Some inflated expectations

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In the 1960s, the creation of indoor environments took on an entirely new meaning. Inspired by new materials, technologies, and the recent romance of space-travel, young architects with a countercultural sensibility started to explore a novel type of micro-environment that was minimal, lightweight, and portable, and that paid special attention to the qualities of the building envelope and the level of comfort of the human body within the "skin." Originally invented by the US military in the aftermath of the Second World War as easily deployable radar domes, inflatables were adopted by architects in the 1960s and 1970s to build mobile spaces for dissent. Incorporating the technique in polemical lightweight "wearable" structures, progressive architects such as Archigram, Utopie, UFO, Coop Himmelb(l)au, Ant Farm,

fig. 1 Frei Otto, Soap Bubble Experiment (n. d.) Source: Archiv für Architektur und Ingenieurbau, Karlsruher Institut für Technologie (KIT)

Haus-Rucker-Co, Superstudio, and Hans Hollein provided a bodily experience with which they could roam the streets and stage a protest. Situating architectural inflatables in today's debates around personal protective measures and home-office working, bubbles represent a critique of societal participation equally valid in situations of enforced and voluntary quarantine.

Indoor ecology as a bubble was explored in the 1950s by visionaries who actively promoted climatic envelopes for human enclosure. Inspired by soap bubbles, engineer Frei Otto was among the first to experiment with thin membranes of synthetic

fabric in the way that layers of soap stick together. His Domed Hall (1959), fig.1 Offshore Storage Facility (1958/1959), and Large-Scale Envelope for Agricultural Use (1959) propose minimalist pneumatic structures for human settlements to survive in extreme climates. A soap bubble, according to Otto, was the ideal pneumatic form to produce urban-scale climatic envelopes "skinning over whole cities." [1] The resulting indoor climates were paradisal spaces set in extreme environments. Buckminster Fuller's take on the indoor ecology was the two-mile Geodesic Dome over Midtown Manhattan (1962), a huge protective skin covering an entire neighborhood. fig.2 The bubble here was a semi-permanent inflatable structure supported by pressurized air that regulated weather conditions and reduced air pollution within the dome. Archigram member Peter Cook retrospectively recognized in Fuller's design "the powerful idea that a building does not have to cope with exterior weather conditions." [2]

The cover of the November 11, 1957, issue of *Life Magazine* prominently featured Walter Bird's Air-Supported Dome for All-Year Swimming (1957), a plastic bubble sheltering a private swimming pool. [3] fig.3 The corresponding article's section "The New Technology Already has Samples of Changes it Made in Everyday World" situated Bird's invention amid those of jet-engine autos, nylon air houses, and one-man aircraft as examples of recent inventions that were not mere theoretical experiments but had been developed for domestic settings or commercial purposes. For a mere two thousand dollars, one could not only dream of,

1 Cited in Peter Cook, *Experimental Architecture* (New York: Universe Books, 1970), 50.

2 Cook, *Experimental Architecture*, 50.

3 "Tomorrow's Life Today: Man's New World, Part II," *Life Magazine*, November 11, 1957, 132—47, here 132, https://books. google.de/books?id=t-VYEAAAAMBAJ&lp-g=PA132&hl=de&p-g=PA132#v=one-page&q&f=true (accessed February 1, 2021).

but own, an all-season outdoor swimming pool. **fig.4** In 1948, the designer of this pool dome had already made significant advances in air-inflated structures with his invention of the radome, a pneumatic shelter for radar devices. Bird's shelters had long served as prototypes to protect military radars from harsh climatic conditions. He was quick to recognize the lightweight, mobile, and easily deployable qualities of radomes, and started experimenting with the application of the same technique to spaces for human shelter.

fig. 3 Walter Bird, "Air-Supported Dome for All-Year Swimming," *Life*, November 11, 1957, cover
Source: Life Magazine Archive, Google Books

Architectural bubbles started to take on an entirely new meaning in the countercultural climate of the 1960s. For architects, the free forms associated with bubbles aligned with avant-garde ways of thinking. New materials and technologies, such as plastics and pneumatics, made possible forms that were diametrically opposite to the rectangles of modernism, a viewpoint that historian Reyner Banham readily embraced:

"What is new is the confluence between changing taste and advances in plastic technologies. The taste that has been turned off by the regular rectangular format of the official modern architecture and Bauhaus-revival modern-antique furniture, is turned right on by the apparent do-it-yourself potentialities of low-pressure inflatable technologies." 4

4 Reyner Banham "Monumental Windbags," *New Society* 11, (April 1968), 569–70.

5 Reyner Banham, "A Home is Not a House," *Art in America* 2, (1965), 70–79, here 70.
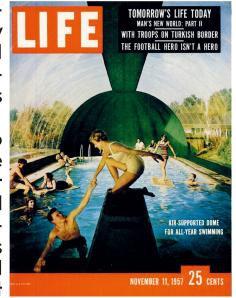
6 Joan Ockman, ed., "1960–1968," in *Architecture Culture 1943–1968: A Documentary Anthology* (New York: Rizzoli 1993; repr. 2007), 317–463, here 370.

7 Whitney Moon, "Environmental Wind-Baggery," in Daniel A. Barber and Eduardo Rega, eds., *Structural Instability, a collaboration between e-flux Architecture and PennDesign*, August 1, 2018, https://www.e-flux.com/architecture/structural-instability/208703/environmental-wind-baggery/ (accessed February 1, 2021).

In his 1965 essay "A Home Is Not a House," Banham went so far as to propose an "environment-bubble" of a domesticated utopia equipped with modern amenities. Interested in both the formal and spatial possibilities of comfort provided by mechanical services, Banham used textual form to introduce the idea of the house as a minimal membrane of enclosure, wondering "when it [your house] contains so many services that the hardware could stand up by itself without any assistance from the house, why have a house to hold up?" 5 With this "unhouse," 6 Banham set the tone for "a radical and anti-monumental prototype for rethinking architecture's relationship to technology, humans, and the environment." 7 The media were actively deployed to promote Banham's environmental bubble. In a 1967 BBC television show, Banham made a performance by living naked for a full day in a mockup of his bubble. Being in this inflatable, in reference to philosopher Peter Sloterdijk, was made possible by a climatic control system located in the bubble's skin that could condition the indoor environment to a comfortable level.

In line with Banham's ideas laid out in "A Home Is Not a House," performative avant-garde architectural groups that shared the contemporary interest in nomadism increasingly turned to inflatables in the 1960s as a quick and inexpensive means to create a lightweight space for dissent and experimentation. Their ideal bubble was transparent, superlight, and as portable as a suit "in which the boundary between inside and outside was as thin as possible." [8]

NYLON AIRHOUSES pop up on a university campus in Kentucky. Made of U.S. Rubber Company's Fiberthin, a vinyl-covered nylon fabric four times as strong as waterproofed canvas yet 40% lighter in weight, domelike houses are kept up by air, pumped in by small blowers. They are anchored at base by ballast ring of sand or water. Already catching on for industrial and military use, they are being developed as vacation houses for around $3,000 for a 25-foot-diameter size.

8 Hadas A. Steiner, *Beyond Archigram: The Structure of Circulation* (New York: Routledge, 2013), 157.

At both the scale of the family dwelling and at an urban level, Archigram members Michael Webb, Peter Cook, Ron Herron, and David Greene readily experimented throughout the 1960s—alone or in collaboration—with prefabricated capsule dwellings, plastic living capsules, and portable environments. Greene's Living Pod (1966), a womb-like mobile home with integrated machinery, could exist independently or be plugged into larger structures as a capsule-dwelling module. On an urban scale, Herron's Sea Bubbles (1966) or Cook's Instant City (1968–1970) were emblematic in their use of inflatables to capture the notion of mobile architecture. The first was a speculative project for inflatable housing units suspended from a mast structure, dangling over and under the sea. The latter was a "traveling metropolis" that, using trucks and especially air inflatables for transportation, injected a metropolitan dynamic in the form of cultural events, mobile facilities, and information technology into what were otherwise sleepy towns.

Webb's Cushicle was a preliminary proposal for a nomadic shelter-cum-clothing that incorporated a small vehicle. *Suitaloon*, the successor to the Cushicle, was the built prototype of a wearable suit that covered all the basic needs of living, which could inflate into a comfortable personalized environment. Or as David Greene would later write, "Suit and Balloon collide to make Suitaloon. Cushion and Vehicle make Cushicle." [9] Designing pneumatic living cells for nomadic lifestyles was one of the key strategies of the architectural collective Archigram to move past the stagnation of the British architectural scene.
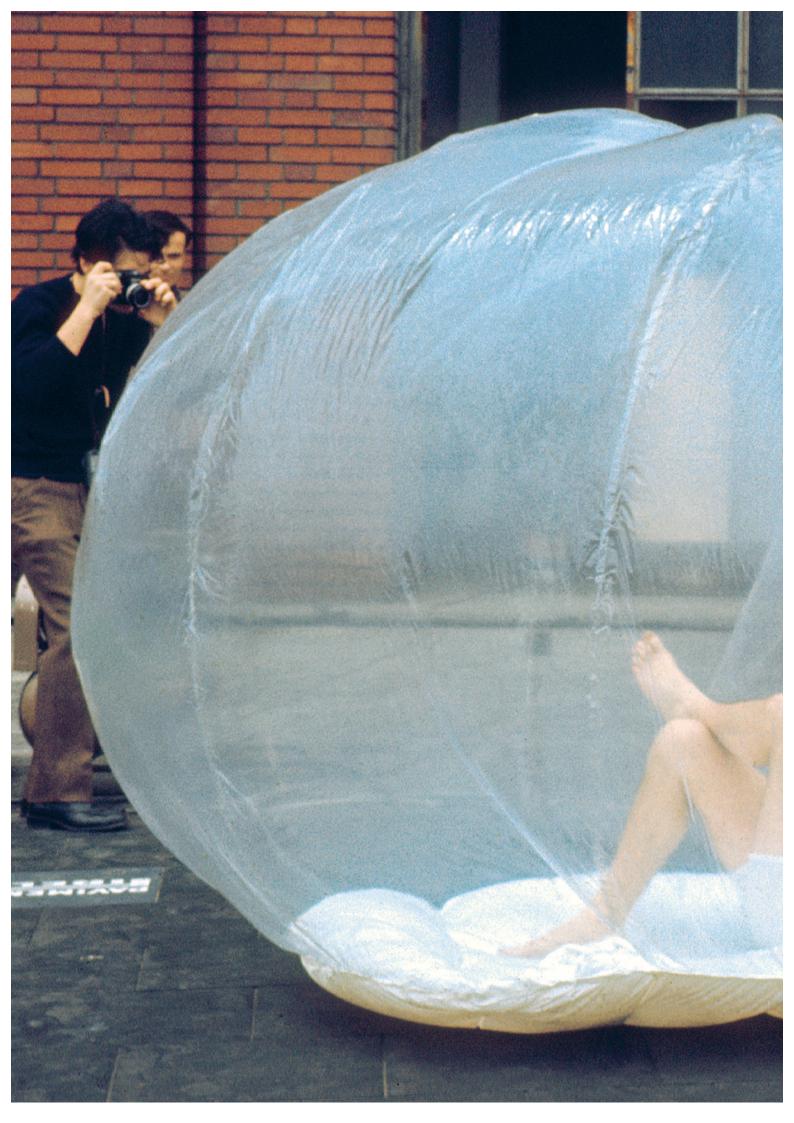
With the Cushicle, Webb started to advance Banham's idea of a house with the ultimate minimal skin. First introduced in 1966 in the eighth edition of *Archigram* as an example of comfort-giving architecture, the Cushicle envisioned a living envelope for the human body "that enables a man to carry a complete environment
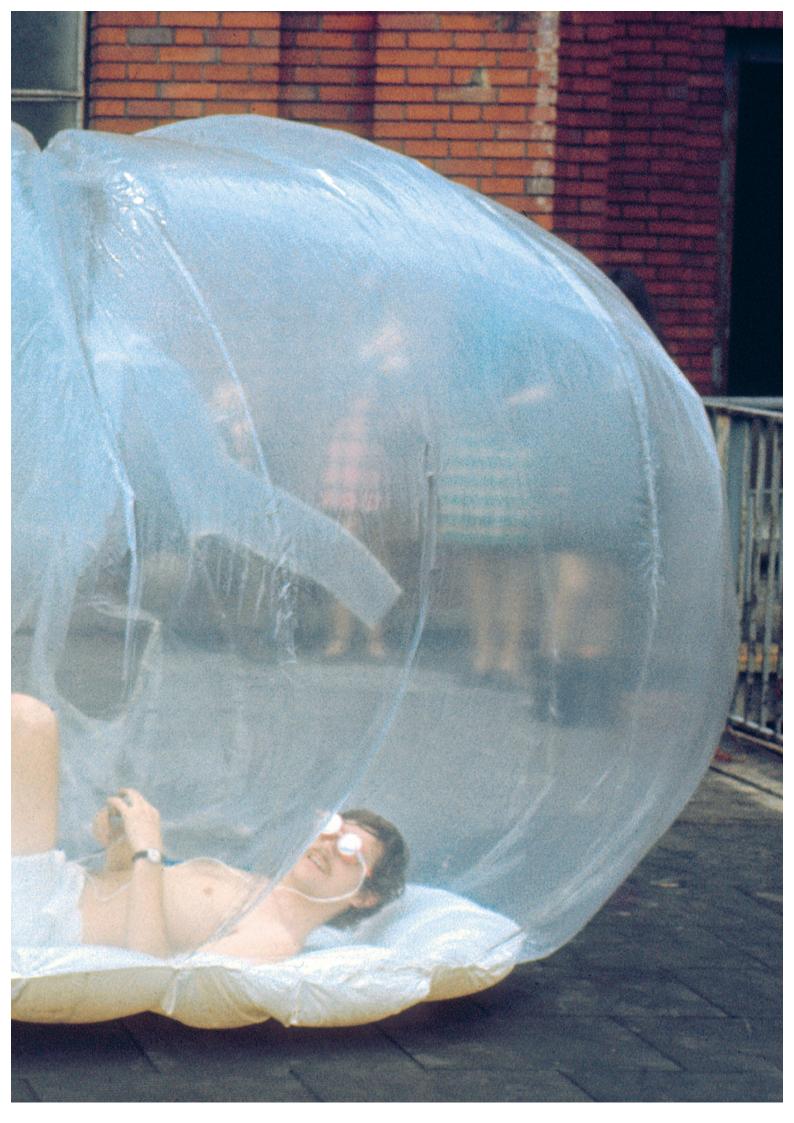
9 David Greene and Samantha Hardingham, *L.A.W.U.N. Project #19: A Dictionary for De-Urbanised Man* (London: Architectural Association, 2008), 152–57, here 153.

10 Michael Webb, "The Cushicle," in Peter Cook et al, eds., *Archigram: The Book* (London: Circa Press, 1972), 64–65.

on his back," according to Webb. 10 The project consists of two main components: a spinal system that forms the chassis and provides support for the appliances, and an inflatable membrane that serves as the house's skin. With the chassis and the envelope both fully opened, the Cushicle turns into a fully serviced air cushion vehicle carrying food, water, a radio, a miniature projection television, and a heating apparatus. 11 As Cook explained, Webb's bubble very much relied on its own mechanism:

11 Webb, "The Cushicle".

"In the Cushicle Mark II a portable membrane is arranged in such a way that when the carrier has decided to set up home, he places it in the ground and by walking into part of the membrane can push the structure out. This structure consists of a series of veins, of fabric and electrical supply and lighting wires. We can get to something very like a man-as-a-bat where the skin of the enclosure is dependent upon a system of vertebrae that responds very directly to the nervous system of the person within." 12

12 Cook, *Experimental Architecture*, 55.

The new architectural idea embedded in this project was that "man can have its own container," suggesting that "each person, on arriving at a state of relative emancipation, should receive a degree of personal support that he cannot get from the collective artifact (house, family car, the village)." 13 Webb's Cushicle is about using the military industrial complex against itself: turning the bubble into a liberatory vehicle.

13 Cook, *Experimental Architecture*, 116.

Webb's Suitaloon further refined the idea of the *Cushicle* "down into a system of pipes worn around the body that heat and protect it, while additional facilities can be clipped on." 14 fig.5 While *Cushicle* was an indoor environment, the size of a small living room, the plastic suit of Suitaloon represented an absolute minimal habitat tightly wrapped around the human body. Webb himself likened Suitaloon to "clothing for living in," arguing that "if it wasn't for my Suitaloon I would have to buy a house." 15 Responsive technology incorporated in the shell

fig.6 Coop Himmelb(l)au, Restless Sphere, Basel, Switzerland, 1971 Photographer: Peter Schnetz/Source: courtesy of Wolf Prix and Coop Himmelb(l)au

14 Cook, *Experimental Architecture*, 117.

15 Michael Webb, "Suitaloon," in Cook et al., *Archigram*, 80.

expanded the functions of the human skin, as much as it created the feeling of a personal cocoon, a haven in the metropolis.

In contrast to architectural bubbles that limited themselves to strictly private individual indoor ecologies, Cushicle and Suitaloon contained a novel sociable aspect. Webb envisioned that the autonomous Cushicle "could become part of a more

widespread urban system of personalized enclosures" once invested with service nodes and additional apparatus. [16] Comfort for Two (1967) illustrated that multiple suitaloons were able to join together in a single enclosure. One person wearing a suitaloon was able to merge with another suitaloon utilizing a plug, a feature that Webb demonstrated with an illustration showing a male—female couple joining suits:

"You can plug into your friend and you will both be in one envelope, or you can plug into any envelope, stepping out of your suit, the suit being left clipped onto the outside ready to step into when you leave. The plug also serves as a means of connecting envelopes together to form larger spaces." [17]

Webb further imagined that Cushicles and Suitaloons could cater to different kinds of individuals and family configurations.

Together, Cushicle and Suitaloon illustrate Archigram's search for an efficient alternative to conventional architecture, one that is light, portable, and transformable. Its skin-like envelope contained environmental qualities that question architecture as a solid enclosure. [18] As scholar Stamatina" Kousidi has argued, Cushicle/Suitaloon also presented a conceptual shift from wearable clothes to a portable space. This in-between space is a comfortable living room that houses the human body (*"Einen Raum, der den menschlichen Korper beherbergt umschliest"*). [19] More than functional attire that keeps its wearer comfortable, one could also argue that Cushicle/Suitaloon is a form of protective clothing, "shielding the human body from physical, social, emotional and spiritual threats, real and imagined" outside the personal—in other words, a shell. [20]

Cushicle/Suitaloon is a self-sufficient bubble that proposes a lifestyle independent from social structures, reflecting pleasure and fun, as much as the liberation of the individual. It represents, in a way both provocative and earnest, a kind of architectural autonomy. As such, it sits in contrast to the anti-architectural inflatables by the San Francisco group Antfarm, for example, who were a reaction to America's heavy consumerism and stereotyped suburban lifestyle. Antfarm members Chip Lord and Doug Michels toured America with inexpensive, portable bubbles to promote an alternative, low-key, and nomadic lifestyle. [21] The Parisian Utopie group turned to mobile architecture to counter the existing power structures in the fields of architecture and town planning. [22] They used inflatables as a form of agitative practice, analyzing what happens in reality and acting in accordance. [23] Webb's stance was not as explicitly political. Instead, he employed inflatables as a form of architectural action, staging architecture as both media and event.

16 Webb, "The Cushicle," 64.

17 Cook, *Experimental Architecture*, 116.

18 Cook, *Experimental Architecture*, 54—55.

19 Stamatina Kousidi situates Webb's Cushicle/Suitaloon in the body discourses of the 1960s and 1970s and uses "dress" and "clothing" as theoretical tools to discuss the project. See Stamatina Kousidi, "The Skins We Live in: Zu Archigrams Cushicle and Suitaloon (1966—1968)," in Karl R. Kegler, Anna Minta, and Niklas Naehrig, eds., *RaumKleider: Verbindungen zwischen Architekturraum, Körper und Kleid*, (Bielefeld: Transcript Verlag, 2018), 179—94, here 180.

20 Susan Watkins, "Protective Clothing," in Valerie Steele, ed., *Encyclopedia of Clothing and Fashion*, vol. 3 (New York: Scribner/Thomson Gale, 2005), 58.

21 Spatial Agency, https://www.spatialagency.net/database/ant.farm (accessed October 16, 2020).

22 Hubert Tonka, Jean-Paul Jungmann, and Jean Aubert, "Architecture as a Theoretical Problem," *Architectural Design* 6 (May 1968), 255.

23 Marc Dessauce, ed., *The Inflatable Moment: Pneumatics and Protest in ,68* (New York: Princeton Architectural Press, 1999).

Contrary to Archigram's utopian proposals, which nevertheless contained possibilities for future living, the "Vienna Scene" of Haus-Rucker-Co, Coop Himmelblau, Zuend-up, Nalbach, and Hans Hollein opted for more dystopian postures. fig.6 Thanks to the support of cultural institutions such as Galerie St. Stephan in Vienna under the auspices of Otto Mauer, the Austrian avant-garde had a platform to meet and experiment with new forms. They particularly embraced the opportunity to develop an alternative to the standard "narrative" mode of exhibiting into one of architectural action. 24 Haus-Rucker-Co, founded in Vienna in 1967 by Laurids Ortner, Günther Zamp Kelp, and Klaus Pinte, explored the performative potential of architecture through installations and happenings using pneumatic structures that aimed at altering the perception of space. fig.7 As part of what they called their "Mind-Expanding Program," Ortner, Zamp Kelp, and Pinte developed a series of

24 For the important role of Galerie St. Stephan in the development of the Viennese avant-garde scene of the 1960s, see Eva Branscome, *Hans Hollein and Postmodernism: Art and Architecture in Austria, 1958—1985* (London: Routledge, 2016), 161.

fig.7 Laurids Ortner, Günter Zamp Kelp, and Klaus Pinter (Haus-Rucker-Co), *Environment Transformers: Flyhead, Viewatomizer, and Drizzler*, 1968 Photographer: Gert Winkler/Source: courtesy of Gerald Zugmann

futuristic helmets that intended to provide the wearer with a psychedelic experience. With small "bubbles" placed onto the head, one experienced the environment through a completely different lens. The bee-like eyes affirm the privilege of subjectivity and perception over mobility. 25 Yellow Heart, to name another of their emblematic projects, was a pulsating pneumatic space capsule for two. Inside the bubble, one experienced the surrounding space expanding and flowing out, again in response to the rhythmic swelling of the soft, air-filled chambers. 26

Architect Hans Hollein is a key figure in the emergence of conceptual architecture amongst the Austrian avant-garde. 27 Educated at the Academy of Fine Arts in Vienna, Hollein had

25 "Mind Expander", https://www.artbrain.org/haus-rucker-co-mind-expander-project/ (accessed August 31, 2020).

26 "The Mind Expander Chair & Other Inventions from the Far-Out World of 60s Architects Haus-Rucker-Co," https://dangerousminds.net/comments/the_mind_expander_chair_other_inventions_from_the_far-out (accessed August 30, 2020).

27 Branscome, *Hans Hollein*, 215.

the opportunity to continue his studies in architecture at the Illinois Institute of Technology in Chicago and the University of California, and to meet and work with some of the American masters, such as Mies van der Rohe, Frank Lloyd Wright, and Richard Neutra. However, as his subsequent career shows, his contact with the counterculture in the United States proved decisive. In his master's thesis, entitled *Plastic Space* (1960), Hollein advocated architecture as a corporeal experience, claiming that "there is no difference between outside and inside space. There is only space." [28]

Hollein's preoccupation with the limits of the human body stemmed from a fascination with space travel. Inspired by the architecture of the spacesuit, "the very best house because you have everything you need," Hollein imagined a human shelter with climate-regulating capacities. According to Marshall McLuhan's definition, dwelling is a means to control body temperature, and, for thousands of years, we have tried to perfect this through means of construction. [29] Today, the most advanced architecture of this kind is the space suit, an architecture that liberates us from the built context and that creates completely new possible relationships between humans and their enviroment. [30]

Hollein's sensibility for irony became visible in his 1967 manifesto *Alles ist Architektur* (Everything is Architecture), [31] a work in which Hollein, according to historian Joseph Rykwert, developed a truly original intuition. [32] Here, Hollein extended the concept

28 Hans Hollein, "Plastic Space" (MA thesis, University of California, Berkeley, 1960).

29 Marshall McLuhan, "Housing: New Look and New Outlook," in *Understanding Media: The Extensions of Man* (New York: McGraw Hill, 1964), 123–130, here 123.

30 "Vorstoss und Rückstoss," editorial in *Bau: Schrift für Architektur und Städtebau* 4 (1966), 65. Quoted from English translation in Branscome, *Hans Hollein*, 194.

31 "Alles ist Architektur (1967)," *Bau: Schrift für Architektur und Städtebau*, 23, no. 1 of 2 (1968), 1–35.

32 Joseph Rykwert, "Irony: Hollein's General Approach," *A + U* special issue on Hans Hollein (February 1985), 194–196, here 194.

33 Branscome, *Hans Hollein*, 161.

34 Hans Hollein, in part of a longer Austrian portrait on Austrian television, as quoted in Andreas Rumpfhuber "Architecture of Immaterial Labour," lecture, December 2013, Volos, Greece, https://www.youtube.com/watch?v=RKSWEW7vYak (accessed January 29, 2021).

35 For an extensive explanation of this argument, see Andreas Rumpfhuber, "The Architect as Entrepreneurial Self: Hans Hollein's TV Performance 'Mobile Office' (1969)," in Peggy Deamer, ed., *The Architect as Worker: Immaterial Labor, the Creative Class, and the Politics of Design* (London: Bloomsbury, 2015), 44—57.

of architecture to include the environment as a whole, proclaiming that "architects have to stop thinking in terms of *building*," urging them instead to focus on non-buildings, invisible architecture, and media environments. In 1969, Hollein designed Mobile Office, an installation made of a PVC membrane that, blown up, created a workspace-on-the-go. fig. 8 **33** "A modern man who changes from place to place does not want to stay in one box, but prefers to carry his home with him," Hollein argued. **34** Hollein envisioned his Mobile Office as an extreme version of an inflatable object, which can easily be packed and inflated with any kind of hoover or source of compressed air. Once inflated, one crawled into the small bubble, entering a personal shell. Compared to Webb's inflatables, Hollein's Mobile Office is more socially critical, as it turns the bubble into a metaphor for the subjectivity of an office worker.

Mobile Office was, above all, a self-conscious media production in which Hollein confidently presented himself as a "creative entrepreneur." **35** Commissioned by an Austrian television company that wanted to promote national intellectuals among the public, the two-minute performance was filmed by a professional film crew. In the movie, we see Hollein arriving at the airport in a small propeller airplane. Upon arrival, he takes out a PVC package, hooks it onto a vacuum cleaner to inflate it, and wriggles himself into the bubble to begin working, as if a routine event. Once confined to the office, Hollein starts drawing a plan of a house before taking a telephone call from a client, in which Hollein confirms that the design is progressing well and agrees to a meeting with the client. Archetypical architectural tools—such as a pencil, ruler, drawing board, eraser, and telephone—are used to evoke the now-redundant work of the architectural office. Hollein's performance both declared the immediate realization of the utopian promises of other bubble inflators and deflated them by showing the architect trapped in a professional routine, much harder to escape than the office itself.