

## Everting the Theatrical Sphere Like Terayama

Steven Ridgely

We face a curious analytical problem when attempting to apply an intercultural framework to projects by a theatre director like Terayama Shūji in that his work in the 1960s and 1970s was already intercultural from its inception—informed by the decentred rise of global counterculture, aimed at the new international theatre festivals (particularly in Europe), and in constant dialogue with leading figures in New York, Paris, Berlin, Amsterdam, and London. In this context, the intercultural approach tends to maintain or extend the spirit of the original project rather than reinvigorate it with fresh energy via transcultural adaptation. This is not to say, however, that figures like Terayama were uninterested in crossing cultural borders—my argument in what follows will be that part of the countercultural project involved moving the focus from crossing geopolitical or linguistic borders (which always risks legitimizing the existence of those borders) toward attention to the fruitful interplay of ideas from across different kinds of bounded cultural zones. One of the crossovers that becomes conspicuous in Terayama’s work is his interest in the transformation of spatial relations in performance spaces (and the bodies that inhabit those spaces), particularly between onstage, backstage, and audience-coded realms, which occurs simultaneously with direct reference in his work to figures from mathematics who work in non-Euclidean geometry and related fields interested in the manipulation of forms and spaces. The following is an experiment in testing the possibility for meaningful interconnection between performance culture and the culture of mathematics in Terayama’s work.

If we are interested in a pattern of inversions and reversals in the plays of the Japanese countercultural icon Terayama Shūji and his troupe, the Tenjō Sajiki, we can start with the name of the troupe, which refers to the cheap seats farthest from the stage where the roughest, and perhaps most bohemian, members of the audience would sit. The troupe of actors, then, is imagined as composed of rowdy viewers of theatre, the type that enlivened the performances in Marcel Carné’s *Les Enfants du Paradis*, a film released in Japan as *Tenjo Sajiki no hitobito*, or “the people of the peanut gallery.” It was this film from which the troupe took its name.

Terayama’s troupe were regulars at Ritsaert ten Cate’s Mickery Theatre in Amsterdam during the 1970s, exploiting the space as fully as possible. Their most notorious performance was probably the 1978 play *Nubikun*, a sort of Mapplethorpe-esque reinterpretation of Jonathan Swift’s *Directions to Servants*, in which houseboys and maids are given strict instructions on ways they are to subvert their masters (Terayama 1986c). This would be performed later in both New York and London, but Terayama tended to debut new work in Amsterdam throughout the 1970s. Their first play there, *Ahen sensō* (The Opium Wars), of 1972 locked audiences outside the building until five minutes after the performance was scheduled to begin. Actors then emerged from behind the building with signs saying “Someone lost his name” and “Please help him find his name” (Terayama 1987a, 138). Once inside, actors guided small groups of audience members through the entire interior of the building, conceived as a labyrinth, including the basement and upstairs spaces, as though on a fun house tour.

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We should understand much of this to be an engagement with participatory theatre in vogue at the time, but there were additional inversions here in which the relative civility of urban Amsterdam were displaced by physical jostling of audience members and the distribution of soup laced with sleeping pills—the drug of choice of Japan’s countercultural youth.

This manipulation of audiences would continue with the next Tenjō Sajiki play at the Mickery, the 1973 play *Mojin shokan* (Letter on the blind; Terayama 1986b). The title refers to a piece by the French philosopher Diderot in which he makes the case that sensory deprivation can open the door to new kinds of insights. Diderot’s case study is a blind mathematician, but Terayama applies the concept to his handling of audience access to lighted and darkened spaces. Major sections of the play take place in perfect darkness—a difficult request given fire codes—with actors striking matches to illuminate their faces as they deliver rapid-fire lines. One memorable exchange of dialogue concerns a boy’s naive claim that the total number of seeing eyes on Earth is always the same, which is why those on the opposite side of the world are often sleeping while we are awake—there is a sense that light and dark, seeing and not seeing are held in some kind of cosmic balance as though the law of conservation of matter also applies to vision.

This technique would continue with the third play in the Mickery sequence, *Ekibyō ryūkōki* (Journal of the plague year; Terayama 1986a), based on the Daniel Defoe novel. Here a square stage is cut into four equal segments with curtains, and with the audience seated in theatre-in-the-round style, no particular member of the audience would have been able to see the entire play—we would be particularly conscious of having been denied access to portions of the action. This is matched with a series of images of actors wrapped head to toe in gauze bandages, but which are gradually unravelled so that they can finally see at the end of the play.

Across these plays we see the power relations between drama troupe and audience that are typical of commercial theatre reversed. The paying audience is not treated to perfect access to a piece of entertainment they have paid to see; rather, they are frustrated, or maybe tantalized and seduced, by a performance that forces them to activate as viewers and recognize that here, as in life, they are getting only part of the story. These tendencies are present in Terayama’s street theatre performances as well, which always included gimmicks to integrate bystanders into the action.

By the late 1970s, particularly in plays such as *Aohige-ko no shiro* (Duke Bluebeard’s castle), Terayama’s work actively featured actors delivering lines in a conspicuously hyperdramatized style directly to the audience, but that direct address itself would often be revealed to be just as scripted as everything else (Terayama 1987b). The gambit in *Aohige-ko no shiro* is that we in the audience are located backstage, watching actors prepare to perform the Bartók opera (on a stage located in backstage for them). The inversion of theatrical and plain language thus takes place in a space also inverted. We encounter situations such as the following:

Stage Director: Who are you?

Girl: No one, yet.

Stage Director: yet?

Girl: I’m becoming.

Stage Director: Becoming what?

Girl: The seventh wife of Bluebeard.

Stage Director: Right. That’s good. They settled on you. Got your script? Girl: I do.

Stage Director: So you must know who I am.

Girl: Yes, Mr. Nemoto, the stage director. (*opens script*) It's right here:  
 "Stage Director: So you must know who I am."  
 "Girl: yes, Mr. Nemoto, the stage director. Opens script." Right? (Terayama 1987b, 12; my translation)<sup>1</sup>

Here we loop around out of the script back into the script with this strange twist of self-consciousness of delivering inscribed lines. But into this situation Terayama will throw accomplices in the audience who stand up midway through the play to say something outrageous, or bill collectors who walk onto the stage and demand overdue payment from the actors (called out by their real names), or perhaps an actor commenting on the events from that day's newspaper, all of which begins to erode the typical coding of script to theatre and serendipity to real life. We gradually become aware of the great potential for creative ad-libbing on the stage and of the often-hyperscripted nature of our own work and family lives, where we play-act our roles and often deliver the same lines again and again day after day.

As one seeks language appropriate to describe what Terayama is doing in these patterns, somehow *reversal*, *inversion*, *mutual substitution*, and others all seem to come up short. *Revolution* is clearly overused, but even in its restricted definition of the socially low replacing the high, the high becoming low, that is not really a description of what is happening here. He is following a pattern in which a social critique emerges by swapping out the standard roles—we will find him doing something similar with sexual violence in films by often having older women assaulting younger men (such as in his 1974 film *Den'en ni shisu* [Cache-cache pastoral]). In a sense, the method is familiar. But simply noting the use of a role-reversal technique in his work does not, I think, fully grasp the potency of what is going on. There seems to be a patterned impulse signalling a fundamental transformation of the theatricalized space in Terayama's work that consistently projects the audience onto the stage—that truly seeks to make actors, in the sense of the active party in a relation, out of a passive viewer. Brian Massumi (2015) might suggest that Terayama was creating an "affective intensity" out of the theatrical space in which both the troupe and the audience were given the capacity "to affect, and to be affected" (xi).

We see this in the common exhortation at the end of Tenjō Sajiki plays in which the performers demand that the audience members create their own theatre troupes, as though to return or "pay forward" the favour they just received. We see it too in the iconography of plays such as *Kankyakuseki* (The audience seats) from 1978, in which the poster inverts the title of the play as well as Terayama's name as though we are positioned behind a transparent poster looking through it (Terayama 1987c). The positionality suggested is that of the performers, looking out through the transparent fourth wall at an audience, which would see the mirror image of the actor's positions on stage. The poster design itself reflects the transformation of a viewing audience into that-which-is-being-viewed.

Terayama returns to this positionality question again and again in the 1970s, at times to wonderful effect in experimental film, for example. In a short film called *Nitojo* (*Two-Headed Woman*), for example, a girl's shadow first tracks her movements as she plays with a hoop and stick, but then parts ways and moves independently (Terayama 2006b). We find ourselves amused at the trick photography but then curious about the apparatus itself, which seems to be revealed near the end of the film as the camera zooms out to reveal the set. Upon further reflection, however, this perspective does not really tell us if what we witness over Terayama's directorial shoulder is the

“front” or the “back” of the shadow play we just witnessed—without further information it could be either.

It is worth noting that films projected onto a standard silver screen are perfectly watchable from the opposite side. Terayama himself will trace this interest in the images on the back of the silver screen to his own childhood, when he lived with his aunt and uncle during high school and spent a great deal of time in their family’s large cinema in the northern Japanese city of Aomori. He claims in some writings to have had a room directly behind the screen, perhaps an exaggeration, but he certainly would have had ample opportunity to wander around enough backstage to realize films could be watched from behind the screen, where one can observe a mirror image of what the paying audience was watching from the standard seats.

These anecdotes are charming, and might help to concretize the origin of the idea, but they still do not help us clearly visualize the kind of transformation of space that Terayama’s plays at least gesture toward. Here I would like to invoke a figure from the mathematical subfield of topology—the branch of mathematics that explores the “theory of space” and the transformation of form—to suggest a visualization that might get us closer to understanding Terayama’s theatre.

Drawing underground theatre together with a somewhat esoteric branch of mathematics might seem analytically acrobatic, a kind of radical juxtaposition of ideas from disparate corners of human experience. But in fact, we find reference to theoretical mathematics in Terayama’s work and that of some of his closest collaborators who cross the threshold into an engagement with ideas from non-Euclidean geometry and topology as structural principles applied to artist design by Japanese countercultural artists.

The opening sequence in one of Terayama’s 1977 experimental short films includes a puzzling reference to non-Euclidean geometry. *Issun-bōshi o keijutsu suru kokoromi* (An attempt to depict Tom Thumb) begins with the Tenjō Sajiki actor Hino Toshihiko, who has dwarfism, dressed in the black robes of a traditional Jesuit missionary standing among seemingly random items such as an umbrella and a chalk-drawn bird, a dove of peace perhaps, in a gesture evocative of surrealist strategies of collage (Terayama 2006a). The sequence develops with Hino moving large cubes from off camera one by one into the *mise-en-scène*, spinning them dramatically as he sets them down to actualize “green screen” or “chroma key” video editing technology (still relatively new at this time) via a blue-papered side facing the camera. This allows Hino to create the effect of “building” a giant naked woman block by block—not a static image but a living, breathing, moving woman who giggles and taunts him. As he builds her, he pauses to caress the stacked blocks, and once complete he will attempt to capture her by binding the blocks together with rope. The clever use of chroma key editing is the centrepiece of the project, but perhaps even more surprising is the text of an intertitle used midway through the build, which reads (in my translation) “A Lobachevsky Box has no head.” What could this possibly mean?

The woman being built here block by block still does not have a head at this point, so this may partially be a straightforward description of the image at this stage in its construction. But then why a “Lobachevsky” box? Lobachevsky was the nineteenth-century Russian mathematician credited as one of two people to almost simultaneously and independently describe, around 1830, non-Euclidean geometry—the geometry of warped spaces where 2D surfaces are bent instead of flat and the internal angles in a triangle sum to either more or less than 180 degrees. To my knowledge, there is no mathematical object called a “Lobachevsky box,” although the concept takes the form of such

named objects as the Möbius strip, the Klein bottle, or Boy's surface. So this box seems to have been an invention of Terayama or his collaborators, possibly signalling the way chroma key is being used in this film to playfully manipulate and layer the spatial relations being represented on the screen. Much of the rest of the film involves efforts to either capture this woman's elusive image or to excise it from the scene, literally cutting, ripping, or crumpling up the blue paper that allows for the visual trick.

It is possible this strange Lobachevsky reference is a form of what we might call “expansion of consciousness lite,” a casual gesture toward an M. C. Escher level of mathematical engagement with dimensionality or tessellation that seems to poster so naturally among lava lamps and tie-dyes in hippie culture. There is also a longstanding association between non-Euclidean geometry and the occult, seen especially in the work of H. P. Lovecraft, for example, and the spiritualists of the late nineteenth century were taken with the idea that ghosts might reside in the fourth dimension—so this reference might be read to enhance the gothic mood of the scene, and perhaps more broadly to pressure the pseudorationalist buzzkill of the technocracy.<sup>2</sup> However, what I would like to suggest is the possibility that the engagement with modern theoretical mathematics within experimental literary and art culture in Japan is a deeper relationship—one in which the writers and artists are well informed and are grappling meaningfully with big, new, consequential ideas drawn from math.

Terayama was not the only 1960s counterculture figure toying with these mathematical concepts. Sekine Nobuo was creating and writing about topological sculptures at the same time, Yuasa Jōji was composing music manipulated according to principles from projective geometry. The set designer for the early years of Tenjō Sajiki, Yokoo Tadanori, the well-known graphic designer, also frames an example of his work from the period in terms from theoretical mathematics. Yokoo was commissioned to do the architectural design for the Textiles Pavilion at the 1970 World's Fair in Osaka, and makes a particularly interesting claim about the shape of the building:

I was in charge of the pavilion design itself. It was my first time doing architectural plans, and the concept was a sort of four-dimensional idea. There is a 4-D theory of the Klein bottle in which the outside is also the inside, so if you were to cut open a hole in the side of a ball, then stick your fingers in it, pinch the far end, and yank it halfway out the hole so that part of it stuck out, that was my design. (Yokoo 2002, 144)

Yokoo is describing the red dome that juts out from the centre of the roof of the pavilion, around which the final design left construction scaffolding in place, complete with carpenter-mannequins still at work on the project.<sup>3</sup> With Yokoo conceptualizing a dynamic geometrical form—one that requires an inversion of the “ball” to fully represent its true form—the static nature of the pavilion is in active tension with its own design. Yokoo's Klein bottle is stuck in the midst of the transformation required for it to exist as a 4D object and is thus literally incomplete or in-process, with the scaffolding signalling not that builders had run out of time or that it was a work in progress, an emphasis of so much 1960s art, but rather the fundamental impossibility of its completion.

Technically speaking, Yokoo is eliding the difference between the Klein bottle and a different problem, that of turning a sphere inside out, but both of these have become the poster children for topology since the 1960s. The Klein bottle does have a smooth transition between its outside and inside surfaces, and it is sort of the 4D big brother of the Möbius strip, both of which are found in topology textbooks as the standard examples of non-orientable surfaces. But Yokoo's folksy description of turning a sphere inside out to reverse the interior and exterior spaces is of particular

interest given the timing (1970) and his proximity to Terayama's theatre work (the Tenjō Sajiki). After tracing the development of this idea within mathematics, the argument will return to Terayama to test the possibility that sphere eversion might help us better understand the way that patterns of inversion and reversal in Terayama's work relate to a broader project of transforming theatrical space.

The topological problem of interest here is called “eversion of the sphere,” by which mathematicians refer to turning a sphere inside out. *Inversion* is turning the outside in, and *eversion* is the opposite, turning the inside out—a potentially important distinction here, one we will return to momentarily. Topology concerns properties of objects and spaces that remain consistent even under fairly radical transformation, and this is the area of mathematics and geometry with the loosest set of rules. Objects can be infinitely stretched and surfaces can pass through one another—distance and angle cease to matter. What you cannot do according to the topological rules is tear a hole in a surface, and you also cannot make a crease in a surface under transformation. Which means that the simplest way to evert a sphere, by pulling the north pole and south pole through each other, is against the rules since it would form a crease at the equator.

These circumstances intuitively seemed to suggest that a simple sphere could not be turned inside out within standard three-dimensional space—that you would need more flexibility to do it, which led people to suggest that four-dimensional space, or hyperspace, was needed to evert a sphere. One example of such a claim was published in the essay that won the 1909 *Scientific American* contest for best laymen's explanation of the fourth dimension. Graham Denby Fitch (1909) lists among the many tricks one could do with an additional dimension of space that “a sphere if flexible could without stretching or tearing be turned inside out,” which implies that this would be impossible in 3D space (15).

But there was a breakthrough in 1958 by the young topologist Stephen Smale (1959), who proved that sphere eversion is possible in three-dimensional space. Smale's own graduate school advisor rejected this claim on intuitive grounds, but the paper was accepted by the field's leading journal and has not been refuted. The problem was that Smale's article is entirely a text-based proof, offering no help in visualizing this kind of transformation.

In 1966, *Scientific American* would present a visualization of the eversion of a sphere, its cover story for the May issue, with a series of colour images representing the transformation in cross-section, stage-by-stage, but even with these images, the process remains far from intuitive. This was a mathematical problem perfectly suited for video rather than still-image representation. It was Nelson Max, later of University of California, Davis, professor of computer science, who took up this challenge and worked with primitive computer graphics software during the years 1970–1976 to produce one of the first CGI animated films, which for the first time offered a persuasive visualization of the eversion of a sphere, using red for the initial exterior surface and blue for the initial interior surface, and pausing somewhat dramatically at the halfway point in the transition to show the four-fold rotational symmetry that allows the sphere effectively to rotate ninety degrees to reverse the colours and unwind itself by the same process as the first half of the transformation.

Alternative methods for everting the sphere would emerge in later years from several mathematics visualization labs—these seem to operate as public relations projects to communicate the cleverness of theoretical mathematics to a public potentially skeptical of its value. A lab at the University of Minnesota released an impressive alternative morphology using a series of radiator-like baffles or

“corrugations” which each rotate in place to invert a sphere in a video visualization released in 1994 (Geometry Center 1994). Not to be outdone, a mathematics and computer science lab at the University of Illinois at Urbana-Champaign would release another version a few years later in 1998, visualized as a soap bubble so as to optimize the efficiency of the process by minimizing the energy required to evert the sphere (Sullivan, Francis, and Levy 1998).

How might this transformative visualization impact the way we understand Terayama’s work? I would like to suggest that as we find these reversals of audience and performer, or of hypertheatrical and conspicuously everyday language, what we are witnessing is primarily an unfolding of the generative, playful, fictional, mystified space of theatre into what was conceived as a hyper-rationalized and oppressively pre-scripted everyday life. The theatrical sphere everts to spill its raucous antiteleological ethos out into the streets, fictionalizing and theatricalizing the everyday. This is quite clearly different than social realist theatre, which might in this context better be understood as an inversion—transporting the tensions and frustrations of work and family life onto the stage for careful dissection.

This eversion visualization might help us to better understand that Terayama was ultimately less interested in reversing the positions of audience and performer than in unifying them as coinhabitants of a common theatrical space, the entirety of which would be brought into new relation with the space outside the theatre by the performance. Rather than allowing the theatricality of the space to end with the conclusion of the play, the eversion carries that marked space into the everyday, back out into the streets after the performance—the point of the project may be the residual effect more so than the impact in the moment. This, I think, might get us much closer to the intended social function of this type of performance.

What I have attempted here is to apply a spatial transformation model to understand the social function of Terayama’s performances and to legitimate that choice by noting Lobochevsky’s appearance within a film by the same director as well as interest in 4D Klein bottles and other “impossible” shapes by Terayama’s contemporary and close collaborator Yokoo Tadanori. The point here is not that the code has now been cracked and we can properly understand a set of Terayama’s plays as secretly manifesting a sphere eversion in the mode Smale and other mathematicians proved to be possible (following the rules of topology), but rather that we stand to gain by expanding the storehouse of abstract models we can deploy to make sense of the transformations of space we encounter in a performance. I believe that our collective analytical range is inhibited by an artificially limited exposure to a wider range of forms and mathematical insights on how they can be reshaped, and I am grateful to Terayama and others for hinting that a border-crossing into the culture of mathematics might be necessary to better understand how a performance is structured spatially. This will almost certainly require an expansion beyond the concept of “revolution” (a simple rotation of a 2D object in 2D space) to begin to understand the revolutionary ideas at play in contemporary performance culture.

## Notes

1. For more analysis of Terayama’s use of Bluebeard, see Ridgely (2013).
2. Lovecraft’s famous monster, the Cthulhu, has a well-known face, but also hails from a “non-Euclidean” planet: “An octopus-like head whose face was a mass of feelers . . . it was nothing of this or any sane planet.” It is later revealed that “the *geometry* of the dream-place he saw was abnormal, non-Euclidean, and loathsomely

redolent of spheres and dimensions apart from ours.” See Lovecraft (2005, 176, 192–93). “The Call of the Cthulhu” was originally published in the February 1928 issue of *Weird Tales*.

3. For images of the Textiles Pavilion, see Nihon Sen’ikan Kyōryokukai (1970).

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