

The artistic use of parallax and lenses revealing the invisible in holography

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Abstract. There are many artistic resources offered by holography: third-dimension registration and reconstruction, immateriality, color interpretation, holographic space, realism, etc. But there are a few of them which are very characteristic and singular of that media such as the inversion of parallax, and the possibility of making invisible to turn into visible. Current paper aims to discuss key issues concerning with the aesthetic use of those special features. It is based on theoretical as well as critical analysis of the production by some of the most outstanding holographic artists who have made use of such interesting resources.

1. Making invisible to turn into visible

Although the sentence “making invisible to turn into visible” may suggest magic tricks or deception, there are many ways to get that aim. Good examples are micro- and macro-scopes which allow human to access spatial as well as temporal domains which would remain unreachable otherwise.

But, in relation to making invisible to turn into visible by means of holography, it refers in a poetic manner to other possibilities offered by such media, as the ones listed below:

1. To register optic properties of translucent objects such as lenses. A mirror or a lens transforms the incoming light wavefront into a new one, which is then registered into the holographic plate or film. In fact, holography is mainly a wavefront registration technique. Afterwards the holographic plate or film allows the reconstruction of the registered objects, including the translucent and transparent ones. Figure 1 (“Breakfast”, by Patrick Boyd, 1988) and figure 2 (“Self-portrait”, by Edwina Orr, 1982) show holographic artworks which have used lenses as resources for the production of the final image.



Figure 1. “Breakfast”, Patrick Boyd (1988) **Figure 2.** “Self-portrait”, Edwina Orr (1982)

2. It is also possible to use lenses and translucent objects when creating rainbow holograms, supporting the creation of abstract multi-colored compositions. Many artists have explored that resource; some of them even did it a distinctive feature of his/her visual language or style. One outstanding example is Marie Andréé Cossette’s holographic art production (see figure 3 “Mémoire”, and figure 4 “Luminescence” as paradigmatic examples).



Figure 3. “Mémoire”,
Marie Andréé Cossette

Figure 4. “Luminescence”,
Marie Andréé Cossette

HOE (“Holographic Optical Element”) is a type of technique that supports the registration of wavefronts themselves. There aren’t usually other objects in the scene, but physical or virtual lenses (the last one when they are computer generated). That technique has been used by several artists as aesthetic resources in their corresponding creations. Mainly in two formats: (a) Textured surfaces producing a huge range of spectral colors.

(b) As elements integrated in abstract spatial compositions. Outstanding artists on the field are: Rudie Berkhout, Melissa Crenshaw, Setsuko Ishii, Paul Newman and Orazem et Luck.

Melissa Crenshaw [1] and Setsuko Ishii [2] [3] made interesting land art pieces such as “Water Falls II” (fig. 5) and “Apolinean Gifts series” (fig. 6) respectively. First of them was composed of an holographic film inlayed into two glass surfaces, used to support a waterfall while being backward illuminated creating an spectral spectacle. Second aforementioned work by Ishii was undertaken with the same type of holographic material used as texture of cylindrical sculptures placed in a water pool. The sunlight reflected on the water surface randomly moved by the wind transformed such installation in an evanescent color orchestration.

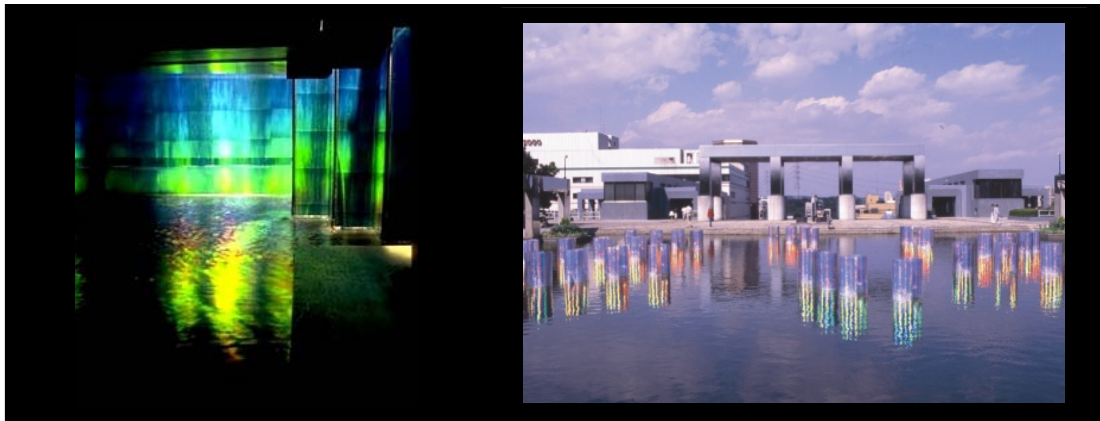


Figure 5. “Water Falls II”,
Melissa Crenshaw, (1992)

Figure 6. “Apollonian Gift Series”,
Setsuko Ishii, (2000)

On the other hand, Paul Newman brilliantly embodied light into holographic sculptures such as “Light Form” (see figure 7). As stated by Eduardo Kac concerning his holographic production “in his holograms it is impossible to identify specific shapes or compositions, because the artist works with the evanescent behavior of the diffracted white light to produce ephemeral appearances” [4].

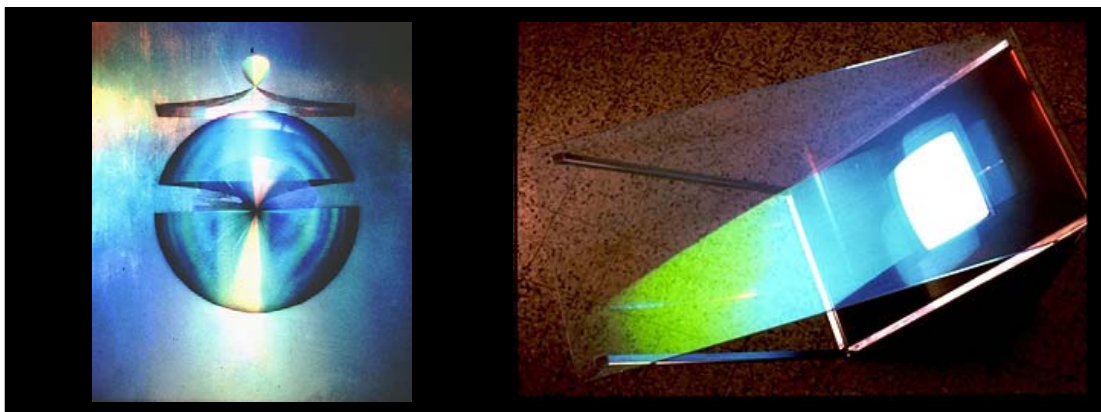


Figure 7. “Light Form”, Paul Newman

Figure 8. “TV HOE”, Orazem & Luck

Orazem & Luck are two associated artists who were working together in light installations, integrating different media such as holography, video and computer graphics. In “TV HOE” (figure 8) a digital black & white TV animation was projected through a big HOE placed in front of the TV monitor. Therefore, the monitor changing images work as lighting sources to illuminate the HOE (further information: [5]).

The artistic outcome became “a cinematic spectacle combining the spatial linearity of the animation with the spatial and chromatic dimension of holography” [4].

3. Alternative sources such as acoustic holography or X-rays allow making holograms of the inner part of opaque objects or the human body. It has not been documented any artistic experience in this direction, but there exists that chance to make invisible to turn into visible.
4. Holographic interferometry is a very useful scientific tool to study material deformation. It has been mastery used by some holographic artists such as Margaret Benyon in her works “Counting the Beats” (fig. 9) and “Tiresias”, as well as Sally Weber [6] in “Fossil” (fig. 10).

Making visually explicit human heart beating as well as human skin movements turn subtle life signals into poetic visual patterns, revealing the mystery and beauty of the living nature.

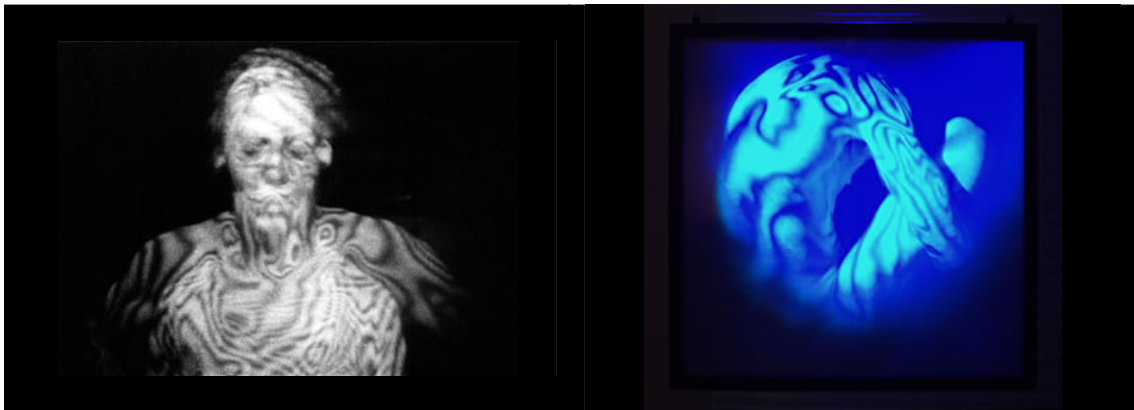


Figure 9. “Tiresias”,
Margaret Benyon, (1981)

Figure 10. “Fossil”,
Sally Weber, (2006)

The aforementioned resources illustrate how holography supports the access of human senses to invisible realms in a very characteristic way; and how artists have experienced them according to different original aesthetic approaches.

To finish the survey on the use of that holographic aesthetic resource, it is remarkable how light acts as genesis and reproduction mechanism of the resulting holographic image. In fact the hologram is essentially light itself, i.e. light represented by light, and such self-referentiality is absolute. That circumstance is especially evident in relation to some outstanding holographic artists whose production may be considered color and light abstraction. That’s Rudie Berkhout’s case [7],[8],[9]. His may be considered connected to the legacy of other previous light art practitioners such as Thomas Wilfred or Laszlo Moholy-Nagy. Other outstanding artists making great contribution to the use of holography as an abstract lighting media are Dieter Jung, Michael Bleyenbergh, and Karsten Hobihorst.

2. Parallax effects: Inverting the space concavity

First question to be answered is how it is possible to invert the space concavity. Pseudoscopia is the physical property explaining that issue. It supports changing the proximity-distance spatial relationship, and the parallax effects of the holographed scene. So, objects close to the holographic plate/film during the registration phase appear to be far away when the holographic image is reconstructed.

When, instead of several objects, there is only one, the result is the volume inversion, i.e. making convexity to turn into concavity and vice versa. Such effect has been widely used in traditional sculpture and reliefs throughout the art history from ancient to contemporary practices. For example, the Egyptian ones in the walls of the pyramids (figure 11); or Subirach's sculptures placed in the facade of the Sagrada Familia Cathedral designed by Gaudi and built in Barcelona (figure 12). Positive (convex) or negative (concave) volumes can be achieved and showed in a very different way depending on the light source position illuminating them.



Figure 11. Egyptian Temple at Dendera



Figure 12. Sagrada Familia Cathedral at Barcelona, Josep. M. Subirach

But, what aesthetic possibilities does this resource offer in relation to holography? The artist can find an illusionistic resource to mislead spectators. The human intellect is culturally conditioned in such a way that it understands as concave what actually a convex volume is. That is due to be accustomed to the sun light shining up in the sky, which makes people to observe outstanding volumes rather than negative ones.

The same happens with holography, and artists have used that resource to deceive spectators, but also to transform the perception of the real world. Although there are not so many examples, a few good ones are "Grater" by Harriet Casdin-Silver (figure 13), "Horizon" by Ken Harris (figure 14), and "Vortex II" by Dan Schweitzer (figure 15).

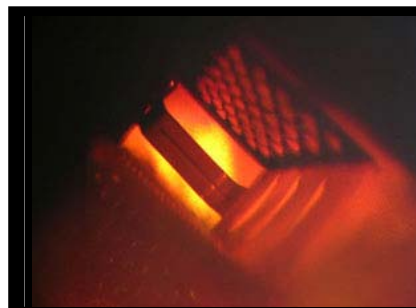


Figure 13 "Grater",
Harriet Casdin-Silver, (1991)

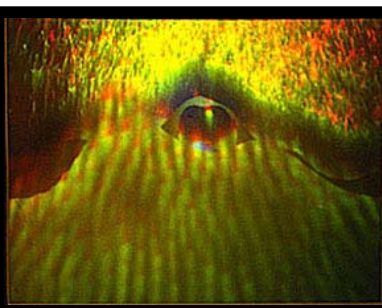


Figure 14 "Horizon",
Ken Harris, (1980)

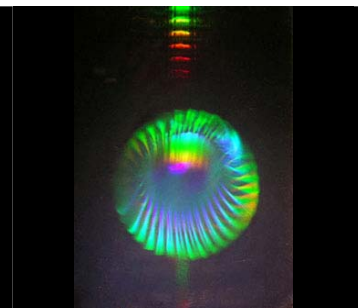


Figure 15 "Vortex II",
Dan Schweitzer, (1978)

Casdin Silver transforms a banal kitchen object, inverting the inner volume to outer; transforming her pseudoscopic ‘grater’ into an abstract light sculpture, as stated by Jonathan Ross (Ross, 2003:Still Life). Similarly to ‘ready-mades’ by Duchamp, ‘Brillo-box’ by Warhol, or Claes Oldenburg sculptures, Casdin-Silver decontextualise an ordinary instrument to become an artistic object.

As it can be appreciated, much more abstract are Dan Schweitzer’ and Ken Harris’ works, with reminiscences of previous artists styles such as Man Ray’s.

3. Conclusion

Pseudoscopy as well as the capacity to register invisible light wavefronts are very characteristic features of the holographic media. Authors have been researching on how to get good artistic outcomes based on both resources. Some of them have even based their own visual languages on shaping light, capturing its ethereal and unique nature by means of both features.

4. References

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Acknowledgments

Thanks to artists exploring the holography media, and specially those cited on this paper, for discovering the beauty of light using the discussed resources. Also to collectors such as Jonathan Ross, because his passion for holography supports research such as the one presented in the current paper.