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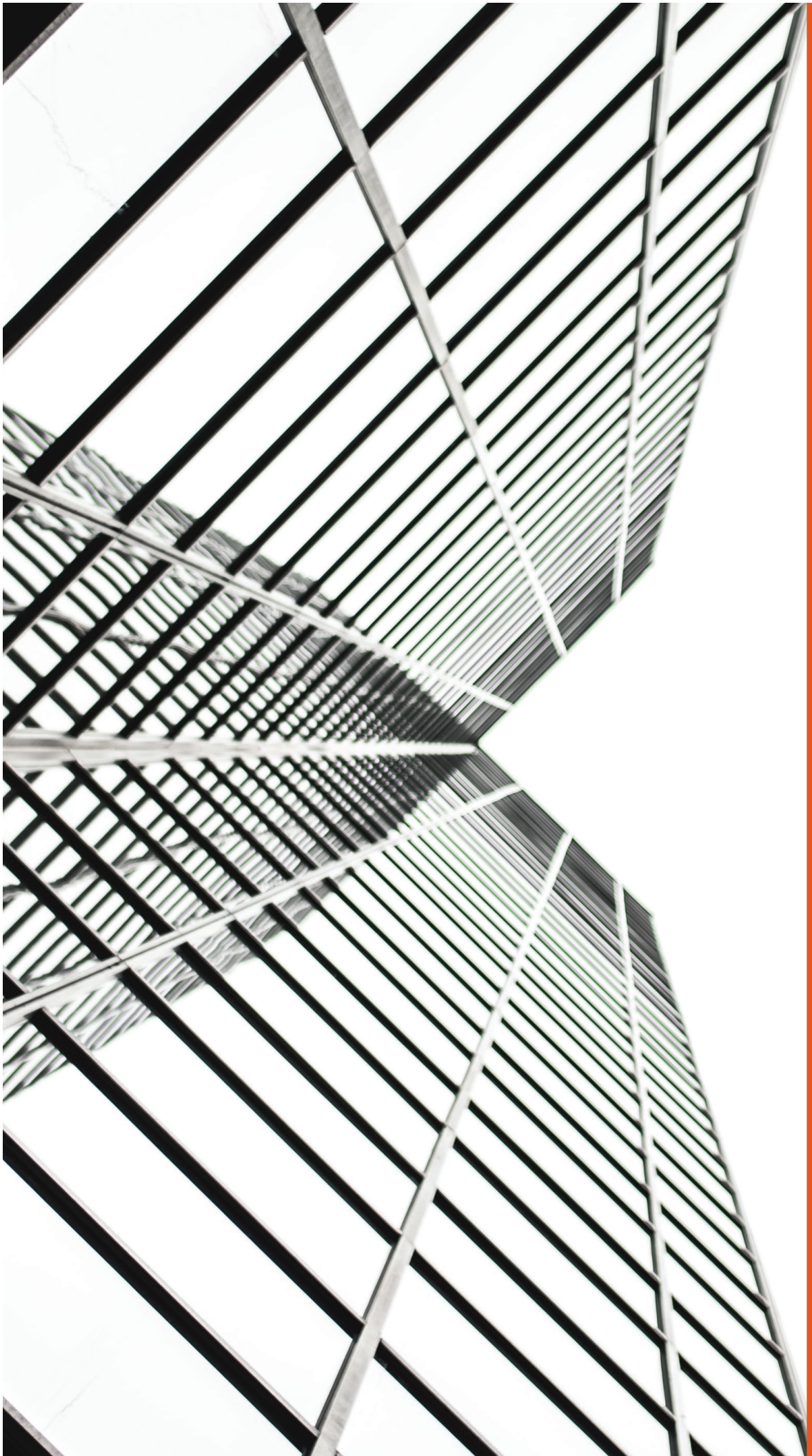**Author**

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Outside of Architecture:
Between Mediating and Navigating the Air

Katarzyna Balug

Air is the physical connection between us and our environment, transmitting our sense experience of light, heat, sound, taste, smell and pressure. But its very transparency prevents us from observing its continuous transformations. Atmosfields and pneumatic environments aim to reveal the aesthetic of air, both in the natural states which make up the atmosphere and by using thin membranes to manifest their motions and forces, in order to extend and change our direct experience of air and our relation to our atmospheric environment.

– Graham Stevens[1]

Reveal, make manifest, extend, and relate: English artist Graham Stevens was uniquely articulate in capturing, in words and structures, the capacity of the inflatable form to condition the human's relationship with her environment. Throughout 1960s Western Europe and the United States, young architects and artists like Stevens adopted the materials and aesthetics of the lunar Space Race to create immersive air-filled environments especially attuned to Earth. However, there was a significant difference in the operating logics of space structures and the Earth-bound forms they informed. While the pursuit of spaceflight had, since the mid-nineteenth century, emphasized the keeping out of the environment and the production of an artificial, fully controlled and enclosed atmosphere, inflatable architectures invited the outside in. These forms continually registered and mediated the relationship

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[1] Graham Stevens, "Pneumatics and Atmospheres," *Architectural Digest*, no. 3 (1972): 166.

between circulating air and the plastic membrane, which together formed a structure without rigidity, and the body that occupied the resulting space.

Such mediating features suggest that 1960s inflatable forms may have had an earlier muse in an invention from the height of European Enlightenment, before the modern narratives of environmental control transformed the episteme guiding our view of nature. The momentous 1783 invention of the balloon as flying machine, by both hot air and hydrogen, captured public imagination across Europe and the US as it at last opened the domain of the heavens to mankind. Once aloft, however, the balloon was at the mercy of wind, with limited control by the aeronaut. As the nineteenth century wore on, it was due to this responsiveness to rather than navigability in the air that it was gradually sidelined in aeronautic pursuits. However, this same feature offers a key to understanding the modern inflatable form. Like its forerunner, the 1960s inflatable was enormously popular when it first appeared, but was soon overlooked within its discipline: architectural scholarship.

This paper unpacks the changing logics of flight, from the hot air balloon to the 1969 moon landing, which mirror the larger transition to narratives of control during the modern industrial era. Then, it explores a blind spot in architectural historiography that left inflatable forms out of architectural scholarship since the 1980s, despite their being prominent in the decade before. Finally, the project deploys recent insights from media studies, a discipline that evolved from critical theory to address communications media and technologies in the 1960s, and more recently focuses on the materiality of such media, to trouble architecture's disciplinary limits and to demonstrate how the logics of the flying balloon illuminate the inflatable anew. Along the way, the work of artists and architects like Graham Stevens, whose texts and structures deploy scientific principles to reveal and embody a human entanglement with elemental forces, grounds the exercise.

Rupture 1: Ascension to the Heavens

The late-eighteenth century invention of balloon flight seamlessly inserts into an Enlightenment narrative of hunger for curiosities and discovery. The balloon, facilitated by recent findings related to air and hydrogen by the modern science of chemistry, was a timely vehicle to satisfy desires for ever-expanding vistas and new experiences. Until the balloon, those vistas remained effectively out of human reach. Visionary French architect Etienne-Louis Boullée created a set of drawings for an imaginary memorial to Sir Isaac Newton in 1784. One of the sectional drawings of the enormous, spherical Cenotaph for Newton captures the reverence for cosmic forces and awareness of the human's limited capacities in the world. It depicts the cosmos inside a dome where the viewing platform holding Newton's sarcophagus is limited to the bottom "ground;" the middle of the sphere is empty, untouchable.

However, the balloon had arrived just a year earlier, as science, an increasingly popular affair, was untethering from religion, and as a public sphere independent of the nobility gained influence.[2] The early balloon ascents were enormous public spectacles, often attended by over one-hundred thousand citizens of all classes and including the king and his court.
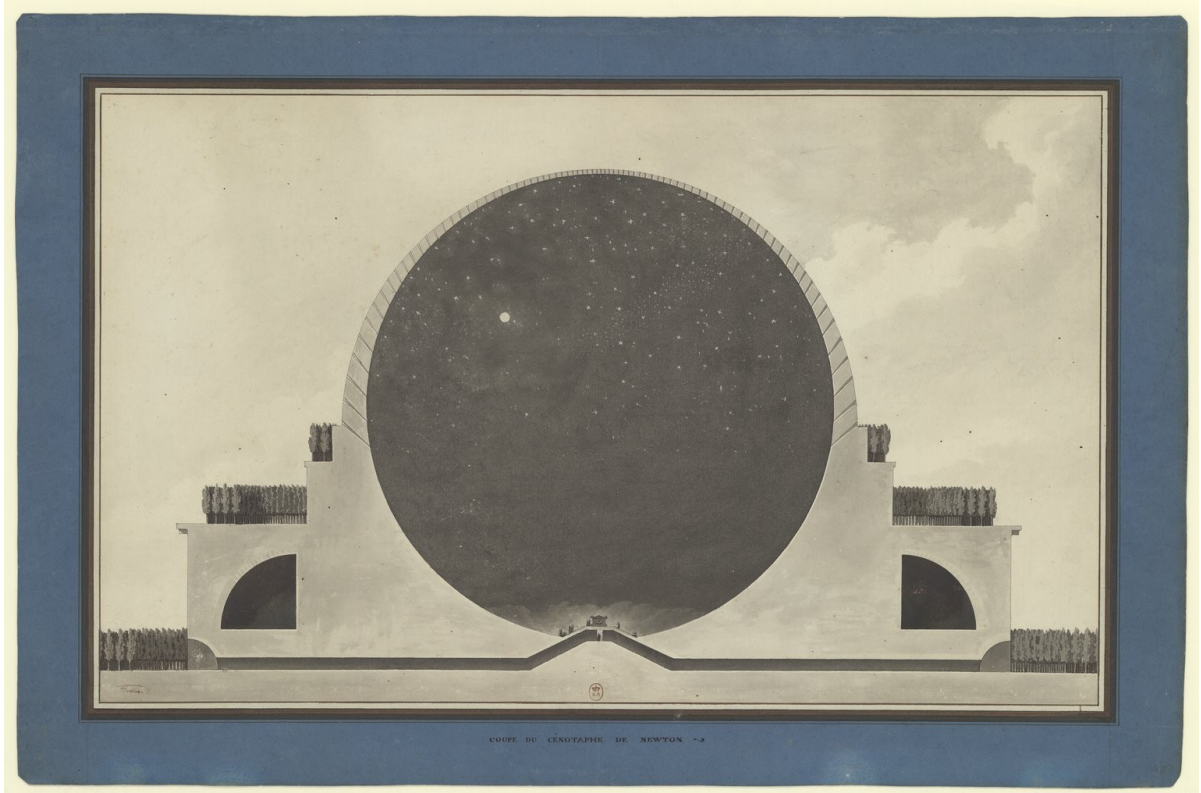
Figure 1. Etienne-Louis Boullée, *Coupe du Cénotaphe de Newton*, 1784, drawing. Image source: BnF ou Bibliothèque nationale de France.

Even as humans delighted in their newfound capacity to view the world from above, the question of control in the air arose in parallel with the balloon. The desire for navigability grew stronger in subsequent decades, and the balloon's dance with the air became technologically retrograde by the mid-nineteenth century. Tiberius Cavallo was an Italian-born Fellow of the Royal Academy in London, a natural philosopher and physicist who had been studying the physical properties of the gases that comprise air since before the air balloon's invention. His 1785 treatise, *The History and Practice of Aerostation,* examined both the philosophical implications and scientific possibilities of the balloon, and refused to accept as a

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[2] Jürgen Habermas, *The Structural Transformation of the Public Sphere: An Inquiry into a Category of Bourgeois Society,* Studies in Contemporary German Social Thought (Cambridge, Mass: MIT Press, 1989).

shortcoming the balloon's most damning critique: that these "bags full of wind" could not be guided against the wind.[3] Cavallo wrote:

> Ignorance, curiosity, and often the supercilious wisdom of the splenetic, ask whether it is possible to bring this discovery to be of any use?... endeavoring to depreciate them still farther by the ridiculous idea of emptiness, which has been often allegorically expressed by the words aerial, full of air, empty balls, and bags full of wind.... The principal objection started against aerostation is, that those machines cannot be guided against the wind, or in every direction at pleasure; and the enemies of innovations would set aside even the idea of air-balloons, because, two years after their discovery, the subject has not been so far improved as to steer them in any direction whatsoever.[4]

Cavallo recognized that the balloon's speed of 40-50 mph would revolutionize travel, but he was especially interested in its vertical capacity, for studying the 'upper air' and expanding the understanding of meteorology and the nature of weather. By achieving altitudes of over two miles, he was confident that man could rise high enough with this machine to see his impact on the planet for the first time, and discover vast tracts of earth still unknown. In short, his retort to critics was that the full potential of flight had not yet been remotely explored, and he encouraged readers to continue experimentation with what the new device could offer.

Other uses envisioned for balloons included military deployments. Benjamin Franklin, who witnessed the first hydrogen balloon flight as U.S. ambassador to France, imagined the possibility of aerial warfare. Indeed, an aerial battalion, the French Aerostatic Corps, was briefly implemented over a decade later by Napoleon's army during the French Revolution.[5] However, as Cavallo had correctly anticipated, an intensifying aspiration for environmental control would ultimately be the grounds for rejecting the balloon, a craft that carries a human passenger in open relation with the environment, for the practical applications of flight.

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[3] Tiberius Cavallo, *The History and Practice of Aerostation* (London: Printed for the author and sold by C. Dilly ..., P. Elmsly ..., and J. Stockdale, 1785).

[4] Ibid., 190-1.

[5] Richard Holmes, *Falling Upwards: How We Took to the Air*, 1st United States ed. (New York: Pantheon Books, 2013), 10.
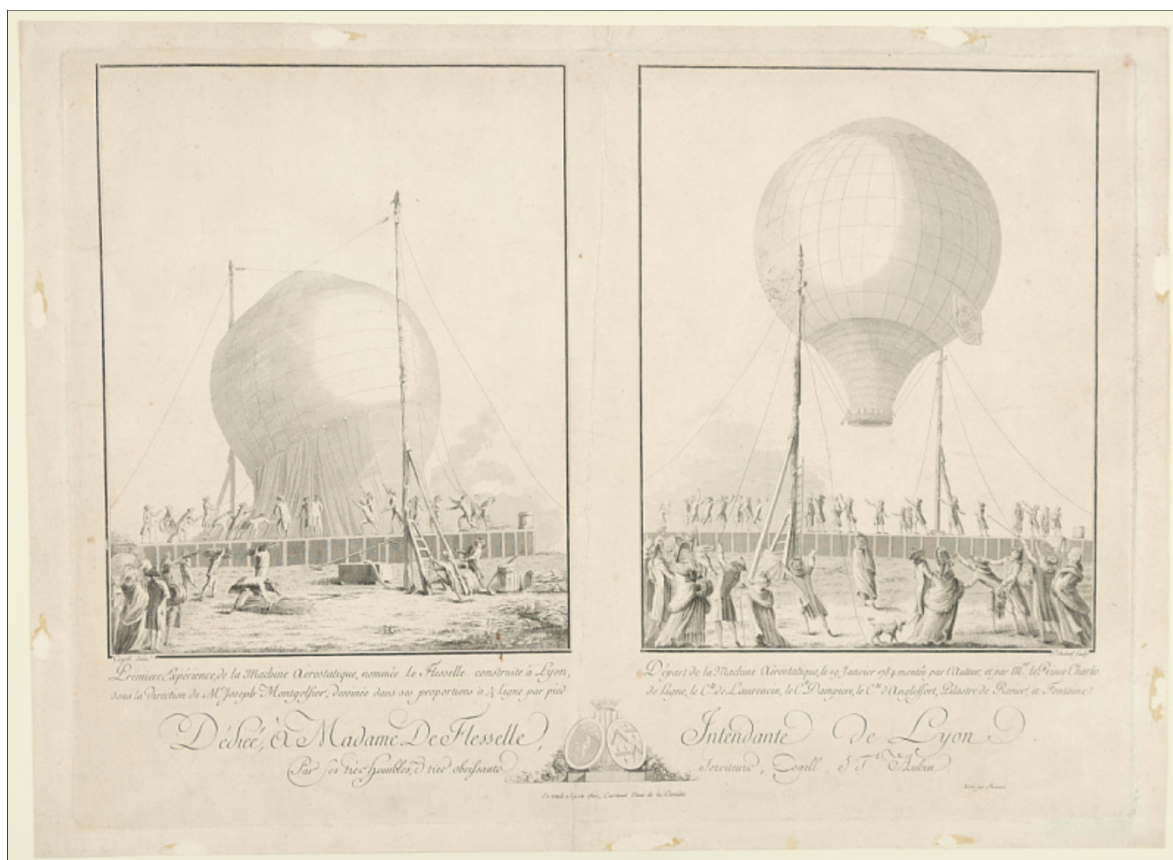
Figure 2. Dédieé, à Madame De Flesselle, Intendante de Lyon. I. Premiere Expérience, de la Machine Aerostatique, nommée Le Flesselle, construite à Lyon, sous la direction de Mr. Joseph Montgolfier; dessinée dans ses proportions à 1/2 ligne par pied. II. Départ de la Machine Aérostatique, le 19 Janvier 1784 montée par l'Auteur, et par Mrs. le Prince Charles de Ligne, le Cte. de Laurencin, le Cte. Dampiere, le Cte. d'Anglefort, Pilastre de Rosier, et Fontaine. Image source: Smithsonian Institution National Air and Space Museum Collection, Gift of the Norfolk Charitable Trust.

In a major breakthrough, seventeenth-century chemistry had managed to isolate the air to study it as if from the outside which, as historians of science Steven Shapin and Simon Schaffer have demonstrated, raised political concerns as much as it offered scientific insights.[6] In the eighteenth century, chemists isolated air's chemical composition, further demystifying the ethereal substance.[7] Gradually, expanding industrial logics crept into scientific pursuits so that new discoveries were evaluated based on their potential instrumentalization.[8] Though a similar geometry

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[6] Steven Shapin and Simon Schaffer, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life*, new ed., Princeton Classics (US: Princeton University Press, 2011).

[7] Steven Connor, *The Matter of Air: Science and the Art of the Ethereal* (London: Reaktion Books, 2010). Steven Connor outlines this history of air studies in the 17th and 18th centuries, highlighting Robert Boyle's air pump experiments and later production of fictitious airs to underscore the early modern significance of enclosed versus open airs for scientific understanding.

[8] Bruno Latour, *We Have Never Been Modern* (Cambridge, MA: Harvard University Press, 1993) describes the modern split between nature and culture, which, per Latour, erroneously
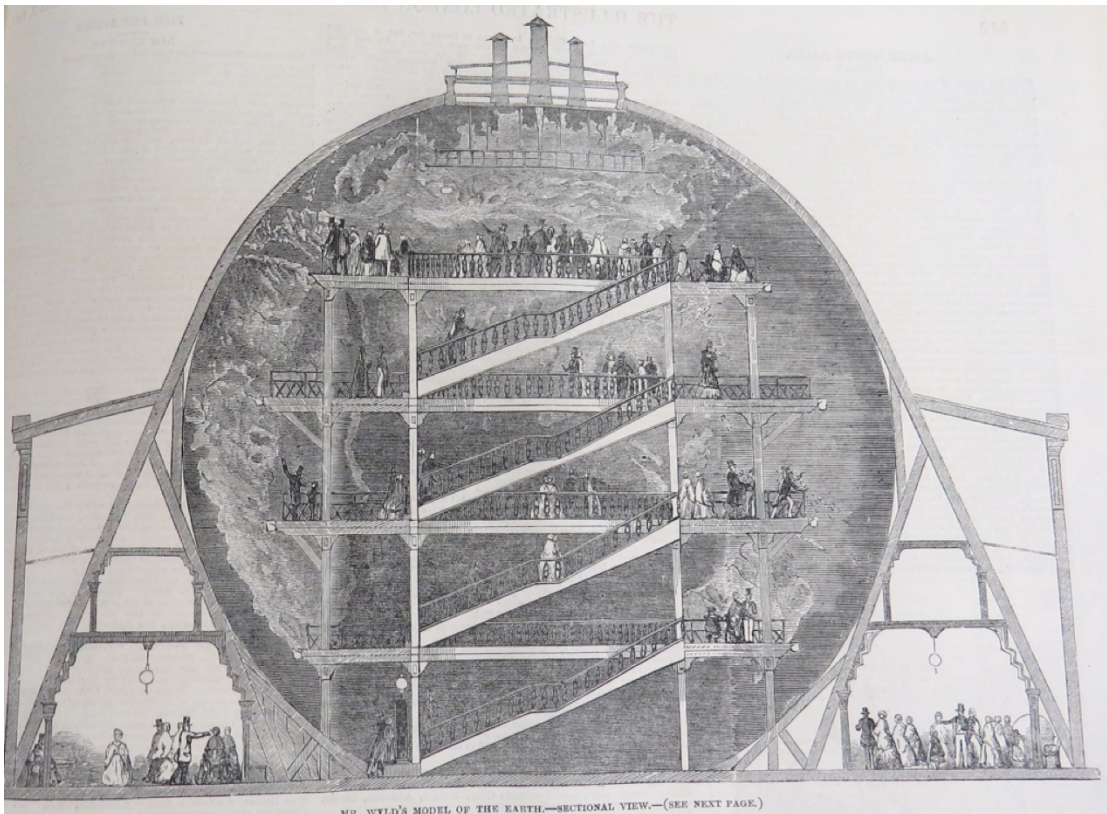
Figure 3. Unknown, *The Giant Globe*, 1851. *Mr. Wyld's Model of the Earth – Sectional View, The Illustrated London News.* Image source: Guildhall Library blog.

and scale to the Boullée Cenotaph, the Georama, first patented in 1822 by Charles-François-Paul Delanglard, illustrates a case in point. The first Georama opened to the Parisian public in 1826, a second in 1844, and a later iteration was installed in London in the 1850s. The initial Georama was a forty-foot diameter building-scaled sphere that operated as an inside-out globe. That is, spectators entered from the bottom, as if from Antarctica, and traveled the world's surface, which was painted along the interior. Stairs and platforms made accessible the entirety of the dome, collapsing the humbling distance of Boullée's earlier sphere while turning the focus away from the cosmos and grounding it on Earth. Via this popular entertainment device, the enormity of the planet could be conquered in an afternoon.[9] In the span of a few decades, the Earth and her subjects had come to stand in as the heart of the cosmos, its details knowable and within optical reach.

Unlike earlier viewing devices and studies of air, the question immediately asked of the balloon was "what is it for?" in a framework that privileged its usefulness for

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separated epistemological from ontological questions. In the nineteenth century, the scientific understanding of air facilitated its influence in cultural phenomena, while this role in turn fueled interest in further understanding its science.

[9] Giuliana Bruno, "The Architecture of the Interior," in *Atlas of Emotion: Journeys in Art, Architecture, and Film,* paperback ed. (New York: Verso, 2007), 133-170.

science or defense, as explored above.[10] Thus the curious, incredible, unprecedented achievement of human spaceflight was short-lived. In an 1863 letter, French Romantic poet Victor Hugo compared the balloon to a leaf or a cloud, swept helplessly by the wind, and urged the displacement of the balloon by the navigable 'bird', or helicopter.[11] Air was not desirable as a dance partner that co-determined the flight path with the aeronaut and his balloon, but viewed as a recalcitrant substance to be manipulated, its unwieldy properties isolated and deployed for human ends.

Despite their start as an open exchange with the elements, the higher altitudes of twentieth-century human spaceflight were predicated on shutting out the uninhabitable environment. To ascend farther from the planet, man had to sever his engagement with the atmosphere and climb up from the balloon's carriage into the controlled, protective environment of the bubble. Over time, his body and its needs came to be viewed as one variable, and a finicky one at that, in control systems aimed to deliver the promise of progress.[12] By the mid-twentieth century, cybernetic diagrams, for example of human waste processing in space, represented human needs as equivalent to any other technical necessity in the system.

However, just as the first astronauts orbited the Earth in tightly enclosed capsules, the narrative of control was unraveling in art and architecture, informed by emerging scholarship on media and technology fueled by the dawn of the so-called Information Age. Around 1964, Canadian theorist Marshall McLuhan framed media as infrastructures that deliver content. He and others began to note that increasingly ubiquitous information networks had attained an immersive, elemental quality no longer within human grasp. Similarly, scholars like American-Israeli communications

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[10] Giuliana Bruno summarizes a history of viewing devices that emphasized optics and were public entertainment embracing the 'travel cult' of 18th century. Steve Connor describes the air studies, as mentioned above. Bruno, *Atlas,* 133-170; Connor, "Taking to the Air," 9-40.

[11] "Let us deliver mankind from the ancient, universal tyranny! What ancient, universal tyranny, you cry. Why, the ancient, universal tyranny of gravity!...Today the balloon has been judged, and found wanting... To be torn from the ground like a dead leaf, to be swept along helplessly in a whirlwind, this is not true flying. And how to we achieve true flight? With wings!...What do you see above you? You see clouds and you see birds. Well then, these are the two fundamental systems of aviation in operation. The choice is right in front of your eyes. The cloud is the balloon. The bird is – the helicopter!" Victor Hugo, 1863 Letter on Flight in Richard Holmes, *Falling Upwards: How We Took to the Air*, 173.

[12] Nicholas De Monchaux outlines the history of evolving ideas of man's 'suitedness' for space, which included attempts to alter the human mechanism via both internal chemical interventions and external protective suits meant to conform the body to spaceflight. Nicholas De Monchaux, *Spacesuit: Fashioning Apollo* (Cambridge, MA: MIT Press, 2011). See in particular Chapter 6: Cyborg.

theorist Elihu Katz posited mass media as modes of being capable of shaping underlying psychic and social orders, akin to infrastructures that condition life, with a life of their own on par with elemental forces.[13] Media considered as inseparable ensembles of nature and technology undermined the modern separation of culture and nature.[14]

Without rigid structure, though not amorphous, the inflatable architectures that proliferated from the mid-60s reflect the apperception of media as elemental. The thin, usually plastic, membranes relied on nothing but air to imbue them with form. They, in turn, made perceptible fragments of this pervasive element in environments that both underscored and undermined the frontier between inside and outside. In 1968, English architecture critic Reyner Banham penned a short article, entitled "Monumental Wind Bags," recounting his experience inside an inflatable dome set up at the British Broadcasting Corporation's Television Centre. He wrote:

> The beauty of that simple wind-bag was the directness and continuity of its response. Every slight change of state inside or out – even a heated conversation – brought compensating movement in the skin, not through the expensive intervention of a computer, but by direct variation of curvature under balance of pressures. For the human occupant it was a kind of partnership relation with the enclosing membrane, each going independently but sympathetically about its business....I *like* that.[15]

In other words, the 'wind-baggery' that had been the eighteenth-century balloon's perceived shortcoming was the epitome of Banham's embrace of the inflatable bubble as he privileged its environmental register and responsiveness over prescribed behavior. Once again, the inflatable structure operated through a continuous engagement with the atmospheric forces of the air despite, unlike the earlier balloon, remaining grounded. In 2015, American media theorist John Durham Peters made explicit the link between how the concept of media was understood in the late Enlightenment and in the years of the 1960s Space Race. During the eighteenth century, writes Peters, media was defined as a continuous, enveloping ether that included the elements with its own dynamics and forces that shape and organize life and its contents. Throughout modernity, nature and the environment were redefined in relation to human control, parceled for instrumental purposes. "Media" became less affiliated with the *forms* of a surrounding, influential environment, and instead came to be understood as an intermediary, channeling

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[13] John Durham Peters, *The Marvelous Clouds: Toward a Philosophy of Elemental Media* (Chicago: University of Chicago Press, 2015).
[14] Bruno Latour, *We Have Never Been Modern.*
[15] Reyner Banham, "Monumental Wind-Bags," *New Society* (1968): 569–70.

information whose *content* became the focus of media studies. For example, inventions like the telegraph channeled human communication with minimal distortion, and that communication became the object of study. With McLuhan and subsequent scholarship, then, we begin to see a return to the earlier notion of elemental media. [16]

The inflatable form of the 1960s permitted, like the balloon or the air-pump, the capturing of a surrounding ether to make it tangible and available for engagement. Unlike the air pump's rigid glass globe or the early balloon, however, the inflatable consciously underscored the relational autonomy between the enveloping matter (the plastic form), the subject, and the larger environment. In 1965 sketches for the project Spacefield, realized with fellow architecture students at the University of Sheffield in 1966, English artist Graham Stevens depicts a 'body environment,' an immersive inflated bubble where the physical distance between the art object and the viewer is collapsed. The body enters the art and participates with all senses in a kinesthetic experience involving a single color field, heat, light, and sound, with the goal to expand consciousness and express the material experience of the elements.[17] The body's presence and exchange with the air in turn affect the environment, or the enclosing form.[18] No longer Boullée's passive observer of inaccessible domains above, nor the visual conqueror of Earth's farthest reaches throughout the Georama, Stevens' is a body in relation whose very existence alters the globe and is in turn altered by the space it produces.[19]

Why does relational exchange between the atmosphere and the human preoccupy creative practices at this moment, just as the first dozen humans are leaving their footprints on the moon in perfectly sealed spacesuits?

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[16] Peters, *The Marvelous Clouds.* 15-48. Several exhibits from the era provide further evidence of the renewed interest in the concept of elemental media in practice: Air Art, curated by Willoughby Sharp, a traveling exhibition across the United States in 1968, and Earth, Air, Fire, and Water: Elements of Art at the Boston Museum of Fine Art in 1971. Both of these included inflatable works; Stevens took part in Air Art. Some inflatable projects were especially attendant to contemporary communications media and its pervasive influence over private, mass consumption. Television and projection, as well as the latest electronic technologies like video, were a key component for some architects working with air, most notably the collectives Haus-Rucker-Co and Ant Farm.

[17] Cited in an unpublished interview for Some Magazine with Graham Stevens, shared with the author in June 2020.

[18] Will McLean, "Atmospheric Industries," *AA Files* 70 (2015): 138–43.

[19] Image is available from the Centre Pompidou: https://collection.centrepompidou.fr/artwork/150000000043895?filters=query%3Agraham%20stevens&page=1&layout=grid&sort=by_author]

Rupture 2: Arriving on the Moon

Comparing the 'inflatable moment' of the late 1960s with the history of early balloons reveals in air architectures a disenchantment with the ideologies of progress and industrially-ordered instrumentalization of science that subsequent scholarship tended to align with postmodern critiques of modernism.[20] Through Spacefield and his subsequent works, it is as if Stevens anticipated a more existential shift, symbolized by the immediate popularity of Earthrise, an image captured aboard NASA's Apollo 8 mission three years later in 1968. Unexpectedly, the Earth viewed beyond the lunar horizon appeared as a marvelous site, an exception in the vast cosmos that made it uniquely, preciously tailored to human existence.[21] Stevens' inflatable color field membranes immersed the soon to be constrained body and its gaze back on the Earth, while the responsive envelope reflected the planet's vulnerabilities to human action. The semi-transparent plastic surface isolated the body from the exterior environment, offering nothing to consume visually on the 'inside' save for the contours of an Earth 'out there', akin to the view from the lunar surface. Yet the same semi-transparency, like the material's responsive quality and constant air flow into the low-pressure system, also contributed to the sensory reception of the bubble-as-Earth, as the exterior continually marked the inside. The plastic mediated, a second skin that registered the pressures of interior and exterior. Framing the inflatable surface as a medium accents the agency of the plastic membrane as both viewing and registration screen, and rejects a binary between outside and inside.

Figure 4. Graham Stevens 'Spacefield' interior/exterior. Sheffield University Arts Festival June 1966. Photo: Peter Luck, Copyright 1966 G.A. Stevens.

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[20] See for example: Robert Venturi, Denise Scott Brown, and Steven Izenour, *Learning from Las Vegas* (Cambridge, MA: MIT Press, 1972).

[21] Hans Blumenberg in Benjamin Lazier, "Earthrise; Or, The Globalization of the World Picture," *The American Historical Review* 116, no. 3 (2011): 602–30.

During the 1950s and '60s more broadly, the binaries of modern scientific knowledge and methods came under scrutiny.[22] The social sciences interrogated modernity's influence on forms of social control and subjectivity, while cybernetics offered nonhierarchical methods to evaluate human/non-human interactions.[23] Late 1960s and early '70s issues of publications like the UK-based Architectural Design (AD) reveal the influence of these thinkers on artists and architects. In a 1972 AD article, Stevens wrote: "Understanding of energy processes is reaching the point where the wave emissions of the body and brain can be registered and measured, opening up the possibility of ultimate environmental control… we are not alienated by technological hardware, but freed by technological forecasting, control and simulation of the elements."[24] For Stevens, as for Banham, greater environmental control meant freedom *from* the environment, even as his forms suggested otherwise: they immersed viewers in a less controlled milieu more vulnerable to environmental factors.[25] This dialectical approach toward control and vulnerability, synthesized in the gap between Stevens' language and form, helps illuminate why the mid-1960s explosion of inflatable architecture became obscured in postmodern architectural scholarship by the mid-1980s, buried as a minor alternative to mainstream modernism.[26]

Twentieth-century architectural histories tended to focus on changes in space, form, and structure aligned with, and rarely questioning, the necessities, capacities, and desires of modern life. Banham, for example, examined the shift from structural to mechanical systems that afforded buildings greater disregard for contextual constraints –facilitating architects' capacity to maintain the same practice across disparate locations.[27] For him, the inflatable visualized the disappearance of the

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[22] Ilya Prigogine and Isabelle Stengers, *Order out of Chaos: Man's New Dialogue with Nature*, Power and Morality Collection at Harvard Business School (Toronto; New York, N.Y.: Bantam Books, 1984).

[23] Herbert Marcuse, *One Dimensional Man: Studies in the Ideology of Advanced Industrial Society*, Power and Morality Collection at Harvard Business School (Boston: Beacon Press, 1964); Andrew Pickering, *The Cybernetic Brain: Sketches of Another Future* (Chicago: University of Chicago Press, 2010).

[24] Stevens, "Pneumatics and Atmospheres," 169.

[25] Reyner Banham, *The Architecture of the Well-Tempered Environment* (London: Architectural P, 1969).

[26] Felicity Dale Elliston Scott, *Architecture or Techno-Utopia: Politics after Modernism* (Cambridge, MA: MIT Press, 2007); Caroline Maniaque Benton, *French Encounters with the American Counterculture, 1960-1980*, Ashgate Studies in Architecture (Burlington, VT: Ashgate, 2011).

[27] Banham, *The Architecture.*

need for architecture as physical enclosure given modern building systems.[28] However, he, like Stevens, also embraced its sympathetic and continually responsive partnership with its occupants and environment. Both saw no conflict between control and responsiveness, inside and outside, which later scholarship would overlook.

This later scholarship, including late-1970s and '80s emphasis on architectural autonomy, was wary of social prescription through built form, undermining modernism's rational-functional utopian visions.[29] American literary and cultural theorist Frederic Jameson shows that for Italian critic Manfredo Tafuri, an important voice in 1960s architectural criticism, architecture does not construct the experience of society but critiques society as a legible text within the city, understood against what it is not. The semiotic reading of built form that developed in practices like American architect Robert Venturi's as early as the mid-1960s, and further evolved in writings by Venturi with partner Denise Scott Brown, Tafuri, architectural theorist Charles Jencks, and numerous others, emphasized the contemporary architectural surface as a communicative medium.[30] The façade could communicate function and program, and reflect popular preferences, even if the form of the building was a generic 'shed'.[31]

Thus on the one hand, postmodernism, influenced by post-structuralism, rejected modernist prescription and embraced liminal, responsive spaces, suggesting a sympathetic context from which to read air structures.[32] On the other

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[28] Amy Kulper, "Ecology without the Oikos: Banham, Dallegret and the Morphological Context of Environmental Architecture," *Field Journal* 4 (2011).

[29] Critics like the Italian Manfredo Tafuri argued that any social project in architecture could not help but serve the capitalist interests that conditioned its utopian imagination, and thus was to be avoided. He posited that rather than represent its social, political, ideological moment, architecture embodies and produces knowledge from within that moment through the architectural form. Thus, it is limited by contextual logics, even as it operates within an aesthetic realm not entirely subservient to political ideologies. See Manfredo Tafuri, *Architecture and Utopia: Design and Capitalist Development* (Cambridge, MA: MIT Press, 1976), and Fredric Jameson, *The Ideologies of Theory*, ipdated ed. (London; New York: Verso, 2008). A 2019 symposium at Harvard University organized on Manfredo Tafuri by visiting professor Jorge Liernur and professor K. Michael Hays helped inform this point.

[30] Fredric Jameson, *Postmodernism, Or, The Cultural Logic of Late Capitalism*, Post-Contemporary Interventions (Durham: Duke University Press, 1991).

[31] Venturi, Scott Brown, and Izenour, *Learning from Las Vegas.*

[32] Some architects working with inflatable forms, such as members of the collective Ant Farm, were likewise influenced by the media theories of writers such as Marshall McLuhan, and especially interested in the role of television in simultaneous experiences shared across space and time. Their interest, however, led to explorations of the interior psychic states facilitated by immersive air environments, rather than to the emphasis on surface. For more

hand, however, the linguistic read of architecture did not share adequate common ground with inflatable forms, whose semiotically blank and aesthetically stubbornly responsive, rather than reflective surfaces were meant to foment an altered interior experience, psychically and physically, and to mediate outside with inside. Architectural discourse continued to assume architecture as enclosure, so while the postmodern surface could communicate between the two, it stopped short of questioning the separation between exterior and interior. Thus, the linguistic models undergirding late-twentieth century architectural theory left a theoretical vacuum from which to analyze the inflatable and the world it envisioned, and they disappeared as unpredictable, temporary, and, at best, critical, or, at worst, emotional events.

The plastic form's primary contribution to architectural knowledge has less to do with its aesthetics of form or structure and more with the aesthetics of encounter that it mediates, between subjects, air and envelope. By doing away with rigid architectural materials, the element of air becomes sensible as atmosphere in the plastic container, a space to confront the breath of life, of wind, and of the electric apparatus of the blower.[33] A potent example of new tools with which we ought to reconsider the earlier inflatable is American posthumanist scholar Cary Wolfe's recent framing of the Blur Building.[34] The Blur Building by architects Elizabeth Diller and Ricardo Scofidio was a temporary media pavilion for Swiss EXPO 2002 installed on Lake Neuchatel in Yverdon-les-Bains, Switzerland. It was a structure of pure atmosphere, defined by a thick mist that blurred the supporting ramps and public walkways, and gave the confounding sensation of immersion in a featureless but nevertheless substantial structure. Wolfe deploys systems theory to show the building as a complex system in continuous engagement with its environment. The ability to adapt to shifting environmental forces – its tendency to revert to its foggy cloud form and maintain structural integrity as changing winds, temperatures and humidity levels continually modify its shape – demonstrates for Wolfe systems theorist Niklas Luhmann's framing of environment as the outside of a specific system that conditions that system while underscoring its autonomy. We are no longer in a humanist dichotomy of inside and outside, human and non-human, or even

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on Ant Farm, see Felicity Dale Elliston Scott, *Living Archive 7: Ant Farm; Allegorical Time Warp: The Media Fallout of July 21, 1969; plus the Complete Ant Farm Timeline* (Barcelona; New York: Actar, 2008).

[33] The concept of atmosphere is a recent topic of interest in architectural theory and practice. One relevant example is: Christian Borch, ed., *Architectural Atmospheres: On the Experience and Politics of Architecture* (Basel: Birkhäuser, 2014).

[34] Cary Wolfe, "Lose the Building", in *What Is Posthumanism?* (Minneapolis: University of Minnesota Press, 2009).

embracing difference. The inside of the cloud structure and its outside are not ontological opposites. Instead, what links the system to the world and makes the world available to the system is what hides the world from the system so the latter maintains its integrity. Blur produces an immersive experience out of focus to emphasize our dependency on visual sensation, exposing the paradox that this dependency always comes up short as the world is never fully observable despite conditioning what we see.

In reflecting on breath, contemporary Italian philosopher Emanuele Coccia poetically articulates air architecture's undeniable yet fraught bond with its environment:

> [Breath] is a vibration that touches, simultaneously, the living being and the world that surrounds it. In breath, for the duration of an instant, the animal and the cosmos are reunited; and they seal a different unity from the one marked by being or form. It is, however, with and in the same motion that living being and world consecrate their separation.[35]

Graham Stevens was already grappling in the 1960s with the unity of separateness and togetherness between the bubble – the material containing the air – its environment, and its occupant: "The membrane of the [inflatable] structure becomes an *extension of one's skin,* seen from inside the body, as it indents, sweats and changes shape, as the person inside moves over and through various locations…"[36] His allusion to skin suggests how the closed systems of space travel can be reconsidered toward more porous relations with the conditionally exterior environment.[37] In his inflatable structures, the subject was as if inside the Earth's atmosphere, shielded from undesirable encounter with outside forces. However, the thin membranes also continually registered the tensions of those forces, emphasizing the tenuous link to the exterior. We arrive at Tafuri's complex enmeshment between architecture and its outside, but in a system that considers not only matter but air, not only the human but the non-human. The living, breathing inflatable organism cannot be adequately represented but must be *inhabited*.

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[35] Emanuele Coccia, *The Life of Plants: A Metaphysics of Mixture*, English edition (Medford, MA: Polity, 2019), 120.

[36] Stevens, "Pneumatics and Atmospheres," 167-8, emphasis added.

[37] See Eva Horn's mention of subject-object rupture related to this extension of skin in: Eva Horn, "Air as Medium," *Grey Room* 73, no. 73 (2018): 6–25