

Of Gravity and Geese

ON 1 AUGUST 2008, attentive passengers on the Trans-Siberian Railway passing through Novosibirsk in southwestern Siberia had an opportunity to see one, perhaps even two, amazing things.

The first was a total solar eclipse. Its path of totality—the path of the moon’s shadow—some 200 km wide, started in northern Canada, moved through central Russia, eastern Kazakhstan, western Mongolia and, finally, China. In Novosibirsk, starting in the late afternoon, the moon slowly slipped in front of the sun. At the moment of the sun’s full obscuration, the sky was cloudless. Normally invisible wisps of the solar corona came into view during the brief period of totality, as did the planets Mercury and Venus.

But in those few moments of darkness, something else was taking place. On a small island in the River Ob, 65 km south of Novosibirsk, Ljuba Beliazkaia sat in a chair equipped with an anemometer and other meteorological instruments. Clad in protective gear akin to a hazmat suit, the professional parachutist was also tethered to 13 specially trained white geese arranged in a haphazard V-formation (Fig. 1).

The whole scenario—the geese, the parachutist, the instrumented chair—was orchestrated by a German installation artist named Agnes Meyer-Brandis. For years, Meyer-Brandis had been intrigued by the perceptions and realities around “gravitational anomalies.” To investigate them, she founded an Institute for Art and Subjective Science in Berlin. Meyer-Brandis adopted the twin tools of Galilean gravitational investigation *Apollo 15* astronauts took to the moon in 1971—a hammer and a feather [1]—as the institute’s symbol. For years, Meyer-Brandis had probed and played with the real and imagined effects of gravity at meteor craters, junkyards of space debris and zero-gravity flights in the atmosphere. It was these forays into the boundary between falling and flying—what she sometimes termed “dropping studies”—that had brought her to this isolated islet in Siberia.

When the eclipse arrived, the early evening sky glowed with a pale and eerie orange-red light. The geese became very calm. Blackness descended. And, for just a moment, as Meyer-Brandis filmed, the large white birds seemed to vanish from sight. Had they flown? If so—where?

The origins for the performance Meyer-Brandis staged on the River Ob go back nearly four centuries. In 1638, an entry appeared in the Stationers’ Register, the book maintained by London’s publishing industry that recorded names of new books for nascent copyright purposes. It noted the publication of a work called *The Man in the Moone*. Subtitled “A Discourse of a Voyage Hither,” it is regarded today as the first English-language work of science fiction. Its author was not, despite the frontispiece’s claim, Domingo Gonsales—despite

that the latter is nevertheless an important part of the book—but rather an English cleric who had died five years prior.

Francis Godwin was born 1562 in Hannington, a small village about 100 km west of London. Educated at Christ Church in Oxford, where he learned some mathematical astronomy, the moderate Calvinist became bishop of Llandaff and then Hereford, where he served until his death [2]. Sometime in the late 1620s, Godwin—lauded by one contemporary as “a good *Man* . . . skilful *mathematician* . . . and incomparable *Historian*”—began to compose *The Man in the Moone*. The book’s incorporation of the era’s natural philosophy has helped scholars precisely date it. Godwin included, for example, an interpretation of magnetism, based on William Gilbert’s *De Magnete* (1600), as well as discoveries from the “new astronomy” as catalyzed by Copernicus, Galileo and Kepler.

The picaresque protagonist of *Moone* is Domingo Gonsales, a diminutive Spanish merchant and nobleman. Godwin’s choice was slightly daring, as his book’s narrator came from a nation with which the kingdom of England was at war. As the story unfolds, Gonsales is forced to flee Spain after killing a man in a duel. After visiting the West Indies, Gonsales is stranded on a remote but “blessed Isle of St. Hellens.”

It’s on that speck of land that Gonsales finds a means of escape in the form of a “certain kinde of wild *Swan*.” Christening them *gansas* (Spanish for geese), the slight Spaniard trained 25 of them to draw him through the air. Gonsales contrives an “Engine,” a pulley-and-string frame to which he harnesses the geese (Fig. 2). After trial flights around his island, he boasts of his plan to travel back to Spain so that he might “fill the world with the fame of my glory and renowne.”



Fig. 1. *The Moon Goose Experiment*, Island of the Sacred Scarab, launchpad in River Ob, near Novosibirsk, Russia, 1 August 2008. (© Agnes Meyer-Brandis, VG-Bildkunst)

Alas, when he is only partway home, an attack by the British fleet strands Gonsales again. As angry natives close in, the Spaniard flies with his *gansas* from the top of El Pico on Tenerife. Once aloft, however, Gonsales discovers the geese have their own intentions. The time of year is important here. As Godwin tells us, it was “now the season that these birds were wont to their flight away, as our cuckoos and swallows doe in Spain toward the autumnne.”

In the 17th century, many unresolved questions persisted around the causes for the annual migration of birds as well as their destination. One theory, put forth by Charles Morton and other natural philosophers, was that, come autumn, some birds migrated to the moon. Morton, an English natural philosopher who himself emigrated to the American colonies, based his theory on his readings of both science and scripture. His *Compendium Physicae* claimed, with its own internal logic, that since no one knew *where* birds went in the winter months, one could just as well suppose that they flew *off* the earth [3].

Morton’s supposition was also inspired by his reading of Godwin’s *Moone*, a book he learned of via John Wilkins, his advisor at Oxford’s Wadham College. Wilkins first achieved renown with the 1638 publication of *The Discovery of a World in the Moone*. Wilkins wrote his treatise to show similarities between our planet and its moon. In it, he referenced as evidence the experiences told by someone with the “fained name of Domingo Gonsales.” Like Morton, Wilkins maintained the consideration that birds, in general, might migrate off-world. Moreover, special sorts of birds could be the means through which people might perhaps fly. Wilkins later went on to co-found the Royal Society, a group occasionally mocked for its farfetched ideas. Society members even included those who “have been so *Planet-struck* as to dream of the possibility of a Voyage to the Moon, and to talk of making wings to fly hither” [4].

Back to Gonsales’s predicament: To his amazement and fear, “with one consent” the *gansas* rose up, “towing upward, and still upward.” The geese, yielding to their autumnal urge to fly—*where?*—soon proceeded to pull the Spaniard away. But, soon, the birds seemed to labor less. The lines connecting Gonsales to his geese slackened, and he found himself “having no manner of weight.” Freed finally from the earth’s pull, Gonsales found himself moon-bound.

Not all ideas au courant in early 16-century natural philosophy appealed to the cleric Godwin. Although offering one of the first descriptions of weightlessness, Godwin’s book attributed this curious state to diminishing magnetic attraction, not gravity. As Gonsales relates, he would not “go so farre as *Copernicus*, that maketh the Sunne the Center of the Earth, and unmovable.” Nonetheless, Bishop Godwin adopted an idea from Galileo—that the motion of the Jovian moons might be used to keep track of time’s passage—and had Gonsales use the Earth’s diurnal rotation to record the duration of his voyage. Slight in size and speculative in form, *The Man in the Moone* nonetheless gives a gauge of the degree to which new astronomical knowledge reached a wider audience in the 17th century.

In Godwin’s telling, Gonsales and his *gansas* touched down



Fig. 2. Image from cover of Francis Godwin’s 1638 book *The Man in the Moone*. Public domain.

on the lunar regolith in mid-September 1599 after a 12-day voyage. In actuality, this fictional moon landing occurred in the midst of a 17th-century space race. We might imagine 1638—the year both Godwin and Wilkins’s books appeared—as “England’s lunar moment” [5]. But unlike in the Cold War version, it was imagination, not hardware, that allowed early English readers to bound around the lunar landscape. Godwin made sure to describe his tale as “an essay of fancy, where invention is showed with judgment.” His speculations were aided by advances in scientific instrumentation and publications that helped bring the moon closer. In 1609, for instance, telescopic observations revealed the moon not as the unchanging sphere as imagined by Aristotle but earthlike, with a cratered and mountainous landscape. Moon-gazing grew in popularity. Hundreds of thousands of almanacs, printed annually in Stuart England, told viewers when they could see lunar eclipses. Two of these, in fact, occurred in 1638, the year Godwin and Wilkins’s books appeared, fueling the fad.

The Man in the Moone blended the picaresque genre with the travel narrative. Godwin’s Gonsales is a rapsallion bounding from one misadventure to the next in search of wealth and celebrity. After visiting the moon, Gonsales ends his sojourn by crash-landing his *gansa*-powered chariot in China, where he hobnobs with pagan (but nonetheless civilized) Mandarins before setting out for—but never actually arriving at—his native Spain. And Godwin, of course, was writing as European explorers were returning home with reports of discoveries in the Americas, Africa, Asia and the Antipodes.

Godwin's short book also addresses contemporary philosophical themes. Theologians and natural philosophers, for example, had long engaged one another about the issue of the "plurality of worlds" [6]. The rapid pace of new scientific ideas and discoveries revitalized these debates as astronomy intersected with religious concerns. Were there other worlds? Were they inhabited? If these other creatures were Christian, did Christ's sacrifice apply to them as well? Perhaps, as more conservative theologians argued, there was but one world. But, by Godwin's time, such views were on the defensive.

What of the lunar dwellers who greeted Domingo Gonsales and his *gansas*? Inhabiting an environment lush with trees and shrubs "at least three times so high as ours," they were likewise giant-size, but with a "color and countenance most pleasing." Godwin made his "Lunars"—to the relief of some theologians—Christian, perhaps even Catholic in that they recognize Gonsales's religious exclamations. More than a century after Thomas More penned *Utopia*, Godwin contrasted his more perfect lunar state, its citizens kind, devout and morally superior to earthlings, with the imperfect world marred by religious conflict, political turbulence and outright warfare that he (and Gonsales) called home.

Immediate reaction to Godwin's posthumously published book was diverse. William Poole, foremost scholar of *The Man in the Moone*, notes that the book's picaresque qualities resonated strongly with early readers, overshadowing the book's engagement with contemporary natural philosophy and cosmology. Godwin's fanciful flight struck many as a peculiar form of lunacy. Then, as now, "goose" stood for fool.

Despite some derision, Godwin's book enjoyed a long life, both in England and on the continent. Within two decades after its publication, translations of *Moone* in Dutch, German and French circulated. The playwright and libertine Cyrano de Bergerac encountered Godwin's book soon after copies of it appeared in Paris in 1648. In de Bergerac's own *L'Autre Monde, ou Les Etats et Empires de la Lune*, a fictional traveler goes to the moon and there meets "a little man . . . an European, native of Old Castile" who had found "a means by Birds to arrive at the Moon" [7]. No longer a welcome guest, in Cyrano's retelling, the man—clearly modeled after Domingo Gonsales—has been demoted by the Lunars to the status of a pet. Cyrano's own methods of flight ranged from the sublime—bottles of dew attached to him that, when heated by the morning sun, lift him upward—to the prescient: explosives. Translated into English, Cyrano's book—like Godwin's and Wilkins's—was part of the flood tide of lunar-themed books that circulated around Europe during the 17th century's space race.

Although woven into English comic opera and drama, Godwin's book was gradually occulted until the mid-19th century. Rediscovery followed, first by Edgar Allan Poe—the protagonist in his 1835 story "The Unparalleled Adventure of One Hans Pfaall" was also a lunar voyager of diminutive size—and then H.G. Wells, who adopted some of Godwin's ideas for his 1901 book *The First Men in the Moon*.

Then, some 330 years after Francis Godwin's death, the bishop's book was reinterpreted yet again. The result was an unexpected chain of events, taking us first to a sandy river

island in Siberia where the sun was fading, a laboratory in rural Italy, and ending—for now—at a decommissioned airport in Berlin.

In 2007, Agnes Meyer-Brandis, then in her early 30s, was preparing to experience her first zero-gravity environment. This would be created, courtesy of the German Aerospace Center, via a series of parabolic flights executed by a modified Airbus A300. During the brief gravity-free segments of flight, Meyer-Brandis would test an instrument she had designed to create and photograph "cloud cores." Meyer-Brandis's project was an artist's extension of the cloud chamber, a tool invented by physicists in the early 20th century to detect and record the otherwise invisible trajectories of subatomic particles. In her version, small particles suspended in air provided nuclei around which atmospheric water could condense. The plan was to study and photograph, while weightless, these small free-floating artificial clouds. Shaped by aesthetic sensibilities, it was an experiment with unpredictable outcomes [8].

Meyer-Brandis, who originally studied mineralogy at the University of Aachen before following her interests in art, found Francis Godwin's speculative fiction while researching the history of weightlessness in advance of her experimental flight. She decided to extend Godwin's account as part of an exploration of what she called "subjective science." By seeking and creating new and complex connections in those things often hidden or, at least, less visible, Meyer-Brandis envisions her art—a blend of traditional and new media forms—as a tool to establish and chart new realities. German media theorist Siegfried Zielinski described this method, sitting at the shifting borders of experiment, art installation and long-term performances, as research "capable of imagining art" while also "assuming experimental forms." These investigations—what will happen if I try *this*? what will I see?—drop exploratory probes into the working worlds of both the laboratory researcher and the studio artist.

The headquarters for Meyer-Brandis's investigations is a facility, part real and part imagined, that she calls the Research Raft. Initiated a decade ago to connect "artistic projects and research movements," its flexibility allows these studies to "peregrinate and sprawl" [9]. Her 2008 eclipse expedition to Siberia—retracing a path of study well worn by earlier generations of scientists—marked Meyer-Brandis's initial study of the latent possibilities concealed in Godwin's narrative. Using 13 birds raised on a farm near Novosibirsk, what Meyer-Brandis called the Moon Geese Experiment aimed to uncover the behavior of those special, perhaps hypothetical, *gansas* that Godwin had described as avian migrants between the moon and earth. "I was wondering," she said with mock seriousness, "if these cosmic phenomena [eclipses] would somehow influence the behavior of moon geese. Maybe they take off and fly to the moon with such a phenomenon?" [10] But, despite her careful instrumental readings and visual observations, there remained that unaccountable instant of totality when they seemed to vanish [11]. Faced with what she playfully labeled as "inconclusive results," Meyer-Brandis decided further experimentation was needed.

Perhaps the problem rested with the birds. In 2011, Meyer-Brandis floated her Research Raft to Pollinaria, a village in

east-central Italy, to launch an experiment of longer duration. Her Moon Goose Colony started with 11 new birds, each named after a spaceflight pioneer. It was a cosmopolitan flock. Besides Yuri, Neil and Buzz, there was Valentina, for the first woman to go into space, and Rakesh, named for the first Indian in space. And, of course, there was Gonsales. Although the incubation of a goose egg might last only a month, a bird's lifespan might be several decades; like many scientists' research programs, the Moon Geese Colony represented commitment (Fig. 3).

Meyer-Brandis combined her interest in the peculiarities of gravity with forays into ethology and human-animal relations. As the Austrian zoologist Konrad Lorenz demonstrated in the 1930s—in work that helped him win a share of a Nobel Prize in 1973—newly hatched goslings imprint on their parents [12]. Lorenz's most famous subject was Martina, a graylag goose that slept next to his bed and followed him around ceaselessly. Meyer-Brandis started her imprinting efforts with voice recognition while the goslings were still in their shells. Physical contact after their birth cemented the link. Short films created by Meyer-Brandis show her flock trailing her everywhere and getting quite vocal in their distress when she takes a short break (Fig. 4).

Training days were packed full of activities designed to foster their training as potential moon-bound *gansas*. A wooden rig similar to what Godwin described helped the geese learn the proper V-formation (Fig. 5). Swimming in a nearby lake provided “weightlessness training”—just as human astronauts train in specially designed buoyancy tanks—which was followed by tests of endurance. Training an astronaut, of course, demands attention to mind as well as body. While clad in a silver-hued flight suit, Meyer-Brandis read to her flock material about the dangers of orbital space debris along with lunar travel stories. She also briefed them—as much as one can brief a goose, anyway—on the mission for which they were all preparing. Corn kernels placed on a chalkboard schematic of a lunar rendezvous orbit allowed the geese to peck their way from earth to moon and back again, providing a mnemonic device for the path they might one day fly. Her geese have plenty to learn, but Meyer-Brandis's schedule for them stretches across many years. The first unmanned mission to the moon isn't planned, she claims, until 2027.

Despite such resolute training, in the films Meyer-Brandis

made, the presumed moon geese seem determined to remain earthbound. A colleague's hang-glider could not lure them into the air, at least not without Meyer-Brandis taking flight as well. More training was obviously needed. Therefore, she built a simulated lunar crater field at the newly christened Pollinaria Institute of Technology. Inspired by the Mars-500 mission, an international psychological experiment to simulate the isolation of long-term space travel, the “Moon Geese Analogue” facility she built provides ample space for the geese to gain experience for the harsh lunar conditions they might one day encounter. Goose-made tracks in the dirt seem to mimic boot prints left by astronauts on the lunar surface. Only the availability of air, the lack of weightlessness and ample bird droppings disturb the Moon Geese Analogue's verisimilitude as a training platform.

Human space voyagers, once launched into space, must maintain close communication with mission control. The Moon Goose Analogue Control Room, a portable installation Meyer-Brandis built, was opened to the public in 2012 (Fig. 6). Visitors at the Liverpool exhibit could monitor the *gansas* in real time as they pecked and waddled across the simulated lunar surface hundreds of miles away at their training base in Italy. Internet communication channels provided two-way live video and audio feed between the Control Room and the Analogue. Telemetry showed data about the geese's habitat and other experimental conditions [13]. Morse code transmitters set the possibility of interspecies communication. Although only a very remote possibility—geese are generally not specialists in Morse code—it pushed, like other studies by Meyer-Brandis, at the boundary between the believable and the absurd. Nonetheless, one cannot visit the Control Room without recalling Bishop Godwin's prediction: “You shall then see men to flie from place to place in the ayre; you shall be able to send messages in an instant many Miles off, and receive answer againe immediately,” Godwin wrote. “You shall bee able to declare your minde presently unto your friend.”

After the experiments in Italy, Meyer-Brandis's Research Raft secured a more permanent anchorage in Germany at the decommissioned Tempelhof Airport. Rebuilt as a Teutonic showpiece for Hitler's 1936 Olympics, the airport later served as the key transportation node during the Berlin Airlift. After its closure six decades later, Berlin officials allowed



Fig. 3. Labeling eggs for the Moon Goose Colony. (© Agnes Meyer-Brandis, VG-Bildkunst)



Fig. 4. Moon geese and Agnes Meyer-Brandis. (© Agnes Meyer-Brandis, VG-Bildkunst)



Fig. 5. One part of the moon geese training program.
(© Agnes Meyer-Brandis, VG-Bildkunst)



Fig. 6. Moon Goose Analogue Control Room: Lunar Migration Bird Facility, Liverpool. Installation, exhibition view, FACT Liverpool, 2011.
(© Agnes Meyer-Brandis, VG-Bildkunst)

Meyer-Brandis to locate her Institute for Art and Subjective Science there. Organized in a fictive fashion like a Cold War-era Big Science laboratory, the Institute's three research divisions cover the celestial, the earthly and the subterranean. There is a Laboratory of Applied Falling and a Department for Possible and Hidden Worlds. Some experiments evolved from other investigations Meyer-Brandis undertook such as locating underground coral formations, icebergs and other subterranean spaces. In all of these, Meyer-Brandis's artistic explorations parallel those of traditional geoscientists who send instruments via balloon, rocket and submarine to extreme once-inaccessible places.

Like Godwin's *The Man in the Moone*, Meyer-Brandis's "subjective science" experiments blend the playful with the probing. In the 17th century, Godwin's story integrated then-unprovable scientific ideas like weightlessness with contemporary developments in natural philosophy and fashionable speculations about interplanetary travel. Like scientists wondering what might exist beyond the capabilities of their own instrumentation, Meyer-Brandis's installation artworks suggest experiences coupled with a slyness seen like the sun reemerging from the earth's umbra. Separated by centuries,

both Godwin and Meyer-Brandis have created a delicate yet durable alloy of artistic creativity and scientific inquiry.

In questioning what is science and what is experience, Meyer-Brandis also forces a reconsideration of what an experiment—something done, after all, to test the boundary between the known and the unknown—exactly is all about. With work inhabiting the subjunctive and the subjective, the artist maintains a serious composure broken only by a winking awareness that, unfortunately, moon geese don't exist. But there is nothing dishonest in her presentation. The degree to which an observer believes depends on how much they appreciate the gravity of the experimenter's working life. Like Godwin, she takes us on a fantastic voyage to a liminal space just beyond the boundaries of believability. "The Research Raft is asking questions," Meyer-Brandis claims, "but gives no answers." And yet we wait.

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References and Notes

The Moon Goose Analogue: Lunar Migration Bird Facility by Agnes Meyer-Brandis was commissioned by The Arts Catalyst and FACT, in partnership with Pollinaria. "The Moon Goose Colony, P1" is a Pollinaria project by Agnes Meyer-Brandis.

- 1 <<http://apod.nasa.gov/apod/ap111101.html>>. More details on Meyer-Brandis's Berlin base are at <www.blubbblubb.net/berlin/index_e.html> and <www.blubbblubb.net/berlin/control_tower_tempehof_e.html>.
- 2 Information on Godwin as well as his book comes from Francis Godwin, *The Man in the Moone*, ed. William Poole (Ontario: Broadview Press, 2009 [1638]). Italics are in the original. All quotes from *The Man in the Moone* come from Poole's edited version.
- 3 Thomas P. Harrison, "Birds in the Moon," *Isis* 45, No. 4, 323–330 (1954).
- 4 Thomas Baker, 1699, from his *Reflections Upon Learning*; quoted in Poole [2] p. 49.
- 5 David Cressy, "Early Modern Space Travel and the English Man on the Moon," *The American Historical Review* 111, No. 4, 961–982 (2006).
- 6 Steven J. Dick, *Plurality of Worlds: The Origins of the Extraterrestrial Life Debate from Democritus to Kant* (Cambridge: Cambridge Univ. Press, 1982).
- 7 This appears in Chapter 9 of the first book of Cyrano de Bergerac's *L'Autre Monde*, also variously called *A Voyage to the Moon* and *The Comical History of the States and Empires of the World of the Moon*.
- 8 This experiment is described at <we-make-money-not-art.com/archives/2010/03/-amb-working.php#UweoXPRdUj2>.
- 9 Described at <www.blubbblubb.net/berlin/index_e.html>.
- 10 Kadhim Shubber, "This German artist is training geese to fly to the moon," *Wired.UK*, 9 September 2013, <www.wired.co.uk/news/archive/2013-09/09/moon-geese>.
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