Thought Experiment

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THE IMPOSSIBLE SPECTACLE OF *2001: A SPACE ODYSSEY*

Six people in silver spacesuits gather in front of a nine-foot-tall jet-black slab standing atop a platform at the center of the excavation site. Above the reinforced edges of the site are the stars and the endless lunar night. From how far down below the Moon's surface it was uncovered, it seems to have been deliberately buried. The people loosely gather in a line in front of it for a photo.

As sunlight hits the monolith for the first time in four million years, it emits an ear-piercing signal picked up by the helmet comms. Everyone doubles over in pain, clutching ineffectually for their ears with suited hands.

—Description from a scene in *2001: A Space Odyssey* (1968)

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2001: A Space Odyssey remains, to this day, one of the greatest science fiction movies ever made. It was a perfect marriage of the mutual expertise of two creative giants in their respective fields: Arthur C. Clarke and Stanley Kubrick. Clarke's expertise in all things fiction and space travel enabled Kubrick to use his full command of the tools of cinematography to create the most realistic film yet made about humanity's prehistoric origins and ultimate voyage to the stars. Kubrick encouraged his crew to invent new technology where none existed to meet his exacting requirements for each shot. As a result, *2001* revolutionized what was possible to achieve with practical effects.

Upon its initial release, though, audiences were puzzled (both the writer Ray Bradbury and the director Andrei Tartakovsky dismissed it as too slow), but wider audiences flocked to see it in droves. Its realism appealed to everyone who was excited about the prospect of putting a human on the Moon (Apollo 11 wouldn't land on the Moon for another year); and its surrealism tapped into the vital core of a counterculture drawn to the mystical. *2001*'s popularity helped science fiction films overcome their reputation as (largely) adolescent drivel and transformed the genre into one of pure spectacle.

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"I know I've never completely freed myself from the suspicion that there are some extremely odd things about this mission."

—HAL 9000 in *2001*

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Spectacle comes from the theater. It traces its origins to European court masques of the sixteenth and seventeenth centuries, which involved improvised performances by members of a court who would wear masks to disguise themselves to act, sing, and/or dance as a character. Masques evolved over the next century into elaborate performances meant to glorify nobility, and featured the most famous artists and performers of the day. The Stuart Court in England, for example, would regularly feature performances written by Shakespeare. They often involved opera, dancing, and plays, all of which incorporated elaborate costumery, set design, and special effects like fireworks and complicated moving sets. Before the Puritans closed all the theaters in 1642, the masque was considered the highest form of art in England. The

tradition of such spectacles would return to stages as Restoration spectaculars a few decades later, and involved similarly elaborate productions. This time, however, they were staged for the public instead of the royal court. These spectacles stood opposed to more serious theatrical productions and, as required by law, had to include elaborate special effects and set designs, as well as songs and dancing. This meant that spectacles were designed, first and foremost, to visually amaze audiences, not necessarily to intellectually stimulate them.

It's no wonder that shortly after film was invented, it became the preferred format of the spectacle. In the earliest days of cinema, the technology itself was the attraction. The Lumière brothers' first film screening in 1895, and subsequent demonstrations in the coming years at expositions around the world, were of things like a train pulling into a station. While the images themselves were mundane, the possibilities were not. Suddenly, reality could be recorded one place and played back anywhere else. It was now possible for anyone to go anywhere, be anyone, and do things never before dreamed of. In the realist tradition, a new tool had been added to its arsenal, along with painting and photography. Film was the new, and perhaps best, way to hold a mirror up to the world.

The popularity of expositions soon led to the establishment of permanent nickelodeon theaters dedicated to showing short films, but as exposure and ubiquity caused excitement over the technology to wane, new spectacular heights were needed to keep bringing people back. Early special effects pioneers, like George Méliès, experimented with the camera itself to create new ways to amaze audiences. Méliès' "trick" films involved techniques like double exposure or the use of quick cuts, which made it seem like actors were magically disappearing or being transformed. Such films transcended realism and made cinema a medium of both the possible and the impossible.

As the visual language of film evolved, filmmakers also experimented with the nature of the theatrical experience. The first thirty-foot-tall 360-degree film screen, known as "Cinéorama," was premiered at the Exposition Universelle in Paris in 1900, patrons were treated to an immersive simulated hot air balloon ride. In *Napoléon* (1927), the French film director Abel Gance experimented with projecting images across three screens, either as separate, complimentary shots on each, or one panoramic shot across all three, in a method he dubbed "Polyvision." Such efforts, Gance believed, "[made] the spectator an actor, to bring him into the action, [and] involve him in the rhythm of the images." The advent of "talkies" that same year eventually led to Disney contributing an innovation not to the visual experience, but to the aural one. *Fantasia* (1940) was the first film to use Stereophonic surround sound to give a sense of audio immersion. These innovations would be combined in 1964 in Cinerama, which employed wide, curved screens and surround sound in specially outfitted theaters in order to entice people away from the convenience of their televisions.

As cinema evolved as an art form, the effect of such innovations was not lost on early film theorists. Professor Robert Wagner, in his 1955 essay "The Spectator and the Spectacle," agreed with Gance that more immersive formats change the cinematic experience by eliciting a greater sense of realism, and thus "spectator participation." In the 1960s and 1970s, theorists began to weave in ideas from linguistic and psychoanalytic theory on what made filmic spectatorship such a unique experience. The linguistically minded thought that the stronger the signal (i.e., the larger the screen), the more effective the communication (i.e., the immersion in the story). Psychoanalytic interpretations, like those by Jean Louis-Baudry, likened the moviegoing experience to a kind of hypnotic, primitive narcissism. In going to the cinema, we become like the chained spectators watching reality play out as shadows upon a

screen, as in Plato's allegory of "The Cave."

So, what made science fiction one of the best genres for cinematic spectacle? By its nature, it's the genre of the impossible, and to make the impossible possible, it's the genre in which special effects would find the most fertile ground in which to grow. Claymation was an early technique to bring impossible things to life, as in *The Lost World* (1925) and *King Kong* (1933); and later "suitmation" and detailed miniature work continued the trend in *Godzilla* (1954). Expertise in prop building and costumery brought robots and alien worlds to life in never-before-seen ways in movies like *Forbidden Planet* (1956). Despite such advances, by the 1960s most science fiction films were low-budget phone-ins like *King Dinosaur* (1955).

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"Cinema has let science fiction down."

—Kubrick, 1964

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After the wild success of *Dr. Strangelove* in 1964, Kubrick could make any kind of movie he wanted. He'd proven himself as someone who could hop between genres with ease, creating remarkable examples of each. He'd shown great innovation with his shot composition and atmosphere in his noir, *The Killing* (1956). He made war movies feel fresh and subversive in his World War I film, *Paths of Glory* (1957). He deftly handled the complexities of a big-budget historical epic with *Spartacus* (1960). He adapted the unadaptable, and deftly toed the line between the pornographic and the comedic, in *Lolita* (1962). With *Strangelove*, he hysterically satirized nothing less than nuclear apocalypse. So why Kubrick decided to immerse himself in an "unrespectable" genre like science fiction was mystifying to many.

Kubrick, of course, wasn't thinking about making just any science fiction film. In Michael Benson's fabulously written and lovingly researched *Space Odyssey: Stanley Kubrick, Arthur C. Clarke, and the Making of a Masterpiece* (2018), he details just how Kubrick tackled making a picture about what Kubrick would later call "nothing less than the origins and destiny of man." Kubrick, at thirty-six, was well-suited to such a tall order. He had come into his own as a director and had developed a particularly keen eye for shot composition, a skill he'd been honing since he'd been a teenager.

Growing up, Kubrick had only ever been interested in things he was interested in. As a result, he wasn't a particularly good student and didn't have a huge number of friends. When his father gave him a Graflax camera for his twelfth birthday, he became obsessed with photography. He soon met another boy in his building who had a dark room in his apartment, and the two became fast friends and collaborators. Kubrick took his camera everywhere and photographed everything. The two boys also cut a lot of classes to go to the movies and both soon dreamed of becoming film directors. Kubrick thus adopted the movie theater as his school, as this was the only kind of film education available to a kid in New York City in the 1940s.

At seventeen, Kubrick sold his first photo, of a man mourning the death of President Franklin D. Roosevelt, to *Look* Magazine. A year later, Kubrick became one of their staff photographers, and, for the next three years, *Look* would regularly feature his photos of his school mates, teachers, and city. During this time, he learned everything he could about lenses, directing subjects, lighting and shadow, framing, depth, and composition. As he later embarked on his film career, he learned to master all the above behind the motion picture camera, too, and his cinematographic philosophy grew out of this extensive, obsessive attention to shot composition. He believed every shot should be at least two of three things: interesting, believable, or aesthetically superior. This philosophy, and his obsession with the camera, is what makes Kubrick's films so rewatchable and compelling.

Geoffrey Unsworth was fifty-two and had already racked up an impressive number of awards for his work by the time he was brought on as cinematographer of *2001*. During filming he said of Kubrick, "if anyone had told me six months ago that I had anything of substance to learn about my profession at this stage of the game, I would have told them they were mad. . . . In fact, though, I have learned more about my profession from that boy in there in the last six months than I have in the previous twenty-five years. He is an absolute genius. He knows more about the mechanics of optics and the chemistry of photography than anyone who's ever lived."

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"I [have] been a great admirer of your books for quite a time and [have] always wanted to discuss with you the possibility of doing the proverbial 'really good' science-fiction movie."

—Kubrick's letter to Clarke
dated March 31, 1964

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Kubrick could have picked any science fiction writer's work to adapt for his first science fiction film. But for anyone who was familiar with the print genre, there was only one obvious choice to help Kubrick tell the kind of first contact story he wanted to tell: Arthur C. Clarke.

Clarke was born on a farm in Somerset, England, in 1917. Three of the biggest influences on the trajectory of his life were discovering *Amazing Stories* as a child; reading Olaf Stapledon's eons-spanning future history of mankind and its expansion through the Solar System, *Last and First Men* (1930); and reading the nonfiction book *The Conquest of Space* (1931). The latter book seriously considered the technology and logistics of rockets and space flight, which was a novel stance at the time. After completing school, Clarke moved to London to become more involved in British science fiction fandom, and during World War II, he joined the Royal Air Force and worked as a radar specialist. There he helped design and develop radar technology that proved critical both during the Battle of Britain and the Berlin Airlift. After the war, he got a degree in mathematics and physics from King's College in London and set seriously to writing.

Clarke quickly distinguished himself as a writer with his essays on technology and space flight. Clarke's influential 1945 essay, "Extra-Terrestrial Relays," proposed that geostationary satellites could be used for telecommunications nearly two decades before the first communications satellite was launched. His 1946 essay, "The Challenge of the Space Ship," was a manifesto for the space age, and argued that mankind's future was in space. That same year, Clarke made his first professional fiction sale to John W. Campbell's *Astounding*, and he quickly became one of the most scientific science fiction writers in the growing field, thanks to his loving attention to the technical details of the future. His third novel, *Childhood's End* (1953), proved a breakthrough for Clarke. It pulled ideas from Stapledon and Nietzsche about how humanity is only an intermediary species on a path to becoming a galactic race. By the early 1950s, Clarke had become one of science fiction's "Big Three," along with Isaac Asimov and Robert Heinlein.

Following the prosecution, chemical castration, and ultimate suicide of Alan Turing in 1954, Clarke, who was also gay, was worried about being similarly prosecuted by the British government. In 1956, after a short, failed attempt at marriage to a woman, Clarke moved to an artists' commune in Sri Lanka, which had a much more permissive culture and government than Britain. There Clarke wrote, and bankrolled low-budget films made by his partner Mike Wilson. Clarke had wanted to get into pictures for years once Heinlein and Bradbury had their own Hollywood experiences with *Destination Moon* (1950) and *Moby Dick* (1956) respectively. But

Clarke would wait eight years for his bigger budget dreams to come true.

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"The truth, as always, will be far stranger."

—Clarke in his foreward
to *2001* (novel, 1968)

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When Kubrick was looking for a science fiction writer to work with, Clarke's name came up twice. The first time was from the musician Artie Shaw, who said Clarke was the best in the world, and recommended Kubrick check out *Childhood's End*. Kubrick was used to working from already published books, and to his dismay found that the novel had already been optioned. Furthermore, instead of reaching out to Clarke, Kubrick assumed since Clarke lived in Sri Lanka, he was a recluse. So Kubrick kept looking. Clarke was brought up a second time by a mutual friend of both Clarke's and Kubrick's—Columbia Pictures publicist Roger Caras. After Kubrick lamented not finding a suitable writer, Caras assured Kubrick Clarke was no recluse and offered to put them in touch. Caras telegrammed Clarke to let him know of Kubrick's interest, and Clarke responded that he was "frightfully interested in working with enfant terrible."

In April 1964, Clarke met up with Kubrick in New York, and thus began a four-year collaboration. Kubrick explained he wanted to make an utterly real movie with "no cheese," an impression he'd adopted from the limited number of science fiction films he'd seen, and the science fiction pulps he'd read growing up. Clarke quickly dissuaded Kubrick from adapting a middling BBC radio play he'd come across about an alien first contact and convinced him they should instead write an original story together. Clarke then gave Kubrick a handful of his own tales for inspiration, including his short story "The Sentinel," which follows scientists on the Moon who discover a mysterious pyramidal structure that stops sending a signal out toward the stars once they've pierced its protective forcefield. Clarke had written the tale for a 1948 BBC story competition, but it didn't even place. Its central concept became the heart of *2001*.

For the next eight months, Clarke and Kubrick got together daily to work on the story for hours before Clarke would return to his room at the beatnik enclave, the Chelsea Hotel, to write. The two intentionally structured it as a hero's journey, along the lines of Homer's *The Odyssey*, except with mankind itself as the hero who departs its African cradle to voyage to the stars millions of years later, only to return home again fundamentally changed for the experience. It incorporated several of Clarke's pet ideas, including man as a transitional species between ape and star child, and a more advanced alien species acting as an evolutionary catalyst. In both the monolith and star gate sequences, Clarke's third law was at play: "Any sufficiently advanced technology is indistinguishable from magic." Most of the novel (aside from the ending) was completed by the end of 1964. Kubrick used it and a test screen of some water-based star effects to secure five million dollars from MGM Studio's then-president, Robert O'Brien.

In many ways, the production of *2001* was a filmic anomaly. O'Brien knew that the super-hot Space Race (which at the time involved the launching of the Gemini missions) had captured the imagination of the world; that science fiction was a genre growing in popularity every year; and that Kubrick and his science fictional idea, after his handling of the big-budget spectacle *Spartacus* and his successes with *Lolita* and *Strangelove*, was a safe bet. Kubrick would therefore receive zero oversight from MGM during the three years it would take to complete the film. Kubrick took over most of MGM's Elstree studio space in Borehamwood, England, and more than doubled the initial budget. He also overshot the estimated release date by over two

years. Furthermore, through paranoia that his idea would be scooped, Kubrick's secretiveness over *2001* meant the studio wouldn't see a single frame of the movie until Kubrick had completed his final edit just prior to the film's release in 1968. There also was never a set script, with Kubrick changing things on the fly based on a combination of his gut instincts (he would become famous for his high number of takes with little concrete feedback given to his actors) and taking ideas from anyone on the cast or crew that made the movie better.

What's perhaps most impressive still today about *2001* is that nearly all the effects were practical. All the spacecraft models and sets were based on consultations with industrial and aerospace designers who'd worked with NASA. After a visit, this devotion to realistic detail earned the studio the nickname "NASA East" from George Muller, the czar of the Apollo program.

The giant, rotating cylinder that was the interior of the *Discovery*'s crew's quarters was constructed by a British aviation firm and remains one of the largest kinetic sets ever built. The rotating centrifuge was a pair of two thirty-eight-foot diameter halves joined together, with a channel between them that a stationary, floor-mounted camera could poke up through. Camera dollies hung on its outside were used for static shots while the drum was rotating. Projector screens (for *Discovery*'s various computer screens, the displays on which were all hand-animated by Doug Trumbull, who would also develop the slit scan technology used to create the psychedelic star gate sequence) and hundreds of lights to achieve Kubrick's precise interior lighting design were also mounted outside the cylinder. The hot bulbs tended to explode when turned upside down.

For the cyclopean antagonist HAL (short for Heuristically programmed ALgorithmic computer, not because each letter is one away from "IBM," as is commonly believed), Kubrick consulted with Marvin Minsky from the MIT AI lab, and with IBM engineers and industrial designers for both HAL's behavior and design. Kubrick based HAL's brain room (the site of the chilling lobotomy by Bowman after HAL murders the rest of the crew) on feedback from IBM that said a computer like HAL would be one you walk into, not around. In a nod to computer history, HAL's final haunting serenade of "Daisy" was Clarke's idea, "Daisy" being the first song ever "sung" by a computer in 1962.

Kubrick spared no less attention for the Dawn of Man sequence. Kubrick and Clarke based their ideas on what differentiated humanity from other apes on Robert Audrey's *African Genesis* (1961). This was a contemporary popularization of the anthropologist Raymond Dart's theories about *Australopithecus africanus*, whom Dart discovered in 1924 in South Africa. *Australopithecus* was the earliest human progenitor then discovered, and Dart's "Killer Ape" theory influenced Audrey. Both men argued that the jump to humanity involved a lifestyle change from placid vegetarianism to violent carnivory. Dan Richter, considered to be the world's greatest mime at the time, was cast to bring these first step towards humanity to life. Kubrick provided Richter with the most recent research on humanity's origins, including Audrey's book, and Richter spent months studying gorillas and other primates at the zoo. Richter then trained his troupe of young dancers in how to move their bodies like our primate cousins.

In the editing room, Kubrick continued to follow his instincts. He discarded the film score he had commissioned in favor of keeping the temporary classical music tracks. He also struggled with the recorded narrative voice-overs, written by Clarke, that were meant to explain the film to the audience. As Kubrick did away with more and more of the narrative it felt more right, until there was no narrative left. He felt the best experience would simply be to let the images speak for themselves.

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"Look Dave, I can see you're really upset about this. I honestly think you ought to sit down calmly, take a stress pill, and think things over."

—HAL 9000

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The initial response to *2001*'s release in Cinerama in April of 1968 was not enthusiastic. Critics considered it arty and slow, and early screenings were host to many walkouts. Before its wider release, Kubrick edited nearly twenty minutes out and greatly improved the now 142-minute film's pacing and clarity. Once the wider release occurred a few weeks later, the public response was immediate. People had never seen anything like it before in theaters. Lines formed around blocks. Its popularity with counterculture types skyrocketed the movie to become the highest grossing film of the year, the only top-grossing film Kubrick ever made. The tighter cut also won over many of the film's initial detractors, with many soon declaring it a masterpiece.

Clarke's novel was released after the film, and it shot to the top of the bestseller lists. Many read the novel to demystify the film, and many more watched, read, and repeated as necessary. It launched Clarke into an entirely new level of stardom. He became not only a bestselling author, but also a media personality, acting as a commentator during three of the subsequent Apollo missions, including the Moon landing the next year on July 20, 1969. Clarke was knighted in 1998 and would die at ninety in 2007 after publishing twenty-two novels, twelve collections of short stories, and fifteen popular science nonfiction books.

2001 changed the landscape of not only science fiction, but of film. The next decade produced some of the most influential science fiction films in history, like Tarkovsky's *Solaris* (1972), *Star Wars* (1977), *Alien* (1979), and *ET* (1982). It inspired the next generation of directors, like George Lucas, James Cameron, and Steven Spielberg, to perfect the big-budget science fictional spectacle. *2001* was science fiction cinema's "Big Bang," and it would change the visual language of cinema forever. After *2001*, everything became possible.