

Understanding Light Art In A Multidisciplinary Context

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Abstract

This paper argues that the making of art through the medium of light (Light Art – both artificial and solar), will continue to elevate human existence so long as its makers remain committed to illusion as opposed to the banality of the real. When an art form becomes obsessed with the real it loses sight of the central power of art – the power of making illusion. Light Art thrives in a multidisciplinary world of knowledge where artists understand that the “real” hides behind appearances. Under such a view we may combat singular interpretations in favor of multiple meanings. When we sacrifice a focus on illusion (so essential to art making) for the banality of the “real” world we venture into a kind of anti-art which I term “art-lite” – one of the many manifestations of weak art which proliferates in the art world today. On the side of Light Art as an art of illusion stand many important areas of study today. In this paper I point to several of these (physics, optical science, history, art history, poetics, computer science, mathematics, sociology and social criticism, digital studies, photography, skiagraphy, and aesthetics). This paper argues that Light Art can continue to play an elevating role in our lives due to the very nature of the multidisciplinary perspectives we deploy to challenge, understand, and complete it. The presence of these multiple and intersecting areas of analysis will continue to serve Light Art and place high demands on its makers – including the most important demand that Light Art, like all true art, be concerned with illusion ever avoiding the banalities of the real.

Keywords: Light, art, illusion, real, multidisciplinary

Introduction

"Previously, men could be divided simply into the learned and the ignorant... But your specialist cannot be brought in under either of these two categories. He is not learned, for he is formally ignorant of all that does not enter into his specialty; but neither is he ignorant, because he is 'a scientist,' and

'knows' very well his own tiny portion of the universe. We shall have to say that he is a learned ignoramus, which is a very serious matter, as it implies that he is a person who is ignorant, not in the fashion of the ignorant man, but with all the petulance of one who is learned in his own special line" (Ortega y Gasset, 1932: 54).

“A man becomes creative, whether he is an artist or a scientist, when he finds a new unity in the variety of nature. He does so by finding a likeness between things which were not thought alike before, and this gives him a sense at the same time of richness and of understanding. ...We expect artists as well as scientists to be forward-looking, to fly in the face of what is established, and to create not what is acceptable but what will become accepted” (Bronowski, 1973, unpaginated).

Light as an artistic medium has a deep history which includes the first use of stained glass windows in buildings in the fourth century. One can argue that any use of light to enhance architectural effect is part of the long history of light art. In modern art Lazlo Moholy-Nagy's *Light Space Modulator* (1930, see: <https://www.youtube.com/watch?v=fNt39WJQqjg>) is considered to be the seminal work of light art in modernism. This electro-kinetic work consisted of moving metal and glass plates arranged with a rotating disk which produced fabulous shadow effects [alongside of coloured and white light]. The work functioned best in reduced light where shadows dominate (see Katenhusen in Gartner et. al., 2009:128-37). Modernism brought technology and electricity to the making of light art but works of art relying on light without electricity predate modernism and continue to this day.

Light Art thrives in a world where the “real” hides behind appearances which conspire to combat singular interpretations as meaning become multiple. Appearances so often play on light and the fact that the human eye is only partially equipped for the universe in which we live – a universe in which about ninety-six percent of matter and energy remain invisible to us. We are reminded of these fundamental aspects of existence at many junctures. Baudrillard noted that because of our distance from it (light years), we see the light of a star for many centuries after the star itself is dead (2000: 71). Indeed, the four percent of the universe we know as “reality” is the result of the amputation of all the anti-matter and energy which we can only speculate about in astrophysics. When it comes to light – we inhabit a very artful, appearance laden, and deceptive universe. All good art is illusion and helps us to understand the illusory nature of our world. Efforts to make

art out of light (both natural and artificial) can touch us on deeply emotive, epistemological and existential levels.

This essay examines art made by using light and points to the necessity of a transdisciplinary perspective to full understand its applications and implications.

Following a short discussion concerning how the human eye sees color, I examine how light can be made to make art works that participate in illusion as “art” must do. I then examine some failed efforts to make art with light – which often result from an over-reliance on the artificial light of technology. What results is not so much Light Art as it is *art-lite*. Next I move away from technology to examine artists who work with the sun and the importance of skiagraphy (the recording of shadows), to artistic efforts. This leads into a discussion of photography which almost always excluded from conversations concerning Light Art. I conclude that Light Art is diverse and like other forms of contemporary art is susceptible to both the productive and destructive applications of technology. While making this case I point to the many areas of study (physics, optical science, history, art history, poetics, computer science, mathematics, digital studies, photography, skiagraphy, and aesthetics) to name a few which come into play in fully appreciating Light Art.

Seeing Light and Color: Physics and Optical Science

“If the world is what it is, where does the illusion of appearances come from?” (Baudrillard, 2006:94).

The first disciplines to help us engage with Light Art are physics and the optical sciences. The world visible to humans is one of light and shadows and in it our eyes are sensitive to a very narrow part of the electromagnetic spectrum. The visible light spectrum consists of wavelengths which range from 390 nanometers to 780 nanometers. [A nanometer (nm) is one billionth of a meter]. Specific wavelengths in the spectrum correspond to our perception of a specific color (red = 780 - 620 nm; orange = 620 - 597 nm; yellow = 597 - 577 nm; green = 577 - 492nm; blue = 492 - 455 nm; and violet = 465 - 390 nm). The color we see is not “in” the object but is produced by light bouncing off the surface of the object. The color we perceive has everything to do with a combination of psychological and physiological responses to this bouncing. Physics teaches us that, in a very real way, the objects in our world reflect us – our ability to see them in color. When light falls upon an object the electrons in the atoms of the object begin to vibrate which results in a light-wave which is perceptible to our eye. Color then is the light striking an object during its reflection (or transmission) to our eyes. The only scientific role played by the object in the color we see is that it contains atoms that are capable of absorbing one of more frequencies

of visible light. Thus, if an object absorbs all of the frequencies of visible light except for the frequency associated with red light, then the object will appear to us as red (Gage, 2002).

Transmitted light enters the eye striking the surface of the retina (which is lined with various light sensors shaped like rods and cones). The rods are sensitive to intensity of light and the cones sense color (there are three kinds of cones: red [sensitive also to orange, yellow and some green light]; green cones [sensitive also to some yellow and blue]; and blue sensitive cones. When light enters the retina a chemical process immediately sends an electrical impulse along nerves to the brain and we discern the “color of the object”. If the red and green cones both activate the brain combines them and understands that the object is yellow (Gage, 2002). Interestingly, it was not long after science understood this phenomenon that social thought devised dialectics.

Objects, which appear to give off an inner light, do not actually do so and each requires artful interpreters to operate on their behalf – this is one of the roles of the artist – the illusionist of light and color. If a light artist is to actually make art, that is, participate in illusion through their work, one of the ways they will do this is through the manipulation of reflection and refraction so that it appears to our eye that the color is actually within the object. This is among the principle strengths of van Gogh’s painting for example. Artists show us the poetic illusion of light in the object rather than the prosaic scientific facts of light. The poetic view of art (that understands light to emanate from objects) and the scientific understanding both play a role in helping us understand light art. We may tip our caps to physics while secretly holding firm with Van Gogh’s poetics! Art history is vital to our understanding of light art as is science.

The Double Edged Sword of Technology and Light Art

Two impressively beautiful melding glass forms of life like dimensions stand before us in the Prague National Gallery: Zdenek Pesanek’s work “Torsos of Men and Women” (1936). The coloured glass vessels are illuminated from within by a curving white neo tube. On the exterior a less curvilinear tube runs the length of the back of one other neon tube illuminates the top and front of the figures. The effect is stunning and while the work is somewhat abstract we sense strongly what the sculptor wanted to communicate before we read the accompanying didactic text – the fragility of the human in a decade which would be remembered for its despair. Artificial Light Art pioneers such as the Pesanek illustrated the great attraction that artificial light has held for artists for almost a century. It is impossible for me to look at Pesanek’s work on display without thinking of his contemporary Siegfried Kracauer (sociologist and critic) who, at this

time, conceived of electricity and light as pure flows – part of a modernity’s machinic libidinality (Kracauer, 1960: 300 ff.). Long before Dan Flavin worked with fluorescent tubes Pesanek was using neon and other artificial media to make Light Art. He projected light using what he called a spectrophone and was asked by the organizers of the 1937 Paris World Fair to make two fountains of light using neon tubing. He was also hired by the Prague electric utility to make light sculptures. Among these were his “Torsos of Men and Women” – a work in which the illusion of movement is created by the electric circuitry alternating power to the light tubes. It is an unusual type of kinetic light work for its time that soon descended into the predictable in the hands of advertisers. Even Paris would endure the kinetic banality of the “Citroën” logo flashing on the Eiffel Tower from 1925-1934. Pesanek also made the popular abstract kinetic light sculpture which adorned the roof of Edison Power Station in Prague (1929-30).

Pesanek’s contribution was to show us an entirely new way to understand the formal qualities of Russian Constructivism in the shapes which merge to make the Edison sculpture. From its origins Light Art showed that it could be both interesting and artful by using artificial light and technology. Technology is however a double-edged sword for Light Art. While it can be used to deploy artificial light in artistic ways, it is also possible that the technology overwhelms the artwork producing neither illusion nor interest. Pesanek set Light Art on a higher course than it would always find itself. Before examining these failures it is important to look at some of the other successful (artful) uses of artificial light for making art.

Wolfgang Winter and Berthold Horbelt have recently shown us an interesting way to achieve artistic illusion in their work “Swingerclub” (2005). The museum goer interacts with the work by actually sitting on and swinging on the giant swing seat, attached to the ceiling by ropes [as with a children’s swing]. The “seat” of the “swing” is clear plastic containing bright blue and orange fluorescent tubes giving off a warm and inviting glow. It is obvious that the source of colored light in the swing seat is a common fluorescent tube – Winter and Horbelt understand that the context in which we experience color, as well as the color itself (warm, cold, neutral), has everything to do with how we *feel* a work of Light Art. This work is about feeling the warmth of swing and this is achieved by placing warm, inviting colors, inside the seat in an otherwise bleak exhibition room. While we know the source of the light intellectually – we still feel it as though it is a kind of warmth given off by the objects in this austere environment. Here we have art not because the artists have highlighted the science of light but rather, because they have focused on its most ancient poetry – the poetry of the warmth of the light from within. This is a kind of primitive based understanding of light that may well originate during the times in which we

lived in caves. Successful Light Art, like art in any media, seeks a poetic (as much as, or more, than techno-scientific) resolution of the world.

Light art, when it is truly artful, participates in illusion. Illusion is based on the fact that nothing means what it appears to mean: “there is a kind of inner absence of everything to itself – that is illusion” (Baudrillard, 1997:49). Dan Flavin probably has experienced this Baudrillardian thought more than any other artist working with light. Since the 1960’s one of Flavin’s favourite tricks has been to make our eye see colors which are not there – in this he plays a game of illusion with the science of seeing. Flavin’s “o.T.” (1969), placed two red fluorescent tubes horizontally (facing the viewer), along the top and bottom of a square frame. On the reverse side, facing away, a few feet from a white gallery corner, he placed a blue and yellow tube on the vertical arms of the frame. The result is a Light Art science lesson in that our cones perceive a green wall which is not there. In other works such as *Untitled* (1976) the artist uses white and yellow lights to make the blue exhibition space appear green. Flavin thus forces the entire context of the exhibition room into his art – including our changing perspective as we move around the art object. Not only does the viewer complete the work of art, as with all art, but in this case is made very aware of his her role as viewer / completer. Powerful Light Art displays interact with out understandings of epistemology and metaphysics.

Similarly, Bruce Nauman created a “Green Light Corridor” (1970) by positioning white fluorescent tubing above two white walls facing each other in close proximity. We can look down the corridor but it is too narrow for even the smallest person to pass though. This work creates the illusion of color by relying on the closeness of the two white surfaces. As the processes of reflection and refraction take place at high intensity the rods participate with the cones in our eyes to makes us see a pale green that is also not really there. As such, Light Art, can serve to highlight that color really is never “there” and allows the work of art to play with the illusion of appearances. The science of light is itself exposed as illusion in works such as these.

Projections enable Light Art to work outdoors where its impact can be visually stunning and evocative. Eric Orr in his “Landmark” (1991) used lasers aimed far into the night sky to make a permanent installation on the roof of a building in Landmark Square in Long Beach, California. The effect is not unlike Michael Ahern’s “Tribute in Light” memorial at the World Trade Centre site in New York. Others like artist Michael Snowdon have used projected light aimed at the sides of buildings to express political messages. In Snowdon’s case he expressed his feelings about the rise of Christian fundamentalism and its entry into North American politics. In one work called “No Jesus – For The Moral Majority” (1982) Snowdon projected a hologram to proclaim a “Jesus free area” in the city.

Light Art made with artificial light can use technology to participate in artistic illusion in a number of ways. Either by the power of the illusion created – or, as in Snowdon’s case, in the message conveyed. It is possible for the artist to command technology in the making of the work of Light Art. In other efforts, as in computer generated images, the art can become lost in the technological pursuit of the real. Here the art retreats (if not disappears) into technological circuits. This is the point at which Light Art disappears to be replaced by something better referred to as “art-lite” – art that is more about technology than art.

Art “Lite”

“Appearances are turning against us, through the very technology we use to drive them out” (Baudrillard, 1999:129).

Not all artists working with light are successful masters of illusion. An unfortunate example of a failure is Rolf Waltz’s “Disturbing Familiarity Number 12” (1977). The work consists of three red, one blue, and one green rectangular aquarium, each connected to a pair of electric wires that conducts the electricity by which they are lit. Two of the aquariums are suspended slightly above the floor while the remaining three sit flat on the floor of the gallery. The problem with this work is that it moves away from illusion (seemingly at light speed), and the objects are indeed “disturbingly familiar” (quite ‘real’). The work is one of light passing through the liquid in these aquarium-like containers (which hold coloured water). The problem with the work is that we aren’t really experiencing artistic illusion but the banality of five aquariums with coloured water giving off different shades of transmitted light. How, precisely, is this work really all that different from the aquarium in my home (which has yellow tinted glass) through which the white light of its top passes? Well, my aquarium has fish in it. Waltz’s work eschews illusion for the banality of the real. By coming too close to the real it fails to fully participate in art’s illusory potential. Still, I must say on Waltz’s behalf, it is every bit as interesting as at least three-quarters of what we find today in contemporary art spaces – and that is, sadly and ironically for art, among the reasons it is there. When technology comes to play a large role in efforts to make art using light, as it has had a tendency to do in recent years, we see efforts to make Light Art pressed more and more into the service of the banality of the real than illusion which is art’s proper domain. In this way Light Art too plays its role in the emptiness of much contemporary art.

In a huge exhibition of exhibition of Light Art (2005) in and beyond the walls of the ZKM Contemporary Gallery in Karlsruhe (Germany), the curators proclaimed that with the advent of electricity man had achieved victory over night and the sun. Our new stars were said to be artificial ones which allow us to bask in paradises of artificial light (see Weibel, 2005: 1

ff.). Besides what this says about the ever closing gap between curatorial work and our general culture of advertising, it failed to understand that art is not art without illusion. If all an artist working with light achieves is a mirroring of the real, then everything is art – which means of course that nothing is particularly “art”. I think the curators at ZKM may simply have been afraid of the dark speaking as they do of “paradises of artificial light” which are really only a small part of the greater functional continuum of office towers which remain lit through the night (Weibel, 2005: 6-7). Pesanek, Flavin, and many others who deal in arts gold standard – illusion, understand this very well. ZKM on the other hand boasted, in its promotion of the artificial, that “Art has increasingly turned from the illusionary representation of natural light to the real application of artificial light” (Weibel, 2005: 5).

What we have when we sacrifice illusion for technology is not Light Art but merely “art-lite” that becomes immersive and interactive. Art-lite is a non-art that has moved away from art which created an illusion in space to dissolving into the real. Since the ancient Greeks discovered life sized sculpture and quickly tired of realism we have long known that realism is the death of art.

In Peter Keene’s “Raoul Hausmann Revisited” (1999-2004) we have the most strained and technologically diluted form of making art with light. Here programmed computer circuits randomly decide which colors and patterns to project onto the gallery wall. In such efforts we find the cold death of art in technology where the medium of light becomes part of the programmed performance of circuits. To his credit, despite the banality of the work, Keene reminds us where the role of technology and artificiality, without illusion, began – with Hausmann’s “Optophone” in the 1920’s (which turned sound waves into visible light). The Optophone was a technological interrogator of sound waves which made them speak in a language they did not know. If illusion is present in any of these works it is only in its negative sense – as a kind of virtual transparency. Here efforts to make art using light becomes merely – a joke played on itself, unknowingly, by it tipping over into the fractal (and today digital).

In recent years some artists have poked fun at examples of Light Art which lost their way into art-lite. Martin Boyce’s *We Are Resistant, We Dry Out in the Sun* (2004) ironically plays with the very problem of technology in creating a work that highlights the artificiality of our culture (at a time when the artificiality of our culture is rapidly becoming its most real aspect). In the work three rather pathetic indoor palm trees made of light tubes stand over two low quality lawn chairs mockingly. It is a purely artificial and ironic work of art targeting precisely the kind of artificial culture, and artificial art world, which would view it as a work of art.

Over the past fifteen years art-lite has come to the center of attention with computer generated images. These works which circulate along the networks and microchips of computers are no more “art” than the computer generated image can be said to be a photograph. This does not stop curators from calling these works art and photography. One way to distance ourselves from art-lite is to understand the problem of technology in relation to Light Art made using the actual light of the sun.

V. Solar Light Art and Skiagraphy

The sun is the ultimate readymade and while Duchamp did not work with it directly himself, light was a central concern of his art and its presentation. His works such as “Trap (1917) or “Given: 1. The Waterfall / 2. The Illuminating Gas” (1946-66) depend in specific ways for light to create shadows. In the case of “Trap”, like many of his works of the day [“The Bicycle Wheel” (1913) or “In Advance of the Broken Arm” (1915)], the works are positioned in such a way that shadows play a key role in their doubling. Duchamp’s concern and mastery of light added to his popularity among surrealists and he was given the task of laying out the 1938 *Exposition Internationale Du Surréalisme* at the Galerie Beaux-Arts in Paris at which “many objects appeared only in outline, glowed or moved in the semi-darkness” (Schwarz, 1970: 507). Indeed, one of the strengths of the ZKM show at Karlsruhe in 2005-2006 is that it documented the history of (artificial) Light Art as an important art of the 20th century (Weibel, 2005). However, by focusing on artificial light this show missed what for many is the best medium for making Light Art – the solar light of the sun.

The sun is the source of everything human and so, in a very poetic sense, all art is Light Art because everything we see is the art of light. Everything we know exists as fragments of light. Against the cold light of artificial art-lite, stands solar art – which includes the art of recording shadows (skiagraphy). While the flow is from elsewhere, there would be no becoming of light, or thought, because it is thanks to us that things become – we are the object against which light breaks (Baudrillard: 2004:100-01). Perhaps it is at sunrise and sunset or while watching the moon trace its course across the night sky that we come closest to our primitive state. We have watched this found object called the cosmos for a long time. One wonders how it would be possible to consider Light Art without considering the light that comes from the sun and bounces off the moon. It is a small step from there to arranging sticks (leaning against and supporting one another) to make a minimalist shadow work on a beach or using a camera to record “found” shadows on our walls.

Solar Light Art which, in its quest for illusion, works with shadows avoids the technological fate of what I have termed art-lite. Olafur Eliasson’s

“The Weather Project” (2003-04) is a master work of art in that it came as close as possible to bringing the sun into the gallery relying on light tubes and a reflecting screen. Few works of Light Art have ever come as close to this for capturing such a powerful fleeting glimpse of the essence of illusion that is necessary to art. The work is profoundly contemporary, set as it was in the vast space of the Tate Modern, and simultaneously profoundly primitive – the glass wall of the Tate serving as a large version of the small corridors of light our prehistoric ancestors used to channel the sun to the center of mounds such as those at New Grange (Ireland), or outside at Stonehenge, England. Eliasson is among those who remind us through his Light Art (even that which uses artificial light) that art relies on illusions which can touch on our origins as star gazers. In the end what are we but coagulations of star dust from the big bang looking out onto the cosmos in an act of self-reflection – star dust considering its own origins?

Fischer and Sjolen’s *Aleph* (2007) was a work of Light Art made using an array of automobile side-view mirrors to alter our awareness of an environment. Each mirror (which acts like an individual pixel on a computer screen) is micro-controlled to create an array of pixel-like reflections. According to the poet Borges “Aleph” was a point in space that contained all other points – to look into it one would see everything in the universe at once – it would be nothing but a blinding light. Aleph uses sunlight to display information from many angels at once. It is both a metaphor for contemporary multi-vocality and the ways in which our manifold systems of information do not take us any closer to the real – indeed, they move us further away from it in a kind of fractal world of information. The sciences of screens and the digital are important not only for the devolution of Light Art into “art-lite” but also for the next generation of truly illusory Light Art.

The artist Peter Erskine’s *Solar Tower* (2007) shows how solar panels are coming to be increasingly used to make works of art. This work, at the University of British Columbia in Canada, is part of the library. A vertical stack of stained glass solar panels themselves are part of the wind tower that ventilates the building. As in medieval churches the light [passing through the carefully placed panels] illuminates the interior in specific patterns which move with the sun. This work of art is an integral part of something designed to contribute to a more energy efficient environment. It is a striking example of how architecture can now include Light Art as part of both aesthetic and functional design requirements.

There are many other ways to use natural light to make art such as solar tattooing of the human skin or pyrographically burning wood using direct sunlight. A long overlooked form of art using sunlight and shadow is tracing such as the work of Brooklyn artist Ellis Gallagher (who signs himself Ellis G). Ellis is a former graffiti artist who now traces the shadows

of fire hydrants, stop signs, and once – an entire city block. At night, under the pale orange-yellow glow of the streetlights his work appears to be a shadow burned into the sidewalk. Ellis G's work is with us, as is most solar art, because of the camera – which is itself an instrument of a very important and almost always overlooked form of Light Art.

Photography as Light Art

“The illusion of appearances is the vital illusion” (Baudrillard, 1994: 94).

Photography is the writing of light and shadows. It is a highly refined form of Light Art when the photographer understands natural light falling on objects. We are seduced by the object as light falls across it. Good photographers make themselves the prey of appearances. The end of photography comes when we seize hold of the object in “making” (via digitalization and computer manipulation), rather than “taking” the image. We have traveled far enough into an ironic reading of the world to know that it is the book that reads us, the television that watches us – why then do we not also seek to understand that it is the object (of photography) that seizes us?

Jean Baudrillard's photograph “Amsterdam” (1989) participates in a kind of natural Light Art which relies on technology (the camera) to record it. Here we have an image of a bicycle leaning against a railing over a Dutch canal seemingly basking in the warm, bright yellow light of the sun reflecting off of the water as would any person. Baudrillard understood, as did Bathes, that the object is indeed a very strange attractor – and as such, it at least shares in the power relationship with the subject photographer (who no longer holds all the power in this view). As in so many of his photographs which rely only on natural light this is a work that highlights the enigmaticalness and ultimate unknowability of the world.

Conclusion

“Everything withdraws behind its own appearance” (Baudrillard, 1996:2).

Light Art, like all art today, is plural. It can use objects or do without them, and it is almost always concerned with the relationships among environment, space, and appearance. It can be minimalist, pop, op, conceptual, technological, photographic, cinematic and so on. While Light Art can be made with artificial light it is often at its best when dependent directly upon the sun. Light Art can deconstruct and de-familiarize or it can be reduced to advertising. Light artists must be very careful not to step into the realm of non-art, that is the “real”, where they can no longer act as the magical agents of the disappearance of the real (Baudrillard, 2005:96). So

long as Light Art keeps its distance from Truth and Reality it remains art. When it fails to do this, when it attempts to be more real than the real, it loses its art and art's most vital concern for the sacredness of appearances. As long as artists working with light remember that when we forsake illusion we forsake art, Light Art will persist in the face of its nemeses art-lite. Among the things that work to preserve and strengthen genuine Light Art as opposed to "art-lite" involve the way in which we require a multi-disciplinary perspective to understand it. Both Light Art and its experience by viewers inside and beyond the walls of galleries, is indebted to many areas of study. In this short essay we have seen the importance of physics, optical science, history, art history, poetics, computer science, mathematics, sociology, digital studies, photography, skiagraphy, and aesthetics (to name but a few areas) which come into play in fully appreciating Light Art. Light Art can continue to play an elevating role in our lives due to the very nature of the multidisciplinary perspectives we deploy to challenge, understand, and complete it. The presence of these multiple and intersecting areas of analysis will continue to serve Light Art and place high demands on its makers – including the most important demand that Light Art, like all true art, be concerned with illusion ever eschewing the banalities of the real.

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