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2001: A Space Odyssey as a Work of Experimental Cinema: Focused on Its Convergence of Technical Innovations and Aesthetic Challenges

Pip Chodorov, Minchol Cha*

Department of Film & Digital Media, Dongguk University, Seoul, South Korea

*Department of Film Studies, Dong-eui University, Busan, South Korea**

*E-Mail: pip@re-voir.com, mincholcha@deu.ac.kr**

Abstract

Stanley Kubrick's 1968 film titled 2001: A Space Odyssey has generally been considered as a monumental piece of mainstream epic science-fiction. However, this film can be evaluated as having properties of experimental cinema by boldly trying technical innovation and aesthetic experiment in various aspects. From the filmmaker's process to filmic structure, technical innovations, screening method, mise-en-scène, cinematic style and its (auto-)reflexivity, 2001: A Space Odyssey is highly experimental. We will attempt to separate out aspects of 2001: A Space Odyssey that derive explicitly from traditions in experimental cinema, whether adopting those traditions or innovating within them, by identifying the film's experimental strategies and relating them to other experimental films that came before and after. This will show that the purely formal characteristics of the film's conception carry meanings on their own relating to Kubrick's personal expression, ideas about cinema and philosophy that go beyond the scope of the film's narrative.

Keywords: *2001: A Space Odyssey, Stanley Kubrick, Experimental Cinema, Science-Fiction, Abstraction*

1. INTRODUCTION

2001: A Space Odyssey, an epic science-fiction film produced and directed by Stanley Kubrick in 1968, does not adhere to the properties usually attributed to experimental filmmaking: the work of a very small crew, and for the most part just one person; tending towards the non-narrative, non-fiction, non-documentary, even often non-figurative; and always non-commercial, no-budget; and often exploring specific qualities of the filmmaking apparatus. In many ways, *2001: A Space Odyssey* is the antithesis of this definition. Although Stanley Kubrick credited himself as writer, director, producer and special effects supervisor, 370 people worked on the film (though nearly 300 went uncredited).[1] The film tells several stories and creates a believable fictional diegesis. In addition, so much scientific research went into the production that it could almost be qualified as a documentary, accurately predicting such technological advances as the credit card, Skype and the iPad. One of Kubrick's main film influences was the National Film Board of Canada's *Universe* (1960), narrated by Douglas Rain who Kubrick would later hire to voice HAL 9000, a visionary animated documentary that inspired Kubrick to treat science fiction as science fact. However, in certain significant ways, the film is highly experimental, on the cutting edge of visual effects, perceptual experiences, non-verbal expression, psychedelic imagery, philosophy and reflections on the cinematic condition. Roger Odin qualified

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Corresponding Author: mincholcha@deu.ac.kr

Tel: +82-(0)51-890-2724, Fax: +82-(0)505-182-6910

Department of Film Studies, Dong-eui University

176 Eomgwangno, Busanjin-gu, Busan, 47340, South Korea

2001: A Space Odyssey as a film with elements in narrative mainstream cinema while fitting into the category of experimental film. Odin cites the stargate sequence as an example of diegetization in which the support (the screen) is erased and figuration occurs whether the referent is real or supposed.[2]

Much has been written on the film's role as a catalyst in the modernization of science fiction cinema. "Stanley Kubrick's ambition, as he expressed to Clarke in his introductory letter, was to make 'the proverbial good science fiction movie.' (...) Over the four years of production he and his crew essentially invented modern special effects." [3] But more than that, the film modernized cinematic, non-verbal expression for a mainstream audience: "Kubrick's epic had little narrative and no central characters – just a series of incidents strung out over thousands of years of earthly and extra-terrestrial history. Plus, it led to a climax whose visual effects were clearly inspired by the kaleidoscopic images of Jordan Belson – an avant-garde filmmaker few '2001' viewers had ever heard of." [4]

Kubrick said the film is "basically a visual, nonverbal experience" that "hits the viewer at an inner level of consciousness, just as music does, or painting." [5] "It changed not only science fiction but also the very form of cinema." [6] Similarities can be found with Disney's 1940 animated film *Fantasia* (discussed below) that also innovated with new technology (stereo sound) to create a mostly experimental approach to animation and was released to radically mixed critical acclaim, but which came to be recognized as a landmark movie that reinvented film form.

This paper will attempt to separate out aspects of *2001: A Space Odyssey* that derive explicitly from traditions in experimental cinema, whether adopting those traditions or innovating within them, by identifying the film's experimental strategies and relating them to other experimental films that came before and after. This will show that the purely formal characteristics of the film's conception carry meanings on their own relating to Kubrick's personal expression, ideas about cinema and philosophy that go beyond the scope of the film's narrative.

2. THE FILMMAKER'S PROCESS

Since experimental films are not distributed commercially, most filmmakers are their own producers and financiers. Films can take a very long time to complete, and the path to completion can meander. The process of development is often inscribed in the film, a notable example being Jonas Mekas' *Lost Lost Lost* (1976) which was shot over thirteen years and documents the filmmaker's life as well as the evolution of his filming style and his relationship to images. Even an abstract film like James Whitney's *Lapis* (1966), which was made over a four-year period is marked by changes in thinking, and finding new techniques.

Although it seems perfectly structured and carefully prepared, as indeed a multimillion-dollar budget fictional studio film should be, *2001: A Space Odyssey* was largely improvised, as are many experimental films. Major plot points were still being worked out during the film's shooting, and the actors and technicians often provided insight into the film's vision. Consider these key scenes: actor Gary Lockwood suggested the astronauts sequester themselves into the pod for a private talk away from HAL 9000; associate producer Victor Lyndon came up with HAL 9000 lip-reading their conversation; special effects supervisor Douglas Trumbull decided that HAL 9000 should kill off the hibernating crew members; actor Keir Dullea thought his character should break the wine glass at the end. Though these suggestions seemed to infuriate Kubrick, he readily adopted their ideas as his own and changed the script accordingly.[7] Indeed, Kubrick seemed ambivalent about details in the story line while preoccupied with the film's underlying mythology and visual treatment, both experimental approaches to filmmaking.

3. FILMIC STRUCTURE

2001: A Space Odyssey has a symmetrical geometric structure. The film starts with the Earth rising over the moon and the sun rising over the Earth, an alignment of spheres with a light source. This confluence is also

reflected in the last shot, the star child gazing at the Earth, now two luminous spheres. A symmetrical play of shapes is established that will also be reinforced by oppositions in the first and last sequences of the film: the apes in their desert landscape and the astronaut in the Louis XV bedroom. In the desert landscape, where all forms are shapeless and craggy, appears a singular perfectly rectangular block, which will be associated with the transformation of dead bone into useful tool. In the room at the end of the film where geometry and rectilinear forms abound, the broken wine glass becomes the only shapeless craggy object, a tool that has lost its function. Another example: the circles aligned with a beam of light (the Earth, moon and sun at the beginning) will also be reconfigured to represent the black, red and yellow eye of the HAL9000 computer, a tool combining the elements of inert planets with pure intelligence. Allegorical symmetry fuses with geometrical mirroring as the astronaut ages at the end, in a strategy that can be found in early iterations of experimental film such as Maya Deren's 1943 film *Meshes of the Afternoon* (the multiplied female character and the fragmented male character; the repetitions of key and knife and mirror) or her 1946 film *Ritual in Transfigured Time* (the woman in negative at the end, the astronaut's eye in negative colors), Luis Buñuel's 1929 film *Un Chien Andalou* (the reoccurring severed hand is reconfigured as the arm with the wristwatch, severed by the framing; the garments thrown out the window found later on the beach). Purely structural films also make use of inverted symmetry such as *T,O,U,C,H,I,N,G* (1968) by Paul Sharits, *The Flicker* (1966) by Tony Conrad or *Arnulf Rainer* (1960) by Peter Kubelka, as patterns from the beginning are reversed at the end.

There are several examples in *2001: A Space Odyssey* of an inverted camera, showing a scene or a character upside down on the screen. Upside down shooting became a feature of some experimental films, such as Peter Gidal's *Upside Down Feature* (1972) or Tony Hill's *Holding the Viewer* (1993), both produced in the UK.

Another strategy that *2001: A Space Odyssey* shares with experimental films is making meanings through associative editing. In Peter Kubelka's *Unsere Afrikareise* (1966) for example, a shot of a European hunter shaking an African man's hand is followed by a shot of a zebra's leg shaking, creating a causal connection between the hunter and the dead zebra. Many 'found footage' films have developed this technique as well, creating new meanings in old images through associative editing: Joseph Cornell's *Rose Hobart* (1936), Matthias Müller's *Home Stories* (1990), and Esfir Schub's compilation documentaries[8] are the examples. Films such as Stan Brakhage's *Dog Star Man* (1961-1964) and *Anticipation of the Night* (1958) excelled in this strategy which came directly from Romantic poetry, especially Wordsworth.[9] The viewer must watch carefully and actively in order to grasp all the meanings inherent in the shots and that arise between them. In *2001: A Space Odyssey*, the sequence of Frank Poole shadow boxing is followed by HAL 9000's eye, which prefigures the theme of a duel; HAL 9000 will beat Frank at chess, and then murder him. We have to watch actively and learn these strategies from the film itself, throughout which the causality in the narrative is posited by abrupt cuts. The ape Moonwatcher toys with loose bones when a flashback to the monolith hit by the sun gives him the idea that they can be used as a weapon. The scene is followed by one of apes eating meat. It is implied by the cut that the use of the weapon has led to a change in their diet. The bone thrown in the air cuts to a vessel in space (actually a nuclear weapon if one reads the screenplay) hence Kubrick establishes the evolution of bone as tool/weapon to the nuclear arms race and later to the computer and AI through cutting and the association of shapes (the bonelike spaceship Discovery). Annette Michelson interprets this cut from bone to spaceship as a sophisticated evolution of Georges Méliès' first discovery of the jump cut.[10] A shot of the monolith on the moon being hit by the sun is the only hint in the narrative that both Moonwatcher and Heywood Floyd have been touched by an alien intelligence and a new jump cut in time to a new story will take place. It is only after accepting these ellipses through which the spectator fills in the gaps of narration, that we can make sense of the stargate and the room at the end, as the film becomes even more elliptical and allegorical: the last monolith in the room jumpcuts us to the shot of the starchild returning to Earth.

Another technique that Kubelka perfected in *Unsere Afrikareise* was the sync event: a correlation between an image and a sound although they do not seem to correspond, creating a new association. Already the Letterist filmmakers Isidore Isou (*Traité de bave et d'éternité* (1951)) and Maurice Lemaitre (*Le film est déjà commencé ?* (1951)) had pioneered the discrepant cinema, in which the image and the soundtrack would diverge completely, creating two distinct experiences that do not relate (though closer analysis would show quite ironic relationships between the two). A particularity of *2001: A Space Odyssey* is the meaning created solely through elements on the soundtrack. The piercing whistle heard when the sun hits the lunar monolith is a signifier that exists only as sound. Likewise, the character of HAL 9000 is a disembodied voice and his death is enacted only through the decomposition of this voice. The alarms that signal that explosive bolts are armed, or that life functions are critical peel out in contrast to the silent shots in vacuum space. Many parts of the film are silent and hark back to the pre-sound days of cinema, including lip-reading. Over the course of production, Kubrick had progressively removed as much verbal explanation as possible in favor of visual and auditory material. The sounds of spaceships, pods or even Kubrick's own breathing were experimental solutions to the problem of what life in space would sound like.

4. TECHNICAL INNOVATIONS

Douglas Trumbull built an animation machine for the stargate sequence, based on techniques that had been developed by John and James Whitney for their abstract film exercises and special effects, albeit on a much larger scale. "For the psychedelic sequence at the end, when Keir seems to pass into a different dimension, we had to invent a whole new type of camera: the Slit Scan, a giant machine nearly 20x30ft. It ran for 24 hours a day, taking photographs of 15ft-tall artworks, backlit and full of patterns and colored gels. These were turned into controlled blurs – like if you leave a camera shutter open while shooting cars at night, you get streaks of light. A single frame of film took four minutes to produce, so the stargate sequence took months and months." [11] The Whitney brothers, James in particular whose films were quite spiritual, would spend four to seven years to produce a ten-minute abstract film with multiple exposures per frame. Building one's own camera or animation machine was not uncommon among experimental filmmakers who were after a specific effect that was not possible with available equipment. Examples that followed the release of *2001: A Space Odyssey* are Standish Lawder who built his own contact printer out of a Coca-Cola can for *Corridor* (1970), Michael Snow who had constructed a special mechanized tripod that allowed shooting in all directions possible without ever seeing itself (*La Région Centrale* (1971)), and Jeff Scher who built a rotoscope out of a coffee can (*Reasons to be Glad* (1989)).

"Compared to technology on earth, technology in space is characterized by the special conditions of usage such as zero gravity, vacuum state, high-strength radiation, high-temperature difference, demands for light weight and high reliability." [12] That's why in *2001: A Space Odyssey* many special effects shots were made up of multiple exposures, in which spaceships, starfields, planets and tiny pilots in cockpits were all composited onto a single strand of film. One of the most risky aspects of this technique involved holding exposed film for months before re-exposing it. An example is the TMA-1 footage of the astronauts on the moon discovering the monolith in the crater Tycho. This set was constructed at a location far from Borehamwood and was the first sequence shot in England for the film. It would be months before the lunar landscape with sunrise and stars could be superimposed onto the shot, carefully matting out the shape of the actors and crater that were already filmed. The film was kept in cold storage until the crew was ready for the animation to be shot on the same roll. This technique of superimposing onto one roll is common in experimental film, a notable example being Kurt Kren's *31/75 Asyl* (1975) which was rewound and re-exposed 16 times while blacking out specific parts of the frame to create a mosaic of images.

5. MULTI-SCREEN PROJECTION

The mosaic of images also appears in *The Space Odyssey* series written by Arthur C. Clarke. The film *2001: A Space Odyssey* was premonitory in many ways: In addition to the videophone, credit card and iPad, but in a more pervasive and mundane way, Kubrick predicted that in the future we would be constantly surrounded by screens. Images within images and screens within screens abound. The views through spaceship windows, the animation in computer monitors, dashboard screens, even the rooms of tiny people on the sides of Clavius as Aries descends were 16mm projections in the 70mm image. Some of these screens in the screen carry pictures, others text, others graphic information. During the TV interview with HAL 9000 and the astronauts, the small screens the film itself. During EVA operations, one astronaut floating in space will be watched on a monitor by the other astronaut inside the spaceship, as if the movie itself were shot by a surveillance camera.

Many filmmakers have worked with multi-screen projection starting with Oskar Fischinger's three-screen film *R-1, Ein Formspiel* (1927). Abel Gance's *Napoléon* (1927) was a notable landmark in expanding the screen. It required installing three projectors side by side for the wide screen effect, curiously similar to the Cinerama installation for *2001: A Space Odyssey* also requiring three synchronized projectors. And starting in the 1970s, many filmmakers created works for 2, 3 or 4 projectors. In *2001: A Space Odyssey*'s centrifuge set, 12 sets of 16mm projectors were mounted on the exterior of the wheel and rear-projected into the consoles.

Post *2001: A Space Odyssey*, many multiple screen film performance films were created. In the UK: Gill Eatherley's *Hand Grenade* (1972), Malcolm Le Grice's *Threshold* (1972), Chris Welsby's *Wind Vane* (1972) and Lis Rhodes' *Light Reading* (1978). In France, Yann Beauvais' *RR* (1976-1985), the 16mm multi-projector performances by the trio Metamkine starting in 1987, etc. In the US, Paul Sharits created multi-projector installations such as *Dream Displacement* (1976). Films featuring a mosaic of images on the screen include Kurt Kren's *31/75 Asyl* (1975) and Zbigniew Rybczyński's *Nowa Książka* (1976). Stan Vanderbeek produced Steam Screens at the Whitney Museum in 1979 projecting through steam towards the viewers creating tunnels of light reminiscent of the stargate. The many screens confronting Dave as he pilots the space pod resemble a modern day web browser or even CNN with multiple displays and scrolling texts along the screen.

6. REPRESENTATIONS OF THE EYE

Since film is a visual medium, many experimental films reference the eye itself as a gesture acknowledging the voyeurism of the spectator. One can recall key scenes of the eye in *Le Voyage dans la Lune* (1902), *Le Retour à la Raison* (1923), *Ballet Mécanique* (1924), *Filmstudie* (1926), *La Coquille et le Clergyman* (1928), *Man with a Movie Camera* (1929), *Un Chien Andalou* (1929), *Meshes of the Afternoon* (1943), *Dreams That Money Can Buy* (1947), *Reflections on Black* (1955), *La Jetée* (1962), *La Cage* (1963), *Peyote Queen* (1965), *Eyeblink* (1966), *T,O,U,C,H,I,N,G* (1968), *Lucifer Rising* (1972), *Short Film Series* (1976-1979), and many others. Of course, the eye is prominent in *2001: A Space Odyssey* as it is in *A Clockwork Orange* (1971) and *The Shining* (1980): close-ups of the eye in psychedelic colors during the stargate figured in some of the film's posters. HAL 9000's eye and Dave's eye are the most memorable close-ups in the film.

Not only the eye as an object, but how the eye sees are a recurring theme, the subjective representation of vision as an act. The camera lens as a mechanical eye is prevalent, and the doubling of HAL 9000's eye as a camera is a good illustration. HAL 9000's eye functions as a surveillance camera, being able to watch over many parts of the ship, inside and out. When the astronaut outside the ship is being seen on a monitor inside the ship, we can surmise that the point of view is one of HAL 9000's eyes. The surveillance camera has taken on a significant role in experimental films, most recently in *Dragonfly Eyes* (2017) by Xu Bing. In a simpler analogy, the wide angle lens is synonymous in *2001: A Space Odyssey* with HAL 9000's point of view. Most notably, at the time that HAL 9000 is telling Dave that "no HAL 9000 computer has ever distorted information" we see the rounded distorted world through his own eye. The wide angle lens has been used extensively in experimental films especially following the release of *2001: A Space Odyssey*: Bruce Baillie's *Mass for the Dakota Sioux* (1964), Al Razutis' 3-screen film *Amerika* (1972-1983), Barbara Hammer's *Bent Time* (1983) are examples of the wide angle lens representing an expanded vision onto a new modern world.

7. ABSTRACTION

Interior vision is also often explored in film, as an extension of the subjective viewpoint. Expanded cinema has often been defined not only as multi-screen projection but also an expanded way of seeing through expanded consciousness. In the documentary about his unfinished project *Dune* (circa 1974), Alejandro Jodorowsky says that “he wanted to make a film that would give the young people the experience of taking LSD without taking it.”[13]

William C. Wees writes extensively about a connection between graphics found in abstract experimental films and hallucinations produced during drug experiences: “What Jordan Belson, James Whitney, and Paul Sharits have in common is their use of the cinematic apparatus to evoke states of mind that lie beyond the boundaries of materialist and rationalist modes of thought.”[14] Wees describes research done by Ronald K. Siegel on drug experiences: “As Siegel points out, a classic study begun in 1926 by Heinrich Klüver showed that four basic geometrical patterns persistently recur in mescaline-induced hallucinations. One pattern has the quality of a grating, lattice, honeycomb, or fretwork; a second resembles cobwebs; a third takes the form of tunnels, cones, funnels, or alleyways; and a fourth appears in spirals. (...) Siegel's own study of subjects under the influence of LSD and other hallucinogens showed that hallucinations can be codified according to eight forms (random, line, curve, web, lattice, tunnel, spiral, and kaleidoscope), eight colors (black, violet, blue, green, yellow, orange, red, and white), and eight patterns of movement (aimless, vertical, horizontal, oblique, explosive, concentric, rotational, and pulsating). One could hardly ask for a better breakdown of the basic elements of most abstract films!”[15]

Jordan Belson has said that his images came from somewhere he had seen; he did not make them up. Fischinger, James Whitney and Harry Smith all explored making psychedelic patterns that originate in nature, from hallucinogenic experience and from cultural traditions. Gaspar Noé, in preparation for shooting *Enter the Void* (2009), actively sought out drug experiences as personal research for the film's visual effects.

There is evidence that Kubrick also headed in this direction. In the summer of 1965, Fred Ordway was working for Kubrick to gather scientific research into space flight and technology 35 years in the future. One letter that Ordway sent out that summer was to Dr. Walter Pahnke of the Massachusetts Mental Health Center, who had conducted the Marsh Chapel Experiment in 1962 with his thesis advisors Timothy Leary and Richard Alpert, in which he gave graduate students of a divinity school strong doses of psilocybin. Ordway asked about the heightened awareness of philosophical matters as a result of receiving the drug. The participants did report heightened religious experiences and visual hallucinations such as being awash with color and movement. It is a direct connection between the production of *2001: A Space Odyssey* and the metaphysical explorations of drug culture at that time.[16]

There are many examples of abstract imagery in *2001: A Space Odyssey*, from the monitor displays in the various spaceship cockpits to the tunnel of light at the end. One may think of the nebulous abstractions during the stargate sequence as spectacular visual filler, giving Kubrick ambiguity to a story he did not know how to end. Consider, however, that these abstract sequences were the very first that Kubrick filmed, in a rented abandoned brassiere factory in New York in early 1965, long before he had even secured funding to make the film. Kubrick shot these sequences himself in a warehouse with a 65mm camera, dropping paint from toothpicks into oil and shooting with a macro lens; the visual field recorded on the film was the size of a playing card. These shots would serve Kubrick as a visual test to pitch the project; they also ended up in the final sequence.

When devising the color combinations of the landscapes at the end, Bryan Loftus tended to use palettes that he liked. Kubrick urged him to make combinations that were new and surprising. Loftus created a random spinner to determine color, contrast and film stock, much as John Cage used the *I Ching* to determine musical compositions, or William S. Burroughs used a dada-style cut-up technique to randomly compose text. Kubrick was delighted at the chance operations and proclaimed: “We've taken the human element out of it!”[17]

8. GEOMETRICAL COMPOSITION

The 1965 Academy Award for Animated Short Film went to an abstract cartoon directed by Chuck Jones for MGM, the same studio that was financing *2001: A Space Odyssey*. *The Dot and the Line: A Romance in Lower Mathematics* (1963) is a fable about a straight line and his struggle to win over the love of a beautiful dot from his rival, an unkempt squiggle. It is interesting to note that within three years this major studio produced two commercial films with such strong abstract content.

For Kubrick, every detail is carefully considered and chosen, and in *2001: A Space Odyssey* in particular, a film with 205 effects shots that took two and a half years to complete, we can consider that graphic, textural and compositional considerations were just as carefully designed as casting and dialogues. The deep structure of the film's propositions is expressed through the details. Therefore, we can consider recurring visual aspects, such as shapes (circles vs. rectangles), colors (red vs. green), motion effects (fast vs. slow, up vs. down) as significantly expressive of meaning. Filmmakers making purely abstract films such as Oskar Fischinger or James Whitney were also acutely aware of the shapes, textures, colors and motions they chose as holding significant spiritual meanings: Fischinger lived according to principles of mysticism and spirituality, and he often refused to show his early films or fragments that were out of context of the structure they were designed for.[18] As William Moritz mentions, we can find Fischinger's continuing interest in eastern mysticism and western hermetic thought in his films.[19] And many of his strongest works with his most accomplished techniques and effects were never included in retrospectives because he felt they did not represent the ideals of his art.[20]

Kubrick uses the interaction of shapes throughout *2001: A Space Odyssey*. Just as the opening and closing of the film are dominated by spheres: the planets, the baby in the bubble, the monolith is introduced as the first straight shape, a rectangle. We will see the play between these shapes throughout the film. The rotating space station is a wheel with a rectangle in its center. HAL 9000's eye is a rectangle with a circle in its center. The monolith floats in space amid round planets. The room at the end is made of predominantly straight lines, the only circles being the pod, then the dining table with its wheels for legs that resemble the space station, and finally the fetus. Just as the rectangular monolith is struck by the round sun, a particular play is set in motion between round and straight shapes. These forms are presented in their purest state. The planets are perfect spheres; the space station a circular wheel. The monolith was designed to measure 1:4:9, which are the squares of 1, 2 and 3, a geometrical representation of three-dimensionality. These mathematically perfect shapes are set against each other at regular intervals: the shuttles to the space station dock in a rectangular slot at the center of the wheel; the spherical space pod sits in the corner of the perfectly squared room at the end.

The circle is a form that appears in nature – planets being naturally spherical, as is the human eye. A rectangle however does not appear in nature. The rectangle is a manmade form that appears in art and architecture: the room, the sheet of paper. The monolith feels totally out of place in the desert of the apes. These two pure forms then tug against each other throughout the film, as in the shape of Discovery with its spherical head and bone-like body.

Where these two shapes combine the most perfectly are in HAL 9000's eye: a spherical circle within an elongated rectangle that eerily resembles the monolith. HAL 9000's brain room also appears to be a rectangular monolith-shaped space at the heart of the spherical centrifuge in Discovery. Artificial intelligence would seem to be embodied then by the natural and the artificial, and the struggle between these shapes, these concepts, would help explain the inner conflict that causes HAL 9000's dysfunction.

Lenses are circular objects that focus light naturally into circular images, as shown by the wide-angle lens of HAL 9000's view. The cinema screen is a perfect rectangle. The circular lens sends a round beam of light to the rectangular screen: this negotiation between forms is the essence of HAL 9000's struggle and the geometrical underpinning of *2001: A Space Odyssey*. The edges of the frame are vertical and horizontal, where most of the film's forms are curved: planets, centrifuges, pods, space helmets. The rectangular shape of the screen is an imposed limitation on the circular lens to give borders to our vision. The cinema is therefore itself a squared-off view of a circular image, and this may shed some insight into HAL 9000's persona as an artifact of cinema. "No 9000 computer has ever distorted information," says HAL 9000 as we are shown a circular image through the fisheye lens. Dave's drawings seen by HAL 9000 are rectangular sheets of paper distorted

and curved by the round eye. HAL 9000's dashboard contains multiple rectangular screens embedded in a curved room. There is a struggle between straight and curved throughout the centrifuge and the space station.

Critics have often mentioned that the monolith in *2001: A Space Odyssey* represents a cinema screen. In fact, *2001: A Space Odyssey* was one of 20 films to be produced in Super Panavision 70 using 65mm film and projected onto a deeply curved screen using special optics. Cinerama was a new technique which required three 35mm projectors placed in an arc facing the curved screen – the film was therefore literally a rectangle projected onto a circle. The dimensions of the monolith being 9 by 4, the ratio of the rectangle is 2.25. The ratio of Super Panavision 70 is 2.20:1; within 3% accuracy the ratio of the monolith is the ratio of the screen while maintaining its geometrical perfection of the squares of 1, 2 and 3.

One can see therefore in *2001: A Space Odyssey* a Kubrickian manifesto about the paradox and magic of a round beam of light projected onto a rectangular screen. The 1973 Anthony McCall film *Line Describing a Cone* best celebrates this phenomenon, demonstrating the transformation of the projector beam into a cone of light in space creating a flat circle on the screen. Viewers were encouraged to stand around the projector and smoke heavily, creating a hazy atmosphere in which the cone of light became a solid sculpture in the theatre space. Rather than watch the screen, the participants stand facing the projector, gazing into a hollow tunnel of white light, its ghostly curved wall slipping into the shadow when touched by the hand. McCall went on to create a range of these projections that he called "Solid Light."

Experimental films that play with the line and the curve go back to *Opus 1* (1919) by Walther Ruttmann. These include Chuck Jones' *The Dot and the Line* previously mentioned, but also films by Oskar Fischinger, Len Lye, Norman McLaren and Robert Breer who have all portrayed struggles between curved forms and straight lines from the 1920s through the 1960s. Lye's first film *Tusalava* (1929) shows snakelike figures trying to penetrate a straight wall. Wavy and curvy shapes predominate throughout his work, but his last film *Tal Farlow* (1980) consists solely of straight lines scratched into the black emulsion. Robert Breer's first abstract animation series *Form Phases* (1952-1954) show lines inching around squares and half circles. Fischinger's *Komposition in Blau* (1935) portrays a series of cubes in space and flat circles that seem to indicate a struggle between the 2D and 3D world. Made soon after 2001, Michael Snow's *La Région Centrale* (1971) is a three-hour film describing a spherical space with a rectangular frame. It depicts a craggy landscape and an empty sky accompanied by electronic sounds that represent a searching probe. Michael Snow was preoccupied since 1967 with the relation of camera and screen and viewer, in his films *Wavelength* (1967), <---> (1969, a.k.a. *Back and Forth*), and *La Région Centrale*. Snow has refused to release these films on DVD, claiming that it is important to see the film in a movie theatre, where you are inside a large box with the image dominating your vision, the light being cast from over your shoulder.

Jürgen Reble showed an installation in Montpellier in 1999 with three 16mm projectors. He had removed the projector gates so the projected images were round instead of square. The three projectors were aimed up at the ceiling and were showing abstract images that seemed to represent a macrocosm; actually the film was being attacked by acid delivered from medical IV drip bags mounted on the projectors, and microscopes positioned near the take-up reel allowed viewers to see the raging of the particles on the emulsion. Just as in the stargate sequence, microscopic chemical reactions represent the cosmos.

The curve and the straight line seem to play against each other in *2001: A Space Odyssey* like musical forms: the planets and the monolith, the watering hole and the bone, the circular space station and the Aries space plane that docks there, the bonelike spaceship Discovery and the round pod, HAL 9000's eye, the round pod at the room at the end and the straight geometric lines on the floor. The pod flying through the stargate corridor has been compared to a sperm entering the room/womb in which the fetus is born. This idea is echoed in Gaspar Noé's *Enter the Void* which has many similarities to *2001: A Space Odyssey* in form and structure. Alejandro Jodorowsky's never-made pre-*Star Wars* science-fiction epic *Dune* also contained a scene of a drop of blood travelling through an ovum to explode there, as made evident in Frank Pavich's documentary *Jodorowsky's Dune* (2013)

This idea is also apparent in the film's title. Many experimental films have the particularity of holding special meanings in the title. For example, Paul Sharits' film *T,O,U,C,H,I,N,G* can be seen to represent the paradoxical quality of the seemingly smooth moving image made up rather of non-moving stills separated by black, just as its title is made up of individual letters separated by commas. According to Arthur C. Clarke, the

title of *2001* was entirely Kubrick's idea, and many working titles were used throughout the production. The choice of the year 2001 would seem arbitrary, 35 years in the future relative to the film's production, just as George Orwell's classic novel *1984* was published 35 years earlier in 1949. Nothing in the film indicates that the action unfolds in 2001, and in fact the Discovery mission occurs 18 months later than the Tycho excavation of the moon monolith. The title of *2001* therefore contains two circles and a straight line, just as its opening shot contains two round planets a beam of light from the sun. The mystical last shot also features two spheres, planet and fetus, which could be seen to revisit the two spheres of the first scene with the beam of consciousness now inserted into the living sphere, an awakened consciousness now a quantum leap above the previous race. The title can thus embody the film's embedded messages: circle and line, egg and sperm, zero and one.

9. PERSONAL EXPRESSION

Experimental films invariably communicate more directly from the artist to the viewer than do the works of commercial cinema made by a cast and crew. Of all of Stanley Kubrick's feature films, *2001: A Space Odyssey* shows the most evidence of Kubrick's personal expression.

References to chess and shadow boxing aboard Discovery relate directly to Kubrick's affinity with these activities. It is interesting to note that Frank's boxing is followed by a close up of HAL 9000's eye closely watching, just as Kubrick's lens was in his first film about a boxer, *Day of the Fight* (1951), based on a photo feature he had taken for *Look* magazine in 1949. It is also interesting that HAL 9000 beats Frank at chess, just as Kubrick often played for money, and won, in New York's Washington Square Park. We begin to see then a connection between the character of HAL 9000 and Kubrick himself, in relation to his reportedly manic control over all aspects of the film's production and his refusal to allow anyone to sabotage it. Kubrick had been a pilot, too, and his fear of flying stems from his once having nearly missed a take-off and worrying that a normal pilot would be even less meticulous than himself in preparing the plane.

The breathing we hear when the astronauts go EVA to replace the antenna module is Kubrick's own; Heywood Floyd's daughter Squirt is Kubrick's own; at one frame in the Tycho crater, a reflection in a spaceman's helmet reveals Kubrick behind the handheld camera, therefore identifying the fifth astronaut who descends the ramp to the monolith as Kubrick himself. Few feature films contain such specific references to the author's own person, with the exception of Hitchcock's comic cameos in his own films.

10. REFERENCES TO FILM MATERIAL

Many experimental films incorporate the process of their own making into the structure of the film. This can be manifest as visible effects such as flashes from the ends of the shot, flares from the end of the roll, or even showing the camera or the crew. It can also be apparent in how the film is structured. Diary films tend to develop as the filmmaker exposes his shots with no plan. It can be made manifest by the inclusion of perforations, framelines, scratches, chemical aberrations, or by references to cameras, screens, mirrors, shadows and eyes.

Such references in *2001: A Space Odyssey* include the monolith as screen, screens in the screen, HAL 9000's eye as a lens or camera, and the flickering video of mission control after HAL 9000's death which references contemporaneous experimental films like Peter Kubelka's *Arnulf Rainer* (1960), Tony Conrad's *The Flicker* (1966) and Paul Sharits' *Ray Gun Virus* (1966).

Other incidental links to experimental filmmakers are apparent. When Kubrick and Clarke started writing *2001: A Space Odyssey*, one of their first impulses was to study Joseph Campbell's 1949 book *The Hero with a Thousand Faces* which explored the universal structures of human myths. Campbell defines the archetypal narrative as a 'monomyth': a hero ventures forth from the world of common day into a region of supernatural wonder; fabulous forces are there encountered and a decisive victory is won; the hero comes back from this mysterious adventure with the power to bestow boons on his fellow man. Not only does 'monomyth' retain echoes of 'monolith' but the definition could serve as a synopsis of *2001: A Space Odyssey*.^[21] Campbell had a connection to Maya Deren with whom he had a long correspondence and whose book on Haitian dance ritual,

trance and possession he published. Clarke wrote most of the *2001: A Space Odyssey* screenplay at the Chelsea Hotel, in the company of William S. Burroughs and Allen Ginsberg, whose experimental film contributions included Antony Balch's *The Cut-Ups* (1966), and *Pull My Daisy* (1959) by Alfred Leslie and Robert Frank, respectively.[22]

11. OTHER MAINSTREAM EXPERIMENTAL FILMS

A curious similarity exists between *2001: A Space Odyssey* and another mainstream commercial yet experimental feature that was made 25 years earlier, Walt Disney's *Fantasia* (1940). *Fantasia* was inspired by abstract animation by Oskar Fischinger who worked at Disney at the time, and it was initially Fischinger's idea to make it.[23] Fischinger, an important experimental filmmaker, had made short abstract music animation throughout the 1930s in Germany to great public acclaim and international demand, and his dream had been to make a feature-length abstract animated film set to music. He had contacted English conductor Leopold Stokowski in 1936 about the project, two years before Disney took it on. *Fantasia* became a pet project of Disney although Fischinger had left the studio soon after production began, and only a few examples of his animation remain in the film.

Fantasia took years to produce, went far over budget, and necessitated many technical innovations for sound fidelity. It was released in a roadshow form in 1940 and 1941, requiring special projection equipment for stereo sound. It was a pioneering technology called Fantasound requiring three-track sound system and two projectors, to be installed in theatres around the country, just as *2001: A Space Odyssey* later required special Cinerama roadshow facilities with three synchronized projectors.

The critical response to *Fantasia* was mixed, as it was for *2001: A Space Odyssey*. Many critics considered it a masterpiece, including Bosley Crowther of *The New York Times*: "*Fantasia* dumps conventional formulas overboard and reveals the scope of films for imaginative excursion." [24] *Variety* called it "a successful experiment." [25] But many other critics gave negative reviews. Recently the film is considered as a landmark that "pushes the edges of the envelope" [26] in the words of Roger Ebert. A similar curve of mixed reviews on an upward slope would await the reception of *2001: A Space Odyssey*. In 1969, *Fantasia* was re-released with a new advertising campaign geared to a young audience and was considered at the time as a psychedelic experience related to a drug trip. [27] It only turned a profit thirty years after its initial release, another similarity to *2001: A Space Odyssey*.

12. CONCLUSION

In general, *2001: A Space Odyssey* has been perceived as belonging to the category of mainstream science-fiction genre, but analyzing the formal experiments, technical innovations and aesthetic attempts that it implies, the film could be considered to have avant-garde or experimental cinema aspects in many ways. From the filmmaker's process to filmic structure, production techniques, screening method, mise-en-scène, cinematic style and its (auto-)reflexivity, *2001: A Space Odyssey* is considerably experimental. In addition to its experimental strategies and features, the film also can be evaluated as a renewal of modern art especially with its inherent musical rhythm and painting composition. Stanley Kubrick, the director of *2001: A Space Odyssey* likened the film to a painting and a piece of music, something to experience "at an inner level of consciousness." [28]

And besides, films like *The Matrix* series (1999-2003) were deeply indebted to *2001: A Space Odyssey* not only for the special effects but also for its deep philosophical underpinnings: actors hired to work on *The Matrix* were required to read three or four books on philosophy before they were allowed to read the script. Gaspar Noé's *Enter the Void*, based on the *Tibetan Book of the Dead* (1993) and included long passages of psychedelic abstract content including a light tunnel to a fetus at the end, can be perceived as following the Kubrickian approach and methodology.

As mentioned earlier, the fact that Kubrick wanted to treat science fiction as science fact can be related to the use of science and research in experimental filmmaking: Ken Jacobs studies of vision and perception, Stan

Vanderbeek as artist in residence at MIT researching machine art and global communication, John Whitney as artist in residence at IBM making computer art films. Kubrick and his advisors continually researched every aspect of scientific veracity, including results of experiments with hallucinogenic drugs conducted by Timothy Leary and Richard Alpert.[29]

“2001: A Space Odyssey (1968), a film concerned with metaphysics, human potential, artificial intelligence, evolution, life, death and rebirth, might be the quintessential Kubrick in that – over 149 minutes – it addresses Kubrick’s fundamental interest as a man: everything.”[30] It is an unprecedentedly detailed reflection on the place of mankind in the cosmos and the evolution of its relationship with technology. Regarded as one of the great landmarks in cinema history, even from the present point of view, this film still contains incomparable profound insights into the past and future of mankind, even half a century after its first release in 1968. This masterpiece of technical innovations and aesthetic challenges looks more prophetic than ever today.

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