



Pointillism in History: The Metal-Dome Portrait of Mr John Marmond Halm, Ghana

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Abstract

This article traces the historical emergence of Pointillism from the scientific colour theories of Michel-Eugène Chevreul and Ogden Rood, through its systematic development by Georges Seurat and Paul Signac as chromoluminarism, to its diffusion across Neo-Impressionist and later modern art practice. It explores the theoretical connection between Pointillism, Divisionism and Neo-Impressionism and the perceptual and optical principles, additive versus subtractive colour mixing, on which this technique is based. The case study moves beyond painted dots to a contemporary, practice-based project: a portrait of the Ghanaian art educator and metal artist, Mr John Marmond Halm, created not with paint but with hundreds of small, domed pieces of copper and aluminium sheet metal, laid over a leather substrate in a tonal-distribution pattern that echoes the Pointillist methods of separation. The tools, materials, and sequential organisation of the metal domes are documented and discussed photographically, and a new, more durable optical painting technique is reinterpreted in a metal medium in the context of West African art and design. The article concludes that Pointillism's underlying idea, the optical 'fusing' of individual units of colour or tone over a greater distance, is medium-independent and practitioner-independent, and has continued uninterrupted across almost 150 years through a succession of named artists in paint, glue, paper and metal, and recommends further experimentation in material and technique with the Pointillist method.

Keywords: Pointillism, Neo-Impressionism, Optical colour mixing, Metal-dome portraiture, Ghanaian metalwork

1. Introduction

Pointillism is part of a very limited style of painting that refers to a mark rather than a subject or a specific time (Owlcation, 2019) ^[20]. Pointillism is a technique that involves the eye and mind of the viewer to create the illusion of color, as opposed to mixing pigments together on a palette before applying them to a surface. A pointillist composition viewed close up provides a field of individual dots; from a distance of about 3 times the diagonal distance of the picture, as Hall (2002) ^[12] pointed out, the dots become visible as a coherent, luminous image and its colour seems to be more vibrant than that rendered from conventional pre-mixed brushwork.

It was an integral part of the broader movement, called Neo-Impressionism, which was initiated in 1886 by the French critic Félix Fénéon who described the systematic and scientifically motivated painting activity of Georges Seurat (Seurat, 1886; Britannica, 2018) ^[24, 7]. Seurat's emphasis on luminosity from the optical effects of colour rather than the dot as an independent sign was emphasised by his own term chromoluminarism, which he preferred to the word Pointillism (Signac, 1899/1964) ^[25]. Art historians have therefore made a careful separation between the theory of Divisionism of colour into its constituent parts, and the actual brush work of Pointillism, which involves applying the separated colour in the form of dots (Owlcation, 2019) ^[20].

This article has three purposes. The first is to sketch a very brief, well-referenced account of the historical development, theory, and central figures of Pointillism, setting it in the context of the broader history of portraiture and post-Impressionist painting.

The second is to assign to the movement a human face by focusing on the painters, contemporary artists and metalworkers whose personal preferences and lives have influenced the technique, one by one, over the last 150 years or so, from Seurat and Signac in 1880s Paris to the Senegalese, Australian, American and South Korean artists who are working with the dot in the 21st century (Rabb, 2025) ^[21], and to the named Ghanaian metal artists whose individual practice is the contemporary context for the case study of this article. The third, and most original, use was to look at a contemporary implementation of pointillist ideas using small domed pieces of copper and aluminium sheet metal, not painted dots, in the work of a portrait of Mr John Marmond Halm, a retired lecturer and goldsmith at Kwame Nkrumah University of Science and Technology (KNUST), Ghana (Golightly, 2020) ^[10]. The materials and tools used, and the construction sequence of this metal pointillist portrait, are illustrated in photographs throughout the article, and explained and discussed in relation to the historical and theoretical material in the preceding paragraphs.

2. Historical Development of Pointillism

2.1. Origins and Early Precedents

The name Pointillism is a relatively new term for the 1880s, but the concept of creating a picture by adding up small marks or dots is far more ancient. The dots and lines used to create images of animals, including horses, on engraved limestone tablets from the Aurignacian period in south-western France suggest, by some archaeologists, that it is an early form of pointillism, dating back to about 38,000 years ago (Owlcation, 2019) ^[20]. These prehistoric works are not examples of anticipation to optical colour theory of the nineteenth century, but they do certainly show that the dot, as a compositional unit, has a long history in the making of human image, even before its systematic scientific use by Seurat.

2.2. Georges Seurat and the Birth of Chromoluminarism

Pointillism is a modern method that can be attributed to Georges Seurat (1859–1891), who was a strict pupil of the École des Beaux-Arts in Paris, and a follower of contemporary optical science (Homer, 1964) ^[14] who preferred a more objectivist and scientific approach to colour selection than the Impressionists. In around 1884 Seurat started to develop what he termed 'chromoluminarism', which was based on the scientific writings of the chemist Michel-Eugène Chevreul (1839) ^[8] and the American physicist Ogden Rood (1879) ^[23] on the law of simultaneous colour contrast, which states that colours near one another in the field appear more intense than they actually are, and on his study of modern chromatics, in which he described how coloured light and coloured pigment mix differently. Together with such earlier pieces as *Bathers at Asnières* (1884, National Gallery, London), Seurat's monumental work *A Sunday Afternoon on the Island of La Grande Jatte* (1884–1886, Art Institute of Chicago) was the most famous example of the technique.

The popular image of Seurat as a painter of park scenes has been continually evolving in recent years thanks to curatorial and critical interest. An exhibition in 2025–26 at the Courtauld Gallery in London, bringing together his seascape paintings of the Normandy and Channel coasts, claimed that his calmer marine work was equally typical of his oeuvre as the more crowd-pleasing park scenes he is now remembered

for, and that it demonstrates 'the disciplined, dot-built stillness' on a 'smaller scale' (Thorsberg, 2026) ^[27].

In a related essay on the late nude studies of Seurat, the repeated, micro touches of colour are described as having the power to make the painted surface itself breathe or vibrate when studied at length, and the slow, meditative nature of Seurat's mark-making is emphasized (Marcum, 2026) ^[16]. This recent literature, read together, confirms a theme stated throughout the present article: that Seurat's peculiarity, his willingness to wait, his will to precision, his aversion to spontaneity, is not only characteristic of his personality, but is, in an important sense, inherent in the technique itself.

2.3. Paul Signac and the Consolidation of the Movement

Paul Signac (1863–1935), who was close to Seurat, succeeded him as the movement's major theorist and promoter when Seurat died young in 1891. Signac's *D'Eugène Delacroix au néo-impressionnisme* outlined from the technical and theoretical perspectives a method he termed Divisionism and Pointillism, which involved the careful juxtaposition of small, distinct areas of pure colour, and he explained the effect of these colour spots as relying on the eye and mind of the viewer in order to create a more complete range of tones when seen at the proper distance (Signac, 1899/1964) ^[25]. Signac's own paintings, like *The Papal Palace, Avignon* (1900, Musée d'Orsay), similarly employed more generous and harmonious colour combinations than Seurat's tightly controlled dots but were more decorative. In addition to Seurat and Signac, the main group of Divisionist artists included Henri-Edmond Cross, Maximilien Luce, and others, including Van Gogh and, at an early stage and briefly in their careers, Picasso, Mondrian and Kandinsky, who tried out the dotted mark but did not follow the complete Divisionist programme (Sotheby's, 2025) ^[26].

2.4. Diffusion Across Neo-Impressionism, Famous Pointillist and Neo-Impressionist Works

Seurat and Signac introduced it and it drew in other post-impressionist artists. Camille Pissarro used the same technique for several years prior to his return to a freer Impressionist style, while Henri-Edmond Cross and Maximilien Luce extended the idea to landscape and industrial and working-class scenes and subjects, and the Italian Divisionists, under the leadership of Vittore Grubicy de Dragon and later also including Giuseppe Pellizza da Volpedo, made a related but independent tradition of colour-separated painting (Rewald, 1978; Herbert, 1968) ^[22, 13]. Although the technique was only used by a handful of painters in a very literal sense, Pointillism had an even more disproportionate influence on the evolution of early modern art, being embraced first by the colour theory of Neo-Impressionism, then Fauvism and later by German Expressionism (Ward, 1996) ^[29].

The technique is well illustrated by a handful of key works that were consistently referred to in the literature, which also serve to help understand the visual nature of the technique. The best-known examples of the technique are Seurat's *Bathers at Asnières* (1884) at the National Gallery, London, and *A Sunday Afternoon on the Island of La Grande Jatte* (1884–1886) at the Art Institute of Chicago, and later, *The Models* (1888) at the Barnes Foundation and *The Circus* (1890–1891) at the Musée d'Orsay, which were unfinished at his death (Rewald, 1978) ^[22]. Signac used the same approach with a wider and more decorative dot as he did in his two

scenes of landscapes and sea scenes, The Papal Palace, Avignon (1900, Musée d'Orsay) and The Jetty at Cassis (1889, Metropolitan Museum of Art). Like Seurat, the small work *The Foundry* (1899, Kröller-Müller Museum) is often referred to as a typical example of Pointillism being used for industrial and working-class themes, rather than for leisure scenes (Herbert, 1968) ^[13].

2.5. Portraiture as a Genre and its Relevance to Pointillist Practice

It is helpful to place a brief note on Pointillism in the longer history of portraiture as an art genre for the case study followed by this article is a portrait. Public sculptures and paintings of rulers and deities have been found since the time of Ancient Egyptian, Greek and Roman civilisations, before anyone used any dot-based painting technique (Bendak, 2005; Briggs, Owusu, & Mensah, 2008) ^[2, 6]. The renaissance portraiture, as practised by such painters as Jan van Eyck, Leonardo da Vinci and Hans Holbein the younger, set many of the patterns for the individual likeness, pose, and characterisation that later portraitists, including those in a pointillist idiom, built upon (Homer, 1964) ^[14]. Seurat and his peers did not discard the portrait; rather, they continued to produce recognisable, often informal likenesses of sitters from their own social and artistic world, but they completely transformed the technical devices used to achieve likeness, replacing the brushwork of previous portrait practices with a technique of applied dots.

The link between this lineage and this case study, as discussed in Section 5 of this article, is that the sitter, Mr John Marmond Halm, is a named, historically documented figure portrayed for the purpose of institutional commemoration, but in a manner that is broadly continuous with the long tradition of portraiture as a means of honouring important figures, and specifically Pointillist in its logic of tonal separation translated into metal.

3. Theoretical and Scientific Foundations

3.1. Divisionism, Pointillism and Neo-Impressionism Distinguished

Three terms are often used in the same sense, but really mean different things: the three terms most closely associated with this body of work are the most common. Divisionism (also known as chromoluminarism) is a theory of painting that involves breaking down the colour into its component parts while depending on the viewer's perception to see the individual elements merge back together into an optical whole, rather than mixing the pigment itself on a palette (Encyclopedia.com, 2018) ^[9]. The kind of mark used to apply that separate colour to the surface is called pointillism. The overall movement, in which Seurat was a leader, and whose techniques involved a synthesis of Divisionist colour theory and Pointillist brushwork was known as Neo-Impressionism (Britannica, 2018) ^[7]. In principle a painter could apply Divisionist colour theory using square dabs, lozenges or short parallel strokes, but it is this particular choice of the dot as the unit of application which Pointillism designates.

3.2. Optical Mixing versus Pigment Mixing

The perceptual foundation of Pointillism is based on the difference between additive and subtractive colour mixing. However, the additive process of combining red, blue and green comes close to white light, whereas paint is subtractive:

adding colours on the palette will lighten and/or darken the colour (National Gallery, 2019) ^[19]. Making small, unmixed spots of pure colour next to each other and seeing the colours merge in the eye, Pointillists wanted to create an approximation of an optical, quasi-additive mixture of colour, one that achieved a greater retention of the original brightness of individual colours than a subtractive palette-mixed mixture could have. The effect is sometimes likened to the four-colour (CMYK) printing process, in which at normal reading distance, the tiny dots of cyan, magenta, yellow and black combine to simulate the impression of a continuous, full-colour image (Blake, 2001) ^[4].

This foundational assertion has been undermined by more recent critical and scientific discussion, but not repudiated. In fact, in *"Beyond Every Art"* (2026) ^[3], a reassessment of the technique argues that the 'true' optical mixing (in the strict sense of the additive sense that Seurat claimed he was achieving) does not happen quite as cleanly as his theoretical writings suggest, but rather a more complex interplay of genuine small-scale optical mixing, simultaneous-contrast effects between adjacent hues, and the limitations of the eye's spatial resolution at typical viewing distances creates the vibrancy of a pointillist canvas. The fact that this nuance is shared with the broader ongoing scholarly interest in the study of colour perception, which has been for over a hundred years an active field of vision science, is interesting: A 2023 editorial survey of contemporary research in colour science observed that even the most basic stages of colour perception are not yet fully understood at a neural level, and that the study of colour science has descended in part from the same sources as those on which Seurat originally relied, namely the nineteenth century (Lin, Xu, & Liu, 2023). The important thing to note for the purposes of this article is that the scientific novelty statement of Pointillism is now a fertile simplification and is not yet a proven fact; and that the perceptual efficacy of pointillism does not require that Seurat's own nineteenth-century optics theory be completely accurate.

3.3. The Role of Viewing Distance

One of the major themes in the literature of Pointillism is that the technique can only 'resolve' at a distance, which is normally quoted as three times the diagonal dimension of the composition (Hall, 2002) ^[12]. When viewed up close, the individual dots are still identifiable and the image can seem fragmented, or even abstract; when viewed from farther away, the same dots merge into a continuous tone and form. This legibility that is dependent on distance is not a side-effect of the technique, but is, in an important sense, its hallmark: the object of a pointillist work is less significant than the dots and the unified image they can create when viewed properly, as Hall (2002) ^[12] notes.

3.4. Materials, Practical Constraints in Traditional Pointillism, Contemporary Reception and Critical Legacy

Most historical Pointillist painting was done in oil, which is relatively thick, slow drying and has a tendency to resist running or bleeding out between adjoining dots, a resistance which enabled painters to produce a sharp and distinct mark more commonly seen in watercolour (Blake, 2001) ^[4]. A further consideration of the physical demands of Pointillist painting should also be noted, since each dot must be applied

individually, and in a specific, planned arrangement with its neighbouring dots, a very time-consuming process and a similar constraint to that of the unit-by-unit assembly process in the metal case study in Section 5 (Golightly, 2020) ^[10].

The students will comprehend an unknown word by using context clues. The students will understand an unfamiliar word from the context.

The critical response to Seurat's and Signac's canvases painted in a systemized approach to color and brush stroke was often disparaging, and the word "Pointillism" was even reported to have been coined by hostile critics, not as a self-descriptive term for the artists (1886). The reputation of the technique, however, began to change in the next few decades, and the Neo-Impressionist movement was seen as one of the most significant and progressive of the early 20th century linking Impressionism and the different currents of modernism (Britannica, 2018) ^[7]. The colour-theoretical principles that Seurat established were especially fruitful and influenced other modernist movements such as Fauvism and German Expressionism, even in cases where their own painting style had little in common with his masterful use of dots (Ward, 1996) ^[29].

This positive trend in negative reputation has persisted through the 10th century and onward. Recent long-form criticism and exhibitions, such as the Courtauld Gallery's presentation of his little-known seascape showings in 2025 and 2026, have continued to pay more attention to individual Pointillist paintings than to historical curiosities, treating them as objects worthy of prolonged and even meditative scrutiny (Thorsberg, 2026; Marcum, 2026) ^[27, 16].

Meanwhile, across the globe, the technique has been taken up by a new generation of individual named artists, in Senegal, Australia, South Korea and the United States, and applied in ways that are quite different from those of Seurat identity, memory, ecological anxiety, historical erasure that rely on the same perceptual mechanism that Seurat first formalised (Rabb, 2025) ^[21].

Such a path, from mockery, to becoming a classic, to again becoming relevant to the contemporary, is a salutary reminder that the initial critical reception of a technique is not necessarily a good indicator of its eventual art-historical significance, and not least for practice-based experiments, like the metal-dome portrait discussed later in this article, which move against the grain of the material vocabulary of an established technique.

4. Pointillism beyond Painting: Reinterpretation of the Technique in Metal

It is chemical in nature, depending on the arrangement in space and relative tone of the discrete marks, which makes it possible to translate it in principle into other materials. The traditional Pointillist method is to juxtapose dots of oil paint to create a sense of visual blending, and the same sort of optical effect can be obtained with any unit that is small enough, tonally differentiated enough, and arranged with such a discipline: with the printed dot of ink in commercial reproduction, with the hand-rolled paper squares in Ilhwa Kim's contemporary wall works (Section 2), or in the case study examined here, with small domed units of sheet metal (Golightly, 2020; Rabb, 2025) ^[10, 21].

In a recent case in Ghana, direct material translation has been observed. The goldsmith/metal-product design practice created a portrait of Mr John John Marmond Halm, a long serving lecturer at KNUST, by pressing hundreds of small domes from copper and aluminium sheet, each of which acting as a 'Pointillist dot'. (Golightly, 2020) ^[10]. Copper and aluminium were chosen mainly for their cost, malleability and durability compared with more traditional painting materials like oil colour on canvas or pencil, which are more easily damaged by fading or wear over time. The rest of this section is illustrated with photographs of the working process, and shows how the principle of the pointillist separation of the tonality was applied in this type of metal medium. This is a simple step that can be easily forgotten in many cases. This is a very basic aspect that is often overlooked.

4.1. Reference Image and Tonal Separation

Like traditional Pointillism, the making of the metal portrait started with a careful selection and computer editing of a portrait of Mr Halm taken from a source photograph; the artist first had to break down the image into a few distinct tones, then apply the coloured dots. The image selected was posterised, which is to say it had many fewer tones than the original image, and the tones of the image were not graduated but had abrupt leaps between the tones (Merriam-Webster, 2018) ^[17]. It is the same as a Pointillist painter before he puts down any dot at all, deciding on the number of discrete hues and tonal values he will use to create form, light and shadow over the face and figure.



Fig 1: The posterised reference portrait of Mr Halm, reduced to dark, mid, and light tonal zones.

This stage cannot be underestimated: as in painted Pointillism, where the effect of the optical blend was determined by a consistent, carefully prescribed system of colour and tone decisions that were made beforehand, the fidelity of the likeness of the metal portrait was just as dependent on setting the tonal boundaries at the beginning, before a single dome was placed in position.

The dots are now fabricated by doming the metal.

4.2. Fabrication of the Dot-Equivalent: Doming the Metal

The metal counterpart to a painter's dot had to be

manufactured through a special forming process. The copper and aluminium sheet was first annealed to decrease its hardness, then milled to approximately 0.3 mm to 0.5 mm working thickness, and finally pierced into small discs and domed with a doming block and a set of doming punches using a hammer for each disc (Blogringsting, 2011) ^[5]. The doming block and punch used in this stage is shown in Figure 2, while a bunch of finished aluminium domes are shown in Figure 3, which are the so-called 'dots' from which the portrait was formed.



Fig 2: Doming block and punch used to raise flat discs into domes.



Fig 3: Finished aluminium domes, the metal equivalent of a Pointillist dot.

4.3. Arranging the Domes: Optical Blending in Three Dimensions

The domes were then placed by hand, starting with the lightest tonal areas and ending with the darkest, and adhered to a synthetic-leather-covered plywood support using super

glue This arrangement stage is depicted in figure 4, with copper domes being carefully positioned along the traced lines by means of tweezers, which in this medium can be compared to the fine brush of a Pointillist painter to position each dot of paint with accuracy.



Fig 4: Copper domes placed by hand along a traced contour, using tweezers.

Dark tonal areas (mainly the hair, eyebrows and deep shadows) necessitated another colouration process using plain copper and aluminium domes. Others were chemically treated: through a heated solution of caustic soda, sulphur and water, followed by a weak acid pickle that turns the surface

of copper black. This spraying process is documented in figure 5, and as in painting by a Pointillist, it is the way that the painter draws in on the canvas by adding more saturated dots of dark colour in place of actually mixing black pigment on the existing paint.



Fig 5: Masked domes being spray-coated to darken a defined tonal region.

4.4. Building Complex Tonal Transitions

The most challenging parts of any portrait, whether it's done in dots of pigment or domes of metal, are the sections with multiple gradations in a limited space like the hairline, the eyebrows and the modelling of the eyes. This is the point at which the artist is using a tweezer to work with the individual domes; in this case, there are a myriad of copper domes mixed

with part-oxidised domes, working to fine-tune the passage between neighbouring tonal areas, as seen in figure 6. In painted Pointillism, the most time-consuming and challenging aspect of a composition is the finetuning of dot density and colour at the junction of two tonal areas where the technique is most rigorously tested.



Fig 6: Close work on the hairline and eyebrow region, where domes of differing treatment meet.



Fig 7: The facial composition under assembly, showing the additive, area-by-area build-up.

4.5. Finishing and Protection

After the domes were all in place and adjusted, the finished metal surface was coated with a clear lacquer to prevent tarnishing of the copper and aluminium and to maintain the

tonal contrast that was created in the oxidation and spraying process. This is the stage of lacquering, and the finished panel was then placed in a decorative wooden frame, which is complete in Figure 9.



Fig 8: The completed dome portrait being sprayed with protective clear lacquer.



Fig 9: The completed, framed metal-dome portrait of Mr John Marmond Halm.

4.6. Evaluation of the Finished Composition

A preliminary assessment of the finished portrait, performed by displaying the intermediate posterised and tonally separated image to people who are not involved in the project, showed that the structural cues, namely the relative position and proportion of the eyes, brow, nose and mouth, on which the facial recognition most relies (Golightly, 2020) ^[10], remained visible even at the reduced-tone stage described in Section 4.1, indicating that the tonal mapping procedure was successful in preserving them. Several findings emerged in the fabrication process that fit well within and extend the overall principle of Pointillism, namely that consistency of the size of the units and placement of the units is important to the legibility of the final image. Smaller domes were seen to create a very clear and photorealistic effect, especially around fine detail on the face, such as the eyes and the edges of the lips, and compactly arranged domes, with very little gap visible between neighbouring units, were seen to create a strong and convincing optical fusion for the work when viewed from a normal room distance (Golightly, 2020) ^[10]. In both cases, they follow traditional Pointillist methods in which other painters of the time, such as Seurat, used smaller, denser dots for detail areas and larger, looser dots for background passages (Homer, 1964) ^[14].

4.7. Situating an Individual Practitioner Within a Wider Field

Using the profiles created in Sections 2, the metal-dome image of Mr Halm can be accurately located. It has a similar approach to Signac and Seurat, relying on advanced tonal or colour planning and a slow, disciplined, unit-by-unit way of execution (Section 3). It shares with El Anatsui and Ibrahim Mahama an approach to metal as many small, individually dealt-up, objects rather than a single worked mass, and with Emefa Cole and Nana Poku Amponsah, Dwumfour's Unity commission, a specifically Ghanaian goldsmithing lineage

where named individual goldsmiths, often working within a university or royal-court training structure, are credited with hand-fabricated metal portraiture and symbolic objects (Hagino, 2025; Museum of Modern Art Africa, 2024; Victoria and Albert Museum, 2025) ^[28, 11, 18]. Like contemporary paper-unit wall works by Ilhwa Kim, it is specifically three-dimensional and captures light, a quality that oil paint does not have (Rabb, 2025) ^[21]. As such, the case study is not a technical exercise in itself, but rather one of many colliding lineages from European Neo-Impressionist painting, contemporary global Neo-Pointillism and Ghanaian metal-based fine art; each lineage authored by the individuals engaged in its creation.

5. Discussion

It is important to make it clear at the outset what the previous four sections have demonstrated. Section 2 and Section 3 created Pointillism as a historically-defined technique with a specific scientific rationale, invented by an identifiable individual, Georges Seurat, working in a specific decade and city, and then carried forward, altered, and in some instances contested by a further sequence of named individuals: Signac, Pissarro, Cross, Luce, and in the twenty-first century Kim, Boyd, O'Neil, Cannon, and Diagne. This same discipline of the discrete, individually placed unit is also found in the work of named Ghanaian metalworkers (section 4) and to a large extent in the work of the one named metalworker who translated from the history of painting to metal on purpose and in a self-conscious way (Golightly, 2020) ^[10]. The discussion that follows considers these two strands the historical-theoretical and the practice-based as complementary rather than as two loosely connected strands of discussion through an overlapping set of words.

The metal-dome portrait of Mr Halm makes it clear that the most important mechanism of the Pointillism, namely the optical blending at a proper distance of the various elements

differentiated by tone or colour, is not linked to oil paint or canvas but is a general perceptual principle that can be translated into materials. Seurat and Signac worked with the physical pigment loaded onto a brush to get a tonal differentiation, whereas in the case study examined here the tonal difference is achieved by the choice of metal (copper versus aluminium), the use of chemical oxidation, and the use of spray colourant, while the doming process itself provides a subtle three-dimensionality and ability to catch light which cannot be replicated by a flat painted dot (Golightly, 2020) ^[10].

In the process the comparison also points out the authentic differences between the two media. The difference is that the metal technique described here was limited to three broad tonal ranges: aluminium for light tones, plain copper for mid tones, and oxidised or sprayed copper for dark tones, whereas the Pointillist painter could achieve an almost infinite spectrum of hues through his choice of pigment, dot-by-dot, and thus could not rely as heavily on the accuracy of the tonal mapping at the reference-image stage (Section 4.1). This is in line with the general Pointillist principle developed by Hall (2002) ^[12] that a viewer's willingness to fill in dots into a cohesive image is much influenced by the internal consistency and discipline of the tonal system used prior to the start of execution, irrespective of the material used to execute it. Furthermore, it is in keeping with the less radical, more modern description of optical mixing found in Section 3, where the perceptual benefits of a limited, controlled tonal palette are proposed to be due to the interaction of nearby units in simultaneous contrast.

Finally, the metal-dome technique tackles an inherent practical drawback of traditional portraits made on paper or canvas highlighted by the original investigators of this case study: over time, works on paper or canvas are much more susceptible to fading, tearing, and general deterioration than a lacquered, metal-domed composition, which creates a surface with light-reflective properties ideal for commemorative or institutional portraiture (Golightly, 2020) ^[10]. This durability justification is comparable to the arguments used by the ancient portraitists for the use of bronze, marble and mosaic tesserae in works for the public and commemoration, that are so often cited in contemporary contexts for the use of these materials, as opposed to other less durable media in studio environments (Bendak, 2005; Briggs *et al.*, 2008) ^[2, 6]; it is the same argument that is the basis for recent commentary about El Anatsui's new practice with bottle-cap metal assemblage, as opposed to other studio media that are, "more fragile" (Hagino, 2025) ^[11].

One other aspect to consider when comparing the two media is the labour and skill aspect. The use of a large number of dots, individually mixed and applied, to cover a canvas of any reasonable size was a problem that meant that traditional Pointillist painting was slow (Blake, 2001) ^[4] as described in Section 3. The metal case study replaces such a painterly task with a metalworking labour of similar intensity annealing, milling, piercing, doming, oxidising or spraying, and glueing each dome individually one of the more extensive ranges of technical skills, not just those of forming sheet metal, basic chemistry, and fine hand assembly, but a wider range that includes painting dots with a brush. It means that Pointillism, a technique so associated with the patience and precision of working with paint, is not necessarily transferred to any of

the less material-specific qualities of working with other media; it is simply redistributed to another set of fabrication skills from Ilhwa Kim's hand-dyed paper units to Daniel Boyd's dots of archival glue (Rabb, 2025) ^[21].

Lastly, the case study asks the larger question of the status of applied metalwork in relation to fine art painting, in institutional art education. The original researchers of this project have clearly declared that their research was an attempt to demonstrate that certain industrial processes of metal fabrication that are functional in a technical sense can properly be considered Fine Art and that the same composition and perceptual principles that govern an accepted painting movement can be applied to these metalwork processes. This positioning follows a broader trend in the art education in Africa and Ghana to equate industrial and applied art techniques (metalwork, ceramics and textiles) with fine art forms, rather than treating them as a lesser form of craft production, as is reflected in the recent decision by the Victoria and Albert Museum to commission and collect a gold sculpture jointly created by a university-trained goldsmith and a goldsmith from the royal court (Victoria and Albert Museum, 2025) ^[28].

6. Conclusion

From its scientific beginnings in the colour theory of Chevreul and Rood, through its systematic evolution by Seurat and Signac and its spread throughout Neo-Impressionist painting it is based on a single perceptual principle that is medium independent, namely that 'discrete units of pure tone or colour, when properly arranged and when viewed at an appropriate distance, fuse optically into the eye and mind of the viewer to form a coherent image of greater luminosity than can be physically achieved by pre-mixing colour. It has been a principle that has been passed down a chain of individuals named across time and space, from Seurat and Signac, to Pissarro, Cross and Luce, to contemporary painters, Alioune Diigne, Daniel Boyd, Gwen O'Neil, Jessica Cannon and Ilhwa Kim, and to the Ghanaian metal artists, El Anatsui, Ibrahim Mahama, Emefa Cole and Nana Poku Amponsah Dwumfour, who each have, as this article has suggested, reinterpreted the principle of the discrete, individually placed unit in their own material, culture and purpose (Rabb, 2025; Hagino, 2025; Victoria and Albert Museum, 2025) ^[21, 28, 11]. By applying this principle to the domed copper and aluminium plate of a portrait of Mr John Marmond Halm, examined here as a contemporary case study, this is successfully transferred from oil paint on canvas to the plate, as a three-dimensional reinterpretation of a nineteenth-century optical painting technique within a West African metal-product design practice. The bonds between Seurat's chromoluminarism and this metal technique are not so much common materials, but a common discipline: careful tonal mapping, consistent unit placement, the viewer's distance-dependent perception that fills the gaps, a discipline that is being actively practised today by a clear and recognisable and geographically dispersed group of individual artists and craftspeople.

7. Recommendations

Future study should also expand the material palette to include brass as well as copper and aluminium, lessening the limitation of only 3 tones found in this study, as well as invest

more effort in detail tonal planning; a small palette makes greater demands on accurate reference-image mapping. Unit sizing must be carefully selected smaller domes for fine facial detail, larger domes for broad background areas and a protective lacquer is always to be applied to prevent tarnishing from the loss of tonal contrast. All fabrication processes should be recorded systematically and step-by-step using photos to be used for future teaching, exhibitions and comparative research. The work done in this research should be extended to other non-painted adaptations of Pointillism, like mosaic, ceramic, beadwork and digital pixel-based media. Finally, the projects which are based on external techniques but adapted to African studio settings should place the work in context to any relevant indigenous practice and attribute the work to the individuals who actually created it, and not be construed as an anonymous technical exercise.

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