means of arriving at a statement," as Jackson Pollock is supposed to have said), rather than inextricably bound up with it, was never true in the first place, and in an age of ever escalating artistic production values, has become patently absurd.[3] This essay suggests that, in the context of contemporary art, one ideal way to interrogate the complex inter-relation of making and meaning is to attend to processes of scaling up and the physical traces that these processes leave behind.

As the book you are reading is intended to demonstrate, scale does have a bearing on all art production, big and small. But in this essay, we limit our interest mainly to one particular issue: the translation of a small thing into a large thing. This topic allows us to focus

our discussion more tightly than an analysis of sheer bigness (accomplished through whatever means) would permit, but it also reflects the reality of most large-scale art, which does indeed involve the use of preparatory models or prototypes. By tracking the imprints left behind in the process of enlargement, we can try to demystify the factor of scale in contemporary art, getting past its sheer power and investigating the terms on which it is achieved. Our subject allows us not only to provide transparency to an arena that is normally opaque (a role that critics and historians can play just as well as artists and curators, by the way), but also to show how the role of the contemporary artist has shifted in response to new technologies and contexts of display. The artist today is an orchestrator of systems in which concepts, physical and virtual models, contractual relationships, and artifacts all interrelate.[4] This is the backstory of large scale, which we hope to dissect.

As part of our contribution to this effort, we would first like to introduce several key terms that help in understanding shifts of scale from the perspective of the maker: *friction*, *figurability*, and *fidelity*. We will first define these concepts, and then show how they can be used in the analysis of particular artworks, both on a very practical level and as a means of critical assessment.

Friction

By friction we mean resistance to a scale shift that is imposed by the tool, the material, or both, in relation to other forces, especially gravity. Now, friction is not a bad thing. It is necessary for all making processes: for example, in the drag of a potter's fingers across a clay surface, in the bite of a chisel into wood, or in the tension binding a grid of threads together. But in both literal and metaphorical senses, friction also implies difficulty, and we use it here to capture one of the most salient facts about shifting scale: it is simply a challenging thing to do. There are numerous automatic means of duplicating a form when working at a one-to-one scale ratio, which may be quite simple (Fischer's compressed clay blob, a negative impression of the space between his palm and fingers, is an example). But changing the size of an object from small to large always introduces additional complexity to the process.

Change in size fundamentally requires some change in material qualities. This is significant when considering techniques of production. In the most literal, scientific, and physical sense of the term, friction inserts itself at every step. While a pruning shear held in the hand may easily snip a small branch, it would take more than a giant shear and

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an arithmetically stronger force to cut through the trunk of the same tree. J. B. S. Haldane wittily captured the importance of "being the right size" in 1926, describing the many ways in which animals are evolutionarily optimized according to their scale. Haldane dramatically illustrated his point in relation to the human form:

> Let us take the most obvious of possible cases, and consider a giant man sixty feet high—about the height of Giant Pope and Giant Pagan in the illustrated Pilgrim's Progress of my childhood. These monsters were not only ten times as high as Christian, but ten times as wide and ten times as thick, so that their total weight was a thousand times his, or about eighty to ninety tons. Unfortunately the cross sections of their bones were only a hundred times those of Christian, so that every square inch of giant bone had to support ten times the weight borne by a square inch of human bone. As the human thigh-bone breaks under about ten times the human weight, Pope and Pagan would have broken their thighs every time they took a step. This was doubtless why they were sitting down in the picture I remember.[5]

As biological organisms increase in size, there is a necessary increase in the number of systems needed to sustain life. There is a strong analogy to this rule in the world of art and artistic reproduction. As the size of an object increases, its complexity may well increase at a much higher rate. For convenience, a large-scale artwork is often conceived and represented at a human scale (a maquette), which bears no relation to that additional complexity. But a maquette does little to indicate how the formidable friction involved in scaling up is to be overcome. The potential of digital modeling techniques in some ways sidesteps this necessity and may account for the current spate of gargantuan artworks; digital modeling is powerful precisely because it is outside of scale. However, the object will eventually need to be reintroduced within the domain of physical materiality.

The necessity to shift materials is just the beginning of the job of scaling up. There is also the problem of tooling: the mark made by a hand tool can rarely if ever simply be magnified. More often a sculptor shifts vocabularies of making entirely, shifting, for example, from hand-modeled clay to chisel-carved stone. How is this done? Given a maquette to work from, a modeler or carver can simply operate by eye, but this places great demands on the skill of the sculptor, and

is unlikely to be very accurate unless he or she is a true master. For this reason, over the history of art, many technical processes have been employed to ease this process of scaling up. When it comes to a two-dimensional surface, "squaring" the original by overlaying a regular grid is the obvious solution. It establishes a set of fixed positions from which the artist can work. In three dimensions, the equivalent technology is the pointing machine, which establishes relative distances on the maquette and transfers them at a ratio to the workpiece.

Both squaring and pointing are a big improvement over the naked eye, but they can only give the artist a guide, a set of points in space that the artist can then connect, to approximate the original form. In two dimensions, this friction has been essentially overcome with photographic techniques, which allow for an exact transcription of the original. In combination with other means such as light projection or photocopying, an artist can attain any level of accuracy in the oversized copy, so far as it is permitted by the printing equipment at hand. In flat artworks, the friction of scaling up has thereby been reduced to a very marginal factor—so much so that the Brazilian artist Vik Muniz has succeeded in creating monumentally scaled photographs depicting a sand castle etched on a single grain of sand.[6]

Pointing devices, too, are only a partial solution to the task of enlargement. They can be used to translate profile and proportion, from a plaster model to a stone sculpture, for example, but while such indexing processes allow the artist to extrapolate reliably, they still require extensive interpolation, drawing or sculpting by hand, once the rough contours of the enlargement have been determined by the device. An important improvement was made in the form of the Collas machine, developed by Achille Collas (1795–1859) in 1836. This was a rotational device, much like an industrial replicating lathe, which could simultaneously index the form of a three-dimensional object and carve its likeness just adjacent. Capable of much greater precision than pointing devices, this machine was most prolifically used by the Société Collas et Barbedienne, the foundry and reproduction company founded by Collas with Ferdinand Barbedienne (1810–1892). The Collas machine was also employed by Henri Lebossé, Rodin's primary fabricator, to create reproductions at multiple scales (both smaller and larger than their originals). Without this innovation, sculptors of the time (Rodin included) would never have been able to meet the demands of their market.

Recently invented digital processes such as scanning, 3-D printing, and CNC carving are the first really transformative developments to

occur since the introduction of the Collas machine.[7] Initially, these techniques also appear to dispense with the friction of scale shift entirely, rather like photography does, because they capture the complete form as data that can then be rendered at any size. However, tooling and materials still have their specificity. Even the highest-resolution 3-D printer still works through the binding of particles that have their own texture and color, and computer-driven carving tools still involve the action of a cutting tool against a material, which will probably produce a drastically different surface than is present in the original maquette. For this reason, digital scaling-up processes are often used in conjunction with subsequent handwork and finishing—though we are approaching the point at which this may start to be unnecessary. If we step back from the immediate context of object production, and think in terms of networked systems, the importance of physical infrastructure becomes even more evident. Even the immaterial world of digital modeling has its own corollary to material friction. While a maquette is often scanned using software that generates a (somewhat) coherent geometry out of millions of points—a "point cloud"—it is afterward manipulated digitally in geometries that involve polygons or surfaces. Then it is fabricated with a series of numerical instructions (for example, a bit might be moved up 3.6 inches in one axis and across 2.84 inches in another). Similar to our example of language in translation, here various sets of geometric conventions continually make their influence known in the process, all of which has been determined to some extent by proprietary software packages. Every keystroke depends on a vast assemblage of materials, equipment, personnel, and technical investment. Digitization is one way in which art has become increasingly integrated with wider systems of capital—whether through software, machine tools, or intellectual property.[8] If we miss this story, we also miss a major shift in art's relations to the surrounding technosocial structures.

Figurability

In most instances of scale shift, there is a sense of "natural" scale by virtue of a connection to a real-world referent. We use the term "figurability" to describe this external relation. We have chosen this neologism—as opposed to the more common "figuration"—to emphasize questions of legibility and coherence. Our concern in examining figurability is not with the palpable processes of scaling (as in our discussion of friction), but rather with the way that a scaled-up form will be perceived: its phenomenological relation to the original scale.

Imagine three chairs, identical apart from their size. The first is ten centimeters high, the second a meter high, and the third ten meters high. Only the second chair will seem like a chair at all. In our terminology, it is more "figurable" as a chair than the other two despite their high degree of mimesis. The others are nonfunctional sculptures of chairs simply by virtue of their size—a miniature and a monument. (The second one could be a sculpture too, of course, but it will need a "Do not sit" sign.) Generally speaking, representational images possess this property of figurability, while abstract forms do not. Geometrical solids and amorphous blobs have no referent; they are equally "natural" at any size, or, more accurately, are denatured with respect to scale. (This absence of "natural scale" is a good definition of the abstract.) Fischer's *Big Clay #3* is interesting partly because it straddles these conditions. Initially, it appears to be a random shape, but by virtue of its Brobdingnagian fingerprints, one gradually understands its reference to the natural scale of the hand.

The film *Powers of Ten* (1977) by Charles (1907–1978) and Ray Eames (1912–1988)—the locus classicus of modern investigations of scale—makes clear the difference between figurable and nonfigurable scale shifts. One tends to remember the film's gradual zoom-in-and-out as a smooth journey across scale. But in fact this is the result of skillful artifice. There is a pronounced shift when, having pulled back gradually from the family on their picnic blanket, the city, the continent, and planet Earth, the Eameses begin to explore deep space, passing by the purely graphic arcs of planetary orbits and out into the galactic clusters. There is a point in the film where actual representation gives way to suggestive pattern, live film gives way to animation, experience to imagination. On the far side of this frontier, we can no longer read the screen image as a literal depiction; we have surreptitiously cruised past the point where form can technically be represented. The same happens in reverse when the film passes through the human epidermis and into its cellular structure, then plunges into the fizzing confetti of the atomic and subatomic.

While figurability initially appears to be disconnected from our primary theme of making, it actually inflects our discussion in important ways. This is because traces of making seem extremely dissonant when they are at odds with an image—particularly where the human form is concerned. The oft-cited concept of the "uncanny valley," coined by robotics specialist Masahiro Mori to describe the creepiness of automata that look only somewhat like people, has an equivalent in such situations. Consider the example of the British artist Ron Mueck

(b. 1958), whose giant superrealistic sculptures unsettle and fascinate precisely because they are not lifecasts, but have instead been laboriously fabricated to approximate the qualities of human skin, hair, eyes, and fingernails. The gigantism makes the workmanship of the sculptures extraordinarily conspicuous, much more than the waxworks of Madame Tussauds (or the earlier sculptures of Duane Hanson) that Mueck's works otherwise resemble. If in *Powers of Ten* we depart from figurability, almost without noticing, in Mueck's work we are faced with an excess: faced with a single enormous fingernail, we are struck by the weirdness of its hyperlegibility, achieved through materials and processes that have no indexical relation to a real body.

Another important aspect of figurability, particularly subtle and fascinating in relation to built form, is the relation of internal structure to the outer envelope. When we consider scale in art—indeed, when we consider art at all—we tend to concentrate mainly on the visible exterior. Whether the pointing machines of centuries past or the point clouds used in digital scanning, the frictional activity of scaling also tends to concentrate on the surface. But scaling up and down is a holistic process. It applies equally to the inside and outside of the form, and this requires a maker to think adaptively. Of course, it is entirely possible to invent new internal structures as one changes the scale of a complex figure. A sculptor wanting to make a human figure in miniature, say an inch high, is very likely to render it in the solid. At life size, it may well make sense to mimic the skeleton and flesh of an actual human body, creating an armature over which softer materials are placed (of course one can instead create a hollow form in which the rigid envelope provides structural integrity, so the idea of a "natural" structure for a given form only goes so far). The Statue of Liberty, being enormous, is hollow, but it has an internal triangulated iron framework (designed by Gustave Eiffel in a manner similar to his later tower in Paris) that fills almost the entire volume in order to support the panels of the skin. The result is a more or less complete schism between the logic of the exterior, which is modulated and mimetic, and that of the interior, which is geometric and serially repetitive. There is again something uncanny here, as visitors to Liberty Island can attest when they enter the monument. As its exterior figurability gives way to a nonrepresentational interior, there is an uneasy sense of a rupture between the bodily and the architectural. As Darcy Grimaldo Grigsby has demonstrated, this rupture mapped directly onto the division of labor between the sculptor of the statue and Eiffel as its engineer, with the artisans who fabricated it (first in a wooden model, then in plaster,

then in a metal armature with a copper sheathing) acting as mediators between the two. Eiffel approached the project in terms of its interior geometry. As Grigsby writes, he "assumed an emptiness, which he would fill with structure. The container of that emptiness was only of slight importance to him. What mattered most in this context was the container's size, height, and surface area. The forces on that size and area would be received and answered by the armature's cross-beams, by Eiffel's structure, which concentrated and answered their force. The outer envelope in such a model almost seems transparent; it is certainly useless."[9]

This example points to the importance of figurability in relation to our earlier comments about productive transparency. The internal structure of a large sculpture like the Statue of Liberty may seem unimportant, simply a necessary detail of production. But recall the architect Rem Koolhaas's influential argument in *S M L XL*: "In Bigness, the distance between core and envelope increases to the point where the facade can no longer reveal what happens inside. The humanist expectation of 'honesty' is doomed: interior and exterior architectures become separate projects."[10] When scale necessitates a disjunction between an object's quality as image and its internal dictates, there is inevitably a loss of structural legibility.

Fidelity

Our third and final concept is fidelity, which refers to the mimetic relation between an original and its reproduction—the degree of "faithfulness" by which the new copy adheres to the likeness of its model. The principal criteria for fidelity in the replication of sculptural form include profile, proportion, and texture. Different processes of enlargement may achieve these goals to varying degrees. Early techniques of pointing and the Collas machine achieve greater accuracy in the first two criteria, but they do very little to translate the intricacies of surface variation, as a one-to-one plaster cast does. There is, in fact, an underlying conflict between reproduction techniques that prioritize profile and those that prioritize texture, leading to two parallel trajectories in the history of reproduction.

The physical impossibility of enlarging any object, living or not, and maintaining infinite fidelity across all domains, forces the artist to reckon with a set of competing possibilities. We might compare this transition from the analog to the digital to the more well-known case of sound recording. The "hi-fi" stereo systems of the 1950s and 1960s were the result of a quest to produce analog recordings that were identical

to the original, free of the markers of transfer—a reproduction that transcended the medium of its transmission. In the realm of three-dimensional reproduction, including sculpture, there has been a similar desire to neutralize the repercussions of materiality. With continual advancements in digital imaging and digital fabrication, this holy grail appears ever closer on the horizon. Advances in 3-D printing, and even the cloning of living tissue, offer the tantalizing possibility of realizing a copy that is faithful in all respects.

Yet even in the case of digitally powered scale shifts, the impossibility of coherently reconciling profile, proportion, and texture results in a conceptual delamination, in which the implied relationships between original and copy are uncoupled to varying degrees. This frees the artist to respond to one aspect of fidelity alone, or to play on the dissonance between differently resolved fidelities. Our increasing technical ability to replicate with infinite accuracy conversely produces layer upon layer of possible divergences from fidelity (i.e., where the cost and effort of achieving similitude is not pursued). With each of these new "advances" in capacity and potential, the aura of the original becomes ever more atomized, the possibility of any gestalt scattered across ever more specialized domains of expertise. Instead, the artist must continually question the nature of the proposed fidelity.

Though he worked long before the onset of digital tooling, Claes Oldenburg (b. 1929) was deeply involved with such delaminations of fidelity. Oldenburg's oversized versions of everyday objects were often created in both "hard" and "soft" renditions. Both cases involve a material shift, as well as a scale shift, yet the two versions differ in the nature of their fidelities. Oldenburg's *Light Switches— Hard Version* of 1964, for example, is rendered in wood and Formica laminate, in a reasonable facsimile of the original plastic object, the orthogonal dimensions of the switches easily scaled up. Yet there is virtually no fidelity of surface texture, materiality, or fabrication technique. The means by which the enlargement was performed are disguised by a layer of paint, which hides the carpentry underneath. We may fail to notice that it actually has little mimetic relationship to the plastic original—it has a high degree of figurability, but a very low degree of fidelity. If a set of household switches were actually scanned and fabricated, we would see nicks and scratches, and perhaps even a fingerprint-shaped film of oil imparted by the act of touching.

Light Switches—Soft Version (1964) is made from sewn canvas stuffed with kapok (a mattress-filling material) and treated with gesso. Here, the same arithmetical logic has been applied; the seams were

initially mapped out as straight lines, just like the linear edges of the wood in the hard version. But in the soft *Light Switches*, the material has had its way with these lines. The form sags and folds, particularly at the points where the weight of the switches drags on the fabric. In this version, fidelity to profile is sacrificed in favor of nuanced understanding of how pliable materials are sutured together, slumping under the weight of their newly discovered dimensions. Not all of Oldenburg's objects obey the rule that "hardness" maps so neatly onto high fidelity, however. When approximating a soft object, such as food or a shuttlecock, his use of textile materials or vinyl is often more mimetic than a rigid one could be.

What interests us here is not just the question of material substitution but rather the way that materiality as such performs across scale shift. Rare indeed is the large-scale sculpture that is made out of the same stuff as its maquette. And in most cases, as in Oldenburg's light switches, the cascading effects of material translation are not addressed systematically. Rather, the gap between material domains becomes an arena in which artists can operate. The struggle to scale up yields creative possibilities, giving the artist a unique and complex field of experimentation.

For the remainder of this essay, we want to put our proposed terminology to work, applying our three concepts to specific examples and showing how they can anchor critical assessment. We should stress that our intention here is not evaluative in any simplistic way. The question is not *whether* a particular scale shift demonstrates the principles of figurability, fidelity, or friction. Rather, we want to ask *how* a given scale shift deploys each of these variables, and what the implications of these choices may be. There are numerous types of frictional workmanship available to an artist who wants to scale up, as well as many degrees and styles of fidelity, which may present themselves as oppositional choices; while the engagement with figurability is particularly elastic, permitting a wide range of scope for expression.

Inflation

A forceful illustration of the ethos at stake in techniques of reproduction—and the way that friction, fidelity, and figurability operate in practice—is afforded by a comparison between two works: Tim Hawkinson's (b. 1960) *Balloon Self-Portrait #4* (1996), a latex sheath cast directly from the artist's body and then inflated; and the much more famous *Balloon Dog* by Jeff Koons (b. 1955), which has, since

its introduction in the artist's *Celebration* series (1994–2000), become
a leading emblem of oversized, capitalized, and spectacularized art.

Hawkinson's work is a beautiful demonstration of the way that
figurability performs across a scale shift (fig. 2). The comic effect of
Hawkinson's sculpture is partly to do with the fact that it is airborne,
like some wayward Macy's Thanksgiving Day Parade float, but also
because of the simple effects of air pressure against the form. The
smaller volumes of the body (fingers, penis) increase in size very little,
while the broader areas (torso, thighs) blow up hugely. The result
is a disarming portrait of the artist as puffed up and easily punctured.
Hawkinson's use of his own body is crucial; distorted through the

action of materiality, he is not afraid to present himself as vulnerable and slightly absurd. Like Oldenburg's soft switches, the work displays a conscious fidelity to friction over profile — internal pressure and surface tension govern the final form more than a desire to create a perfect likeness of the original.

Yet Hawkinson also departs from Oldenburg's precedent, in that his work is an absolutely accurate index of the human figure, or at least its superficial qualities. While this plump portrait would certainly be unrecognizable as the artist to any but his most intimate circle, the direct material mapping of his skin through latex is extremely faithful to the original. Hawkinson's "second skin" is precisely that, accurate

to within the millimeter dimensions of its thickness. When *Balloon Self-Portrait #4* is taken alongside Hawkinson's other "flayed" works (such as *Laocöon*, 2004), we can see how he tracks different relationships between volume/profile and texture/surface, prioritizing certain variables in each case. These works toy with the notion of figurable—*Balloon Self-Portrait #4* maintains a clearly recognizable shape but seems to be on its way to becoming an amorphous blob. If one were to continue inflating the sculpture, it would become more and more abstract, losing figurability while its surface fidelity remains constant.

Or of course, it might just pop. The charming and fragile bathos of Hawkinson's *Balloon Self-Portrait #4* stands (or rather, hovers) in vivid contrast to the shining and priapic *Balloon Dog* (fig. 3). Much has been written about Koons's interest in inflation, a word that registers in both an economic and a physiological sense. Within the artist's own carefully wrought ideological program, the inflatable toy is meant to symbolize the animating spirit of life (reminscent of the concept of *pneuma* in ancient Greek thought): "We are breathing machines, we're inflatables. When we take a deep breath, we're a symbol of optimism, a symbol of the future. When we exhale, it's a symbol of death. We deflate. The balloon dog is eternally optimistic."[11] Inflation also functions in Koons's work, in an unacknowledged way, as an index of his ever escalating ambition. Here the term's commonplace economic definition, referring to the cheapening of currency, seems apposite.

Koons's involvement with inflatables goes way back. He began his career by appropriating found blow-up toys and then vacuum cleaners, in the approved Duchampian manner. He then started casting at one-to-one scale with the series *Equilibrium* (1985), which included a group of sculptures referring to inflation, such as *Aqualung* and *Lifeboat*, as well as the artist's celebrated basketballs that seem to levitate in their tanks. The sculptures for *Equilibrium* were cast in bronze, the most traditional of sculptural materials, at Tallix Art Foundry.[12] The following year, Koons achieved his masterpiece, the stainless steel *Rabbit*—which, in a case of life imitating art imitating life, actually did inspire a Macy's Thanksgiving Day Parade float in 2007.

The signal departure of *Balloon Dog* from these various precedents is of course its scale. The rendering of a soft vinyl bunny into hard steel was by no means easy—the polishing of the rough cast required extensive labor, and it took great skill to capture the delicate puckers at the seams of the pliant toy. Like almost all his cast works, *Rabbit* was created in an edition of three, a strategy that permitted him

to recoup the high costs of "tooling up" to make the sculpture. But in terms of sheer, frictional, physical demand, *Balloon Dog* is at another order of magnitude entirely. As Scott Rothkopf, curator of the recent Whitney Museum retrospective on Koons, points out, the run of the edition was now expanded from three to five, each in a different color: "The break-even point on fewer examples would have been impossibly high. There couldn't have been one without the whole litter."[13] Liberated from the original balloon toy (which Koons actually did learn to make by hand), it is no longer an index but instead a gigantic, free interpretation—its fidelity to the original is compromised both in profile and in texture, and the relation to the model seems to pass through the realm of fantasy.

A striking aspect of *Balloon Dog* is the way that its affectless surfaces—in themselves purely industrial in appearance, and nothing like stretched rubber—give way to hyperrealistic detail at the extremities. The impression of pinching at the interstices of the sculpture, and particularly the neat tie-off that marks the nose, are triumphs of precision rendering. But of course, there is no direct indexical relation in this case, as there had been in the cast *Rabbit*. The sculpture is more like a portrait of the original, independently designed and then fabricated in stainless steel by a large crew at Carlson & Company, founded in 1971 and the largest and most proficient fabrication firm on the West Coast. Fittingly, the firm hired engineers from the Disney Corporation to get the job done. The mimesis here is all a staged effect, which only refers to the process of replication—there is no direct means used to scale up the original.

Koons only gradually came to this way of working. When making a stainless steel sculpture called *Kiepenkerl* in 1987, he had what proved to be a happy accident. The cast came out of its mold imperfectly, and there was no time or budget to start again. What at first was a crisis became a eureka moment (at least in the artist's telling). He reworked it freely, sculpting into the existing object until it looked like a perfect replica of the form. As Michelle Kuo puts it, he felt "a sudden liberation from fidelity, from having to adhere slavishly to an *ur*-object."[14]

With this shift, what had always been implicit in Koons's work— the felt inadequacy of the readymade, his seeming need to perfect it—now became a dominant theme. *Balloon Dog* both transcendently celebrates and willfully disregards its original; it has maximal figurability and zero fidelity. As in many of Koons's works, the "reading" of the original surface in *Balloon Dog* is already difficult, because it is

soft and yielding. Koons claims to want a hyperdetailed rendering, but his insistence on exactness is entirely and obviously fictive. If you were to actually and literally enlarge a cheap blow-up toy to this scale (ignoring for a moment the physical impossibility of doing so), it would distend and bloat into spherical forms, much as Hawkinson's *Balloon Self-Portrait #4* does. This is because the skin of a balloon stretches under pressure: the membrane is thicker toward pinched tie points, and thinner where it has been most stretched. (Inspection of an inflated balloon will confirm this; it is more transparent in the areas of greatest inflation.) Koons's *Balloon Dog* derives its iconic, dominating power partly by disregarding these issues of material specificity. Through a massive investment of labor—notably, the Sisyphean task of polishing of the surface—the work has become uniform, seamless, perfect in a way that we very rarely encounter in our everyday physical environment. What is actually a frictional fiction is presented as frictionless truth, a highly crafted image that presents itself as the view through an innocent eye.

Heavy Metal

A further work by Koons, *Play-Doh* (1994–2014), complicates this account of his work. This towering sculpture, fabricated in multiple aluminum sections, is based on a heap of Play-Doh fashioned by one of Koons's children. Initially, the sculpture seems to inhabit the same terrain as *Balloon Dog*: that of a hypertrophy based on a plaything. But there are important differences between the two works, which revolve precisely around its figurability (see fig. 3). Remarkable for its supreme difficulty of manufacture, the ten-foot-tall sculpture took twenty years to realize—Koons's son was an adult by the time it was finished—and was delivered to the Whitney just in time for the artist's retrospective. (Each colored element is a separate casting, all of which are joined together at the site of installation.) One thinks immediately of Urs Fischer's *Big Clay* works, and the artists even used the same primary material of cast aluminum. There are differences: Fischer purposefully retains the awkward imprints of the transformative process, while Koons's *Play-Doh* is again smoothed out through the application of paint—no fingerprints here. In this case, however, he has been slavishly precise in scaling up the model, perhaps suggesting that nothing could be more worthy of a monument than the casual play of his own child.

He and the team at Carlson employed a combination of analog and digital techniques to scale up the original, including the use of 3-D

scanning technology, which has become a common technique in his work in recent years. Unlike the rubbery puckers in *Balloon Dog*, the fissures in the surface of *Play-Doh* are exactly like those in the model, forcefully locating the work in reference to its original.[15] This literal fidelity is counterbalanced by an unstable figurability, in that the sculpture does not relate clearly to any one natural scale. *Play-Doh* actually could be an enormous pile of the eponymous play stuff, or it could be an enlargement from a pile one inch, ten inches, or three feet high.

Whatever one thinks of Koons, the fact that such a hilariously lumpen sculpture could float so gloriously free from its referent does ample testimony to his powers of fantasy. Perhaps the only sculpture in America that can compare to *Play-Doh* in its pretense of frictionless omnipotence is *Cloud Gate* (2004), a work by the British artist Anish Kapoor (b. 1954) located in Millennium Park in Chicago (fig. 4). The latter is not dissimilar in scale, and though inspired by a bead of mercury—a shape determined by surface tension, and therefore impossible to scale—it is without specific figurability (though Chicagoans' tendency to refer to it as "The Bean" perhaps betrays a longing for this quality, so traditional in public art). Like *Play-Doh*, it pretends to be

4
Anish Kapoor, *Cloud Gate*, 2004. Stainless steel, 394 × 787 × 504 in. (10 × 20.1 × 12.8 m). Millennium Park, Chicago, Illinois.

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an effortless perfection, as if birthed from Kapoor's mind fully formed, but it was actually grindingly hard to make. *Cloud Gate* was made by the Oakland-based company Performance Structures Inc. from 168 separate stainless steel plates, which had to be welded together on-site in Chicago and then hand-polished to a mirror finish.[16] The elimination of the joints, which erases evidence of the form's tectonic assembly, constituted a major part of the sculpture's whopping $23 million price tag, over twice the original budget. As for Koons's fabricator, Carlson & Company, it went bankrupt in 2010, prompting widespread speculation that the ambition of the artist was a contributing factor, though in fact the national recession is a more likely culprit.[17]

Koons and Kapoor are superstars within the artistic firmament, and there are few others who have the capital or organizational prowess to work at such enormous scale and cost. Yet the laboriously disguised techniques of scaling up that they employ are to be seen everywhere in the art world these days. The leveraging of the real estate market led to the bubble economy and subsequent crash of 2008, but despite failures like that of Carlson & Company, the leveraging of art through scale seems to be gathering steam. A museumgoer today can now see many objects blown up to giant size: Louise Bourgeois's spiders; enormous Chinese scholars' rocks in stainless steel by Zhan Wang; Katharina Fritsch's menagerie of brightly colored animals and everyday objects; giant furniture by Robert Therrien; representations of a single neuron made of 3,500 metal pipes by Roxy Paine; Marc Quinn's portrait of the pregnant limbless woman, Alison Lapper, for the Fourth Plinth in London's Trafalgar Square. As Caroline Soyez-Petithomme writes, "The XXL format has now become a norm for midcareer and established artists, [which] of course, obliterates any emancipation from architecture or the art market."[18]

Given the proliferation of large-scale sculpture, it seems imperative to establish a critical response. We propose that each of our three terms can be used in this way, providing a vocabulary that can then be mobilized in a broader assessment. We have now demonstrated that Koons's *Balloon Dog* and *Play-Doh* and Kapoor's *Cloud Gate* exemplify a desire to scale up, as if without consequence. Crucial here is their pretense to an impossible fidelity (in the case of Koons's *Balloon Dog*), and a correspondingly whimsical or escapist attitude to figurability. There is in these works a surface denial of frictional reality (the economic cost and craft labor requisite to their making), which is perhaps best undertood as a desire to amaze and confound. Koons and Kapoor, and other artists working in this Barnumesque mode, certainly

do not expect their audience to forget about the difficulties of making; rather, the seamless surfaces of their productions underline the artists' self-conscious desire to overcome that friction despite its costs. Rather like Hollywood filmmaking, which involves extraordinary expenditures of capital in order to make ever-more-astonishing effects, these artists leave their audience in a state of perplexed awe. This does not, of course, make these works "bad"—the fact that we have spent so much time analyzing them should suggest how seriously we take them as propositions about the powers and limits of art today. But just as surely as these impressive creations do not physically index a referent, they certainly do index indulgent wish fulfillment in contemporary art and its receptive public. In their approach to scale, these works perfectly manifest Guy Debord's famous lines: "The spectacle presents itself as something enormously positive, indisputable and inaccessible. It says nothing more than 'that which appears is good, that which is good appears.' The attitude that it demands in principle is passive acceptance, which in fact it already obtained by its manner of appearing without reply, by its monopoly of appearance."[19]

Koons's instinctive "smoothing out" of forms within the process of scaling up, and even Kapoor's magical capture of the entire Chicago skyline in the mirrored surface of *Cloud Gate*, seems to us indelibly linked to mass media culture's overwhelming propensity to airbrush and distort the real. As in Hollywood, or any number of other industries in which physical form is made seamless—new cars, Apple products, the bodies of athletes and fashion models—the labor that goes into the act of perfecting is rigorously effaced, making the forms (and by association, the absent labor that lies behind them) all the more mysterious and potent. This accounts for these works' great popularity and makes them valuable as registers of our cultural moment.

But there are also other ways to scale up.

Thinking Big

We have referred, in our discussion of Hawkinson and Koons, to the metaphor of inflation. But there are other ways that objects get bigger. One of these is metastasis, the uncontrolled proliferation of a replicating cell, as in the spread of a disease through the body. That process is figured in a remarkable work by the artist duo caraballo-farman (Leonor Caraballo [1971–2015] and Abou Farman [b. 1966]) called *Object Breast Cancer* (2011). Originally a response to Caraballo's own experience as a cancer patient, it is a bronze sculpture of a tumor realized with the aid of an MRI machine (fig. 5). After scanning the tumor in her

5
caraballo-farman, *Extractions #1* (from the *Object Breast Cancer* series), 2011. Bronze (from MRI & 3-D print), 10 × 14 × 7 in. (25.4 × 35.6 × 17.8 cm).

body, the duo used a 3-D printer to render the form in plastic and then had that prototype cast by a metal foundry. The result is not all that big, as sculptures go, but it is of course many times larger than its original (a much greater degree of magnification, even, than Koons's *Play-Doh*). In this way, caraballo-farman's project imbued an unseen, terrifying, and malignant disease with a degree of the palpable. For them, it was a way of gaining psychological control over a life-threatening situation. They had even made pendants using the same process. Caraballo tragically died in 2015, but wore one of the pendants around her neck as she battled the disease: "For me it's a reminder that I'm here and this thing is out of my body," she said, "and I feel more powerful than it."[20]

While caraballo-farman employed an ambitious set of techniques—digital scanning (through MRI), modeling, plaster mold making, wax casting, and, ultimately, bronze casting—the final objects divulged none of this process. Here the notion of fidelity to the digital image was imperative. Because of the incredibly personal nature of these forms, it would seem disingenuous to alter their geometry in any way, however unrecognizable that alteration might be. Here we have an ingenious inversion of the formula employed by Koons. Rather than

something banal and familiar, like a blow-up toy or a lump of Play-Doh, caraballo-farman showed us something we could not normally see at all: figurability was being employed for epistemological ends. The larger-than-life object offered a sense of the knowable while also inviting exploration through its uneasy fit at an unnatural scale.

caraballo-farman pointed to the way that fidelity and figurability (both ambiguous and certain), rather than aiding in the creation of gargantuan escapist objects, can be used to provide real insight into the conditions of our lives. Their approach is familiar from the sciences, where scaling up and scaling down (along with various types of schematic abstraction) are routinely employed to clarify complex systems: blood vessels blown up and seen in cross section, molecules rendered as multicolored and conjoined spheres, mountain ranges and weather patterns turned into diagrams. These are the methods that Charles and Ray Eames employed in *Powers of Ten* (and if they had had digital tools at their disposal, you can be sure they would have used them). The difference, of course, is that caraballo-farman had personalized the technique. Each iteration of *Object Breast Cancer* was specific—not just a cancer cell, but some particular person's cancer cell. Their gesture made us realize how detached from emotional experience the standard-issue scientific model is, even as it borrows from that object type's explanatory power.

The use of scale shift in this socially incisive way is not all that common in contemporary art, but examples can certainly be found. One such is Charles Ray (b. 1953; no relation to the Eameses), whose *Firetruck* (1993) is an enlargement of a toy to the scale of an actual vehicle. The work prompted double takes when it was "parked" in front of the Whitney for the 1993 Biennial. A related work, *Fall '91* (1992), is an eight-foot-tall woman wearing a power suit; the title is of course a fashion reference (fig. 6). Ray insists that shifts in scale are never the point of his work—rather, like caraballo-farman's *Object Breast Cancer*, they are triggers to an emotional response. In a 1995 interview, he made the point as follows:

> *Scale change is subservient to the Freudian big lady/ mother equation.* Fall '91 *doesn't question that. It simply embraces it and rides its wave. . . . The world is only named, but it doesn't make any difference, because the objects have a life of their own, and a direction of their own, and we're really not in control. And Oldenburg's similar. That soft typewriter, how do you explain it over the phone to*

6
Charles Ray with *Fall '91*, 1992. Mixed media, 96 × 26 × 36 in. (244 × 66 × 91 cm).

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someone without saying, "typewriter"? Yet it has nothing
to do with the object named. I'm not so interested in the
aspect of monumentality.[21]

Here Ray points to an important aspect of his work with scale:
he never tries to impress through sheer size or engineering prowess. His
work is not seamless and makes no attempt at the jaw-dropping formal
power of Koons's and Kapoor's works. (As one of the anonymous peer
reviewers of this essay neatly put it, he is "a permanent resident of the
uncanny valley.") That the most widely circulated image of *Fall '91*
features an apparently awestruck Ray, gazing up at his creation, under-
lines his tendency to send up the factor of scale as a technique of
dominance. This deadpan strategy is grounded in the specifics of pro-
duction. There is always an intended awkwardness to Ray's acts of
magnification and little attempt at high fidelity.[22] *Firetruck* is no more
precise a rendering of a toy than the mannequin-like *Fall '91* is of a
woman; it lacks the molding lines that a plastic toy would have (features
that Koons, in a recent work scaling up a little gorilla figurine, has
rendered in hand-carved granite). It is not overwhelmingly impressive,
either in its fidelity or its frictional fabrication. Ray asks us not to
marvel at the feat of enlargement but rather to take his interruptive
objects on their own slightly unsettling terms.

This accounts, perhaps, for their nondidactic nature. *Firetruck*
did effectively rupture the "official" atmosphere of the New York City
streets, but one would be hard pressed to locate a specific politics in
the piece (in this respect it contrasted with much of the work in the 1993
Biennial, which was famously contentious). As for *Fall '91*, it is hard
to read as a statement of either pro- or antifeminism. It could be inter-
preted as a droll invitation to consider the very terms on which women's
autonomy was achieved: the transformation of the self and the hyper-
trophied objectification that might result. But really, neither work
comments on a particular social context so much as it creates a new one.
Ray's manner of scaling up is thought-provoking and culturally intro-
spective, wry and observant rather than swaggeringly dominating.

This brings us to a final point regarding scaling up: its intrinsically
public character. Even in the context of an art gallery, though more
so in the open air, big art readily establishes itself as an anchor of social
relations. It inexorably gathers a community around it. It is a simple
and obvious point to make, but nonetheless an important one. Small
artworks are meant to be seen by one person, or at most a few, at a time.
But big art immediately becomes a common point of reference for a

crowd, which must organize itself physically and psychologically around the work. As anyone who has shared in the response to Kapoor's and Koons's works will know, the reaction is distinctly noncritical—viewers of the *Cloud Gate* in Chicago or *Play-Doh* at the Whitney seem concerned mainly to photograph themselves, posing cheerfully in front of the awesome spectacle. Ray's *Firetruck*, though it preceded the introduction of digital photography, doubtless encouraged a similar reaction. Such involvement, though it may seem superficial, has deep implications, pointing to the complicity of audiences with big art, their perhaps unwitting tendency to assume the role of worshippers before an idol. One thinks inevitably of Walter Benjamin's essay on the reproducibility of the work of art; there is here a reprise of archaic behaviors, inspired by the sort of auratic power that he set himself so firmly against.

Insofar as Ray's *Firetruck* directly addressed its civic context through a double-take action—sitting much in the position that a real firetruck might, it employed figurability to destabilizing effect—it did go some way to attacking the easy digestion of art, creating a momentary tear in the social fabric. A more recent, and much more emphatic, gesture in this direction is Kara Walker's (b. 1969) *A Subtlety, or the Marvelous Sugar Baby* (2014), which is ingeniously polyvalent in its figurability. Because of its sugary surface, this piece asks to be read as an enormous replica of a dinner subtlety, a sugar confection of the elite in the Middle Ages. And yet the profile of a sphinx establishes this monstrosity at exactly its own scale (or perhaps a bit smaller given the immensity of the original Great Sphinx of Giza, the largest monolithic sculpture in the world).

The production of this monumental object seems beyond the initial concept of the artist, but certainly not outside of public knowledge. Because of its temporary nature and incredible size, the construction of the sculpture depended more on technology of the provisional as perfected by Disney and Las Vegas than on the translation of architectural strategies of structure and surface. In a contrary gesture to the structural armature of the Statue of Liberty, Oldenburg's giant hard sculptures, or even Hawkinson's inflated self-portrait, here the entire form is solid and self-supporting. Solid, oversized foam bricks (each $4' \times 8' \times 4'$) are tightly stacked and sculpted (both digitally and manually).

In keeping with the generally transparent approach of its sponsor, Creative Time, the process of making Walker's project has been shared with the public through time-lapse video—in our terms, the friction involved in creating the work has been unveiled for consumption. It is

likely, indeed, that more people experienced the work through this medium than in person. What is interesting, too, is the way that Walker managed to sustain a critical figurability throughout its structure: the project maintains a poetic connection to a material process at a smaller scale, that of stacking sugar cubes, here metaphorically restaged with giant blocks of foam. One also might think of transported blocks from a quarry—and this reference to the antiquated logic of masonry alludes to monumental Egyptian construction techniques (the Great Sphinx was reductively carved from an existing stone ridge, but the reference to the Pyramids is obviously intentional). Walker acknowledges the expenditure of human effort involved in her sculpture's own creation in contrast to the invisible and exploited workers involved in the sugar industry. Historically, these were often slave laborers, as were the people who made the Sphinx and the Pyramids—hence the artist's decision to dedicate *A Subtlety* as "an Homage to the unpaid and overworked Artisans."[23]

In a very contemporary move, Walker and her colleagues at Creative Time actively encouraged the taking of "selfie" photographs at the site. Visitors were doing exactly the same thing as the cheerful crowds at Koons's retrospective across town at the Whitney; in both cases, the audience has co-opted itself into the artist's project. But one can argue that the political valence of these images is quite different—as different as the political sympathies and objectives of the artists themselves. In the case of the Koons retrospective, an art show was simply recast in the role of a background set. The innumerable thumbs-up that visitors offered in front of his sculptures had no more weight than their digital equivalents on social media sites, and the artist (and the Whitney itself) maintained an equal and opposite stance, offering no comment on the widespread practice beyond its tacit toleration.

Walker, by contrast, was quite self-aware about the processes of self-identification that occur in front of and around big art and considered this to be part of the work's intended effect. She anticipated the revealing range of responses that her sphinx, with its explicit racial and gendered content, might prompt: "I put a giant 10-foot vagina in the world and people respond to giant 10-foot vaginas in the way that they do. . . . It's not unexpected. Human behavior is so mucky and violent and messed-up and inappropriate. And I think my work draws on that. It comes from there. It comes from responding to situations like that, and it pulls it out of an audience. I've got a lot of video footage of that [behavior]. I was spying."[24] In other words, *A Subtlety* is intended as a moral challenge to viewers. Through its massive scale and

in combination with ubiquitous digital technology, the work invites them to position themselves on a political spectrum.

A final example takes us one step further along this continuum, showing how the technique of scaling up can be employed as a form of direct political engagement. It also takes us back to the topic of the inflatable. Artúr Van Balen (b. 1983) has been making giant blow-up objects in collaborative groups for several years, first with the Eclectic Electric Collective and more recently with Tools for Action. They are meant to be used in the context of protest. While they have taken many forms—a giant saw, representing budget cuts, or a hammer, representing the desire to smash power structure—the most celebrated of these works are the simplest, a set of giant silver "cobblestones" that were recently featured in the Victoria and Albert Museum exhibition *Disobedient Objects* (2014). The inflatables have been deployed in political actions with delightfully comic results. Van Balen explains:

> *We call them a secret weapon of tactical frivolity: they transform a protest in a highly interactive and playful event, make it hard to control and all at the same time, they can physically protect people from a police baton. It is especially interesting when you can create decision dilemmas with the objects and your opponent needs to decide what to do. In case of the cobblestones, the riot police at the May Day demonstration in Berlin decided to get rid of the inflatable by piercing it. They had problems with the slippery surface of the material and the scene this created was hilarious: everyone saw how a highly armed squad of riot cops tried to destroy a balloon. In Spain, protesters documented how two policemen arrested an inflatable and squeezed the bulky thing in a van.*[25]

For Van Balen, it is particularly important that these "blow up" objects (one thinks of the Antonioni film) be easy to make, partly for reasons of economy and partly because their pre-protest manufacture by a group can be an important opportunity to build solidarity. They are, of course, very-low-fidelity objects, but the use of a cursory, symbolic figurability is key. While they resemble abstract minimalist sculptures—Tony Smith's *Die*, for example—there is nonetheless a clear reference to paving stones being hurled at police in such events as the Paris riots of 1968. By reminding protestors and police alike

of this precedent, while avoiding comparably violent and destructive consequences, the use of inflatables defuses moments of conflict, introducing humor and play to a situation of stark opposition.

Conclusion: Scaling Down

In this essay, we have seen how different strategies of scaling up yield very different results, both formally and conceptually. Of course not all the effects we have described are the direct outcome of decisions about fabrication; Van Balen's cobblestones and the Macy's Thanksgiving Day Parade version of Koons's *Rabbit*, for example, were made in a similar fashion but occupy nearly diametrically opposed ideological positions. Nonetheless, we want to insist on

close observation of the means by which scale shift is achieved as a matter for critical investigation.

The same is true of scaling down. Though they are quite similar to methods of enlargement, we have not focused on processes of reduction in this essay, given our concern with the implications of bigness in the contemporary art arena. But here, in conclusion, it may be worth mentioning just two works that employ downsizing in an illuminating fashion. Not unlike the approximate craftsmanship of Van Balen's inflatables, the relative modesty of making smaller perhaps leaves room for insight in a way that the gigantic power-brokered art of today does not.

Our first example of downward scale shift could hardly be described as a miniature: Simon Starling's (b. 1967) *Long Ton* (2009), which consists of two enormous chunks of marble hanging from a ceiling-mounted rig (fig. 7). One piece of stone is imported from China; it still bears the cutting marks from the quarry there, and weighs one ton exactly. The other block is made from Italian Carrara marble, a prized and expensive sculptural material. Though the Carrara block is only one-quarter the size and one-quarter the weight of the Chinese block, the two are equivalent in monetary value (even accounting for the shipping). At first glance, it looks like the smaller block also bears the marks of its quarrying, until one notices that these marks are identical to those on the larger one. Starling had the Chinese marble digitally scanned, and then cut the Carrara marble with the aid of a digitally guided carving tool so that it exactly matches the Chinese marble, albeit at smaller scale.

What is the point of this complex exercise? *Long Ton* is, first and foremost, a materialization of global economic imbalance. The two masses, held in a state of physical equilibrium in the installation, are also equivalent in value even though they are drastically out of scale with one another. One thinks naturally of Carl Andre's (b. 1935) series of *Equivalents* (1966 and later) in which an equal number of mass-produced firebricks are arranged in various configurations. In Andre's case, there is a thorough insistence on exchangeability. Any brick could be swapped for another within each sculpture, each work in the series is equivalent to the others, and the bricks can be discarded entirely and the piece reprised later with identical bricks. Andre was exploiting the sameness of industrially fabricated units and creating a sculptural idiom that internalized that logic of infinite exchange.

Starling's work, through the act of reduction, questions this logic and the larger capitalist system that it underpins. Beginning with its

riddling title (how can a ton, a measure of weight, be "long"?), the work juxtaposes supposed equality with drastic disparity. Even the most basic fact about the two blocks, their differing weights, is overcome through the use of pulleys so that they precisely counterbalance one another. Their equal economic value (itself a factor of the weight of the stones) is made to seem absurd, given the difference in size. And as to the identical profile and surface markings, they seem to undercut (pun intended) the very act of imbuing material with a form. While walking around underneath *Long Ton*, thoughts of other digitally powered monumental works of art leap to mind, and by comparison, they seem willfully isolated from broader conditions of production. Starling evokes a world out of balance in which one region's labor, and very geology, is held superior to another.

Long Ton's power lies in a faithful reproduction of profile and texture, expertly traced through digital scanning and digital sculpting, but the project tracks other strains of fidelity as well; an acute under-standing of global economies anchors the project to an understanding of materiality that seems mutable. The size discrepancy between the two pieces, coupled with their seeming similarity in weight, at first

8
Maya Lin, *106° East Meridian*, 2013. Vermont Danby marble, 9 × 168 ¼ × 5 ½ in. (22.9 × 427.4 × 14 cm). This is one of two works that make up *Longitude New York City*; the other is *74° West Meridian*.

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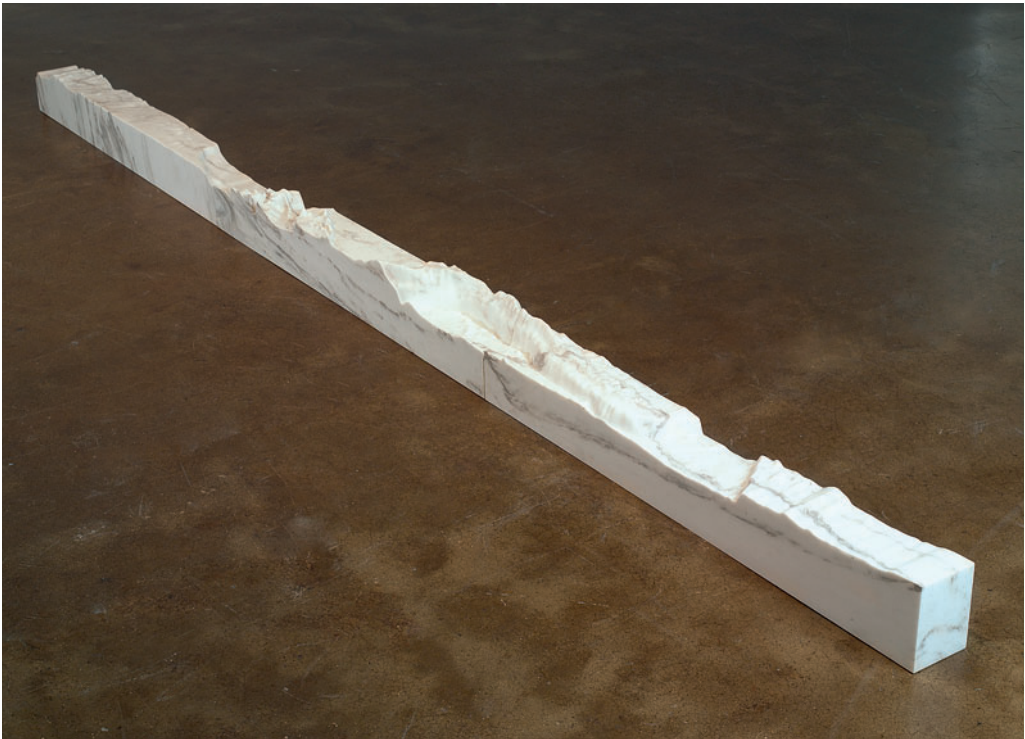
leads the viewer to imagine two differing densities of marble, dislodging our understanding of figurability; as the same form seems to hover between two different "natural" sizes, it is clear that neither can be "true." There is the virtuosity of digital scanning and fabrication, which remains silent in the interpretation of the piece, but any friction of translation or production is here visually erased in favor of a larger understanding of friction of economy, or production in terms of global economy rather than physical craft.

Of all the acts of miniaturization in contemporary art, perhaps none is as extreme as Maya Lin's (b. 1959) *Longitude* NYC (2013). Fourteen feet long and only a few inches high, the work is a diagram of the meridian at 74 degrees longitude, which passes right through Manhattan (fig. 8). The sculpture's top surface depicts, in miniature, the nuanced rise and fall of the earth's crust, while its thickness suggests the depth of rock beneath. It is made from an appropriately subterranean material: gray-veined marble sourced in Danby, Vermont— the largest underground quarry in the world. (It is interesting to note Starling's and Lin's use of white marble, that most traditional of sculptural materials, in contrast to the shining industrial metals typically favored by Koons and Kapoor. Respect for history can be a telling sign of artistic self-awareness.) The stone, which might otherwise have found its way into a kitchen countertop or ornamental frieze, is beautifully carved on the basis of innumerable data points tracking the earth's topology. Lin has noted the importance of the work's artisanal character: "It's a process that balances scientific data with the handmade. If the end form looks only like the idea of the information, then it fails."[26]

Made in the immediate aftermath of Hurricane Sandy, which devastated New York City in October 2012, and motivated by Lin's environmentalism, the piece is an effort to direct our attention to the world that lies beneath our feet. As a concluding example in this essay, it reminds us once again that whenever artists enact a scale shift, they are not only directing our attention to the absent original but also bringing a new fact into the world. Any rescaled object, gigantic or small, must be considered not only as a feat of engineering but also in its own right, independently of its relational status to the original. In *Longitude* NYC, the abstraction of the section cut is so extreme that we can never imagine what it would look like at full scale; like caraballo-farman's *Object Breast Cancer*, Lin's sculpture is an example of figurability used to enlighten. We cannot track its fidelity, or even attach it to a recognizable referent, yet it is grounded in reality. It reveals a profile that is existent but outside the parameters of our perception.

In this respect, the work inverts the strategy of Urs Fischer's *Big Clay #3* and Jeff Koons's *Play-Doh*, both of which take something unremarkable and render it astounding. Lin, by contrast, takes something beyond our ken and presents it matter-of-factly, palpably. Despite the vast scale of its referent, the work is ultimately a gesture of supreme deference. The *rückenfigur* of Romantic painting is a person seen from behind, staring at the infinite in wonder. Many artists seem to want to put their viewers in exactly that position, presenting them with an overpowering, sublime work. This is the logic of spectacle. But Lin's delicate line of stone travels the other way.

Throughout this essay, we have tried to show how our "three *f*'s" can be factored into an assessment of art and its social effects. There is no simple formula here. It would be wrong to insist (as modernist theorists used to insist on truth to materials, or optical integrity) that transparency with regard to friction, high fidelity to an original, and legible figurability are inherently superior or ethical. We have not written this essay with the intention of setting rules. Instead, we have tried to show that friction, fidelity, and figurability can be used as part of a larger critical array to help unlock the subtle valences of works. Thinking through these terms helps explain why, standing in front of different, equally huge artworks, viewers may feel overpowered and small, amused and distracted, or motivated and enlightened.

There is, however, one principle we do wish to uphold—one that brings us right back to *Powers of Ten*. We happen to be the size that we are, and we do our best to organize the world around us to fit. But there is an arbitrariness to that instinct. Charles and Ray Eames were humanists through and through, but their film demonstrates clearly that our own bodily scale is no more "natural" than any other. Since their time, the insights provided by many fields of study, from digital manufacturing technology to environmentalism, have shown the limitations and even the dangers of using ourselves as the measure of all things. As we become ever more technically proficient at scaling up, we may also be gaining new psychological tools that will permit us to distance ourselves from ourselves, to see things from a more holistic perspective. That is a difficult idea to hold on to, and one that happens to work in opposition to the sturdiest of conceptions about art. Classical sculpture, Renaissance perspective, even Minimalist art: all are premised on a human-centric sensibility of scale. As our essay has shown, there have been many departures from this standard, and they are multiplying all the time. Even the biggest sculpture is a tiny speck in the great scheme of things, and the smallest artwork we can see with the naked

eye is, from another point of view, absolutely enormous. While art is usually considered according to its qualities in three-dimensional space and, increasingly, in time, perhaps scale might be an equally important consideration—a fifth dimension, as it were. Every time we travel along the line of scale, sliding up and down in relation to possible frameworks of reference, we more completely understand the place that we, and the art we make, take up in the world.

1   Most of the detail in this account is pro-
vided on Kunstgiesserei's website (http://www.swiss-
artfoundry.com/artistsprojects/urs-fischer/, accessed
June 7, 2014); we are indebted to Michelle Kuo, editor
of *Artforum*, for the detail about the rough surface.

2   Roberta Smith, "Exploration of Space," *New York
Times*, Oct. 29, 2009.

3   For a more extended argument on this point,
see Glenn Adamson and Julia Bryan-Wilson, *Art in the
Making* (London: Thames and Hudson, 2016).

4   Here we enlarge on the arguments set forth
by John Roberts in *The Intangibilities of Form: Skill
and Deskilling in Art After the Readymade* (London:
Verso, 2007).

5   J. B. S. Haldane, "On Being the Right Size,"
Harper's Magazine, Mar. 1926.

6   *Vik Muniz: Pictures of Anything* (Tel Aviv:
Tel Aviv Museum of Art, 2014). See also Zach Sokol,
"[Exclusive Video] Creating Sand Castles with a
Single Grain of Sand," Mar. 27, 2014, accessed Sept. 13,
2014, http://thecreatorsproject.vice.com/blog/
creating-sand-castles-with-a-single-grain-of-sand.

7   Ron Labaco, ed., *Out of Hand: Materializing
the Post-Digital* (New York: Museum of Arts and
Design, 2013).

8   The situation is comparable to Minimalist
artists' unacknowledged dependence on companies
like Dupont in the late 1960s, as discussed by Julia
Bryan-Wilson in *Art Workers: Radical Practice in the
Vietnam War Era* (Berkeley: University of California
Press, 2009).

9   Darcy Grimaldo Grigsby, "Geometry/Labor =
Volume/Mass?," *October* 106 (Fall 2003): 18.

10   Rem Koolhaas, "Bigness, or the Problem of Large,"
in *S M L XL* (New York: Monacelli Press, 1998), 494–516.

11   "Jeff Koons Talks about Balloon Dog," Jan. 3,
2014, accessed Oct. 1, 2015, http://4umf.com/jeff-koons-
talks-balloon-dog/.

12   See Daniel Belasco, *Dick Polich: Transforming
Metal into Art* (New Paltz, NY: Samuel Dorsky
Museum of Art, 2014).

13   Scott Rothkopf, "No Limits," in *Jeff Koons:
A Retrospective*, ed. Rothkopf (New York: Whitney
Museum of American Art, 2014), 28.

14   Michelle Kuo, "One of a Kind," in Rothkopf,
Jeff Koons, 247.

15   Jori Finkel, "When Artists Think Big," *New York
Times*, Apr. 27. 2008.

16   Kate Bachman, "Metal Fabricating in a New
Millennium," *The Fabricator*, May 9, 2006, accessed
Sept. 13, 2014, http://www.thefabricator.com/article/
arcwelding/metal-fabricating-in-a-new-millennium;
Performance Structures Inc., "Cloud Gate," accessed
Sept. 13, 2014, http://www.performancestructures.
com/cloud_gate.html.

17   Lindsay Pollock, "Koons 'Dog' Fabricator Carlson
Shuts as Recession Hits Big Art," *Bloomberg News*, Apr.
28, 2010.

18   Caroline Soyez-Petithomme, "Paris Thinks Big, but
Small Is Also Beautiful," *Art Review* 60 (Oct. 2012): 99.

19   Guy Debord, *Society of the Spectacle* (1967;
New York: Zone Books, 1994), 12.

20   Eric Molinsky, "Object Breast Cancer," *Studio 360*,
Aug. 3, 2012, accessed Sept. 13, 2014, http://www.studio
360.org/story/227070-object-breast-cancer/. See also
Ron Labaco, ed., *Out of Hand: Materializing the Post-
Digital* (New York: Museum of Arts and Design, 2013).

21   Paul Dickerson, "Charles Ray," *Bomb*, Jan. 1, 1995.

22   Charles Ray has more recently completed projects
at a scale of one-to-one in which fidelity is more at
issue. These include *Unpainted Sculpture* (1997), a com-
plex multipart fiberglass cast of a wrecked car; *Tractor*
(2005), a copy in aluminum; and *Hinoki* (2007), in which
the artist commissioned a group of Japanese carvers
to make a handmade copy of a felled tree. In all these
cases, the failure of the work to grasp the full sensual
qualities of the original results in a ghostly effect.

23   Artist's dedication, 2014, accessed Nov. 11, 2015,
http://creativetime.org/projects/karawalker/.

24   Kara Walker, interview by Caroline Miranda, *Los
Angeles Times*, Oct. 13, 2014, http://www.latimes.com/
entertainment/arts/miranda/la-et-cam-kara-walker-on-

her-sugar-sphinx-the-piece-she-saved-video-shes-making-20141013-column.html#page=1. *See* also Alison Herman, "Kara Walker Knew That People Would Take Dumb Selfies with 'A Subtlety,' and That Shouldn't Surprise Us," *Flavorwire*, Oct. 14, 2014, http://flavorwire.com/482585/kara-walker-knew-people-would-take-dumb-selfies-with-a-subtlety-and-that-shouldnt-surprise-us.

25   Artúr Van Balen, interview by Steffi Duarte, July 3, 2014, Victoria and Albert Museum, acessed Oct. 1, 2015, http://www.vam.ac.uk/blog/disobedient-objects/tools-for-action-interview-with-artur-van-balen. *See* also Catherine Flood and Gavin Grindon, eds., *Disobedient Objects* (London: Victoria and Albert Museum, 2014).

26   Press release for *Here and There*, Pace Gallery, 2013.