Liberating Light: A Contemplative and Scientific Encounter
The purest and most thoughtful minds are those which love color the most.

John Ruskin

With every glance around us, we become aware not only of the objects seen but also, by inference, of the light that illuminates them. Without light, the faculty of sight lies impotent. The bright, contoured forms and colors of our environment are brought to us on the wings of light, yet light itself remains unseen, the unrevealed revealer. The material world is thus made visible by means of light while light itself remains invisible—at least until the art of James Turrell.

For thirty years I have used scientific, philosophical, and contemplative strategies to gain insight into the true nature of light. As a researcher and teacher concerned with classical and quantum optics, electromagnetic theory, the experimental foundations of quantum physics, and, especially, the quantum mechanics of light, I have performed experiments with single photons and developed a high-powered laser system in the hope of probing atoms. Over the years I came to know the intricacies of light as only a physicist can, performing optical experiments that required a technical mastery of lasers, vacuum systems, and a myriad of optical components, and using theoretical models of light and the abstract mathematical formalism of quantum optics to explain the results. In 1951 Albert Einstein wrote that his five decades of pondering light had brought him no closer to a real understanding; in the end, my experience has been much the same.

My study of Goethe’s three-volume Theory of Colors (Zur Farbenlehre, 1810) offered a fascinating counterpoint to the abstract theories of physics and the complex instrumentation of the lab. In it, Goethe declared, “The ultimate goal would be: to grasp that everything in the realm of fact is already theory. The blue of the sky shows us the basic laws of chromatics. Let us not seek for something behind the phenomena—they themselves are the theory.” Goethe, ever the artist, was tenacious, demanding that in our study of color we hold fast to experience and not replace it with mathematics and mechanical theories. Notably, the word “theory” stems from the Greek word theoria, meaning “to behold.” We need to learn to see the blue sky as already dense with theoretical significance. As the philosopher N. R. Hanson later argued, all seeing is “theory-laden.” For Goethe, we need only learn to see into natural phenomena fully to experience their lawfulness (no small task); while abstraction may be a powerful aid to understanding, ultimately it stands between humans and the direct perception of reality.

Goethe’s stance is one shared by contemplative traditions such as Buddhism that view the goal of human existence as a deep and direct insight into reality. Analysis and logic are subordinated to genuine insight (vipassanā) and viewed as a provisional means to the ultimate experience of reality via direct perception. The facts themselves, rightly seen, are the theory. Art, and
especially that of Turrell, can bring us deep into the full, rich experience of color, light, and our very act of perception. I had meditated on light as a daily practice for twenty years and more when I first met Turrell’s work around 1991. I was still learning to see the phenomena of color and light in their true fullness as Goethe asked—a capacity Turrell seems to have achieved and out of which he creates his art.

Light Itself

When teaching the physics of light I often start with a simple demonstration. My students and I begin in a sealed, completely darkened room. I then turn on a laser whose beam of light strikes a white screen opposite it and 20 feet away. A small, brilliant red spot of light glintens on the screen, but the space otherwise remains black. Finally I bang two erasers together, letting the chalk dust fill the air in front of the laser, and a brilliant red beam of light flashes into sight. The light beam was always present but, with no dust or other substance to shine on, it remained invisible.

Turrell has said that one of his greatest interests is to bring physicality or “thingness” to the perception of light (as in my physics demonstration), making it the object of attention instead of merely a hidden illuminator. “My art deals with light itself. It’s not the bearer of the revelation—it is the revelation.” Every moment of seeing is an act in which external light is married to the interior light of the mind (recall Goethe’s idea of fact as theory). Turrell is as much interested in this act of perception as he is in the nature of light: “My interest in the perception of light is in giving it thingness. It exists just as a physical object has presence. I make thingness of perception by putting limits on it in a formal manner. There is no object there, only objectified perception. By putting into question physicality and objectness, the work may reveal more about physicality than any physical object.” Experience without object, formal limits on seeing, objectified perception—such are the means Turrell uses to invert our awareness and draw us into a novel psychological and artistic experience. But how can we shift our attention to that which we never experience directly? What would light look like as revelation instead of revealer?

Philosophy as Artistic Experience

Imagine yourself completely alone, descending a staircase shining with color of a single luminous hue into a large, two-story, enclosed space filled with light of the same color. You have just entered Bridget’s Bardo (2009), one of Turrell’s Ganzfeld installations. Unlike the painted surfaces of a standard room, the walls here shimmer with color but lack a detectable surface location. When we first enter into such a space of luminous, uniform color, we
feel disoriented; we mentally seek for conventional points of reference and objects to help stabilize consciousness. Finding none, we are thrown back on ourselves. If we have good sense, we give up the search for objects and allow the color experience itself to be sufficient. Yet most people will continually feel an urge for representation, for the contours of a concrete object. At least we have gravity and the perception of our own body to stabilize awareness, but at the same time we sense that we are at the threshold of a form of consciousness without objects or symbolic images or a direction of attention, where even the body can disappear from awareness. Turrell has described the Ganzfeld experience in language that refers to spiritual awakening: “This sense of disequilibria can at once be exciting as well as terrifying. It is not dissimilar from the luminous emptiness or filled void, spoken of in terms of satori, enlightenment, or experiences mentioned in near-death experiences.”

In the 1960s and 1970s, Turrell studied with leading scientists, astronomers, and psychologists working at the edge of their disciplines, experimenting with biofeedback, alpha training (i.e., meditation) for astronauts, Quaker silence, and Asian spirituality. When Turrell compared the experience of his art to satori or enlightenment, he did so having deeply engaged with these ideas. In this sense, Turrell is both an artist and an explorer of the mind. Never didactic, his art nonetheless leads us to ask what it is to see and to be human.
Another way of characterizing the experience of the Ganzfelds is with respect to what philosophers call “intentionality,” a concept introduced in Franz Brentano’s influential book *Psychology from an Empirical Standpoint* (*Psychologie vom empirischen Standpunkt*, 1874). Brentano posed the question, Can one ever have a mental experience that is pure, uninterpreted sensation or is experience always about something: a thing, an object, or an image?

Pick up the pen on the table and examine it. Is it possible to *not* see it as a pen? Try. As you look around, everything your gaze falls on is seen as something: a door, a painting by a particular artist, a bench, and so on. How does this happen? Can you withdraw the activity that makes meaning of what you see, hear, or smell? We become aware of this unconscious activity when it is frustrated, for example when the visual experience is ambiguous or the odor is unknown. A person born blind and given sight later in life must expend great effort to consciously interpret visual sense cues that others effortlessly see as significant. Similarly, if a Sanskrit passage were inserted here, it would appear as merely an obscure set of shapes to anyone unable to read Sanskrit; it might be experienced as script but it would not hold any particular meaning. This quality
of “aboutness” is the intentional nature of mental experience. For Brentano, a mental act was always directed toward an object: “What is characteristic of every mental activity is . . . the reference to something as an object. In this respect, every mental activity seems to be something relational.”

For one hundred and forty years philosophers have wrestled with the intentional structure of consciousness. Such is the power of Turrell’s art that it can reposition this abstract philosophical discourse, turning it into an experience both artistically powerful and cognitively demanding. He does not debate the issue philosophically but explores it artistically and phenomenologically. Turrell places us in a new and unfamiliar domain of mental experience, where the very action of looking becomes the object of attention. In the Ganzfeld works, he does this by stripping back the referents of conventional consciousness leaving only pure color perception. After several minutes, we may note that the color we first saw is gone and another has, imperceptibly, taken its place. Thus, we experience neither spatial form nor temporal change directly but are held within color’s womb beyond (or at least at) the limit of conceptual designation. In a space devoid of all objects and images with no particular direction selected for our gaze, all that remains is color and the self. As a consequence location, direction, movement, and time cease to have meaning.

Turrell’s Skyspaces are a perfect example of perceptual experience as relational. Here, we enter a space with a large opening to the sky (see Dividing the Light, 2007, p. 57). The experience of the changing colors of the sky at dusk is surprising and beautiful—not only because of the sunset, but also because of the subtle, slowly changing colors on the interior surface surrounding the aperture. In a phenomenon known in scientific psychology as “simultaneous contrast,” the visual experience of color is always in relationship to other colors in the field of view. Turrell learned about such effects as an undergraduate studying perceptual psychology, and he makes remarkable use of the dynamic and relational nature of color perception in every piece he creates. In this way Turrell works at the boundary of art, physics, perceptual psychology, and mysticism.

Letting Go

But do not ask me where I am going,
As I travel in this limitless world,
Where every step I take is my home.

Dōgen

As we journey home, the landscapes through which we stride are filled with trees, clouds, animals, buildings—indeed, with countless things. It is possible to let these things go, one by one, so the relationship between human
and landscape becomes ever simpler. Finally all that remains is the goal of home and the sky and earth with the horizon between them. With one last release we can let go of even the elusive goal of home and of the horizon, the two points that mark the final remaining distinctions between forward and backward, up and down.

The thirteenth-century Japanese Zen master Dōgen wrote that wherever we are is home. Each moment is the only moment we live in; it is always now. In this way we can understand Turrell when he said, “I am interested in the landscape without horizon and that’s the landscape that is encountered in meditation.” All familiar distinctions fall away and we learn simply to be. Such could be the instruction of a Zen master to a student who seeks to move beyond conventional awareness.

Yet for every simplification, the contemplative traditions also pose a countervailing elaboration. For example, in the complex spiritual philosophies of Tibetan Buddhism and Rudolf Steiner’s anthroposophy, the progressive stages of meditative practice lead one from the conventional sense objects of daily life to artistic images or mandalas of a more symbolic kind. These images, which become increasingly potent, are understood to be but way stations on the path to a release from the fixed forms of normal consciousness and to a new focus on the generative activity behind them. That is to say, one makes a conscious effort to shift from symbolic images to the activity that makes the imagined image or the objects in the world. In this way the meditant is said to come to experience the creative energy of the cosmos, and ultimately to experience the activity in and behind everything. One final stage remains on this path of light. By letting go of object, image, focus, direction, and activity, one can enter into an unbounded, formless consciousness, a state the Indo-Tibetan pundits call arūpa (a Sanskrit word for formless realms of inner experience).

When Turrell writes of his interest in the “thing-making” ability of light, he seems to be describing in his own language a long-standing idea in Eastern and Western spiritual traditions. The Scholastics called this ability of nature to make things natura naturans (“nature naturing”), contrasting it with natura naturata (“nature natured”), or the inert things in the world. Light is agency, the maker of things.

Light is a recurring motif in the meditant’s inner experience across many spiritual traditions, and the lineage of meditation on light is long and honorable. In the fifth century BCE the Chinese Taoist philosopher Lao-tzu wrote, “Use your own light and return to the source of light. This is called practicing eternity.” In the thirteenth century the Sufi scholar Najm al-Dīn Rāżī wrote of the light in the heart: “If the light rises in the Sky of the heart . . . and, in the utterly pure inner man attains the brightness of the sun or of many suns . . . then his heart is nothing but light, his subtle body is light, his material covering is light, his hearing, his sight, his hand, his exterior, his interior, are nothing but light.” Thus the human being becomes light, and only by becoming light do humans know light fully—this is the spiritual path of insight.
I am the one who (only) openeth his eyes, and there is light;  
When his eyes close, darkness falleth.  
Ra speaking, Turin Papyrus, 1300 BCE 

To an ancient Egyptian, the light of day was the directed gaze or consciousness of the highest Egyptian god Ra. The sun and moon, which were also called the two eyes of the god Horus, were but the most prominent of myriad eyes (including the stars) looking down on the human world. Such was the felt moral and spiritual reality of the ancient world that light was not a material entity but the activity of a god, whose open eye and act of sight gave light to the world.

Human awareness figured more prominently in the ancient Greek imagination than did the awareness of distant gods. By the time of the Greek philosopher Empedocles (ca. 490–430 BCE), the solar eye had migrated to the eye of man and woman. Empedocles, like many after him, thought of the eye as a lantern inside which burned a pure ocular fire whose ethereal light passed unimpeded through the membranes of the eyeball and reached out to touch the objects before it. We now term Empedocles’s view the “extromissive theory” of vision, and it dominated natural philosophy until the twelfth century. I consider the longevity of the extromissive theory as an early reification of the experience of intentionality. We strain to see something in the distance. Why?
That lived experience became the basis for the idea of ethereal light emitted by the eye into the mute world around us.

Turrell might have been one of Empedocles’s protégés when he said, “It is with lower levels of light our pupils open, and feeling comes out of the eye as touch. We touch and caress with the eyes.” In other words, something seems to come out of our eyes, and light itself becomes tactile: “In working with light, what is really important to me is to create an experience of wordless thought, to make the quality and sensation of light itself something really quite tactile.”

Turrell’s interest in the felt experience of light extends to the possibility of attributing consciousness to light. There are several sources for this view, but one is a physics experiment my colleagues and I performed at the Max Planck Institute for Quantum Optics in the 1980s. Princeton’s John Archibald Wheeler first described these wave-particle experiments theoretically in the 1970s. When we performed a version of Wheeler’s proposal at the Max Planck Institute, we showed that light appeared to change its character depending on the kind of observation being made. When we set the apparatus for observing wave behavior, wave phenomena showed up; and when we set the apparatus for complementary particle behavior, particle phenomena appeared. Moreover, in our experiment, we were able to delay the choice as to which observation would be made until very late, indeed to the last possible instant, but light always responded according to our question—wave or particle—long after one would have expected the behavior to be set. Turrell’s scientist friends told him of the experiments we were doing, which demonstrated what Einstein had called “spooky action-at-a-distance” and showed that observation played a strangely powerful role in quantum physics.

About these experiments Turrell has said, “That was very interesting to me; it almost awarded light a consciousness. I certainly feel that way. Quakers are always talking about going inside to greet the light, and about this idea of the light in everyone.” According to Quaker thought, the light within is the reflection of God’s light in us. That light can be vividly experienced and appear to have a type of living and wise awareness all its own. Turrell’s long association with Quaker silence disposed him to a vivid, luminous, inner life. Quantum physics experiments seemed to confirm his own experience of greeting the inner light, a medium that possessed consciousness.

Yet when talking with Turrell, he always ends conversations on such wide-ranging topics with laughter, declaring that in the end his work is simply art. In that instant, philosophy, contemplative exploration, and quantum experiments all slip away, and we stand once again within the remarkable lived experience of his art: that is sufficient. Turrell leads us into a space of uncommon experience, where we greet the light, sense its presence, and consider its invitation. Taking up this invitation with a lightness of heart is perhaps our greatest safeguard when we enter the new cathedrals Turrell creates. At the moment of the Buddha’s enlightenment, he reached down to touch the earth. In the presence of the greatest mysteries, we must remember to lean back, smile, and touch the ground. Art is enough.