Broken colour in a modern world: chromatic failures in purist art and architecture

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Modern colour is free colour. Nineteenth century science liberated it from its longstanding submission to form, transforming it into a free-floating matrix of sensory effects. And yet, in the early modern art and architecture of Purism, this freedom was for the most part disavowed. The article charts the ways in which experimental aesthetics and psychophysics atomised colour into sensory fragments, connecting this research to the role of colour in the art and architecture of Purism, consisting of Charles-Édouard Jeanneret and Amédée Ozenfant. Within the Purist approaches, the article argues, one finds the epitomisation of the ongoing effort to deny and systematically re-organise colour into new formal systems of meaning and control. However, the article concludes, these efforts fail, not due to any glorification of achromatic white but, rather, because colour always manages to break free of formal and technical systems of control.

"If there is anything that typifies today's educated philistine, it is his fear of colour…Colourlessness is the mark of education, white like the Europeans' skin! Civilized people of our climes look down on chromatic art and chromatic architecture…Where Europenaness ends, that's where the beauty of the world begins."

– Adolf Behne (1919)

The colour problem

Colour is often seen as a destructive force that flies in the face of clean and efficient norms, evading attempts to control or master it. The story of colour in modern architecture is a story of failure; not for colour, but for architecture. For the modern architect, colour signifies a fast falling decline into that savage state of non-civilisation that history and Western European culture has worked so diligently to lift itself up and out of[1]. While it is emphatic, modern architecture's disdain for colour is by no means unique. Such chromophobia, as David Batchelor coins it, is common not only to Western architecture but also to the entire history, philosophy, and ideology of the West.

Battles against colour also tend to rear their head in times of social and political unrest, one primary example of which is modern architecture in the interwar period, which I will return to shortly, or the *colore* (colourism, or, brushstroke) and *disegno* (line, form, or design) debates, which came to a head during the height of the Italian Renaissance. Colour is also shunned as deceptive because "it" is at once nowhere and everywhere. Colour has no object and yet it is primary in our relation to, and experience of, the world.

This is why colour must be approached through multiple registers including history, culture, and systems of distribution and innovation [2]. This article begins in the nineteenth century science, when colour was seemingly freed from its longstanding subservience to form into an otherwise incoherent flux and flow of sensory stimuli called perception or, what in the nineteenth century was construed as one's subjective reality. And yet, no sooner did this occur than new strategies emerged in modern psychology, industry, art, and architecture to rein it back into an objective ordering system. The way in which this interdisciplinary re-organisation occurred in the early and mid twentieth-century offers insight into the nature of colour and its problematic relation to the built environment.

The article explores this process within the specific context of Purism and, unlike other contemporary architectural analyses of colour, this article embraces the unique unions between science and art – also uniquely framed through the lens of colour – throughout the Purist endeavors. Founded by Charles-Édouard Jeanneret (Le Corbusier) and Amédée Ozenfant, Purism theorised the use of colour in art and archiecture in the first few decades of the tweniteh century. In part one, the article delineates the origins of fragmented colour in experimental aesthetics and psychophysics, after which it shifts into the overlaps between these modern scientific approaches to colour and colour in the work of Purism. The article demonstrates that colour in the work of these two modern architects does have a history, albeit an often unacknowledged and problematic one, subsumed within an otherwise aggressive and austere program to re-create formal systems of meaning and control. This analysis is presented in a trajectory: from the most militant and chromophobic colour techniques in Purism to a colour friendly architectural polychromy, trumped only by the strange yet prescient turn to full spectral colours in the late life and work of the once-militant Purists: Le Corbusier and Amédée Ozenfant. The article concludes that colour needs form, and form needs colour, however difficult their relationship may be.

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[1] Modern art and architecture refers to the art, architecture, and literature produced at the end of the nineteenth and first half of the twentieth century. It refers to a style whereas the "modern era" refers to a broader historical period that, arguably, began with the Renaissance and continues through the present. Moreover, the modern style is a part of the modern era where, as Jonathan Crary has indicated, one finds a post-historical era caught in the continual production of the "new" which, in the end ensures that things always stay the same [1].

Partitioned world

If modernisation is defined as the process of continually expanding and creating new needs, demands and technologies, then it must also be seen as inextricably bound to both industrial capitalism and corresponding shifts in human subjectivity. Through the introduction of the assembly line and Taylorization[2], intrinsic to market capitalism in the nineteenth century, the massive fragmentation of objectivity, perception, and lived experience ensued. The rapid and hyper-efficient logic of industrial machines, complemented by the laws of supply and demand, also extended to numerous spheres of public and private life, including new communication systems like trains, cinema, motorcars, and newspapers, and a dramatic rise in urban populations. As a result, incredible demands were placed on perceptual and physiological life that for the first time surpassed the human[3] [3-4]. In terms of architecture, new streamlined "machines for living" meant houses and buildings could be developed with central heating, freeing the walls from heavy drapery and insulation, which in turn, opened up new questions about colour. How this question was answered, for Le Corbusier at least, was not by a simple turn to white, as is often believed, but instead, with the development of an architectonic colour theory that derived from nineteenth century experimental science[4].

Johann Wolfgang Goethe's benchmark 1810 Zür Farbenlehre (Theory of Colours) advocated a polemic against Newton's 1704 colour theory, which posited that colour exists as an external and physical, objective quality. At first Zür Farbenlehre was lambasted within the scientific community, but by the second half of the nineteenth century, pioneering psychophysicists Gustav Theodor Fechner, Ernst Heinrich Weber, Hermann von Helmholtz, Johannes Müller, James Clerk Maxwell, and Thomas Young came to accept many of Goethe's claims for the primacy of subjective perception, with secondary links to objective (chemical) colours. While a more comprehensive analysis of this work must be conducted elsewhere, suffice it to note here Goethe offered a radical new theory of colour that began with the colours of subjective perception (such as halos and after images), from which he then extrapolated and developed into broader claims about colour and its particular, mysterious ordering systems.

However, no sooner was the subject's body identified as the new source of subjective knowledge than it was also removed and abstracted from the world. In pursuit of an "ideal subject" of vision, perceptual processes were isolated and abstracted for rational observation and calculation. Much of this turned on Fechner's Weber-Fechner law, which supposed a 1 to 1 quantitative logarithmic relationship could be established between a stimulus and a corresponding sensation. Through this law the mind could connect to the body, or so it seemed. The body, which is certainly material, was also the only way in which psychophysics could gain access to the interior. Externally administered stimuli were, through 1:1 extrapolations, presumed to correspond to an internal sensation. As Fechner puts it, "The fundamental experiences in the entire field of psychophysics…is connected to the functioning of the mind only by the mediation of the physical world." [6]. Externally measured responses offered new truths about internal experience [1].

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[2] This refers to the process developed by Frederick Winslow Taylor.

[3] Also see Walter Benjamin's essay "On Some Motifs in Baudelaire," which offer a poetic snapshot of these changes.

[4] Wigley effectively deconstructs the false "whiteness" in Le Corbusier's chromatic oeuvre, demonstrating that colour has not only been with him all along, but also, that white exists as an effect of colour. White "is the control of colour, the strategic position of certain colours on certain surfaces that evokes the effects of white" [5].

When it came to experimental aesthetics, developed within the context of psychophysics, colour was also analysed in terms of atomic units used to measure sensory response and create an ideal aesthetic science. Here Fechner took his lead from the work of German psychologist Adolph Zeising, who had previously argued that the numerical relation of the golden mean was an *a priori* universal principle of the harmony of nature and art [7-9]. French philosophers Charles Lalo and Charles Henry also took to experimental aesthetics and both published in early issues of the Purist magazine, *L'Esprit Nouveau*. Lalo wrote his 1908 dissertation, *L'esthétique Expérimentale de Fechner*, on Fechner's research [10], while Henry had been working in the field since the end of the nineteenth century and his *Sensation et énergie* (1910) had a substantial effect not only on the Purists but also on their archenemy: the Neo-Impressionists [11-12]. For Henry, as for Fechner, sensory experience was primary, but after this baseline commonality, they abstracted their data to analyse it in terms of quantifiable algebra. Like Zeising, Henry also went so far as to propose an underlying mathematical basis to all humanity so that when one saw a so-called perfect form, a kind of universal bell would ring indicating one had witnessed ideal beauty [13]. Such theoretical ideas and ideals soon migrated into art and architectural practice.

Purism

Purist founders Charles-Édouard Jeanneret (1887-1965) and Amédée Ozenfant (1917-1925) met in Paris in 1917, after which they began an intense professional collaboration and close friendship. The bulk of their work consists of writings, paintings, and architectural projects made between 1918 and 1925 by Jeanneret and Ozenfant (Figure 1), with occasional contributions from Fernand Léger. Purism can be defined alongside, and in contrast to, a number of modern aesthetic movements, all of which emerged in response to the social and political conditions in Europe, and especially in Paris, after the First World War. At this time, a new streamline and mechanised aesthetic became both a style and political tactic to distance oneself from the excessive décor, ornament, and decorative techniques of the nineteenth century, alongside their equally heavy traditions and bourgeois ideology.

Figure 1: Amédée Ozenfant, Le pot blanc (1925), 151.5 × 176.5 cm. Light and dark contrasts are used to build architectural-volume within a two-dimensional plane. Image courtesy of © 2014 Artists Rights Society (ARS), New York / ADAGP, Paris.

The Purist ideas were articulated in Jeanneret and Ozenfant's first book, *Après le Cubisme* (1918), the first Purist exhibition held at the Galerie Thomas in Paris in 1918, and eventually in a series of articles in the magazine *L'Esprit Nouveau*, founded by Belgian writer and poet Paul Dermée (1886-

1951). The goal was to synthesise classical art, painting, sculpture and architecture. After Dermée exclusively edited the first three issues, the first appearing in October 1920, Jeanneret and Ozenfant came on board as editors and contributors. It was also at this time that they took on pseudonyms, one of which was "Le Corbusier," based on Jeanneret's mother's maiden name [14]. By 1924, Le Corbusier and Ozenfant left the magazine. They had become critical of Dermée, who appeared in Dada manifestos which the Purists disliked, despite the fact that Ozenfant subscribed to them [15].

Purism dealt in austere geometric forms, which they used to achieve a highly reductive and so-called pure universal aesthetic inspired by industrial machinery (see Figure 2). In other words, in a marked rejection of Cubism's multiple points of view and the Neo-Impressionists' attention to perceptual variations in light and colour, the Purists sought an objective portrayal of everyday mass-produced objects by way of necessary geometric form [16]. Cubism lacked this necessary and essential "narrative aspect," they argued and thus there was "no difference whatsoever between the aesthetics of a carpet and that of a Cubist painting." [17]. Even Fernand Léger, whom they worked closely with on early issues of L'Esprit Nouveau, held an approach to architectural colour that they soon dismissed as too "ornamental" and thus un-modern.

Figure 2: Le Corbusier, Still life. Objects are reduced to essential forms and volumes, also believed to correspond to a universal law of harmony. Image courtesy of © F.L.C. / ADAGP, Paris / Artists Rights Society (ARS), New York 2014.

For all its militant hipness, however, Purism undeniably labored strains of neoclassicism. For instance, like Lalo and Henry, they insisted on achieving a correct and decisive way of working with pure geometric forms. A work of art, they argued, "should induce a sensation of mathematical order, and the means of inducing this mathematical order should be sought among universal means." [9, 18]. By reducing everyday objects to their so-called objective form, an image could achieve a harmonic resonance, or invariability that triumphed chance and romantic impulse. In *Après le Cubisme* they write: "The need for order is the most elevated of human needs; it is the cause of art itself." [19]. Especially appealing in Lalo and Henry's approach to experimental aesthetics, for the Purists, was their adherence to a Fechner-esque empirical analysis "from below". That is, measuring empirical sense impressions and then quantifying them in the Fechner-Weber formula which could then be extrapolated into other scenarios, like art and architecture. The highest delectation of the human mind, they insisted, is the perception of order [20]. In short, Purism simultaneously straddled modernist impulses and neoclassical ideals: the effort to streamline form and space, as machines did, guided by the classical axioms of universal law, balance, and harmony.

Purist colour

In classical chromophobic style – defined here as the restricted use of colour to muted tones or primaries, or the subservience of colour to primacy of line and form – colour for Ozenfant and Jeanneret belonged to the realm of disorder. In *Après le Cubisme* they write:

> "The idea of form precedes that of colour. The form is preeminent, colour is but one of its accessories. Colour depends entirely of the material shape: the concept of a sphere, for instance, precedes the concept of colour; it is conceived as a colourless sphere, a colourless plane, colour is not conceived independently of some support. Colour is coordinated with form, but the reciprocal is not true. We believe, thus, that a theme should be selected for its forms and not for its colours." [17, 21].

Numerous articles published in *L'Esprit Nouveau* between 1921 and 1924 support this view. At the same time, the prioritisation of form did not make them Platonists outright, as is often believed. Rather, the Purist colour aesthetic, as with psychophysics and experimental aesthetics, consisted of a combination of the empirical and the mathematical.

For colour, the program was to deploy it in the service of transforming a two-dimensional space into the illusion of a three-dimensional one, without recourse to classical perspective. Through the careful and controlled use of light and dark contrasts – chiaroscuro – they could use colour to imply depth. To clarify, they did not reject colour out right, but rather, assigned a highly specific role to it. Thus black and white, the most dramatic and volume-building hues, became primary colours in their depiction of architectural volumes in both two and three-dimensional space. At the same time, the predominance of black and white has led many to incorrectly believe that they abandoned colour altogether [5, 17, 22]. To the contrary, the Purists developed an entire theory of architectural colour.

Figure 3: Le Corbusier, reconstruction of the Pavillon de L'Esprit Nouveau, Bologne, 1977, exterior view. Image courtesy of © F.L.C. / ADAGP, Paris / Artists Rights Society (ARS), New York 2014.

Like black and white, colour was permitted into Purist aesthetics by way of its relative ability to serve as an architectonic rendering mechanism. These volume building colours were first identified in what Ozenfant and Jeanneret termed the large gamma or major scale, which consisted of complex, muted, and "lesser-chromatic" colours like "yellow ocher, sienna natural, sienna burned, ultramarine blue, white, black...and certain of their derivatives." [23]. These hues were strong and stable, lending unity and balance to a space, as evidenced in Le Corbusier's *Pavilion de L'Esprit Nouveau* (1925) as

shown in Figure 3, an updated version of his Maison Citrohan from 1922, exhibited in the International Exhibition of Modern Decorative and Industrial Arts (planned for 1915 but pushed back until April 1925).

It is crucial to acknowledge that the Purist theory of architectural colour is essentially un-modern. Note first the way in which the hues in the major scale are "natural" colours, or at least ones that simulate nature through synthetic means. Earth tones like ochers, sienna natural, or sienna burned are the colours of the past, not the early twentieth century when the industrial and chemical production of synthetic hues had been prospering across numerous culture industries. This is also why the major scale must be seen in contrast to colours like fuchsia, purple, and synthetic indigo which were indisputably more modern colours, having emerged from the synthetic dye industry just before the turn of the century and promptly integrated into Impressionist and Neo-Impressionist palettes [24]. Rather, for Purism, these modern colours – the colours of Delacroix, Cezanne, and the Impressionists – were to be distrusted as they yielded to a faddish "attractive offer of colour" with "no possible effect of great painting". Modern colour was mere décor: "Let us leave to the clothes-dyers the sensory jubilations of the paint tube." [19]. Second, because the colours in the major scale were selected for their volumetric qualities, i.e. warm and cool contrast which could be used like black and white to advance or recede in space, they again relapsed into classical techniques like chiaroscuro, that denied more modern tendencies to use colour to induce flatness or to deny depth.

This strange rejection of modern colour within an otherwise modern project is further evidenced in the second two colour scales. After the major scale came the brighter, dynamic scale, which contained colours of a "disturbing" nature like citron yellow, oranges, vermilions, and other "animated" and "agitated" colours. The dynamic colours created a feeling of movement, which one may presume is particularly modern attribute but, within the confines of Purism, it was instead considered dangerous because harder to control. The third and last scale was the "transitional scale" which included "madders, emerald green, and all the lakes, which have the properties of tinting." These colours were also "disturbing" as they lacked building properties or, the capacity to construct volume. The further one drifted down the scales, the more one moved away from the architectural aesthetic proper and instead towards the "aesthetic of printed cloth," which is to say, mere ornamentation. So while colour was messy and aberrant, certain colours were useful to Purism, insofar as they aided in the controlled construction of volume and form. Just as the Purists pared down objects like wine bottles and pipes to their essential and so-called architectonic-forms, so too was colour [24].

There is also a minor but not insignificant distinction to be made between Purist architectural colour, a term that mainly applies to Le Corbusier's work between 1922 to 1927, and colour in Purist painting. When painting is introduced in the interior, the Purists argued, it cast a hole in the wall that broke the unity of space and form, and thus painting should be kept separate from architecture [25]. However, when architectural polychromy was used on the interior, each wall should assume only one single chromatic hue and this hue would be determined by its capacity to contribute to the *gesamtkunstwerk* of the architecture. Moreover, this colour could assume no set or representative signifying function: a blue indicated only another plane borne from within the space. In contrast, in Purist painting, a blue bottle indicated the bottle, and a grey pipe; the pipe. Colour was not permitted on the exterior either, as it would actively destroy or "camouflage" the purity of the structure [26-27]. The Purist theory of architectural colour was thus as highly restricted, if not more so, than colour in Purist painting, in terms of both hue and application. Further, the notion that painting and architecture should be kept separate directly defies the earlier *L'Esprit Nouveau* mandate to synthesise the arts. Such a contradiction, as I will show in the last part of the article, is typical of Ozenfant and Le Corbusier, given their embrace of spectral colours late in life.

Colour thus played an ambivalent and paradoxical role in Purism. On the one hand, they recognised it as essential to form: "A painting cannot be made without colour." At one point they even observed colour as prior to form: "When one says painting, inevitably he says colour... colour has properties of shock (sensory order) which strike the eye before form." [23]. On the other hand, they clung to old world values of *disegno* where colour fell second to form. "In the expression of volume, colour is a perilous agent, often it destroys or disorganizes volume..." [23]. Regardless, from the heart of this ambivalence emerges an inadvertent admission of colour's power[5].

System failure or colour's return

Le Corbusier, Après le Purisme

In *Après le Cubisme* (1918), Jeanneret argued that form preceded colour. In *Vers une architecture* (1923), colour was not even mentioned. By the 1930s however, his views had dramatically shifted, as illustrated in a comparison between his otherwise disregarded two sets of Salubra wallpapers. The first set, from 1931, consists of 43 differently coloured samples that clearly deviate from the major scale, but nonetheless remain within the range of earth tones [28]. In contrast, the second set from 1959 contains an almost full spectral range of rich, saturated hues including blues, oranges, rich reds, pinks, greens and yellows, bookending his full embrace of spectral colour in the post-war period [24] (see Figure 4).
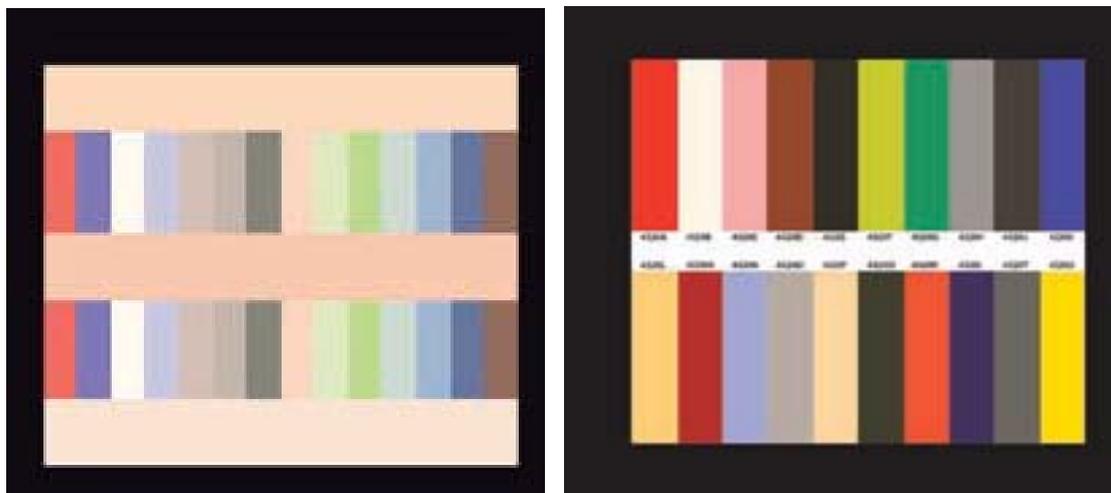

Figure 4: Le Corbusier. Left – keyboard no. 11 from of the first Salubra Wallpaper set (1931). Right – sample from the second Salubra Wallpaper set (1959). In comparison, one sees the adoption of a fuller and more saturated gamut in the second (right-hand side) set. Image courtesy of © F.L.C. / ADAGP, Paris / Artists Rights Society (ARS), New York 2014.

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[5]The Purists were not alone in their constructive use of modern colour. De Stijl, Russian Constructivism (for instance, Alexander Rodchenko's 1921 triptych, *Pure Red Colour, Pure Yellow Colour, Pure Blue Colour*), French and German Expressionism (heralded by colour-positive critics like Adolf Behne), and the Bauhaus, all influenced Purism, despite the latter's haphazard acknowledgment.

Jeanneret's turn to colour was also made explicit in "Polycromie Architecturale," a text written in the 1930s to accompany the Salubra wallpapers but not published until after his death in 1965. In it Le Corbusier returns to Léger, quoting his claim that "Man needs colour to live, it is just as necessary an element as water or fire." [29]. The article goes on to argue that colour is as powerful an instrument of architecture, as are the plan and the section. What was once a disdain for and drive to suppress had now become a passionate lyricism: "Architectural polychromy seizes the entire wall and qualifies it with the powerful throb of the blood, or the freshness of the prairie, or the glow of the sun, or the depth of sea and sky... colour is the very element of the plan and the section." [29]. Examples of colour abound in his work and architectural endeavors hereafter.

To note only a couple of instances, consider Le Corbusier's *Pavilion des Temps Nouveau* (1937), a polychromatic spectacle with a red-painted canvas backdrop, a green wall on the left hand side, a grey one on the right side, an entrance painted in blue, a roof made of translucent yellow materials, and a floor of yellow gravel [28, 30-31]. Perhaps the most dramatic moment in this shift occurred en route to Chandigarh in November 1951. In celebration of the brilliant hues observed in a rising sun through his window, he drew a corresponding free form, Impressionist-like sketch [32] (Figure 5). This image is remarkable as there is not the slightest trace of geometry or form beyond what the colours themselves imply (Figure 6). Also, one of the last structures built by Le Corbusier is the eccentric and highly experimental Phillips Pavilion in Brussels in 1958, wherein colour was not only allowed free reign without adherence to form, but also, appeared in piercing and luminous *electronic* form [32]. Contrary to common associations with Le Corbusier's white, après le Purisme, he came to insist on nothing less than "extreme physiological perceptions of volume, surfaces, contours and colours [which] together led to [an] intense lyricism." [31]. Brilliant spectral colours had become integral to his life and architecture. Moreover, it is fascinating to note that he, like Ozenfant, encountered and embraced colour early in life. For Le Corbusier, this occurred while on a *Voyage d'Orient* in 1914, and for Ozenfant, on a trip in Switzerland in 1916. However both then promptly disavowed these colours in their Purist phase, only to return to them later in life [36].
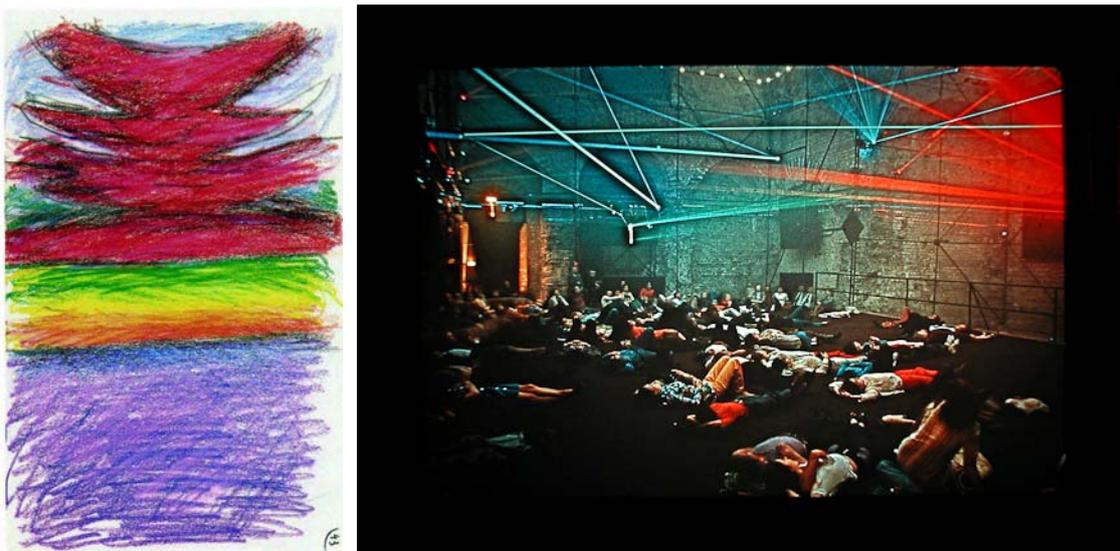

Figure 5 (left): Le Corbusier, sketch 361 vol. 3 1954-57. Later in life, Le Corbusier turns to brilliant spectral colours. Image courtesy of © F.L.C. / ADAGP, Paris / Artists Rights Society (ARS), New York 2014.

Figure 6 (right): Le Corbusier and Iannis Xenakis, Poeme Electronique for the Phillips Pavilion at the Brussels World Fair (1958). Image courtesy of © F.L.C. / ADAGP, Paris / Artists Rights Society (ARS), New York 2014.

Ozenfant's chromatic turn

As for Amédée Ozenfant, in the 1930s he published a series of articles on architectural colour demonstrating that he too had completely repudiated his Purist standpoint from 1918 and failed to follow Le Corbusier's early transformation of colour in architecture. He instead adopted a more practical approach to colour, inspired by none other than former Purist enemy: Neo-Impressionist Paul Signac.

Ozenfant met Signac back in 1914, when he was driving alongside a country road in the Alps and encountered Signac painting alongside the road. They conversed on the topic of colour and painting but not until years later did Ozenfant return to these lessons, adopting Signac's pointillism, premised on subjective colour and optical blending [16]. This approach to colour did not originate with Signac however but rather from what Signac learned from French chemist Michel Eugène Chevreul (1786–1889).

Chevreul worked as a superintendent in the dying Department of the Manufacture Royale des Gobelins, the national tapestry workshop in France. When he became director in 1824, he quickly identified problems with the intermixing of colours in the weaves' warps and wefts, colour fading, and brilliance. He observed the way in which colours frequently faded into each other, not because of the dye but because of what he termed "simultaneous contrast" wherein one colour was affected by its neighboring colour and as a result, there was an overall shift in both hues. In other words, the colour problems were due to optical mixing not the chemical nature of the dyes [37].

Chevreul's observations drew on Goethe's subjective theory of colour, as well as the work of nineteenth century psychophysicist James Clerk Maxwell and his theory of spinning discs, which offered an engaging and convincing theory of the way in which coloured objects, when spun, produced the sensation of colour mixing in subjective perception. (This is also the principle used in electronic screen display, which essentially consists of red, green, and blue dots, or, phosphor traces.) This research, complemented by Chevreul's practical applications, became central to Impressionism and eventually Ozenfant, as elaborated in his 1937 theory of Colour Solidity.

Through optical mixing, Ozenfant now argued, one could increase colour brightness and illumination [16]. He proposed colour contrasts be used to visually solidify colour power, therein enhancing architectural form. Three rules governed his theory of colour solidity:

1. Very bright [*éclatant*] hues are less solid chemically (and generally also appear less solid) than more neutral hues.
2. In the same pigment the most intensely [pure] pigmented colour is the most solid chemically (and psychologically). A pink obtained by adding red to white is less solid in "feeling" and in duration than red.
3. Clear [translucent] hues are generally more fragile than somber ones [16, 38].

His theory prioritised saturated hues, while it also merited the psychological and the material-chemical aspects of colour. Colour was its material substrate just as much as it was its hue and corresponding sensory response. In this way, Ozenfant's theory of Colour Solidity was truly unique, and perhaps it is also for this exact reason that it has been marginalised (Figure 7).

While living in London in 1932, Ozenfant opened a school of architecture called the Académie Ozenfant where he taught his theory of architectural colour and advised students to treat colour "As if in fact there were a natural relationship between the actual fragility of pigments and their effect on our

intuitive psychology."[6]. His dual focus on the objective and subjective effects of colour is ultimately what allowed him to articulate a theory of virtual architectural colour. If "any of the more complex or more brilliant colours could be obtained by using simultaneous contrast with stable dull paints," then colour could feasibly be said to exist on a "virtual" plane. And thus his primary rule of solidity became: "A 'virtual' tint is always more attractive than the same hue in reality." In a full turn, architectural colour had become an experience, far from any absolute or supposedly objective form[7]. Broken and reassembled, modern colour entered the heart of modern architecture.

Figure 7: William Braham's digital reconstruction of Amédée Ozenfant's living room / colour laboratory in his London apartment. Image courtesy of William Braham.

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In closing, both the Purists' early appeal to formal absolutes and their post-Purist turn to subjective colour stemmed from two different aspects of psychophysics. The former came from Gustav Theodor Fechner's, Charles Lalo's and Charles Henry's quantified model of perception, while the latter came from Chevreul's theory of subjective colour mixing, which itself drew on the work of Fechner, Hermann von Helmholtz, Johannes Müller, and James Clerk Maxwell. However, in early modern architecture, these two streams remained separate. The Purists chose the side of geometric order and rational form at the cost of colour, while the post-Purists chose subjective colour at the cost of ideal and objective form. To put it another way, the former entails a relation to colour based on quantitative criteria, reducible to a calculus of management and regulation. Here colour is ultimately disembodied and immaterial. In contrast, in the latter, colour is embodied and material, but it is also chaotic and without order. Why can one only choose one at a time?

Given colour's relentless ability to undermine any ordering system that attempts to control it, this divide becomes logical. On the one hand, the hard-lined modernist approach, while progressive, was doomed from the start. In denying the power of chaotic colour, which it had to do in order to maintain

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[6]In 1938 he opened up the Ozenfant School of Fine Arts in New York, to further the purist technique in the classroom and in 1944, he taught at the Black Mountain College, where colourist Josef Albers and architect and former Bauhaus director Walter Gropius were then professors.

[7]A similar argument can be made for Le Corbusier's colour in his "architectural promenade."

militant control, and only acknowledging so-called objectivity in a priori orders and ideals, Purist colour was fundamentally retrogressive, repressive, and un-modern. On the other hand, broken colour will in itself get one nowhere. A touch of this is evidenced in architect Bruno Taut's work, though it is ultimately epitomised in an arbitrary patch of Impressionist dots. In short, colour needs form, and form needs colour, however difficult this relationship may be. Both are required for a fruitful and rigorous architectural practice, as demonstrated in this article, producing a world that is appealing to critics, practitioners, and the people who inhabit these spaces.

And thus it becomes that much more remarkable to consider that this seemingly incorrigible divide may have in fact found a synthesis in the generally unacknowledged late work of Amédée Ozenfant. Like the late Le Corbusier, Ozenfant abandoned the use of Charles Henry's quantified model of perception and the pseudo Platonism of the Purist manifesto, in exchange for the pragmatic terms of colour in architectural space. He then pushed this further by returning to the origins of modern perception: the utter fragmentation and partitioning of reality into subjective experience, a move that ultimately freed colour from form, but also, made it a new tool and grammatical unit with which he used to develop his theory of colour solidity, a theory that combined the empirical, physiological, material, and abstract. Modern colour's encounter with architecture teaches its successors in the postmodern and beyond, where the impossibility of axioms and ideals is openly acknowledged, that broken colour lives in a broken world but, complemented by emerging styles and tenets in art, science, and architecture, there co-exists an ongoing drive to put it back together again[8] [39].

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[8]This article is the first in a series demonstrating how this re-ordering of broken and free modern colour is further challenged and ordered in post-industrial, informatic culture.

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