

Sleep as Movement/Sleep as Stillness: Colliding "Objects" at the Scientific Exhibition Dreamstage (1977)

Lunzer, Mina

Veröffentlichungsversion / Published Version

Zeitschriftenartikel / journal article

Zur Verfügung gestellt in Kooperation mit / provided in cooperation with:

GESIS - Leibniz-Institut für Sozialwissenschaften

Empfohlene Zitierung / Suggested Citation:

Lunzer, M. (2023). Sleep as Movement/Sleep as Stillness: Colliding "Objects" at the Scientific Exhibition Dreamstage (1977). *Historical Social Research*, 48(2), 115-134. <https://doi.org/10.12759/hsr.48.2023.18>

Nutzungsbedingungen:

Dieser Text wird unter einer CC BY Lizenz (Namensnennung) zur Verfügung gestellt. Nähere Auskünfte zu den CC-Lizenzen finden Sie hier:

<https://creativecommons.org/licenses/by/4.0/deed.de>

Terms of use:

This document is made available under a CC BY Licence (Attribution). For more information see:

<https://creativecommons.org/licenses/by/4.0>

Sleep as Movement/Sleep as Stillness. Colliding “Objects” at the Scientific Exhibition *Dreamstage* (1977)

Mina Lunzer *

Abstract: »Schlaf als Bewegung/Schlaf als Stille. Kollidierende ‚Objekte‘ in der Wissenschaftsausstellung *Dreamstage* (1977)«. This contribution analyzes the much-acclaimed exhibition *Dreamstage*, initially presented at the Carpenter Center for the Visual Arts in Cambridge, Massachusetts, USA, in 1977. Based on conceptual papers, private correspondences, press releases and reviews, etc., it will claim that, at the time, divergent cultures of knowledge had created divergent objects of “sleep”: On the one hand, participating scientists and artists at *Dreamstage* represented what shall be called “sleep as movement” – by underlining the hidden activities of the sleeping body. Yet, popular cultures regarded sleep as opposing movement – a poetics, that shall be called “sleep as stillness,” would frame, or even romanticize, sleep as an act of refusal or pacifistic resistance. In virtue of their constituent logic, both objects were found to collide. Throughout the 20th century, representations of “sleep” and “dreams” were shaped via multiple applications of objectifying/observational, time-based technologies (e.g., Electroencephalography [EEG], Magnetic resonance imaging [MRI], film, or video). This allowed for a circulation between laboratory, cinema, and television, in which knowledge appears to be consolidated again and again. “Sleep as stillness” and “sleep as movement” are thus developed from the case study to better grasp these formations since the late 20th century.

Keywords: Movement, time-based media, sleep research, dream research, neurosciences, representation, contemporary art history, film theory, Ted Spagna, J. Allan Hobson.

1. Introduction

At the far end of the *Dark Space* lay the “sleeper,” illuminated behind one-way glass. The sleeper’s physiology was monitored by a polygraph machine over

* Mina Lunzer, Department of Cultural History and Theory, Humboldt-University Berlin, Georgenstraße 47, 10117 Berlin, Germany; mina.lunzer@posteo.eu. ORCID ID: 0000-0003-1732-4389. This contribution was supported by a “Wissenschaftsstipendium” grant awarded by the Cultural Department of the City of Vienna in 2022.

16 channels. A mirror prism reflected the live tracings of muscle tone, eye movement, heart rate, and brain activation to project them onto a wall with a laser. A hanging screen presented a video of the reclining body together with the polygraph's read-out projections. The sleeper's tracings were further fed into a synthesizer and amplified into sound. Two illuminated pedestals were positioned in front of the sleep chamber: On the left side, an entire preserved human brain, floating in the center of a light box. On the opposite side, the X-ray of a human skull.

The main hall of the exhibit, the *Light Space*, was conceived as the rationale – the narrative and explanatory complement to the *Dark Space*. It consisted of large wall panels with graphics and instructional material about current sleep research and dream theories. The sounds – as taken from the sleeping body – were played there (Dreamstage, n.d.).

Dreamstage was open from April 22, 1977, through May 21, 1977, at the Carpenter Center for the Visual Arts Exhibition Hall in Boston, MA, USA. Access was provided only at night, from 5 p.m. to 11 p.m., at no charge, six days per week. Conceptualized by the neurophysiologist and psychiatrist J. Allan Hobson, the sound artist Paul Earls and the photographer Theodor Spagna, *Dreamstage* was funded by an education grant from Roche Laboratories, a division of Hoffmann-La Roche, Inc. According to the makers, the prototype version of the *Dreamstage* exhibition at the Carpenter Center would have attracted a record attendance of well over 10,000 visitors (Dreamstage, n.d.). Press coverage included reviews in *The Boston Globe* (April 27, 1977) and *Harvard Magazine* (July-August 1977) as well as a lead feature in *The New York Times* (May 16, 1977). A revised version of the article by its author Carey Winfrey (Winfrey 1977) also appeared in the *Chicago Tribune*, the *San Francisco Chronicle*, and the *San Diego Sun*. The later US-travel version of the exhibition was shown at renowned exhibition venues such as the Exploratorium (San Francisco), St. Louis' Old Post Office (Atlanta), the Pacific Science Center (Seattle), the Museum of Science (Boston), and The Dallas Health and Science Museum (November 15, 1980 – February 1, 1981). In 1982, *Dreamstage* was shown in Bordeaux, France. Before opening in Dallas, it was estimated by the exhibition coordinator, Noreene Storrie, that 135,000 people had already viewed the exhibit; publicity surrounding the installations reached another 11 million, and articles or broadcast pieces on sleep and dreams that included material from the exhibit were reported to have been seen by another 50 million people (Storrie 1981, 23-4). In 1978, *Dreamstage* received the Gold Award for science exhibits by the American Psychiatric Association (APA). Yet, despite the mainly favorable publicity, visitors were not generally at ease with the scientist's intrusions into sleep. Or, as a 10-yearold visitor put it: "It gives people the creeps."

Sleep, in contrast its traditional characterization as universal or a-historical, has been described in recent decades as bound to practices that generate

knowledge about the phenomenon. Throughout the 20th century, these practices themselves were bound to – and shaped by – objectifying, time-based media technologies. My research has been concerned with those media, particularly film and video, with respect to their widespread application: Did the use of similar (time-based, objectifying) technologies across disciplines in the 20th century lead to similar objectifications of “sleep” and “dream”? Or are their respective objects rather different, perhaps even opposed to one another? If so, why?

The term “object” is used in reference to historic epistemology, as it addresses the role of media as ensembles of techniques and methods that turn things into objects of knowledge (Rheinberger 2001) to shape psychological and physiological phenomena (Borck and Schäfer 2005). The objects to be described in the following have thus been “made” through methods and practices – whether via observation, performance, or in direct reference to those objects.

As to the focus on *media at use* and the specific range of their limits and possibilities for representing sleep and dreams, my research crossed scientific and artistic disciplines. This work began in 2009 via a film experiment in which the dream scientist J. Allan Hobson himself had become a subject of research.¹ The emeritus professor from Harvard Medical School, neuroscientist, and psychiatrist had begun brain-based dream research in the 1970s and ever since has worked on dreaming. As Hobson was one of the main developers of the prototype *Dreamstage* exhibition at the Carpenter Center for the Visual Arts as well as the touring version, the exhibition later came into focus as well. I was able to give it special attention in 2015 on a research trip undertaken to view his private collection, which also included the holdings of his Dream Science Museum, both of which were located in Vermont.²

For this contribution to “Sleep – Knowledge – Technology,” I focus on the *Dreamstage* exhibition as a case study through which I analyze representations of sleep. I therefore suggest that the application of objectifying and time-based media has led to at least two divergent objects about sleep in the 20th century.

¹ In reference to Nathaniel Kleitman’s famous cave experiment, we spent ten days in a remote country house in Mitogio, Sicily: J. Allan Hobson and his inner family, the camera operator Ute Freund, the sound operator Peter Kutin, and me, who was conducting the film study. We were recording whatever caught our attention during days of work, dinners, and spare time, engaged in long interview sessions, and we were allowed to record Hobson’s nighttime sleep. At the end of our stay, based on the nighttime recordings, Hobson unexpectedly diagnosed himself with severe sleep apnea. This basic research was supported by the ZKM Center for Art and Media, Karlsruhe (Germany), the Academy of Media Arts Cologne (Germany), the Federal Ministry for Education, the Arts and Culture (Austria), the Ministry of Art and Science (Austria), and the City of Vienna (Austria).

² The Dream Science Museum website can be viewed here: <https://dreamstage-museum.net/pages/home.html> (Accessed March 29, 2023). It also offers images of a reconstruction of the *Dreamstage* exhibition.

The first object, which I call *sleep as stillness*, emerged against the backdrop of the widely perceived (technologically enhanced) acceleration of the life world. It became an object of fascination with sleep as deceleration and regarded or even romanticized the state as a condition that ranges from peaceful recreation and artistic contemplation to a conscious act of refusal. The other representation, which I call *sleep as movement*, emerged against the backdrop of stillness. Fascination with sleep as movement arose from observing activity during sleep, resonating with the rise of sleep research in the 19th century and seems to have peaked, together with the notion of *sleep as stillness*, as an object of the arts and sciences in the late 20th century.

Both approaches objectify sleep, and both derive from a similar desire: To adapt a conception of *sleep* to a changing social and technological environment. Yet, these objects implied divergent and even contradictory ethics – ranging from the personhood of the sleeper to the conception of the dream. In the next section of this contribution, I argue that the makers of the *Dreamstage* exhibition, scientists and artists alike, implicitly drew on the representation of *sleep as movement*. Divergent disciplines and approaches – such as neurology, psychiatry, photography, film, sound, and visual arts – were inspired by the exploration of possibilities offered by time-based technology to facilitate the observation of movement during sleep. This allowed for a trans-disciplinary endeavor. Aptly, the project originated in Boston, a city that has been historicized, conceptualized, and presented as a place for (technological) innovation.

In the second section, I describe how, at the *Dreamstage* exhibition, *sleep as movement* and *sleep as stillness* collided. As historic actors existed in both cultures of representation at once, with knowledge circulating among them, the two objects faded into one another. This circumstance can be retraced in contradicting aesthetic gestures presented at *Dreamstage*. While some cross-references might have contributed to the overall mediation of the subject, others produced profoundly unwanted effects. “Uncanniness” and “creepiness” were the most disturbing qualities to the audience as well as to the makers. Subsequently, elements of the show became subject to an inner controversy. Yet, even adaptations never seemed to resolve the problem. As shall be shown, the conflicts arose mainly in the domain of the *personhood of the sleeper*.

It is not the aim of this essay to claim that the exhibition was created inconsistently. I instead regard the collision between *sleep as movement* and *sleep as stillness* as an overlooked qualitative result of the exhibition’s earliest experimental approach: divergent aesthetics manifested at *Dreamstage* that otherwise would have remained invisible and ungraspable.

In the third section, I describe the collision of *sleep as stillness* and *sleep as movement* as a phenomenon that persisted throughout Hobson’s later career. I will suggest it as a central reason for the controversial public and popular

scientific perception of his persona. In this case, the conflicts manifested mainly in the domain of *the dream*.

With the distance of time, the focus on the collision of these objects may help in analyzing fundamental challenges that have accompanied – and likely still persist in – any approach to a “dissemination of knowledge” about sleep. The following materials found in Hobson’s private collection, which include the holdings of the Dream Science Museum (Vermont), were relevant to this study: scholarly papers, with respect to predecessors and successors of *Dreamstage*; correspondence and concepts considered before, during, and after the making of the exhibition; visitor studies and evaluations with involved exhibition houses and museums; press reviews (newspaper and magazine articles, television broadcasts), as found in press clippings featuring Hobson and staff at Harvard Medical School on topics associated with *Dreamstage*; film material, such as TV reports on *Dreamstage* but also films documenting experiments at the Harvard Medical School laboratory. Film media of various formats were therefore transported to Boston and digitized at VIT Boston and Emerson College.

As mentioned, a series of supporting interviews was conducted with Hobson from 2009 to 2015. Hobson’s private collection as well as the interviews were presumed to support the actor’s personal experiences and narrative preferences. They were thus treated with care and checked via multiple sources, if possible. There has been no indication, however, that the structuring role of the media itself has been part of the scientist’s reflections. The concept of movement/stillness eventually evolved out of the distance of time – years after the research on source material had ended.

2. Disciplines over Technology?

The *Dreamstage* exhibition was from the beginning considered by its authors as an experiment, as acknowledged in the subtitle: *An Experimental Portrait of the Sleeping Brain*. Regarding the original concept outline, the collaborators saw *Dreamstage* in the tradition of artist and art theorist Gyorgy Kepes, who 25 years prior had assembled a “landmark exhibition” at MIT: *The New Landscape*, which “dwelt upon the evolving vocabulary of vision, perception and experience.” *Dreamstage* too would strive to present a new aesthetic. This time, it was to derive from the human brain, as “the ultimate in documentary self-portraiture,” eagerly following Kepes to “assimilate with the scientist’s brain, the poet’s heart and the painter’s eyes” (*Dreamstage*, n.d.).

Experimental aesthetic ambitions appear to have faded away over the life of *Dreamstage*, not least for the fact that, while the Carpenter Center for the Visual Arts was an art space, the institutions to follow would be mainly science museums.

At a conference on “International Perspectives on Museums of Science and Technology,” Storrie, the exhibition coordinator, saw the exhibit’s form and content already in an alternative order: It would stem from its “scientific purpose to portray brain science – anatomy, physiology, behavior, and psychology – through sleep, in such a way that the visitor is stimulated to learn more about neuroscience and himself.” While Storrie conceded that “the psychological aspect of sleep, although part of the original concept of the exhibition, has not been developed,” the experimental art movement is regarded as merely an *influence*, resonating in “a theatrical environment and a number of multimedia presentations” (Storrie 1981, 23).

To the public, *Dreamstage* was usually presented as an exhibition on sleep and dreams. In line with this positioning, the exhibition catalog opened by describing dreams as “a recurrent theme in the art of all ages and cultures. The dream state, represented artistically, is one of heightened poetry, bizarre images, intense romance, untrammelled imagination, and access to hidden truths” (Hobson 1978, Preface).

After all, *Dreamstage* appears to have been torn between conflicting perspectives from its earliest steps – as a contemporary artistic exhibition, an exhibition on brain science, or an exhibition of sleep or dreams from one or the other perspective. In the following, I will argue that there was an implicit approach and aesthetic that had the capacity to tie all those strands together.

3. Sleep as Movement and the Beginnings of Dreamstage

The *Dark Space* had been built to represent sleep. It was a self-contained structural unit that was 4.7 meters high and 20 meters wide. The interior of the *Dark Space* was covered with around five centimeters of soft foam cushioning. Upon entering, visitors were asked to remove their shoes. Distributed around the room were pillow bolsters; some held tape recorders that were replaying spoken dream reports. Everything in the *Dark Space* was designed to be viewed lying down.

Projected onto the ceiling were photographs of sleepers taken from above, straight onto the bed. The sleepers had been observed via time-lapse photography at either 7.5- or 15-minute intervals during the course of a night and were presented in slide form. As if performing a dance, bodies, pillows, and duvets were floating wildly across the rectangular form of the bed.

The recordings of the polygraph – as taken from the live sleeper in the sleep chamber – were transcribed into sounds and visual motion created by lasers. The green laser line represented the sleeper’s brain wave activity, the yellow stood for the heartbeat, the red for muscle tone, and the blue line represented

eye movements. Visitors were encouraged to remain in place in the *Dark Room* for a full sleep cycle of 90 minutes. During the rapid eye movement (REM) phase, the blue line was described as having become very active, while at the same time the red line, reflecting the loss of muscle tone, would diminish. The performance was designed to demonstrate the intense movement of the closed eyes during REM sleep: the phase of sleep where most dreaming activity was hypothesized to take place.

Ever since the application of sleep-recording apparatuses, sleep scientists had aimed to make sleep tangible and visible – whether in the form of curves, a continuous stream of data or time lapses strung together into a series. When light sensitivity and recording time increased, the video camera became an integral element of sleep research.

The approach to dreaming via the observation of sleep is situated in the Western tradition of inscribing thinking to the locality and materiality of the brain.³ In 1956, this epistemology intersected with sleep research when Nathaniel Kleitman first correlated Electroencephalography (EEG) registrations with REM. In wake-up studies during REM, dreams were reported (Aserinsky and Kleitman 1953).

Ever since that time, the sleep laboratory had provided the technological and architectural structure for sleep and dream research on the basis of the observation of movement. The logic of the white or black cube (black, as it allowed for projections) of the exhibition space would seamlessly accommodate the aesthetic logic of the laboratory.

“[...] squiggly, dancing lines and colored light projected on the exhibit’s walls,” Carey Winfrey (1977) wrote in her review for *The New York Times* on *Dreamstage*. Together with the time-lapse photographic series, the visual tracings as taken from the live sleeping performance gave a sense of the vigorous movement that would take place over the course of a night of sleep.

Independent discipline-specific, artistic, and scientific approaches at *Dreamstage* were unified by the aim to expose, to reveal, and maybe even to decipher the *movements* of a supposedly still state. This was made possible mainly through the application of time-based media. Furthermore, the location of its origin, Boston, would have taken on a role in this unification.

One of the cultural historical imprints from which *Dreamstage* derived had been the collaborator’s associations with the Boston Museum of Science and the Bicentennial exhibition “XIXth-century Boston.” The Bicentennial had taken place in Boston from spring 1975 to autumn 1976. It depicted the life of the city as a center of culture and invention during the second half of the 19th century.

Hobson, then the principal psychiatrist and director of the laboratory of Neurophysiology at the Massachusetts Mental Health Center, was serving as

³ On the history of this tradition see, for example, Hagner (2000, 2006).

a member of the Society for Neuroscience's Advisory Committee to the Boston museum's brain exhibit project. By paralleling REM sleep with the concept of dream phases, Hobson and his then-colleague at Harvard, Robert McCarley, had for years investigated dreaming. Their main body of research had focused on single-neuron signaling in the brain stems of cats during REM. According to their activation-synthesis hypothesis, developed from those studies, the forebrain would synthesize brain stem circuits and memory to create a dream. This finding was presented as evidence of physical determinations of the dream process (Hobson and McCarley 1977). In consequence, the two scientists declared those psychoanalytic concepts on dreaming, which Sigmund Freud had modeled from neurobiological assumptions about 80 years earlier, inaccurate. This was especially directed at Freud's wish fulfillment-disguise theory of dreams (McCarley and Hobson 1977).

Through the organization of the Bicentennial, Joan Hobson, who was a program coordinator and Hobson's wife, had worked with Paul Earls, a multimedia artist and composer at the MIT Center for Advanced Visual Studies, and his colleagues on several art projects.

Hobson met with Earls in winter 1974/75. Over the course of a weekend, they decided to transfer the brain-based approach to dreaming into a multimedia exhibition. There they also conceived the idea of the *Dark Space*, a domed structure holding a wired live sleeper and laser art.

In the spring of 1976, Robert Gardner, Director of the Carpenter Center at Harvard University, volunteered to mount *Dreamstage* at the Center if they were able to find funding for it. Gardner, an acclaimed anthropologist and filmmaker, introduced the collaborators to the work of an incoming lecturer at Carpenter Center, Ted Spagna, a photographer, filmmaker, and native of New York City, who had graduated from Cooper Union and Boston University. At the time, he had directed a commercial feature-length film and published his photography in the *New York Times* and *Japan Architecture*. Two years prior, in New York, Spagna had initiated a photographic series of sleeping persons. That was when he had freshly acquired a camera with the technical features that would allow for such a project. Reminiscent of Eadweard Muybridge's pioneering work in photographic studies of motion, Spagna used the time-lapse technique to represent sleep at various intervals over the course of a night.⁴

After their first meeting, Spagna and Hobson immediately set about conducting a study together to capture features of sleep behavior available only to direct observation via the use of an intervalometer-controlled camera. Hobson used Spagna's series to further observe an absence of movement

⁴ An extensive sample of sleep photography conducted by Ted Spagna can be viewed at <https://www.tedspagna.com/sleep-photography> (Accessed March 29, 2023).

during sleep phases and thereby demonstrate the persistence of sleep cycles (Kodak International Photography 1980, 15).⁵

According to Hobson, Spagna was asked to become the third principle collaborator at *Dreamstage* for three reasons: the “technical finesse” of his time-lapse studies, their scientific importance, and the “human factor” in his photography. Spagna accepted.

At first, however, an application for the funding of *Dreamstage* was turned down by the National Science Foundation (NSF) and 20 other organizations to which the team had applied. At a sleep research meeting in Cincinnati, OH, Hobson then presented Spagna’s photographs arranged along a timeline to prove that body positions do not change during REM. The photographs attracted the interest of Howard Rofsky and Ned Putnam from Roche Laboratories, a division of Hoffmann-La Roche, Inc. They expressed interest in acquiring the image rights for their advertisements. Subsequently, Roche Laboratories funded the first *Dreamstage* exhibition in Boston as well as its later tour.

In 1979, a Washington-based consumer group published a “White Paper on Science Museums,” claiming that public museums of science often served as “advertising showrooms” for the nation’s largest corporations.⁶ Based on available historical documents, however, there is no indication that Hoffmann-La Roche, Inc. sought to influence the content or presentation of *Dreamstage* (that would also have been a reason for its not being shown at institutions such as the San Francisco Exploratorium, which explicitly did not accept industry-funded exhibitions). Certainly, the company was seeking to be associated with sleep research as well as state-of-the-art basic research in (brain) science at a time when increasing sleep-related prescription drugs, deriving from experimental laboratory practices, was still seeking a physiological foundation.

In any case, Roche’s earlier request to use Spagna’s photographic series for advertisements (presumably for sleep-inducing drugs) can be read as a sign of an even more pragmatic necessity: Representational images of *sleep* have presented a constant, yet disregarded, challenge over the long history of Western image-making. This challenge can be attributed to the immanent stillness of single/still images, which pertains to all traditional media – from drawing and painting to sculpture. This problem materializes when signifying the stillness of sleep. Since its invention, photography had been regarded

⁵ The experiment is also mentioned by Ted Spagna himself in a radio interview for WNBC-TV in New York, regarding the typescript transcription of the show entitled “Radio TV Reports, Inc. Broadcast Excerpt,” 1977. An additional guest was Robert McCarley.

⁶ To secure funding for exhibits, many financially hard-pressed museums would have accepted exhibitions that were directly donated by a given industry that would design, build, and write the text on certain subjects. The Center for Science in the Public argued that, thereby, corporations could avoid controversial public policy issues such as health dangers and environmental issues (Putzel 1979).

as an “imprint of reality” and thus was frequently confronted with the allegations that it turned *the living into the dead* – by imposing a kind of *rigor mortis* on the flow of life.⁷ Consequently, the stillness of photography and its heightened objectification culminated in the representation of “sleep.” In other words, the vitality of the sleeper – the fact that the sleeper was alive, not dead – would be even more difficult to signify than in any other still medium. Representation of *sleep as movement* in photography, as in Spagna’s time-lapse studies, were thus not only making invisible movement visible, they also succeeded in a much wider and a much more general sense: by contributing *the very first credible representation of sleep in the medium of photography*.⁸ This form of representation would correspond to the particular possibilities and limitations of the medium and thereby extend cultural knowledge.

The *Light Space* held two displays entitled “The Scientist as Artist” and “The Artist as Scientist.” The “Scientist as Artist” presented scientific drawings and photographs of the brain by Rafael Lorente de Nó, Thomas and Clinton Woolsey, Arnold and Mila Scheibel, and Ruth Bleier, among others. In style, they ranged from hand-painted images of the Cajal Institute to then state-of-the-art computer graphics. The “Artist as Scientist” contained a further series of time-lapse photographic studies – like those in Spagna’s slide show. The series displayed the sleep of infants, couples, the elderly, other individuals, and animals alike. When the exhibition toured in Dallas, the latest work, showing a sleeping tiger, was among them.

Two other artists contributed to the *Dark Space* at *Dreamstage*: Ragnhild Karlstrom composed a large mural of changing slides made by photographing microscopic sections of the brain’s sleep-control sites. Clara Wainwright designed bed coverings for sleeping subjects.

Notwithstanding the lack of an articulated general concept, *Dreamstage* aimed to fuse artistic and scientific disciplines. As was meant to be shown, the contributions were *indeed united* – via a mutual endeavor to reveal hidden *movement within (supposedly still) sleep*.

4. Sleep as Stillness

“[A] temporary and passive diminution of life itself” is how the historian of sleep science Kenton Kroker (2007, 5) had phrased a common view of sleep in accordance with Georges Canguilhem. Once sleep became an object of increased scientific curiosity in the 19th century, this view transformed – for sleep science.

⁷ For a discussion of the association between death and photography, see Ruby (1995) and Sontag (2013).

⁸ For an elaboration of the iconographic problem involved in representing sleep, see Lunzer (2019).

For everyday experience, however, the intrigue regarding the passive state did not vanish; In 1963, Andy Warhol's silent 16 mm film installation "Sleep" had famously displayed a naked sleeper for about eight hours, in framed body parts as a projected sculpture (with only minimal movements such as the rising and falling of breath). In 1995, the actress Tilda Swinton would sleep publicly on site at the Serpentine Gallery in Royal Park of Kensington Gardens, again a year later at Museo Barracco in Rome, and eventually in 2013 behind glass at The Museum of Modern Art (MoMa) in New York for a performance entitled "The Maybe."

Despite – or perhaps because of – the rapid spread of time- and motion-based technology and its effects (such as the increasing speed at which film could be edited), the stillness of the sleeping figure gained particular attention: The poetics of *sleep as stillness* was not meant to entertain but to oppose – to oppose the ever more widely perceived acceleration of city life, leisure time, and work.

On closer look, Warhol had not displayed an interchangeable model: The subject was his friend and lover, the poet John Giorno. In the case of Swinton, the favored actress of painter/filmmaker Derek Jarman, who would receive an Oscar in 2008, she had become famous during the period in which she exposed her sleeping self recurrently – garnering increasing public attention. But already in 1969, John Lennon and Yoko Ono had welcomed the press to interview them in bed (the "bed-in") in their protest for peace and against the Vietnam War.

Against the backdrop of movement, the bed throughout the 20th century framed "sleep" not only as a place for (muscular) relaxation: It turned *the sleeper* into an icon. The public sleeper inspired by a gesture of refusal (against movement), by representing fragility and/or pacifistic resistance. What may have begun in the experimental arts would become increasingly popular: Up to the present moment, numerous public sleeping performances have been staged.

"Many find it hard to believe that the entire video and audio display has been generated as apparently static form. [...]" The TV Report "Dreamscape," by the reporter Gail Scott, introduced the reclining figure of the sleeper at *Dreamstage*.⁹ As I show below, the live sleeper and the *mise-en-scène* of the *Dark Space* incorporated an entirely different system of significations and ethics. In consequence, *movement* and *stillness* collided – mainly in the domain of the *personhood of the sleeper*.

"A Real Dream Job: Starring in 'Show' While Fast Asleep," *The New York Times* entitled its article on *Dreamstage*. "Opening night was a great success I am told, though I wouldn't know as I slept through it," the article quotes the sleeping subject's journal. "The hours are terrible but the money's good

⁹ Part of the film collection had been digitized in the course of the research.

considering the nature of the work: to sleep, perchance to dream. Ben, an M.I.T. sophomore who treasures his anonymity, gets paid \$100 to sleep from 5 to 11 p.m. six nights a week” (Winfrey 1977).

The light-hearted joke plays with the contradiction between the “job” (as movement) and “sleep” (as stillness). At each location, *Dreamstage* collaborators would have to be looking for local residents to play the role of a live sleeper: To find a human subject or performer, they themselves must have drawn on this contradiction in their press release to promote the exhibition. With evident success: Over a hundred headlines in newspaper press clippings throughout the US referred to: “A job to dream about” (*The Boston Globe*, November 2, 1979), “Rest assured, job a dreamy chore” (*Boston Herald American*, October 26, 1979), “Sleep on the job and get paid for it” (*New England Newsclip*, October 27, 1979), “How about \$150 a Week To Sleep on the Job” (*Manchester Union Leader*, October 27, 1979). *Dreamstage* makers themselves reused the analogy later to advertise the show: “Come watch people sleep on the job” (*The Boston Globe*, January 24, 1980). In the same manner, countless reports on and reviews of *Dreamstage* would eventually refer to the role of the live sleeper as a job on which to hang the story.

The joke did not improve the ever-implicit exhibition design to present *movement* within sleep. The reference would instead draw on *sleep as stillness* – opening associations of sleep as an act of refusal of acceleration, particularly refusal to meet the demands of work life. Ironically, sleep research itself derived from the scientific studies of the productivity of labor with an interest in controlling individual physical needs¹⁰ – a science, that had been created in favor of improving productivity over rest, the body over the person, waking over sleep.

At first, however, the makers of *Dreamstage* were happy to fuel the fire that attention to the live sleeper caused: While Benji, an M.I.T. student, was introduced to the press at the Carpenter Center, Tina, a sleep research student from Stanford University, was presented sleeping at the Exploratorium. Above all, it was Debbie, a nurse exhibited at the Boston Museum of Science who would share the bed with her cat, who garnered the greatest media attention (*Boston Herald American*, November 29, 1979).

Yet, in sharp contrast to the representation of *sleep as stillness*, the choice of the person to represent *movement* was meant to mirror universality: “To avoid the obvious charge of sexism, I selected a male but one whose long hair would give a unisexual universality (as well as an intriguing polymorphism) to the subject of the show – which was not sex, but his bedfellow, sleep,” Hobson (n.d.) remembered.¹¹ The aim to erase all personal attributes and cultural

¹⁰ On sleep and economy, see Cray (2013). On the history of sleep research, see Williams (2005); Ahlheim (2018).

¹¹ The purpose of the writing on its own account lay “[i]n striving here to achieve clarity of expression of my own personal view of the conceptions of *Dreamstage*.”

significations of the sleeper might have backfired, as the attention on the subjects ran out of control:

It was a constant source of amazement to me, that our human subject attracted such intense, varied, and sustained interest. Man's narcissism and voyeurism combined in a multiplicative fashion around the sleeper. [...] From the night of the opening onward, the press constantly pushed on the sleeper's anonymity and privacy: his motivation, his family life, his girlfriend, and even his bedroom were probed by reporters. (Hobson, n.d.)

The team avoided providing more information about the live sleeper. Instead, the show returned to its underlying approach to represent *sleep as movement* and to regard the live sleeper as an experimental subject of artistic and scientific curiosity: e.g., in the attachment of electrodes to the immobilized body or in the display of artifacts such as the real brain of a dead person – whose identity and history remained undisclosed.

The effect of the colliding aesthetics, to regard *sleep as movement* and yet to refer to the aesthetic of *stillness*, would have been carried further by Paul Earls. The sound artist rendered the sleeper's bodily signals into "haunting, electronic music, hinting of some future world," as Winfrey (1977) perceived it according to her review. Perhaps the way the narrative of *Dreamstage* played out was best expressed by Tina the nurse, the sleeper at the Exploratorium. As an effect of sleep deprivation, she described a delusion to the *San Francisco Examiner*:

I had this strong belief that they were trying to program my mind. [...] It reminded me of a book I once read, "A Wrinkle in Time", about a planet where people are being held under the influence of a giant brain that controls everyone's mind. (Saltus 1978)

A significant share of the general public appears to have felt uncomfortable at the exhibition. Storrie (1981, 23), the exhibition coordinator, recalled that, while some visitors had become so enchanted they spent hours in the exhibit, others left confused and even angry. The conflicting feelings of fascination and revulsion remained a constant challenge to the makers of *Dreamstage* as well as to those managing the respective exhibition spaces.

After the first week of the exhibition at the Seattle Pacific Science Center, a representative, Linda Clingan, reported to the *Dreamstage* team that children would relate to the exhibit as a "spook house," stating that it would be "scary in there," "neat," or "really weird." Other than at the Carpenter Center, which had been an art space (where the show was open only at night), children formed the principal audience of visitors at science museums such as those in Boston and Seattle. According to Storrie, the brain generated the most comments from youngsters: "They call it *creepy* and the second most frequent question after *Is the sleeper real* was *Is this the sleeper's brain?* The questioner often becomes distressed when he learns it's not" (Storrie 1981, 23).

As a consequence, a psychological pilot study was conducted at the Boston Museum of Science in January 1980, entitled “Dreamstage: Impact of an Art/Science Exhibit in a Science Museum” (the contracting authority could not be clarified). The study consisted of semi-structured interviews with 68 subjects across all age groups. According to the study leader, Lawrence Jacobsberg (1980), older visitors were troubled by the same questions as the young. Yet, in being perhaps only slightly “more sophisticated,” grown-ups would ask for personal data about sleepers or tap on the window of the chamber to evoke a response.

The team at the Pacific Science Center further attributed the negative feelings to the expectations of a science museum audience that would want to carry away a clear science lesson, which *Dreamstage* did not offer. For the original exhibition at the Carpenter Center of the Visual Arts, the collaborators had indeed deliberately decided not to use any labels or narratives in the *Dark Space*. The makers had finally and reluctantly excluded even the pillow bolsters that held tape-recorders replaying spoke dream reports. The verbalization of dreams was perceived to have “fractured the ambience of the Dark Space” (Hobson, n.d.). In response to the critique, however, explanatory material was added at later shows: *The Dark Space* then included labels, and outside the space visitors could peer into lighted boxes with explanations of the neurophysiology of sleep. Additionally, exhibition catalogs and an introductory videotape were produced. Yet, none of these items seemed to solve the problem without creating others. Informative material suffered from being too technical and, with each new installation, it became more time-consuming to train visitor guides. Subsequently, for the show in Dallas, a small brochure was produced to serve as a tour guide.

The negative reactions contributed by visitors were also attributed to particular elements of the show: Clingan (1979) suggested removing the brain, as its value would be “primarily sensational and the association of the brain with the process of sleep is missed.” The study by Jacobsberg also scrutinized the brain, which was almost always described as “gross,” but also the human sleeper and the synthesized music, as they were labelled “creepy.” Jacobsberg recommended altering or removing the music for future exhibitions.

Eventually, the team attributed the negative reactions to the unique character of the *Dark Space* as a whole, which some visitors simply rejected as “a threatening atmosphere” (Storrie 1981, 23). Storrie still expressed hope for another study that would focus more deeply on the causes of the distress and their educational effects on learning about sleep.

As I suggest, it had not been a single element, nor even the overall atmosphere at *Dreamstage*, that caused the revulsion. It had been the juxtaposition of objects of knowledge about sleep as either *movement* or *stillness*, which collided in the domain of the *personhood of the sleeper*.

Knowledge is known to be in transit (Secord 2004) and even to circulate. At *Dreamstage*, each of the main actors lived in both worlds and had thus experienced both objects – *movement* and *stillness* – at once. This led one approach to fade into the other: personhood into the experimental subject, the specific into the general, and further, associatively: the human into technology, proximity into distance, the real into abstraction, warmth into cold. Given the conflict with the object of *sleep as stillness*, the initial unifying but underlying artistic and scientific approach to “represent the invisible” (*movement*) experienced disturbing setbacks that resolved into gestures of either irony or uncanniness. And yet, these gestures were conflicting enough for some visitors to call *Dreamstage* a “spook-house” or even to walk out in a rage.

5. Sleep as Movement in the later Work of J. Allan Hobson

Representation of sleep as *stillness* and *movement* were found to reoccur throughout the later career of J. Allan Hobson. Another field of conflict was then found in the domain of *the dream*.

In the years following *Dreamstage*, Hobson continued studying the mind using a brain-based approach. While his former colleague McCarley pivoted fully towards research on schizophrenia, Hobson remained concerned with dreaming and dreams alone: whether the formal aspects of dreaming, dream report studies (e.g., based on lab studies as well as by using introspection in thousands of Hobson’s own dreams), the effects of drugs on dreams, and or as one of the earliest advocates for research on lucid dreaming in the sleep lab.

In parallel, over the course of the later 20th century, the *dream* appears to have faded out as a cultural object. This can be seen, e.g., in an increase in exhibitions on *sleep* with a sharp decline in content on the topic of *dreams*.¹²

¹² In recent decades, the sciences and the arts increasingly focused on *sleep* while attention to *dreams* would decline: In 1999/2000, the *Musée Cantonal des Beaux-Arts in Lausanne* dedicated an exhibition to sleep: *Le Sommeil ou quand la raison s’absente*. In 2006, the *Residenzgalerie* in Salzburg declared that it had intentionally focused the exhibition *Süßer Schlummer* on sleep (from antiquity to the present), rather than on dreams. In 2008, the Syker Vorwerk Zentrum für zeitgenössische Kunst showed *Künstlerische Visionen des Schlafes* (“Artistic Vision of Sleep”), for which curator Susanne Hinrichs underlined as well that dreams had been willfully left out (Hinrichs 2008). In 2010, the exhibition *Sommeils Artificiel* (“Artificial Sleep”) at *Musée d’Orsay* in Paris, revealed sleep as one of the earliest subjects in staged photography. In 2017, the *Paula Modersohn-Becker Museum* in Bremen curated *Schlaf. Eine produktive Zeitverschwendung* (“Sleep. A Productive Waste of Time”) by concentrating on the figure of the sleeping body in the arts.

Exhibitions focusing on *dreaming* appear not only quantitatively rarer but show a tendency to historicize the dream: In the year 2000, the Wien Museum showed *Träume 1900-2000* referring

Within the logic of representing *sleep as stillness*, such a decline would be consequential: Stillness too adhered to objectivity, but at the same time its disregard of movement *hindered any signification of the dream*. As one possible solution, continuity theories, which regard dreaming as a continuous process shifting between sleep, waking, and lucidity, substituted for any “other world” approach (Domhoff 2017). As a discrete state, however, the dream would be degraded to a metaphor – of naïveté and unworldliness.

The vanishing of dreams had not occurred in *Dreamstage*, as the exhibition’s implicit focus lay in presenting *sleep as movement* – *thereby offering a signifier of the dream*.

In effect, even within the laboratory and experimental research, representations of the dream became precarious: To receive more “accurate” reference material that would at best resonate with the state of neuroscientific findings, Hobson became increasingly interested in informing film theory. Having come in contact with the academic art scene via *Dreamstage*, the scientist would contribute articles such as “Film and the Physiology of Dreaming Sleep: The Brain as Camera-Projector” (Hobson 1980) and “Dream Image and Substrate: Bergman’s Films and the Physiology of Sleep” (Hobson 1981), the latter for a publication by Vlada Petrić, the director, film scholar, and founding curator of the Harvard film archive, who had dedicated his lifelong attention to films as dreams. In 2015, Hobson published a book on the representation of dreams in art history *From Angels to Neurons* together with art historian Hellmut Wohl (Hobson and Wohl 2005). The approaches passed by film and art theory without much notice.

Finally, the photographs of Ted Spagna, would remain the most adequate representation of Hobson’s dream theory. In a gentle, mannered aesthetic with a focus on the shape of the body in movement, Spagna had underlined the personhood of the sleeper and still applied a notion of universality and scientific curiosity. This allowed the two divergent objects of knowledge to co-exist.

When Hobson disseminated his findings to the press, he would thus remain eager to offer Spagna’s time-lapse studies to accompany the article. It should be noted that, as to their representation of movement in the still medium of photography, these studies too provided the only credible signifier to represent sleep in print media. The photographic sequences thus became the most useful and most frequently used visual content to accompany magazine or

to Sigmund Freud and to Vienna as the “city of dreams.” In 2013, *La Renaissance et le Rêve* at The Musée d’Luxembourg in Paris called the period between the 14th and the beginning of the 17th centuries an ancient order of dreaming (Musée d’Luxembourg 2013, 13). According to the curators, the old order had disappeared from our memory as a result of the later “revolutions” of dreams and their “antagonists,” namely psychoanalyses vs. neurosciences (Musée d’Luxembourg 2013, 13).

newspaper reports, not only on *Dreamstage* or Hobson's work, but on any topic in current sleep research.

According to Hobson's own statement, Spagna increasingly demanded compensation for the wide distribution and exploitation of his work. As can be observed in letter correspondence with Hobson, no fees were paid to participating artists for *Dreamstage*, and negotiations with La Roche had reduced the artists' rewards to crediting and covering the costs of round-trip airfare. Spagna's photo series were eventually provided to La Roche Laboratories for advertising purposes, yet based on current source material, there is no indication regarding the arrangements for that transaction.

In May 1982, Hobson, together with Dr. Scott T. Aaronson at McLean Hospital, reported to the press the use of time-lapse television recording to study changes in body position in REM and non-REM sleep (Cooke 1982). As to several letters found in Hobson's private archive, dating from July to October 1982, Hobson and La Roche directly claimed the rights to Spagna's photographs for the *Dreamstage* exhibition that was about to be shown in Bordeaux and sought legal advice. Image rights conflicts had become frequent.

Over the decades to follow, Hobson became best known to journalists and their readers for his provocative anti-psychoanalytic claims. Attention peaked in his popular scientific dispute with fellow psychoanalyst and brain researcher Mark Solms – leading to such scientific paper titles as “The Ghost of Sigmund Freud Haunts Mark Solms's Dream Theory” (Hobson 2000), “Freud Returns? Like a Bad Dream” (Hobson 2004), and “In Bed with Mark Solms? What a Nightmare! A Reply to Domhoff” (Hobson 2005) as well as a DVD-released public debate that presented the discussion in reference to a boxing match (Hobson, Solms, and Chalmers 2006). At the same time, the variety of Hobson's own contributions to research on dreaming remained scattered.

Furthermore, Hobson became associated with calling the dream itself “meaningless” – initially in his critical opposition to the neuroscientific basis of psychoanalytic dream theory. This was a term he deeply regretted, and yet it seemed to have struck a chord: Despite later calling the dream even “hyper-meaningful,” it could never be fully revised.¹³

6. Conclusion

Ted Spagna died of brain lymphoma in June 1989 in Boston at the age of 45. The obituary in *The New York Times* called him “a pioneer in time lapse studies of sleeping animals and people, developing a non-intrusive technique for

¹³ As stated by J. Allan Hobson in the interview series conducted in 2009 in Mitogio, Sicily. Collection of interviews on sleep and dream research 2009–2015, Mina Lunzer.

filming as they slept” (*The New York Times* 1989). From what has been said, I would add that Spagna’s work was indispensable in four more respects: For delivering a *signification of sleep to the medium of photography*, for revealing a *hidden movement within sleep* – and thereby also providing a *possible signifier of the dream* – and for *mediating the ethics of stillness and movement via a code of gentility*.

Stillness and movement, both modes of representation, were used in objectifying “sleep” in the 20th century. These concepts were divided in a divergent approach to (media) culture: either in the curious application of time-based technology or in critical opposition to its accelerating effects. While *sleep as movement* would provide the inherent foundation of sleep and dream research, *sleep as stillness* would provide the inherent yet widespread foundation for regarding sleep within popular culture.

Each approach subsequently created a respective *object of knowledge about sleep* that would become a carrier of particular ethics. At the *Dreamstage* exhibition, the divergencies between the two collided mainly in the domain of the *personhood of the sleeper*: The movement of the sleeping body unified artistic and scientific curiosity. The stillness (in disrespecting movement) highlighted the personhood or even romanticized the sleeper for its exposed fragility, deceleration, and quiet resistance.

Throughout J. Allan Hobson’s later career, these collisions further manifested in the logic of the *dream*: Research from the perspective of *sleep as movement* aimed to grasp “the dream” as a discrete phenomenon. *Sleep as stillness* dissolved it, e.g., as a continuous mental process between sleep and waking. For science, these collisions would thus pose a new challenge to either adapt or find adequate representations of the object of research.

In closing, I would like to return to the overarching question of the production, application, and legitimation of knowledge. Both objects of knowledge about sleep appeared in flux but also experienced rigidification. This might be due to the same reason: their *implicit, unexpressed* character. The set of pre-assumptions, the limits and possibilities of the media, the network of significations, ethics and their circulations and collisions, however, complicate the idea of scientific “dissemination of knowledge.” Perhaps any such approach would thus have to be regarded as an element of experimental practices – as it had fueled the earliest scientific and artistic attempts to mount the exhibition *Dreamstage*.

References

Ahlheim, Hannah. 2018. *Der Traum vom Schlaf im 20. Jahrhundert. Wissen, Optimierungspantasien und Widerständigkeit*. Göttingen: Wallstein Verlag.

- Aserinsky, Eugene, and Nathaniel Kleitman. 1953. Regularly Occurring Periods of Eye Motility and Concomitant Phenomena, during Sleep. *Science* 118: 273-4.
- Borck, Cornelius, and Armin Schäfer. 2005. *Psychographien*. Berlin/Zürich: Diaphanes.
- Clingan, Linda. 1979. Memo to Michael Helmuth and Dennis Bonnie. Private Collection J. Allan Hobson.
- Cooke, Robert. 1982. TV cameras used to study sleep patterns. *The Boston Globe*, May 19.
- Crary, Jonathan. 2013. *24/7: Late Capitalism and the Ends of Sleep*. London and New York: Verso.
- Domhoff, G. William. 2017. The Invasion of the Concept Snatchers: The Origins, Distortions, and Future of the Continuity Hypothesis. *Dreaming* 27: 14-39. doi: [10.1037/drm0000047](https://doi.org/10.1037/drm0000047).
- Dreamstage. N.d. An Experimental Portrait of the Sleeping Brain. A Travelling Version of the Exhibition First Shown at the Carpenter Center for the Visual Arts Harvard University April 23 – May 22, 1977. Private Collection J. Allan Hobson.
- Hagner, Michael. 2000. *Homo cerebialis – Der Wandel vom Seelenorgan zum Gehirn*. Frankfurt am Main: Insel-Verlag.
- Hagner, Michael. 2006. *Der Geist bei der Arbeit: Historische Untersuchungen zur Hirnforschung*. Göttingen: Wallstein.
- Hinrichs, Susanne. 2008. *Was schläft – Künstlerische Visionen des Schlafens*, Catalogue Accompanying the Exhibition at Syker Vorwerk – Zentrum für zeitgenössische Kunst from 23rd of November 2008 - 15th of February 2009. Bremen: Eckstein-Verlag.
- Hobson, J. Allan. 1978. *Dreamstage Exhibition Catalogue*. Self-published.
- Hobson, J. Allan. 1980. Film and the Physiology of Dreaming Sleep: The Brain as Camera-Projector. *Dreamworks* 1: 9-25.
- Hobson, J. Allan. 1981. Dream Image and Substrate: Bergman's Films and the Physiology of Sleep. In *Films and Dreams, An Approach to Bergman*, ed. Vlada Petrić, 75-95. New York: Redgrave.
- Hobson, J. Allan. 2000. The Ghost of Sigmund Freud Haunts Mark Solms's Dream Theory. *Behavioral and Brain Sciences* 23 (6): 951-2. doi: [10.1017/S0140525X00494021](https://doi.org/10.1017/S0140525X00494021).
- Hobson, J. Allan. 2004. Freud returns? Like a bad dream. *Scientific American* 290 (5): 89. doi: [10.1038/scientificamerican0504-89](https://doi.org/10.1038/scientificamerican0504-89).
- Hobson, J. Allan. 2005. In Bed with Mark Solms? What a Nightmare! A Reply to Domhoff. *Dreaming* 15(1): 21-9. doi: [10.1037/1053-0797.15.1.21](https://doi.org/10.1037/1053-0797.15.1.21).
- Hobson, J. Allan. N.d. Dreamstage or Letting the Brain Speak for Itself. Private Collection J. Allan Hobson.
- Hobson, J. Allan, and Robert W. McCarley. 1977. The Brain as a Dream-State Generator: An Activation-Synthesis Hypothesis of the Dream Process. *American Journal of Psychiatry* 134: 1335-68. doi: [10.1176/ajp.134.12.1335](https://doi.org/10.1176/ajp.134.12.1335).
- Hobson, Allan, Mark Solms, and David John Chalmers. 2006. *Dream Debate. Hobson vs. Solms – Should Freud's Dream Theory Be Abandoned?* NetiNeti Media.
- Hobson, J. Allan, and Hellmut Wohl. 2005. *From Angels to Neurones: Art and The New Science of Dreaming*. Italy: Mattioli.
- International Photography*. 1980. The Camera As A Time Machine. Vol. 4. Eastman Kodak Company. Rochester, NY: 11-7.

- Jacobsberg, Lawrence. 1980. Dreamstage. Impace of an Arts/Science Exhibit in a Science Museum. Private Collection J. Allan Hobson.
- Kroker, Kenton. 2007. *The Sleep of Others and the Transformation of Sleep Research*. Toronto: University of Toronto Press.
- Lunzer, Mina. 2019. The Sleepless Dream, In *Histories of Dreams and Dreaming*, ed. Hendrika Vande Kemp, Giorgia Morgese, and Giovanni Pietro Lombardo, 219-45. Cham: Palgrave McMillan.
- McCarley, Robert W., and J. Allan Hobson. 1977. The Neurobiological Origins of Psychoanalytic Dream Theory. *The American Journal of Psychiatry* 134 (11): 1211-21. doi: [10.1176/ajp.134.11.1211](https://doi.org/10.1176/ajp.134.11.1211).
- Musée d'Luxembourg, Paris. 2013. *La Renaissance et le Rêve*. Paris: Réunion des Musées Nationaux.
- Putzel, Michael (Associated Press). 1979. Science museums under attack. *The Boston Globe*, May 28.
- Rheinberger, Hans-Jörg. 2001. *Experimentalsysteme und epistemische Dinge. Eine Geschichte der Proteinsynthese im Reagenzglas*. Göttingen: Wallstein.
- Ruby, Jay. 1995. *Secure the Shadow. Death and Photography in America*. Cambridge, MA: MIT Press.
- Saltus, Richard. 1978. The Woman Who Sleeps in a Fishbowl for Science. *San Francisco Examiner*, April 13.
- Secord, James A. 2004. Knowledge in Transit. *Isis* 95 (4): 654-72.
- Sontag, Susan. 2013. *Über Fotografie*. Frankfurt am Main: Fischer.
- Storrie, Noreene. 1981. Dreamstage. An Experimental Portrait of the Sleeping Brain. In *Towards the Year 2000. International Perspectives on Museums of Science and Technology*. Proceedings of a 1980 Conference Organized by ASTC and CIMUSET, ed. Victor J. Danilov, 23-4. *The New York Times*. 1989. Theodor Spagna, 45. Made Science Films. June 23.
- Williams, Simon J. 2005. *Sleep and Society: Sociological Ventures into the (Un)known*. Oxfordshire: Routledge.
- Winfrey, Carey. 1977. A Real Dream Job: Starring a 'Show' While Fast Asleep. *The New York Times*, May 16.

All articles published in HSR Special Issue 47 (2022) 4:
Sleep, Knowledge, Technology

Introduction

Hannah Ahlheim, Dariuš Zifonun & Nicole Zillien
Sleep, Knowledge, Technology. An Introduction.
doi: [10.12759/hsr.48.2023.13](https://doi.org/10.12759/hsr.48.2023.13)

Contributions

Julia Vorhölder
Sleeping with Strangers – Techno-Intimacies and Side-Affects in a German Sleep Lab.
doi: [10.12759/hsr.48.2023.14](https://doi.org/10.12759/hsr.48.2023.14)

Dariuš Zifonun, Svenja Reinhardt & Sebastian Weste
Rescaling the Patient. The Diagnosis of Sleep-Related Problems in the Sleep Laboratory.
doi: [10.12759/hsr.48.2023.15](https://doi.org/10.12759/hsr.48.2023.15)

Hannah Ahlheim & Jonathan Holst
“Masters” of Time. Chrono-Biologizing Sleep in the 20th Century.
doi: [10.12759/hsr.48.2023.16](https://doi.org/10.12759/hsr.48.2023.16)

Julie Sascia Mewes
Matters of Sleep. Sleep Timing Devices Towards a “Sleep of Any Time.”.
doi: [10.12759/hsr.48.2023.17](https://doi.org/10.12759/hsr.48.2023.17)

Mina Lunzer
Sleep as Movement/Sleep as Stillness. Colliding “Objects” at the Scientific Exhibition *Dreamstage* (1977).
doi: [10.12759/hsr.48.2023.18](https://doi.org/10.12759/hsr.48.2023.18)

Ben Lyall and Bjørn Nansen
Redefining Rest: A Taxonomy of Contemporary Digital Sleep Technologies.
doi: [10.12759/hsr.48.2023.19](https://doi.org/10.12759/hsr.48.2023.19)

Nicole Zillien, Nico Wettmann & Frederik Peper
Sleep Experiments. Knowledge Production through Self-Tracking.
doi: [10.12759/hsr.48.2023.20](https://doi.org/10.12759/hsr.48.2023.20)

Diletta De Cristofaro & Simona Chiodo
Quantified Sleep: Self-Tracking Technologies and the Reshaping of 21st-Century Subjectivity.
doi: [10.12759/hsr.48.2023.21](https://doi.org/10.12759/hsr.48.2023.21)

Christine Hine, Robert Meadows & Gary Pritchard
The Interactional Uses of Evidenced Sleep: An Exploration of Online Depictions of Sleep Tracking Data.
doi: [10.12759/hsr.48.2023.22](https://doi.org/10.12759/hsr.48.2023.22)