Chromatic dematerializations. The development of the culture of colour between art and design

«Colour is hard for the weak. To make colour, you need blood in your veins and in your brain», wrote Giò Ponti in 1952, in the opening words of *Tutto il mondo deve essere coloratissimo* published in the magazine *Pirelli*. And indeed, the use of the emotional nature of colour in art and design has required the courage to overcome a certain degree of chromophobia (Batchelor, 2001). In the modernist conception, the chromatic dimension appears subordinate to form and structure, an approach criticized on a number of occasions in the 1950s by Ettore Sottsass Jr (1954, 1956). In art, as Carlos Cruz-Diez (1993) writes, due to its changeable nature, colour is employed «and absorbed in one single way: first form, then colour» (p. 2). However, in the late 1960s, the dematerialization of colour in art through additive synthesis appeared to influence a part of design culture that, interested in reacting to certain historical prejudices on colour, determined a new way of understanding the chromatic dimension and transformed intangible factors into parameters for building the quality of space.
In this framework, this paper proposes reinterpreting these artistic influences in the culture of design to cast light on how the immaterial nature of the chromatic dimension today becomes a ground for dialogue and collaboration among artists and designers engaged in enhancing the natural and artificial environment, precisely by using those values linked to the emotional nature of colour.

[chromatic culture, primary design, minimalism, additive colour synthesis, perception]

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Chromophobia between art and culture of design

For centuries, colour has been the subject of numerous reflections that have been updated in correspondence with the social, cultural, economic, and technological transformations succeeding one another over time. Ever since Wolfgang Goethe, aiming to bring colour back to the phenomenological, emotional dimension, developed his theory of colours in 1810 (to a great degree opposing Isaac Newton's 1704 theory), two perspectives through which to read the chromatic phenomenon have taken shape: one "scientific", and the other "emotional" It is precisely this emotional aspect – intangible, subjective, and fleeting – that makes colour an immaterial factor to be "governed".
In addition to the separation between white and colours made in 1925 by Le Corbusier in *L'art decoratif d'aujourd'hui*, Teo Van Doesburg (cit. in Sottsass, 1954), as early as 1917 in *Grundbegriffe der neuen gestaltenden Kunst*, stated that «surfaces or lines in which colour is enclosed must be deprived of all emotion, because the smallest emotionality in the profile of the splash of colour could cost it its concreteness, and alter it» (p. 47).
In the modernist conception of the industrial product, the presence of colour appears connected mainly to the functionality of the object (Romanelli, 1987). At the same time, the prevailing trend in the architectural conception is to avoid polluting the clarity of compositional thought with colours, to preserve the purity of the structure by using white, or to define chromatics via processes of abstractionwhile restoring hues to the essentiality of the primary pigments, and to govern colour with balanced compositional relationships (Polano, 1990). Design culture therefore appears pervaded by a sort of chromophobia, which for David Batchelor (2001) manifests itself in the «varied attempts to purge colour from culture, to devalue colour, to diminish its significance, to deny its complexity» (p. 19). This also results from the observations of Adolf Behne (cit. in Romanelli, 1987), who, in *Wiederkehr der Kunst* in 1919, writes: «If there is anything that typifies today's educated philistine it is his fear of colour! [...]. Civilized people of our climes looks at chromatic art and chromatic architecture the way they looks at people of colour. With a sort of horror» (p. 8).
While colour appears subordinate to form in the design world, in art on the other hand it is relegated to the "certainty" of line. The counterposition between drawing and colour was already clear in the mid-sixteenth century, between the painting traditions of Florence and Venice. For the former, the line – *lineamentum* – represents a factor capable of joining the idea to practice, while for Venetian painting colour is employed in its chromatic essence. Giorgio Vasari bore witness to this conflict in *Tiziano da Cador* in 1568, and Manlio Brusatin (1983) confirmed it when he stated that fifteenth-century drawing leads the reproductive arts to knowledge and truth, «while the world of colours is still composed in accordance with a seductive and apparent harmony of elements» (p. 48).
During the last century of the nineteenth century, Charles Blanc (cit. in Batchelor, 2001) maintained a moral rejection of colour, stating that: «The union of drawing

and colour is necessary to engender painting, just as is the union of man and woman to engender humanity; but drawing must conserve its preponderance over colour. If it is otherwise, painting will run to ruin, as humanity was lost through Eve» (p. 20).

The changes in the chromatic culture of the 1950s

In the eighteenth century, thanks to chemical synthesis, chromatic ranges began to expand, extending into the nineteenth century with the production of paints on an industrial scale; the twentieth century brought an additional increase through colours produced by electronic systems. Starting in the late 1940s, in the industrialized world, the influence of colour in mass communication gradually took on an important role. During this period, Edwin Land, the founder of Polaroid, studied the connections that the human perceptual system forges among colours, and in the 1970s developed the Retinex theory. The studies initiated by Faber Birren in the 1920s spread, such as consulting for major United States corporations with regard to colours' influence and effects on employees and sales. Since 1948, companies in the United States have been able to access information and forecasting tools dedicated to colour and functional to coordinating the marketing of large-scale production chains. In essence, since the 1950s, chromatic language, with the gradual shifting of interests from production to the market, has become the seductive lexicon of merchandise. Moreover, during this period, the development of nightlife established new conditions for perceiving the chromatic phenomenon. «In practice, in emotional terms, our interaction time with chromatic reality ended up doubling» (Moro, 2010, p. 192). After the 1970s, the spread of colour television and electronic media broadened the chromatic landscape and nourished possibilities for interaction with the chromatics produced by artificial light. This period saw the rapid transition from the nearly exclusive use of subtractive synthesis to the application of additive synthesis, «an expression of the physics of colour, which had never been exploited until that time» (p. 190).

Colour as a factor of design

The 1960s and 1970s were a period marked by a radical transformation of the artistic process and of design culture; the latter proposed going beyond the demands of the historical avant-gardes, taking as a reference expressions and actions of new artistic movements like Pop Art, conceptual art, Arte Povera, body art, Op Art, Land Art, and Minimalism. In a process of cross-pollination between art and design, not only were new languages experimented with, but alternative cultural models too, both to denounce the market logic of mass society, and to verify the possibility of generating new realities. It was in this climate, in the early 1970s, that the investigations of primary design by Centro Design Montefibre (CDM) were developed, seeking to examine the impact of all those intangible phenomena – "soft", and bound to physical perception – while distinguishing them from the "hard" ones belonging to structure. CDM's design sector, established by Massimo Morozzi, Andrea Branzi,

and Clino Trini Castelli, developed new ways of intervening with the quality of the artificial environment, consisting of information, semi-finished products, and manuals, «capable of guiding the work of the designers themselves, and of industry» (CDM, 1975, p. 41). These studies were inspired by a radical reconsideration of the chromatic dimension, which until that time appeared to be a superstructure of the object. A contributing factor that favoured this process of the emancipation of colour was its dematerialization through additive synthesis, which allows art to use the changeable and precarious nature of colour to affirm chromatics in space; in design culture on the other hand, treated for its emotional essence, colour becomes one of the intangible factors of quality – one that is strategic and a priority.

The influences of Maurice Merleau-Ponty and the relations between Dan Flavin and Clino Trini Castelli in developing a new chromatic culture in design

The use of artificial light in art was already present in the 1920s; in spite of this, artistic experimentation, beginning in the 1950s and consolidating in the 1960s and 1970s, was initiated, able to disconnect that subordination of colour to form; this experimentation involved perception, which during that period was no longer understood in the sense of Gestalt, but rather as experience of the body and senses. In *Phenomenonlogy of Perception*, published in 1945, Maurice Merleau-Ponty holds the body to be «the point of view of the world», capable of identifying «that broad process of perception through which the subject gives meaning to the things of reality. And it is precisely in the body that the basis for all knowledge – perception – is embodied» (Merleau-Ponty, 2003, p. 122). This theoretical supposition entered into the awareness of American minimalist artists in 1962, when Merleau-Ponty's text was translated into English, twenty years later than the French artists of the 1940s, and «with Pollock, Still, Newman, and Rothko lagging behind» (Krauss, 2007, pp. 271-272).

Although it may appear reductive to ascribe the minimalist movement to the perceptivephenomenon, there is no denying that their works propose involving viewers precisely by stimulating their perception. In fact, these works are enlivened through reduced formal solutions capable of generating tensions with the surrounding space (Poli, 2003, p. 8). Although born in the 1960s, Minimal Art may be considered a trend referred to by various disciplines, that to this day constitutes the basis for a series of phenomena of art and of design culture. According to Baker Kenneth (1989), minimalism can refer on the one hand to essential works exalting geometry and eschewing expressiveness, and on the other to the tendency to present as art things that are «indistinguishable (or all but) from raw materials or found objects, that is minimally differentiated from mere non-art stuff» (p. 9).

In 1968, Morris, coming into contact with Merleau-Ponty's idea of perception, developed the concept of Anti Form (Nigro, 2003, p. 24), published in the magazine *Artforum*, proposing to overcome the residual, Gestalt schematism of the minimalist *Primary Structures*, deemed unsuited for grasping the complexity of

experience. Morris's intention was to go beyond geometric and compositional limits through the use of deformable and shapeless materials (lead, felt, rubber, or debris, sand, and steam), involving – in accordance with Merleau-Ponty's perceptive model – the body of the viewer, who becomes an active part in the very construction of the work that is transformed into a perceptive energy centre. However, this idea of the body as a medium of knowledge of the world appears to govern not only the interests of minimalist art, but also those of primary design, according to which:

Our body can actively elaborate the data it receives from the surrounding space, and transform it into experience and culture [...] it is an active instrument of cultural elaboration, able to act within a systematic complex of sensory signs [...]. (Branzi, 1984, pp. 98-99).

Additive colour synthesis, and Merleau-Ponty's way of understanding the perceptive dimension, makes colour in art not just a visual but a sensory phenomenon, capable of autonomously going beyond the confines of the work to generate space, as in the works by the minimalist Dan Flavin. This new dimension influenced Trini Castelli, leading him subsequently to work in design, staying outside of «traditional figurative culture, which saw the dimension of composition as the ideal reference» (Moro, 2010, p. 197).

Among the artists of the New York Minimalism of the 1960s, Flavin was the one who undertook a unique path through the use of the chromatics produced by neon lights. According to Trini Castelli (2004), Flavin did not feel the need to overcome the *Primary Structures* demanded by Morris through the use of the deformation of the material; instead, what he aspired to do was «to integrate, in a complete way, his work into space», making clear that «autonomy of light in the solidity of its additive form, perhaps the most immaterial *objet trouvé* in all of art history» (p. 93). Flavin connected to reality by employing fluorescent tubes available on the market, and was inspired by the iridescences characterizing nightlife, such as those in places of leisure and entertainment. Moreover, by using additive colour synthesis, he openly declares the work's precarious nature, with the awareness that his works are not destined to last over time. Initially, his works respond to the traditional principles of exhibition; he subsequently investigates the effects of chromatics of light in exterior and interior spaces, through restrictions of accesses, openings, alterations, manipulations, and reiterated lows of light (Gellini, 2004, p. 45).

In Italy in the late 1960s, American minimalism found no immediate access to the institutional exhibition channels; in fact, it was not present at the Venice Art Biennale in 1966, but only in 1968, representing the first important moment in American minimalism's encounter with Italian plastic experimentation during that period. It was, however, the galleries that offered opportunities for the encounter between Minimal Art and the design culture emerging at that time. In 1967, Flavin, after his European debut at the Zwirner gallery in Düsseldorf, showed at Milan's

Sperone gallery, where Trini Castelli was staging the lighting system (Trini, 1967, p. 33). This encounter proved to be decisive for Trini Castelli's chromatic experimentation and for changing the role of colour in design (Moro, 2010, p. 194.). In 1974, Trini Castelli, influenced by Flavin's works, designed a photoluminescent plastic laminate, *Print Lumiphos 14-580*, a semi-finished product also employed by other designers and conceived as a component of primary nature «according to the 'primary structures' concept of Minimal Art (and) the Anti Form theories of Robert Morris» (p. 196).

Again in the late 1960s, artists from the "Los Angeles School" on the West Coast of the United States – James Turrel, Robert Irwin, Bruce Nauman, and Mario Merz – made additive colour synthesis a central element of their work. These investigations on the dematerialization of space through light and colour later influenced the works of several artists and designers.

The chromatic dematerialization of space as current ground for dialogue and collaborative efforts between artists and designers

In recent years, designs employing additive colour synthesis as an integral part of space have fostered the development of different forms of collaboration between artists, designers, and companies in the lighting sector. Many of these projects – also stimulating the citizens' participation in design choices – propose augmenting the social value of urban spaces through interventions that combine innovative lighting solutions with art installations; for example: the designs published in the volume *Light and Art in Public Spaces* (2016) promoted by the Luci Light & Art Commission, involving various European cities like Amsterdam, Gothenburg, Helsinki, Lyon, Rotterdam, and Turin. On the other hand, other interventions engage architects, light artists, and interaction designers for the development of interactive projects, such as, for example, the group – formed by the architect Milo Laven, the light artist Erik Krikortz, and the interaction designer Loove Broms – that recently developed *Colour by Numbers* (colourbynumbers.org), an installation for Telefonplan in Stockholm in which, through the use of digital devices, users can change their colour. Then there's the *Me. Here. Now* (atlondonbridge.com) project for the Deptford London Bridge station in Southwark, where the designer Alexandra Kalimeri and the artist Mark Titchner developed a design that deals with the relationship between the daily travel experience and the spiritual reflection it brings. On the other hand, the design study and the creative experiment Whyixd Interactive (it.m.hktdc.com), composed by artists, mechanical engineers, and interior designers, works on the themes of integration between media and innovative technological solutions for the development of temporary and institutional events, and musical and artistic events. In Taiwan, it recently staged *Magpie Bridge*, a lighted kinetic installation that proposes spurring the visitor to reflect upon the origin of light. In addition to urban spaces, natural environments are also the ground for experimentation by light designers and artists, as in *Descanso*

Gardens (descansogardens.org), where a series of installationsis integrated with the landscape, also interactively, through the designs of digital artist Maotik and set designer Etienne Paquette, visual designer Jen Lewin, and designer Chris Medvitz. Then there is *Lumagination* 2018 (buffalogardens.com), a project supervised by the designer Philip Colarusso for the Buffalo Botanical Gardens, where plants are immersed in luminous chromatics, sound effects, and interactive itineraries. In other cases, the figures of the designer and artist coincide, such as for example in the *Coding* project(grawunder.com/sfo), for the car park at the San Francisco international airport, where designer and artist Johanna Grawunder, supported by a company in the Osram Group, staged a permanent installation that emphasizes the codes of programmed perception of time and events. These recent projects, which are just some examples of collaboration between artists and designers, show how chromatic installations that propose the intangibility typical of the dimension of light are a kind of "happening". Although some of these experiences may be deemed cases of mere spectacle, they are still capable of fostering processes of convergence of the artist's and the designer's experiments with the artificial or natural environment, which becomes the device for doing works in which, to cite Merleau-Ponty (1989), «Quality, light, colour, depth, [...] awaken an echo in our body and because the body welcomes them. This is the carnal formula of their presence» (pp. 20-22).

Conclusions

The exploitation of additive synthesis has «marked the history of the figurative arts and of design – not only in terms of style, but with substantial changes capable of modifying, on the anthropological level, collective aesthetic conscience on the great themes of artificiality» (Moro, 2010, p. 191).

The influences between the iridescent works of the American Minimal Art of Flavin, and the new culture of the immaterial emerging in the 1970s, on the basis of a reconsideration of the perceptive phenomenon, demonstrate that art can influence design not only on the theoretical level, but on the experimental one, too. In other words, the use of colour in Flavin's iridescent works offers design the possibility of verifying how chromatics, liberating themselves from light sources, can relate to the environment and expand into space, conditioning its perceptive quality. This influence supported a new way of understanding the chromatic phenomenon and lent the entry of emotional aspects to design culture, but also to the logic of production, placing the immaterial factors among the elements of mediation between professional practice and technical elaboration. As digital technologies took hold, additive colour synthesis pervaded various immaterial realities, bringing about a radical change of the artificial environment through the «dematerialization, superficialization, ephemeralization, and virtualization of experience» (Manzini, 1990, p. 22). These design territories always require more than a multidisciplinary approach to the chromatic dimension and the formation of heterogeneous working groups in which artists and designers overlap and intertwine their skills. In this

sense, the artist no longer appears as a figure who, as Bruno Munari maintains in *Artista e designer*, «works in accordance with his or her taste, for him or herself», but rather manifests willingness to integrate with the skills of other figures. Moreover, the digital world spurs new investigations towards the limits of all those intangible, unstable, and precarious factors that relate to the perceptivephenomenon, developing influences and cross-pollination that blur the boundaries of the search between art and design.

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