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PEEPING INTO ABSTRACT WORLDS: TRACING THE KALEIDOSCOPE FROM OPTICAL INSTRUMENT TO IMMERSIVE AND THERAPEUTIC MEDIA

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Abstract

Bridging interdisciplinary perspectives, this article presents the kaleidoscope as a significant case study of self-directed perceptual technology in the history of immersive media. Using a media-archaeological approach, the study traces the device's journey from Sir David Brewster's 19th-century optical invention to its roles in contemporary therapy and immersive art. The article argues that the kaleidoscope endures because it mediates a recursive relationship between agency and perception—specifically through the interplay of tactile control, visual symmetry, and temporal fluidity. By contrasting the device with representational peep media, the analysis shows how it generates endless, abstract, non-narrative images that foster an embodied experience and cognitive regulation. This mechanism is explored across diverse contexts from its controversial beginnings as a 'philosophical instrument' to its clinical validation as a tool for reducing anxiety, to its transformation in large-scale installations by artists like Olafur Eliasson and teamLab. In these modern works, the principle of self-directed seeing evolves from tactile manipulation to viewer mobility. Ultimately, this study posits the kaleidoscope as a foundational ancestor of contemporary immersive technologies.

Keywords: *kaleidoscope, optical devices, peep practice, abstract immersion, media archaeology*

John Lennon, Baudelaire, Taylor Swift, Patti Smith, Karl Marx and Coldplay, what do they all have in common? A shared fascination with the kaleidoscope. From the 19th century to today, the word 'kaleidoscope' has appeared in so many contexts that its metaphorical meaning has all but eclipsed the optical device it originally described. It is the device's hypnotic beauty and bewitching visual patterns—perhaps amplified by childhood memories of looking into its shifting symmetries—that have inspired these artists, poets, and thinkers to write, sing, and create around its imagery. Its enduring presence is not only due to its past popularity as an optical device but also due to its mesmerising, almost otherworldly quality that continuously transforms colourful images at the whim of our hands, giving us the agency to control our experience and facilitate an immersive adventure through which to escape.

The optical device, the kaleidoscope, was patented by Scottish scientist and writer Sir David Brewster in 1817, framed as a scientific instrument intended to assist artists and explain reflected light. However, by the early 1820s, the kaleidoscope had transitioned from a high-quality optical device to a children's toy. This rapid decline in prestige and domestication has led many scholars to treat the kaleidoscope as a mere curiosity, obscuring its significance within media archaeology. This article examines the kaleidoscope not merely as a tool but as an important paradigm of self-directed perceptual technology. By tracing its journey from a 19th-century scientific novelty to a 21st-century therapeutic tool and its development into immersive art installations, it argues that the device persists because it models a relationship between agency and perception that anticipates the therapeutic and aesthetic capacities of contemporary immersive media.

To develop this argument, this article first investigates the device's origins, framing Sir David Brewster's contribution not simply as an optical refinement but as the first to introduce controlled, kinetic symmetry governed by the user's hand. Second, it analyses the kaleidoscope through the lens of media archaeology, positioning it within the continuum of peep and tactile practices that established the device's capacity for embodied experience and sensory grounding. Third, the article connects the mechanism of abstract, non-narrative immersion to its contemporary uses in therapeutic and wellness environments. Finally, it explores the kaleidoscope's legacy in the works of artists like teamLab and Olafur Eliasson, demonstrating how the core principle of self-directed visual creation has evolved from tactile control to collective screen-based viewer mobility. By tracing this continuum, this analysis confirms the kaleidoscope's status as a foundational ancestor of the history of immersive and stereo media.

Design and Evolution

The kaleidoscope was designed by Sir David Brewster (1781–1868) in 1817 and quickly became a craze. But its invention was not without controversy. Brewster also discovered what is presently known as Brewster's Angle in 1815, a principle that the polarising filters widely used in photography and filmmaking are based on. He claimed to have envisioned the instrument during investigations into light polarisation. 'The first idea of the instrument presented to me in the year of 1814', writes Brewster in *Treatise on the Kaleidoscope* (1819, p.1). However, his contemporaries, critics and theorists who came after, argued that Brewster had simply refined an existing notion rather than invented something thoroughly new

(Huhtamo, 2014; Graf & Hodgson, 1990). Similar mirrored devices had been described in earlier writings on natural magic and were found in cabinets of physics long before Brewster's time. It is also important to note that Brewster himself was very well acquainted with and a frequent visitor of such cabinets and phantasmagorias, as he writes in *Letters on Natural Magic* (1856). Critics later drew connections between his invention and earlier mirror experiments by Athanasius Kircher and Giambattista della Porta, both of whom used mirrors to multiply images, as well as to Richard Bradley's 1717 description of an angled-mirror system for generating symmetrical patterns (Huhtamo, 2014; Graf & Hodgson, 1990). Brewster discusses these predecessors in detail in his *Treatise* (1819) yet stresses their fundamental differences from the kaleidoscope. Porta's mirrored devices, he writes, 'have no farther connection with the kaleidoscope than that they are composed of plane mirrors' (1819, p. 143), while Kircher's mirror constructions were likewise designed merely to reproduce an object a set number of times, without any attempt to generate symmetrical forms (1819, p. 147). Kircher also devised a so-called 'metamorphosis machine,' which did introduce motion through a rotating internal drum, although its movement lacked the rotational symmetry that defines the kaleidoscope (see the reconstruction discussed in *Utpictura18*, n.d.). As Brewster (1819) argues, it was not until he introduced movement into the visual that the kaleidoscope became a complete instrument. He therefore frames his own contribution as the first to unite reflection with controlled, kinetic symmetry.

Beyond the device itself, Brewster also coined the name that would take on a life of its own. In keeping with the linguistic fashion of his time, he combined the Greek words *kalos* ('beautiful'), *eidos* ('form' or 'aspect'), and *skopein* ('to see'), creating a term that captured the essence of the instrument's endlessly shifting, symmetrical patterns. Much like the word *panorama*,¹ another term born from an optical invention, the word *kaleidoscope* has since transcended its original meaning. Over time, its metaphorical use has far outpaced references to the physical device, turning it into a symbol of transformation, multiplicity, and ever-changing perspectives across art, literature, and culture. Today, the *Merriam-Webster Dictionary* defines *kaleidoscope* not only as an optical instrument but also as 'a variegated changing pattern or scene' or 'a diverse collection,' and 'a succession of changing phases or actions' (Merriam-Webster, n.d.). This reinforces how the word has evolved beyond its original context and also backs Brewster's argument that it is the movement or change that makes the device complete.

Brewster's kaleidoscope has a relatively simple yet ingenious design. Inside a cylindrical tube, two long reflective mirrors are positioned at a carefully calculated angle. At one end of the tube is a peephole, while the opposite end contains a cell filled with marbles and coloured glass. As Brewster explains in his *Treatise*, the symmetrical patterns seen inside the kaleidoscope were determined by this division—360 degrees divided by the angle of the mirrors (Brewster, 1819). When

1. In a media-archaeological context, the panorama is defined as an immersive spectacle that utilised massive, 360-degree cylindrical paintings to spatially surround the viewer, functioning as a key historical precursor to modern moving images and virtual reality. It was first patented in the late 18th century and flourished as a dominant form of mass entertainment throughout the 19th century. Today, the word *panorama* is used to mean 'an unbroken view of the whole region surrounding an observer' or 'a picture or photograph containing a wide view' (Oxford Dictionary).

the viewer looks through the peephole, the reflections inside form intricate, symmetrical patterns (Fig. 1), which seamlessly transform as the cell or device is rotated, causing the pieces to shift and rearrange.

Though based on a simple optical principle, the kaleidoscope was intended to be a high-quality scientific instrument. Brewster selected specific manufacturers to produce them, ensuring they met exceptional precision and craftsmanship standards (Fig. 1 & 2). These early kaleidoscopes were displayed in optical shops and often featured interchangeable cells, allowing users to swap out different sets of objects and explore variations in light, and symmetry. Some versions even included an empty cell so viewers could create their own unique patterns by filling it with small objects of their choice. This took place within a broader culture of optical experimentation and 'natural magic,' where mirrored and peep devices, as well as magic lanterns, served both as instruments of scientific observation and as spectacles of visual wonder (Huhtamo, 2011), situating the kaleidoscope at the intersection of entertainment, education, and science.

Originally, the kaleidoscope, as a scientific instrument, was designed to explain reflected light and symmetrical image formation. Brewster also promoted it as a tool for artists to help them design precise symmetrical patterns. Such dual framing, scientific and artistic, is mutually reinforcing. Optical principles could rationalise aesthetic creation, just as artistic forms could demonstrate scientific truths about symmetry, order, and perception. This connection between empirical instrument and generative aesthetic device is foundational to the interrelation of science, art, and sensory

experience during this period. The kaleidoscope's effects emerged not from a singular function but from this interplay. In his short discussion of the device, Jonathan Crary notes that Brewster

saw it as a mechanical means for the reformation of art according to an industrial paradigm. Since symmetry was the basis of beauty in nature and visual art, he declared, the kaleidoscope was aptly suited to produce art through 'the inversion and multiplication of simple forms'. (1988, p. 22)

Other scholars have explored the kaleidoscope's connection to natural symmetries, sacred ornaments, and decorative imagery (Maillet, Prioleau, & Briggs, 2012). For instance, there are visual affinities between kaleidoscopic patterning and long-standing ornamental traditions such as Gothic tracery and Islamic geometric design. However, this does not propose a direct historical lineage but suggests that kaleidoscopic imagery is rooted in an aesthetic vocabulary already recognised across cultures since antiquity.

Besides the two-mirror system, Brewster also introduced the Telescopic Kaleidoscope, which replaced the object cell with a lens to incorporate elements from the surrounding environment, and the Polyangular Kaleidoscope, which allowed users to adjust the angle of the mirrors for varying effects. The kaleidoscope was initially produced with high-quality materials, such as brass, precision optical glass, and finely crafted wooden or metal stands, often engraved with decorative details (Correia, 2016). However, the time-consuming nature of this craftsmanship slowed production. Before Brewster

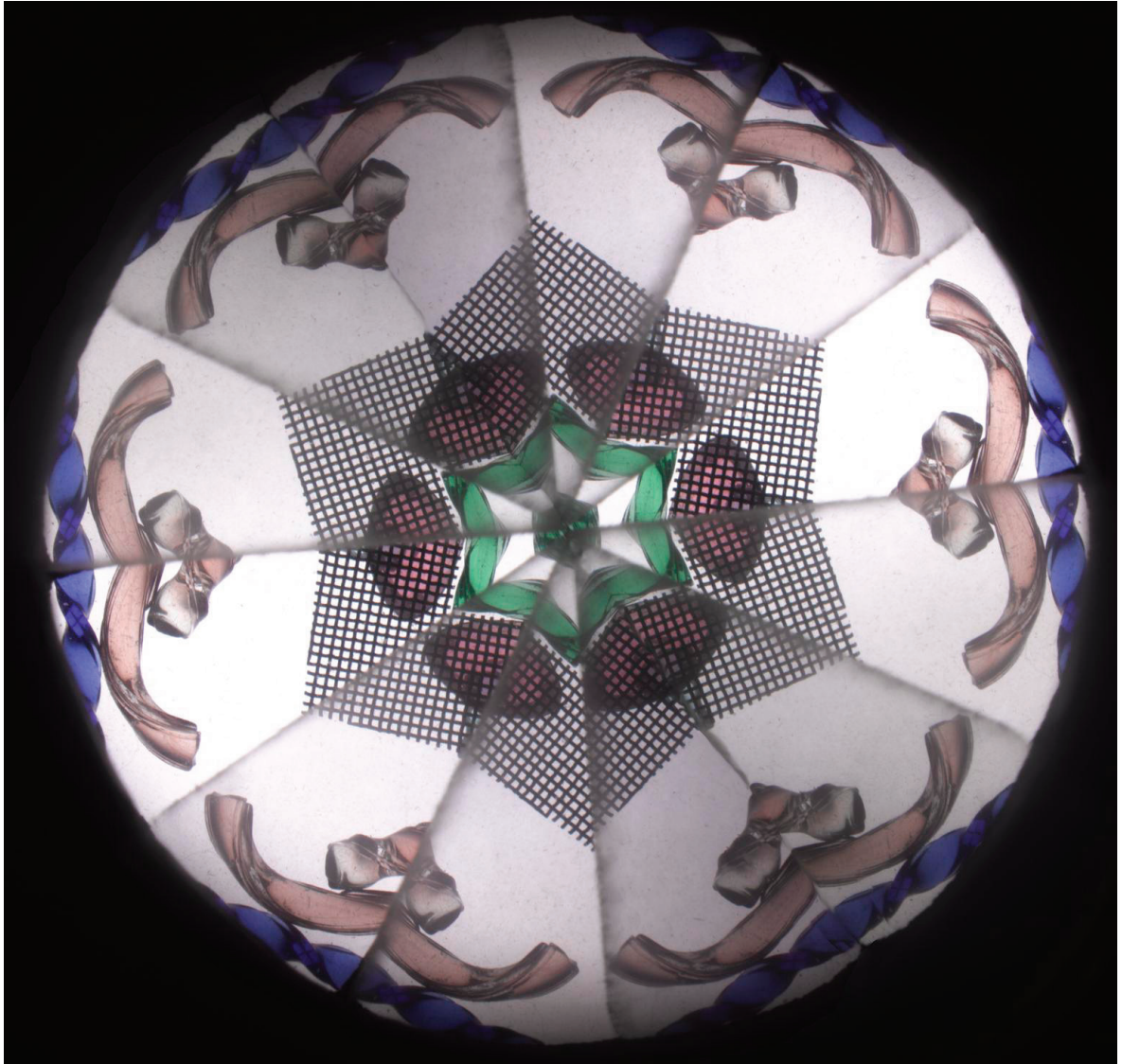


Fig. 1 Brewster's Patent Kaleidoscope by Philip Carpenter, Birmingham, England,1820. 1918-112 Science Museum Group Collection Online.

had established manufacturing partnerships, the design was leaked, leading to a flood of cheaply made copies constructed from tin and paper. As he laments in *Treatise*, ‘no fewer than two hundred thousand instruments’ were sold in London and Paris within months (1819, p.7) yet most were poorly made imitations that failed to reflect the precision and quality of his original design. This shows how an instrument could be reduced to a mass-produced object, thereby shaping how the kaleidoscope was experienced by the broader public.

Philip Carpenter, a scientific instrument maker in the 19th century, worked closely with Brewster. He helped produce the patented kaleidoscope to the standards Brewster envisioned. This image captures the view through the peephole of one of Carpenter’s early kaleidoscope designs (1820). The tasteful colours, translucency, and carefully crafted quality of the glass pieces inside differ from the inexpensive plastic beads familiar to childhood toys.

While Brewster’s original kaleidoscope used a two-mirror system, variations emerged over time. Some designs featured a three-mirror setup arranged in a triangular formation, with one side blackened out to create a circular image framed by dark corners. Others used a fully reflective three-mirror structure, producing repeating patterns without a defined border. Four-mirror systems and other complex configurations have also been developed, expanding the range of symmetrical effects achievable within the device. These and many more real and theoretical mirror arrangements are discussed in *Popularizing Geometrical Concepts: The Case of the Kaleidoscope* (Graf & Hodgson, 1990) and visually demonstrated in *Kaleidoscope Mirror Systems* (Cape Kaleidoscopes, n.d.).

The kaleidoscope quickly became a fashionable curiosity, and miniature jewellery pieces were crafted from fine materials and even precious metals—not for scientific use, but as luxury or decorative objects (Correia, 2016). Brewster had originally intended for the instrument to assist designers and natural philosophers by revealing geometric patterns and colour combinations not easily constructed by hand. Soon after the kaleidoscope’s introduction, it spread rapidly across all classes, creating what some newspapers called a ‘mania’ (Correia, 2016). Its reception followed a pattern common to many visual devices initially grounded in experimental science or natural philosophy in that it was rapidly absorbed into popular entertainment. The thaumatrope, the ‘caged bird’ spinner that demonstrated persistence of vision, the phenakistiscope, and later the zoetrope all originated as scientific demonstrations but became consumed as toys. The kaleidoscope underwent a similar transformation; its scientific or pedagogical applications were only sporadically adopted, while its dazzling effects made it instantly marketable as a novelty. It was quickly domesticated and was available in many Western households. Once inexpensive, low-quality copies flooded shops, its identity shifted. What Brewster presented as a precision optical instrument was embraced by the public primarily as an amusement. By the early 1820s, the kaleidoscope had transitioned from a scientific tool to an item, primarily relegated to the realm of children’s toys, its once-revered optical wonder now seen as simple amusement. This remains true today: the most widely available kaleidoscopes are found in toy stores, and DIY versions are commonly featured in children’s craft books with instructions for making one at home.

Kaleidoscope within Peep, Touch and Mobile Practices.

In *Natural Magic: A short cultural history of moving images* (2011), Erkki Huhtamo describes the four types of practices encountered in the media-archaeological analysis of moving images. These practices are the screen practice, the peep practice, the touch practice and the mobile practice (Huhtamo, 2011). Most of these practices do not exist in isolation but intersect. The screen practice is described by the distance between the observer and the screen; in a discrete case, the viewer is typically stationary. An example of this is a *panorama* or any *magic lantern* show where the viewer does not physically interact with the spectacle, and where he/she observes it from a distance. However, throughout history, the screen practice often coexisted with mobile practice. Mobility here refers to the physical movement of the observer and not of the image. A prime example of this combination is the *panorama*, where the audience remains at a distance from the image but moves about a circular space to experience multiple perspectives. Similarly, *phantasmagorias* incorporated magic lantern projections into theatrical spectacles, where audiences were free to move around the space rather than remaining in fixed positions.

Peep practice, in contrast, reduces the distance between the image and the viewer, creating an intimate and isolated visual experience. Peep media, broadly defined, encompasses a range of optical devices that invite individual viewing experiences, often creating a sense of isolation from the surrounding world. These images are usually viewed through a peephole built into a specialised box. An array of related

devices has appeared over the centuries—showboxes, objects that hide secret, sometimes seductive, pictures, and optical instruments such as kaleidoscopes, stereoscopes, phenakistiscopes, and zoetropes (Huhtamo, 2011). Huhtamo (2006) argues that peeping is an inherent part of human nature, reinforcing the idea that curiosity is an innate trait. What distinguishes peep media from other visual practices is the particular form this curiosity takes: a desire to look into something enclosed, secretive, and concealed, to access what is not immediately available in the open and what, at any given moment, can be seen only by a singular viewer. Perhaps this dynamic of hiddenness and revelation explains why peep media gained widespread popularity across all social classes, from its early use in cabinets of curiosity to the peep shows and fairs of the 18th century (Huhtamo, 2012).

Over time, as media moved from public spaces to private homes, peep media adapted by incorporating tactile practice, when touch is introduced into the viewer's experience, bringing more interactivity as well as immersion into the scene. Previously, it was the showman who controlled the changing images within the public peepshow box. The viewer passively peeped at these images, some of which were static while others were designed to change or move. With the domestication of optical devices, agency shifted to the viewer. Individuals could now control the images' movement and duration, and select exactly what content they wished to see. The shift makes the experience significantly more personal and private compared to public shows. However, for those who could not afford to own these devices, public options remained available—people could still 'peep for a penny.'

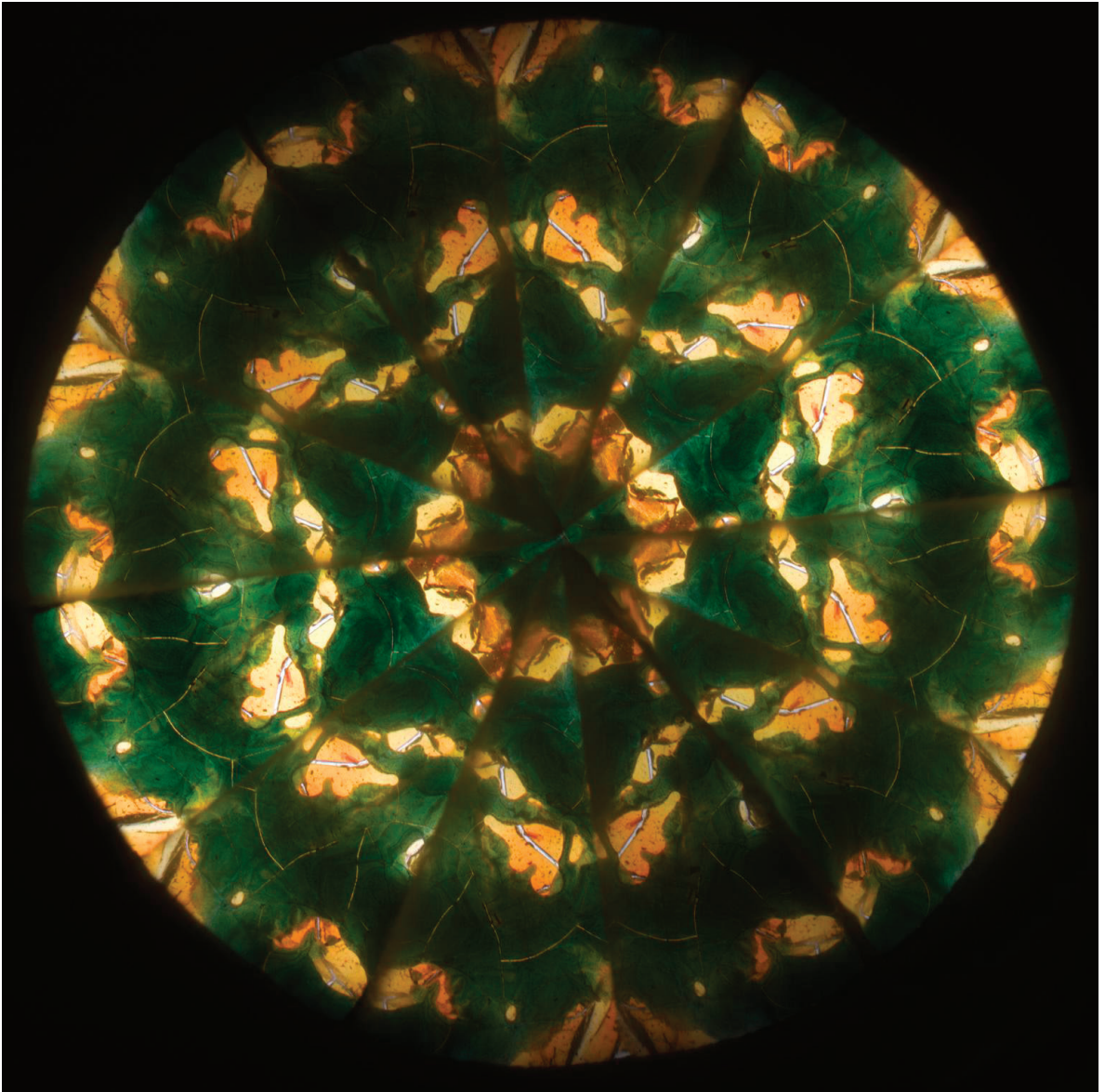


Fig. 2 Brewster's Patent Kaleidoscope by Philip Carpenter, Birmingham, England,1820. 1918-112 Science Museum Group Collection Online.

Peep devices varied widely in their focus: some aimed for realism, displaying recognisable imagery of distant cities, historical events, or animated objects, while others, like the kaleidoscope, functioned purely as a visual spectacle independent of narrative or representational intent. The kaleidoscope shares essential characteristics with most peep devices—it isolates the viewer's gaze, offering a private display of images. It also incorporates a tactile practice that allows the user to control the pacing of the transforming images. The kaleidoscope's appeal lies in its ability to generate endless, self-created transformations of the mesmerising, shifting, abstract patterns (Fig. 1 & 2) that have endured for over two centuries, unlike many other optical devices that have faded into obscurity.

Brewster continuously sought to expand the kaleidoscope's applications. Beyond peep media, he proposed methods for projecting kaleidoscopic images onto screens using electric lime balls (Amery, 2020). This idea anticipates later optical innovations, such as chromatrope slides for magic lanterns, which emerged in the mid-19th century and are often described as 'kaleidoscopic geometries' (Warner, 2007) projected onto a screen. Chromatrope slides were widely used in Victorian-era spectacles, serving both educational and entertainment purposes, including teaching colour theory and creating mesmerising, firework-like visual effects at events (Ronetti, 2017).

Interestingly, some historical sources mention that chromatropes were used in medical treatments to induce hallucinations, while the kaleidoscope was considered less effective for this purpose (Ronetti, 2017). One possible explanation is that the kaleidoscope requires active engagement from the

user, granting them control over the movement of the images. This element of control may have prevented the same passive, trance-like effect that chromatropes could induce. However, contemporary healing practices and mindfulness techniques now utilise kaleidoscopic imagery to enhance focus and guide users into a suggestible, meditative state. The movement and repetition of symmetrical forms help redirect mental concentration, fostering a sense of openness and relaxation.

Abstract Immersion, Escapism and Therapeutic Potential

The kaleidoscope offers a useful lens through which to consider hallucination, sensory immersion, and escapism. Its patterned abstractions produce an intensified yet non-narrative form of visual engagement that is now increasingly recognised for its therapeutic and meditative potential. Within this broader context, escapist behaviour is often seen as a defence mechanism, used to distract from distressing thoughts or emotions such as guilt, anxiety, or powerlessness (Longeway, 1990). In *Playful Visions* (2020), Meredith Bak notes that despite the kaleidoscope's potential for teaching colour theory, it was largely excluded from 19th-century educational curricula because of its distracting and immersive qualities. While this characteristic may have been seen as a drawback in formal education, it is arguably precisely this absorption into a world of shifting patterns that gives the kaleidoscope its continued appeal.

Research suggests that not all forms of escapism are inherently negative; in fact, when approached intentionally,

escapist activities can foster beneficial psychological states such as mindfulness and flow (Mičić & Musil, 2020). Immersive visual experiences—particularly those rooted in abstract and symmetrical patterns like kaleidoscopic imagery—can serve as a gateway to such states. Neuroscientist Joe Dispenza has noted that kaleidoscopic visuals are increasingly used in therapeutic and meditative practices to calm the analytical mind. These repetitive, mirrored patterns reduce the cognitive overload by minimising external distractions, thereby guiding individuals into deeper states of consciousness and presence (Dispenza, 2019). In clinical contexts, the kaleidoscope's potential for emotional regulation has also been recognised. For example, a study by Bulut et al. (2020) in a randomised controlled trial demonstrated that using kaleidoscopes reduced fear and anxiety in children aged 7–11 following surgery. Notably, the kaleidoscope's effect was superior to hand massage and comparable to music therapy, highlighting the unique role of immersive, visually dynamic distraction rather than just any toy or simple social activity. This suggests that the shifting, absorbing nature of the kaleidoscope drew attention away from the distress and had a distinctive impact on the children's postoperative experience.

Several randomised controlled trials have used kaleidoscopes and other distraction tools such as virtual reality (VR) glasses and distraction cards in paediatric settings. For instance, Besirik et al. (2024) conducted a study in which children undergoing blood drawing procedures were assigned to the distraction group with VR glasses, kaleidoscopes, or distraction cards; all interventions reduced anxiety and pain but VR demonstrated the most pronounced effect compared

to the other methods. Additionally, Canbulat et al. (2014) compared distraction cards and kaleidoscope interventions for procedural pain and anxiety reduction, showing the effectiveness of kaleidoscopes. These findings invite a closer look at the specific perceptual dynamics that make kaleidoscopic immersion psychologically potent.

What makes abstract immersion effective, arguably, is its ability to engage the senses while bypassing the narrative and symbolic thinking that often dominates our conscious mind. The symmetry and ever-shifting forms found in kaleidoscopic imagery offer a dynamic, non-verbal space for mental restoration. Unlike linear stories or literal visuals, which may trigger personal associations or mental critiques, kaleidoscopes and kaleidoscopic visuals provide a neutral yet captivating environment. This allows the viewer to lose themselves in pattern and motion—an experience akin to certain meditative or trance-like states, where thoughts quieten and the body relaxes.

Interestingly, a 2024 study (Peng) on adults discovered that experiences with psychedelic art produced diverse emotional, mental, and physical effects, such as relaxation, peace, reduced anxiety, euphoria, awe, and hypnotic meditative states. The study randomly assigned 102 participants aged 18 to 35 to either an experimental group, which viewed digitally rendered psychedelic art imagery for five minutes, or a control group, which viewed five minutes of scenic imagery. After the viewing, all participants completed surveys and open-ended questions to assess changes in their physical, mental, and emotional states. The research concluded that psychedelic abstract art holds significant promise

for healing and mental health promotion even more than scenic imagery, suggesting avenues for its integration into therapeutic practices and digital health environments. From this perspective, abstract immersion through kaleidoscopic aesthetics becomes not just a form of escapism but a potentially therapeutic and transformative experience. Such experiences can foster deep relaxation, a sense of peace,

anxiety reduction, and meditative states by temporarily suspending ordinary perceptions of time and identity. This form of art-induced immersion enables individuals to recalibrate their senses and access introspective awareness, thereby promoting emotional processing and grounding in the present moment.



Fig. 3 TeamLab Borderless. Photograph by Patrick Vierthaler, 2024, Flickr.

Kaleidoscopes in Contemporary Art

Building on the therapeutic significance of abstract visual immersion, the kaleidoscope's legacy also extends into contemporary artistic practice. David Brewster's suggestion that the kaleidoscope might serve artistic purposes has, to some extent, materialised. Since the 19th century, kaleidoscopic geometries have permeated visual culture, evolving from optical toys to tools of digital abstraction. Symmetrical compositions—whether produced through traditional kaleidoscopes, modern reinterpretations, or digital means—remain widespread. Kaleidoscope-themed exhibitions are popular, and the device continues to inspire contemporary artists, both metaphorically and materially. As the interest in kaleidoscopic imagery increases, it often transitions into a screen practice that is characterised by greater distance from the image, while agency often derives not from tactile manipulation but from the mobility of the viewer.

Some works evoke kaleidoscopic aesthetics without direct reference. Rana Begum's (Bangladesh, 1977) sculptural pieces, for example, feature vibrant, geometric forms and translucent materials that recall childhood kaleidoscopes, bridging memory and abstraction. Likewise, James Turrell's (United States, 1943) immersive explorations of light and space, particularly through works that induce contemplative states, have been likened to kaleidoscopic experiences. His installations share with Yayoi Kusama's (Japan, 1929) *Infinity Mirror Rooms* an emphasis on the interplay of light and a dissolution of spatial boundaries, conjuring an altered sense of perception. A more technologically expansive form of abstraction is offered by the Tokyo-based art collective

teamLab (2001). Their *Borderless* exhibition (Fig. 3)—which drew over 2.3 million visitors in its first year—puts audiences into large-scale digital environments that react to movement and touch. These shifting landscapes of petals, rivers, and galaxies create a multisensory state of immersion. Some rooms with their reflective surfaces and circular motifs draw visual parallels to kaleidoscopes; here the viewer shifts from passive observer to active participant. The solitary peeping device becomes a collective, interactive encounter, marking a significant evolution in how kaleidoscopic principles are engaged in screen-based practices.

Some artists explicitly adopt the kaleidoscope as both form and metaphor. Laura Buckley's (Ireland, 1977) *Fata Morgana* (2012, Fig. 4) is a mixed-media installation that directly references the kaleidoscope. A large-scale hexagonal tunnel lined with mirrors and video projections at the end of the tunnel functions as an immersive walk-in kaleidoscope. Buckley aimed to 'take the viewer on a separation from reality, but in a positive way—escaping and reaffirming things at the same time' (Wonderland Magazine, 2019). This duality—between disorientation and affirmation—is central to kaleidoscopic escapism.

Olafur Eliasson's (Iceland-Denmark, 1967) work often incorporates kaleidoscopic motifs. His *One-Way Colour Tunnel* (2007) invites viewers through a passage of triangular, semi-transparent panels. More recently, his *Kaleidoscope* series (2024) returns to peeping-device form. *Kaleidoscope for Solar Amplification* presents a tube on a stand with a viewing end with a design that is reminiscent of the original kaleidoscopic form. *Kaleidoscope for Uncertainty and Surprises* is larger but still

designed for a single viewer, and swaps traditional marbles for LED lights and water. *Kaleidoscope for Plural Perspectives* uses rotating polarising discs to generate dynamic, shifting triangular forms. While these works preserve the act of peeping, they limit the viewer's agency to observation alone. The tactile, interactive dimension is here replaced by carefully

constructed systems in which the viewer is a recipient rather than a co-creator. *Kaleidoscope for Beginning at the End* invites multiple viewers to simultaneously peer into a vertically positioned mirrored tube where oil, ink, and water swirl in the cell into organic patterns described by the artist as oscillating between 'the microscopic and cosmic'.



Fig. 4 Installation by Laura Buckley, 'Fata Morgana'. Photograph by Sascha Pohflepp, 2012, Flickr.

Eliasson's *Kaleidorama* expands the kaleidoscope into screen-based practice. Drawing from its Greek etymology—'beautiful,' 'form,' 'view'—the installation combines reflections, fluids, filters, plant matter and light to produce continuous, shifting visuals. Unlike the closed loop of a traditional kaleidoscope, *Kaleidorama* opens the experience outward, encouraging reflection on perception and movement.

These diverse artworks demonstrate how the kaleidoscope's influence extends far beyond its original optical function, shaping contemporary immersive practices in both aesthetic and experiential terms. Their widespread appeal is not incidental but closely tied to the therapeutic and introspective qualities associated with abstract immersion. As *Blooloop* noted in a recent article (Jodry, 2025), 'immersive wellness' is emerging as a significant trend, with abstract immersive exhibitions attracting growing public interest. This development aligns with the rapid expansion of the wellness industry more broadly, driven in part by increased attention to mental health and emotional wellbeing (Business Wire, 2025). The trend is already materialising in new forms of 'abstract wellness' environments, such as *Submerssive*, a bathhouse-spa set to open in Texas in 2026 featuring large-scale immersive abstract projections designed to induce states of 'awe, transcendence, and heightened presence' (Mitchel, 2024). Whether through direct structural references or more diffuse conceptual echoes, the kaleidoscope's shifting geometries continue to inform contemporary approaches to emotional regulation, sensory grounding, and restorative immersion.

Conclusion

The kaleidoscope offers a uniquely self-directed experience: the viewer controls the speed, rhythm, and transitions of the imagery. Its system of mirrors not only reflects light but also creates a perception of infinite depth, enhancing its immersive quality. The interplay between tactile control, visual symmetry, and temporal fluidity demonstrates how media induces an embodied experience, cognitive regulation, and aesthetic engagement. The kaleidoscopic allure reveals an integral aspect of human perception: our desire for immersion in abstract, non-narrative visual experiences. This dynamic clarifies why the device has persisted across centuries and contexts from scientific and artistic instrument to domestic toy and therapeutic tool.

Whether through digital installations or the fleeting patterns behind closed eyelids, abstract imagery is part of our perceptual inheritance, experiences that are at once primal and futuristic, cellular and cosmic. Abstract immersion is not merely an aesthetic indulgence; it has the potential to promote mindfulness and reduce anxiety. Evolving from tactile agency to the form of viewer mobility found in contemporary screen-based art, the kaleidoscope anticipates modern media's capacity to join agency, abstraction, and sensory modulation in fostering contemplative states. This article contributes to the study of stereo and immersive media by positioning the kaleidoscope as a paradigm for understanding the interplay between perception and agency.

By tracing the kaleidoscope across scientific, domestic, and artistic settings, this article positions it as a precursor to modern attention-shaping environments. This process shows that the aesthetic and the therapeutic arise from the same process of self-directed engagement with abstract, dynamic imagery. In a culture marked by overstimulation, the continued appeal of abstraction reflects a desire to recalibrate perception—to pause, reflect and step outside linear time. The kaleidoscope, from the simple act of turning a tube to a more complex orchestration of interactive exhibitions, reminds us that abstraction is an invitation to imagine, to feel, and to simply be.

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