

CONCENTRATION PAPER

MYSTERIES OF SOLAR PHENOMENA

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Through the ages, man's survival has been dependent on solar light in varying degrees. Ancient man used solar light to grow food, warm his home, light his environment, while contemporary man has shunned a natural energy source and used electricity to light his home and place of business. The metaphysical aspects of the sun have also disappeared, replaced by data collected by physicists and astronomers. However, the science of the twentieth century cannot override the qualities of solar light. The purity and beauty of the light of ancient and medieval times is still the same today, however, it is experienced by those whose sensibilities point in that direction.

Light represented the principle of order and beauty to the Inca of Pre-Columbian times. For medieval humanity, light was the most noble of natural phenomena, the closest approximation to pure form and beauty.¹ Contemporary man uses light in an impersonal and external way. Technological advancements based on scientific measurement gather light for energy purposes without regard to its splendor and beauty.

The differences in attitude between ancient and contemporary thought regarding evolutionary cycles of light are fascinating. The metaphysical, personal aspects of cyclic solar light used in ancient ritual contrast with contemporary scientific and external-oriented use of solar energy. There has always been a quest for understanding solar light. People of every age and every culture have been aware of the sun--of differences of light and dark; of its relationship to good and evil, wisdom and ignorance, life and death. From these contrasts, humans have spun the mythology and legends of the sun. It has been

a search for an explanation of natural phenomena and the relationship of humanity to the cosmos. Sun-gods and sun ritual evolved. Symbols of the divine, renewal, soul illumination, and royalty became form. Light is a part of story, poem, superstition, religion and tradition. The meaning of the sun traverses ethnic and cultural boundaries.

For an ancient society, the giant stone trilithons of Stonehenge near present-day Salisbury, England, marked winter and summer solstice sun. Cyclic light and sequences of light-dark created a dramatic progression in Egyptian funerary architecture in the Middle Kingdom (c. 2000 B.C.). Open courtyards evolved into enclosed spaces progressing alternately to the sacred tomb. Even though the sun god Ra among a pantheon of gods, was worshipped in the Old Kingdom, it was not until the Amarna Revolution during the reign of Akhenaten (c. 1372-1355 B.C., New Kingdom) that the Egyptians turned from pantheism. In veneration of the life-giving sun disk, the Aten, Akhenaten built a new city with palaces and a sun temple open to the sky.²

Thousands of miles away from the land of the Nile, in Peru of the Americas, the sun was a central force in the life of the Inca. Beginning in 1438 A.D., during the rule of the ninth Inca,³ Pachacuti, the solar cult rose to fruition.

SUN AS GOD

In the towering Andean mountains of Peru, the cycles of solar light were cause for celebration. The Inca led his people in the worship of the sun, the giver of light, fertility, and harvest; on four major occasions and monthly celebrations as well. Inti Raymi, "The

solemn feast of the Sun" took place in June during the winter solstice. The ritual communicated the mythical concepts of the Inca's solar cult, and adoration of the beauty of light. The three other important festivals focused on the planting and harvesting of maize, awarding of knighthood and purging of ills and disease from the city of Cuzco, the seat of the sun's earthly descendent, the Inca.

Reverence for the sun became form in the Coricancha, the Temple of the Sun. Located in Cuzco, the navel of the universe for the Peruvian Indian, the Coricancha was stark austerity lit with gold.⁴ Geometric, cyclopean stone walls sheathed in gold repousse caught the intense Andean sun and glistened and shimmered in return. Thatch in the roof was set with gold straws,⁵ while a gold frieze ran parallel to the wall repousse beneath the thatch. Devoid of image, its gleam was like a ray of sun - a symbol of divine beauty.

Near the interior golden wall of the Coricancha, the formal garden was planted with gold and silver images of the sacred maize and other plants. Created by privileged noble artisans, symbols of the creation hung on surrounding walls. Depicted on a golden disc the size of a man, the Sun, the most important servant of the creator god, Viracocha; had a human face and extending rays.⁶ Niches in the walls of the inner courtyard of the Temple of the Sun held gold icons of the sacrificial llama (Figure 1). Underground water flowed through five fountains tipped with gold.⁷

As indication of their position as children of the sun, the males of rank in the Indian society adorned themselves with gigantic gold ear spoons. Other gold body adornment included masks, bracelets and necklaces symbolic of solar light. Only a privileged few were allowed

to wear the precious metal. Legend relates the belief, gold was the sweat of the sun while silver was tears of the moon.⁸ As servants of the sun, the only females permitted to wear gold were the Chosen Women. Paying homage to the sovereign and assisting in temple activities were among the duties of these women of chastity and obedience.



Figure 1. Llama, gold, 15-16th Century A.D.

The celebration of Inti Raymi began on a day appointed by the astronomer. The Inca, believed to be the divine ancestor and the earthly representative of the sun, came with his high officials to meet the sun at the beginning of winter solstice. As the sun burst onto the golden wall, the crouched officials raised their arms in adoration, kissing the first rays of the sun.⁹ The celebration of the phenomena of solar light and order culminated in nine days of music, dance and feasts.

Pachacuti's festivals were contrived as solemn reminders of a heavenly order to which the Inca world was linked. Realizing the effect of the sun's power in their lives, the Indian artisans as an extension of the government, created objects of gold to worship the giver of light. Given the harsh climate of the Andes, the solar god was an important protector of crops and assistant in the maturation.¹⁰ The Temple of the Sun, the artifacts and Inti Raymi expressed a reverence

for this god. The luminous images were not art for art's sake, but of a utilitarian nature for use in festival. Although the appreciation of form was important, the objects were meant to be read and understood. The reflective quality of gold and the preciousness of the metal provided a visible bond to the sun and the universe for the Indian. It gave explanation for cosmic phenomena.

DeWain Valentine, 20th century sculptor, has explored the metaphysics associated with Egypt's Aten and the solar cult of the Andes in his giant transparent acrylic discs made in the early 1970's (Figure 2).

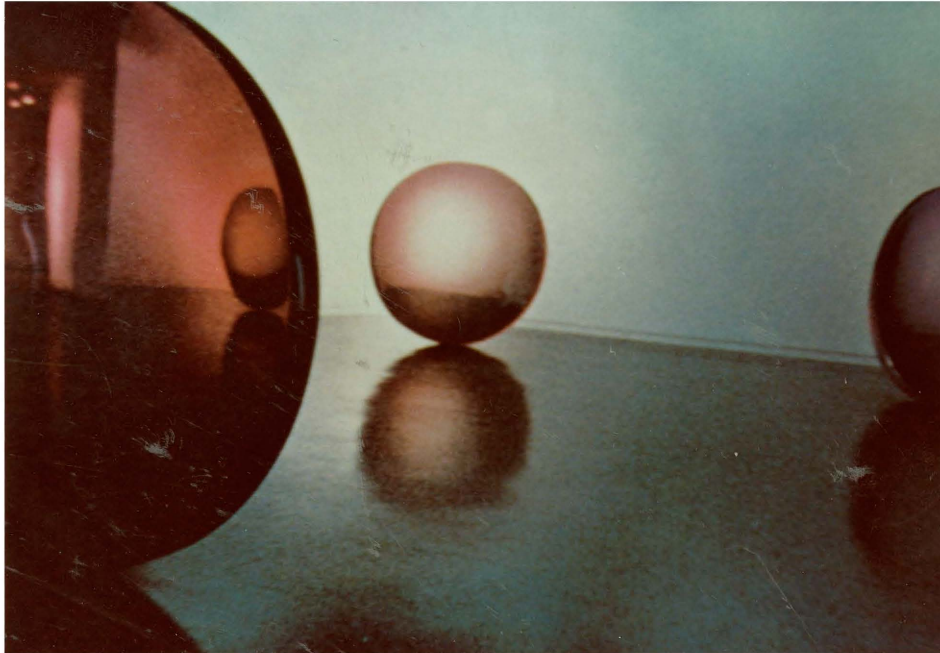


Figure 2. Concave Circles, DeWain Valentine, Cast Acrylic, 1970.

The mystique of light inherent in the belief systems of ancient societies continues to be a factor in Valentine's work. In a search for origin of personal energies, various aspects of solar light need to be investigated further. Although there is little scientific data to prove solar light's

effect on man, there is some indication our desire to be in the sun has a relationship to survival.¹¹

SUN AS DIVINE LIGHT

The Indians of Peru utilized the sun in a metaphysical manner as well as for survival. The awesome glory of the sun's effect on the gold metal at Cuzco is analogous to the bending of light through the colored crystal windows of the Gothic Cathedrals of the 12th and 13th century in Europe. Early abstract and geometric designs in stained glass activated by solar light, transmitted a mystical illumination and harmony in mathematical proportion and ratio signifying all beauty. This numerical harmony combined with the sparkling colored light were symbolic of Christian concepts of light and harmony.

By mid 13th century, the glass designers were assembling mosaics into figures of legend and Christian theology. The Gothic cathedral became an architectural combination of crystal and stone to give form and meaning to an expression of feudal state and subtle theology corresponding to the solar cult's use of gold and stone in the Sun Temple at Cuzco. Gothic cathedrals were conceived as a source of emotion and a materialization of divine illumination. For the genre, it was a narrative and literary document of the 13th century; and for the learned, a symbol of the universal church.¹²

Chartres rising out of the plain of Boauce in France was an expression of medieval man and the upsurge of Christian faith that occurred during the 12th and 13th centuries. Nowhere else had the integration of theology into architecture had such radiance. It was a mingling of things of heaven and things of earth. The fragmented mosaics refracted light into a world of richness and splendor like that

of glimmering precious gems. Subject matter ranged from the glorification of the Virgin which occupied sixteen windows (Figure 3) to the cycle of the year in the Zodiac transparencies. Physical light became

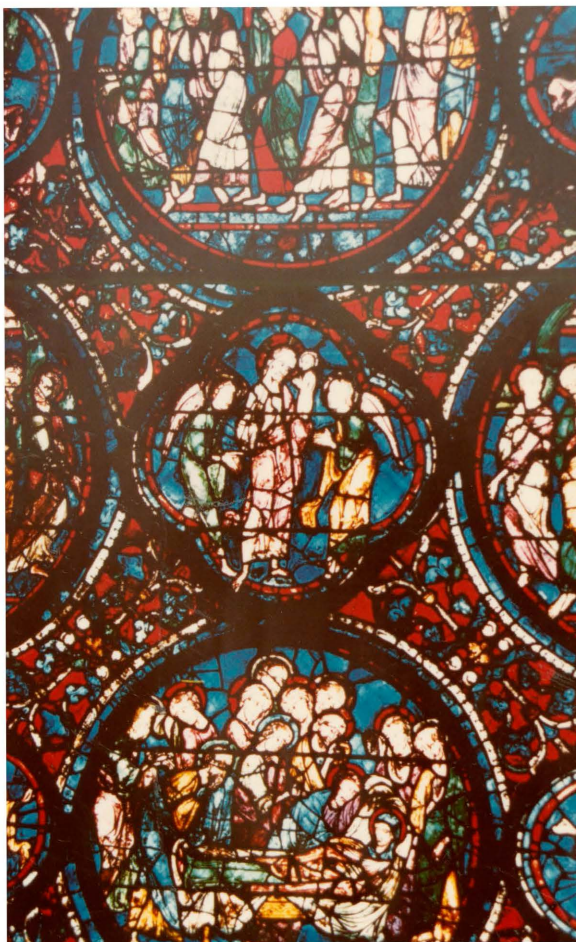


Figure 3. Window of the Death of the Virgin (fragment), stained glass, 12th Century A.D.

symbolic of the divine light of God. The legends of Charlemagne and the feudal state further combined history with theology (Figure 4) in the lyric light of the big boned edifice.¹³ It was a paraphrase of 12th and 13th century ethics in divine light radiance where light and dark exemplified the drama of life and death.



Figure 4. Window of Charlemagne, Charles Builds a Church, stained glass, 12th Century A.D.

The windows of Chartres, a monument to resemble the ideal edifice of heavenly Jerusalem,¹⁴ were not a complement of architecture, but architecture itself.¹⁵ Its Gothic walls were made porous allowing light to filter through the glass; permeating, merging and transfiguring the structure. The epic grandeur of the cathedral's window and frame are a transformation of hard and heavy material--stone contrasted with crystal, into a characterization of Gothic art (light against

dark).¹⁶ Oriented with the cardinal points of the world, Chartres materialized the ideas of theologians although they did not conceive the cathedral nor did they contribute to the construction.¹⁷

The intent of the donors/builders was to ornament the cathedral as brilliantly as possible; augmented by the sun, the interior would banish romanesque shadows. According to the metaphysics of the Middle Ages, light was the most noble of natural phenomena, the least material and the closest approximation to pure form, and beauty. "To the medieval mind beauty was not a value independent of others but rather the radiance of truth, the splendor of ontological perfection, and that quality of things which reflects their origin in God. Light and luminous objects, no less than musical consonance, conveyed an insight into the perfection of the cosmos and a divination of the Creator."¹⁸ As with the Indians of Peru, light represented the principle of order to medieval humanity. Light streaming through the crystal windows were to be read and understood yet had aesthetic value.

The illumination of the interior would move with the sun, synthesize the light rays and give back the hues with dazzling effect. It is this concentration of light passing through glass onto receptive surfaces that is worthy of further investigation in the 20th century. Images moving with the sun's cycle asks the viewer to return at a later time to fully understand the changes in the work. As in the cathedral at Chartres, there will be periods of suspended activity on a non-sun day followed by dormant incandescence or bursts of kaleidoscopic effect.

The translucency of the windows gives an impression of weightlessness and each hour brings new harmonies of which one never tires. As in Coricancha, it is the reaction of one energy on another that is

felt not reasoned. The clarity of arranged forms show the effect of intellectual thought through symbolic use of objects; a representation of human attitude toward light that is Gothic, yet timeless.¹⁹ The content of the cathedral is dependent on one's experience. Conditions always differ. What you see and when you see it will sway your emotions. Happy are those when mood and hour and light are crystallized into a vision of unearthly beauty. This concept can be explored in creativity in a contemporary age and for many years to follow.

The medieval spirit of bright and dark, fierce passion and stillness, sorrow and hope coalesce in the windows into visual experience and understanding. Paradox and contradiction are unfolded. Spirit has taken aesthetic form. In this, an altar to the rising sun, one can visualize primordial brute creation--a world beyond time and space, something beyond the human cycle of birth and death.²⁰ The monument on French soil that is truly an ageless symbol of spirituality and aesthetic value has universality²¹ yet is open to personal interpretation.

MODERN MAN AND LIGHT

During the course of history, the characteristics of the beautiful have had universal meaning. Thomas Aquinas and Hugh of St. Victor ascribed consonance of parts or proportion and luminosity to beauty. Light and geometry continue to be explored as the closest approximation to pure form and beauty in the twentieth century works of DeWain Valentine, Larry Bell, Eric Orr, Robert Irwin and James Turrell.

Valentine's concave discs of 1970 (Figure 2) searched for metaphysics and physics of the color spectrum. The eight foot precisionistic transparent circles focus on expressing totality of the psyche inseparable

from the totality of the universe.²² The contemporary industrial materials in geometric sculpture form have a spiritual presence corresponding to the light filtering through the stained glass of Chartres. In both instances, the sensory, aesthetic, and metaphysical are present.

Concurrently in the 1970's, Larry Bell was creating meticulously manufactured glass cubes and interlocking glass planes with a high vacuum optical coating which reflected illusionistic views of the spectator's image. *Iceberg and its Shadow* (Figure 5, late 1970's) further



Figure 5. *Iceberg and Its Shadow*, Larry Bell, glass, 1975

developed Bell's illusionary space in an architectural mood. The geometry of the Neo-Constructivists highlight its intellect that is discovered over time by the viewer.

The inherent order, harmony and intellect of geometric shape and form are seductive in sculpture. Adding the phenomena of solar light to geometry serves as a contrast challenging the intellect of the viewer in a time when scientists, astronomers and physicists gather solar light for energy purposes without regard for its splendor and beauty. Natural light integrated with visual art has been ignored since the post-Middle Ages, except for a few works by Valentine, Orr, and Bell. Catenary Light (Figure 6) and Sky Garden (Valentine) employ natural

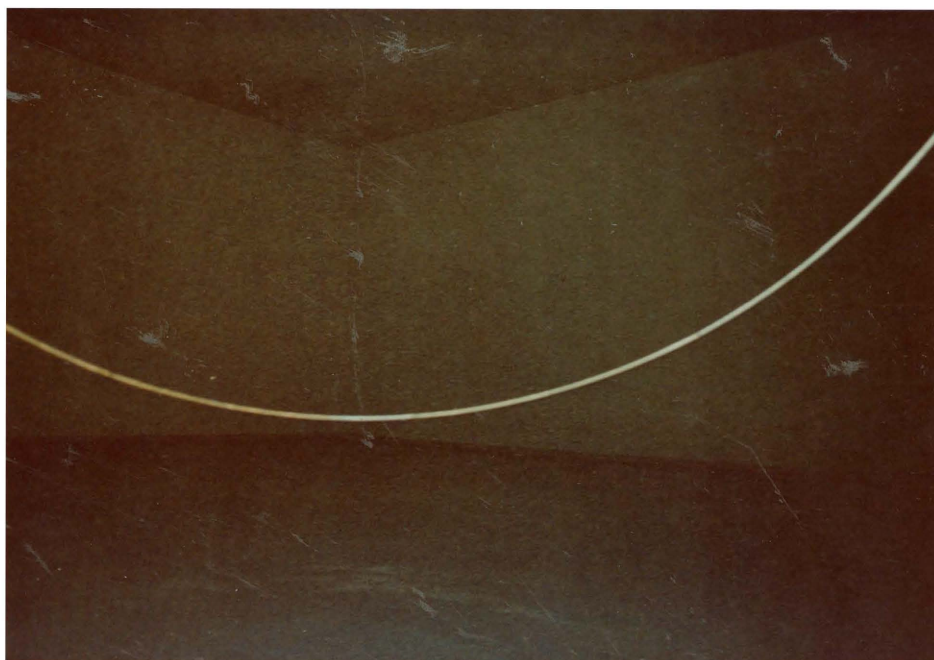


Figure 6. Catenary Light, DeWain Valentine,
Cast Acrylic, 1970-72.

light. In Catenary Light, a cast acrylic rod is illuminated by solar light and constantly changes according to the time of day and season.

Its ambient luminosity induces contemplation similar to an experience that one might have when entering a Gothic cathedral. Sky Garden is a camera obscura concept visually tracking time and the turning of the earth on its axis.

Proposed by Bell and Orr for a Denver park, the Solar Fountain has yet to be funded. Uniting science of the 20th century with art, solar energy will move water vapor by convection causing visual and physical effects in light and water combinations. An observer will experience a continuous movement of rainbows and reflections in a 10 by 26 foot glass bowl.

A 20th century trend toward objects for contemplation rather than immediate apprehension of content has become apparent in Valentine and Bell's work as well as other California artists. Robert Irwin's and James Turrell's involvement with light take on a perceptual mode. The late works of Turrell and Irwin are mysterious walk-in environments challenging the visual sensibilities and the mind of the viewer (Figure 7, Turrell). The mystique of light, the perceptual processes of the spectator and time are of importance to these artists--a reflection of the laid-back California lifestyle.

Valentine, Orr and Bell continue to use light with transparent industrial materials uniting science with art in sculptural form while Turrell and Irwin's perceptual light environments define art by sensory experience not form. Form is only a vehicle used by Irwin and Turrell to assist the viewer in a heightened awareness of natural phenomena and sensory enrichment.

Turrell's is an art of nothingness but light and space, austere in its purifying role, where observation is the most exquisite kind of



Figure 7. Single Wall Projection Piece Series, James Turrell, projected light, 1967.

pursuit. His goal is for the viewer to perceive their perceptions and become conscious of their own consciousness. Observation and contemplation play a role in solar light-activated sculpture that is necessary for the comprehension of the content of the work. Immediate visual experience can be an exciting factor but only on return visits to a solar work will the viewer begin to understand the sculpture, and project beyond the work into an aesthetic experience.

The art of Turrell and Irwin are only fully appreciated after hours or even days. During that time, significant change would have occurred in light and mood of the piece and if the spectator was responsive, change would occur in the psyche of the viewer. "A first impression would be modified and remodified by a patient viewer who was both participant and beholder."²³ Turrell's 1980 Space Division Series (geometric projected light shapes hovering weightlessly in walls)

(Figure 7) is grounded in the seductive appeal of luminosity to eschew mood.²⁴

The allure of solar illumination from the ancient period of time through the 20th century continues to captivate humanity. The sun creates and designs patterns of our environment in geology, vegetation and weather. Its luminosity has seasonal signs. The evolutionary cycles of light produce changes so subtle, some people are unaware of the excitement it creates.

It is my purpose to explore the mysteries of solar phenomena integrated with geometry and the technology of the 20th century. Via a concentration of solar energy in reflected and refracted images from plexiglass panes onto receptive surfaces in sculptural form the objective is to explore the metaphysical and personal aspects of universal cyclic solar light used in ancient ritual and medieval theology, and the contemporary external-oriented and impersonal use of solar energy. The intent is to bring together the inherent order, harmony and intellect of geometric shape with the purity of solar light culminating in a work where form is secondary to the visual experience when the art is activated by solar light.

The exploration is search for the origin of personal energies to sustain contact with universe in a fast-paced society faced with daily violence, economic crises and finite energy sources. It is a commitment of time and involvement with things of the past, present and future.

On another level, the works will ask the viewer to examine her/his own source of strength and appreciation of art. Perhaps inquiry of their consciousness will lead them to a discovery of a new relationship to the universe and a world beyond time and space.

ENDNOTES

¹Thomas B. Hess and John Ashbery, eds., Light, From Aten to Laser, (New York: The Macmillan Company, 1969), p. 39.

²H. A. Groenewegen-Frankfort and Bernard Ashmole, Art of the Ancient World, (Englewood Cliffs and New York: Prentice-Hall/Abrams, 1977), p. 59.

³The Inca was emperor or king, rather than the name of the tribe or society.

⁴Sacheverell Sitwell, Golden Wall and Mirador, (Cleveland: World Publishing Company, 1961), p. 100.

⁵Ibid.

⁶George Bankes, Peru before Pizarro, (Oxford, Phaidon Press Limited, 1977), p. 162.

⁷Louis Baudin, Daily Life in Peru, (New York: The Macmillan Company, 1962), p. 152.

⁸C. A. Burland, Peru Under the Incas, (New York: G. P. Putnam's Sons, 1967), p. 60.

⁹Louis Baudin, p. 154.

¹⁰George Bankes, p. 156.

¹¹John N. Cole, Sun Reflections, (Emmaus, Pennsylvania: Rodale Press, Inc., 1981), p. 118.

¹²Helen Hess Parkhurst, Cathedral, (Boston: Houghton Mifflin Company, 1936), p. 229-33.

¹³Louis Grodecki, Chartres, (New York: Harcourt Brace and World, Inc., 1963), p. 196.

¹⁴George Henderson, Chartres, (Middlesex, England: Penguin Books, 1968), p. 15.

¹⁵Louis Grodecki, p. 140.

¹⁶Ibid., p. 200.

¹⁷Ibid., p. 206.

¹⁸Thomas B. Hess and John Ashbery, p. 39.

¹⁹George Henderson, p. 38.

²⁰Helen Hess Parkhurst, p. 261-2.

²¹Louis Grodecki, p. 9.

²²Jean-Luc Bordeaux, "DeWain Valentine: Light Explored," Art in America, (December 1979), 67:103.

²³Nancy Marmer, "James Turrell: The Art of Deception," Art in America, (May 1981), 69:92.

²⁴Ibid., p. 21-98.

SELECTED BIBLIOGRAPHY

Books

- Bankes, George, Peru before Pizarro, Oxford: Phaidon Press Limited, 1977.
- Baudin, Louis, Daily Life in Peru, New York: The Macmillan Company, 1962.
- Burland, C. A., Peru Under the Incas, New York: G. P. Putnam's Sons, 1967.
- Cole, John N., Sun Reflections, Emmaus, Pennsylvania: Rodale Press Inc., 1981.
- Grodecki, Louis, Chartres, New York: Harcourt Brace and World, Inc., 1963.
- Groenewegen-Frankfort, H. A. and Ashmore Bernard, Art of the Ancient World, Englewood Cliffs and New York: Prentice Hall/Abrams, 1977.
- Henderson, George, Chartres, Middlesex, England: Penguin Books, 1968.
- Hess, Thomas B. and Ashbery, John, eds., Light, From Aten to Laser, New York: The Macmillan Company, 1969.
- McIntyre, Loren, The Incredible Incas and their Timeless Land, Washington, D.C.: The National Geographic Society, 1975.
- Parkhurst, Helen Hess, Cathedral, Boston: Houghton Mifflin Company, 1936.
- Sitwell, Sacheverell, Golden Wall and Mirador, Cleveland: World Publishing Company, 1961.

Periodicals

- Bordeaux, Jean-Luc, "DeWain Valentine: Light Explored," Art in America 67 (December 1979):103-106.
- Butterfield, Jan, "Larry Bell: Transparent Motif," Art in America 66 (September 1978):95-99.
- Marmer, Nancy, "James Turrell: The Art of Deception," Art in America 69 (May 1981):90-99.