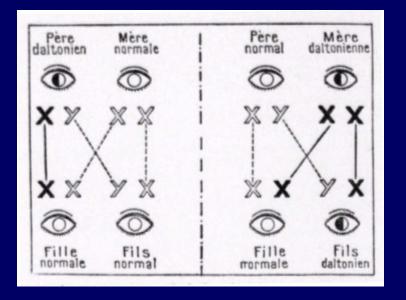
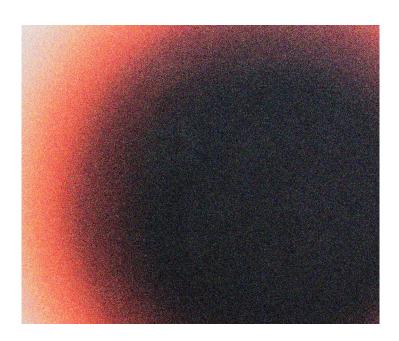
THE END OF DALTONISM

RACHEL HOFFWANN



ASANOBSTRUCTION

1707/



THE END OF DALTONISM AS AN OBSTRUCTION

THIS BOOK MUST NOT BE
TURNED AROUND OR TURNED OVER.
IN ORDER TO UNDERSTAND THE CONTENT,
ONE MUST CHANGE THE PERSPECTIVE.

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THE END OF DALTONISM AS AN OBSTRUCTION

Rachel Hoffmann supervised by Jérémie Cerman

Space and communication HEAD Genève

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INTRODUCTION

The phenomenology of perception has over the past decades been subject to various psychological and philosophical studies. Carmelo Calì, an assistant professor at the University of Palermo specialized in the philosophy of cognitive science, recognizes the general perception as follows: "from the epistemological standpoint, perception is considered an independent mode of knowledge of the world at the environmental scale to which the subjects have access. Accordingly, the world is considered as the perceivable environment specified in the modes of sound, visual and tactual appearances and distinguished from the world as the object of research of the natural sciences." In accordance with Calí's understanding of perception in general, the analyses conducted on the following pages focuses mainly on visual perception while partially touching the subject of an advanced form of acoustic perception.

1 CALÌ, Carmelo, Phenomenology of perception: theories and experimental evidence, Leiden and Boston, Brill Rodopi, 2017, p. 1-2. 2 AUTHOR UNKNOWN, "Evecare, the difference between sight and vision", smartvisionoptometry, (date unknown), https://www. smartvisionoptometry.com. au/evecare/evesight-vs-vision/, accessed July 2020.

When speaking of visual perception, we have to differ between sight and vision. Sight represents our sensory experience, namely "the physical attributes and performance of the many organic components involved in the visual system."2 Vision, however, refers to how our mind interprets the images perceived by the eyes. It is "a

4 PANTON, Verner, "Notes on Color" (1997), in Musée des arts décoratifs et du design – Bordeaux, *Oh! Couleurs*, Bordeaux, Les éditions confluences, 2017, p. 199-214.

5 PANTON, Verner, "Notes on Color" (1997), in Musée des arts décoratifs et du design – Bordeaux, Oh! Couleurs, Bordeaux, Les éditions confluences, 2017, p. 211.

6 AUTOR UNKNOWN,
"Light: Electromagnetic
waves, the electromagnetic
spectrum and photons",
khanacademy, (date
unknown), https://www.
khanacademy.org/science/
ap-chemistry/electronicstructure-of-atoms-ap/
bohr-model-hydrogen-ap/a/
light-and-the-electromagnetic-spectrum, accessed
July 2020.

7 JURICEVIC, Igor, WEBS-TER, Michael A., "Variations in normal color vision. V. Simulations of adaptation to natural color environments", Cambridge University Press, December 2008. p. 1. thought process, which gives an understanding of what is seen, where it is and how to react to it. It combines information from many sensory systems and thus creates a perception of reality."³

Through the pupil of our eyes, light is refracted and falls onto the retina at the back of our eyes. Through light-sensitive nerve endings and color cells the information of what is seen is transmitted as optic nerves to the brain. The brain then processes the image. Through this procedure, we are capable of distinguishing over 10 million color nuances.4 Which color we perceive, depends on the object and its properties as well as of the light source. Friedrich von Schiller already wrote about the paintings of Peter Paul Rubens in the 18th century: "I cannot shake off the thought that these colors are lying to me because they seem to be different depending on the way the light falls on them or whether the angle from which I see them is the one or the other." When light hits the object, parts of the light are being absorbed, while some parts called "wavelengths" are being reflected. These are responsible for what colors our eyes perceive. But not only. Scientists have found that there are differences in color perception among people with complete visual functionality.7

With the awareness that even the visual perception of human beings without congenital defect creates differences in vision, how can we as viewers of the same obKNOWING THAT THE PERCEPTION OF COLOR IS RELATIVE, HOW DO WE KNOW THAT OUR VISUAL PERCEPTION CORRESPONDS TO REALITY?

ject ever know that one perceives the color of the object in the same way? The answer is simple: we cannot. As Josef Albers writes in his book *Interaction of color*: "In visual perception a color is almost never seen as it really is – as it physically is." Accordingly, he claims that "this fact makes color the most relative medium in art." Knowing that the perception of color is relative, how do we know that our visual perception corresponds to reality? Knowing that other people see differently, what can be called reality? Is reality the one that corresponds to the perception of the majority of people or do we live in a world of visual parallel realities? How do people whose reality looks different reflect their reality?

People with severe color vision deficiency are called to be daltonic or color-blind. Research shows that 8% of men and 1% of women have a form of color impairment. The form deuteranomaly, which is a red-green color-blindness, and the most common form, to tritanopia or achromatopsia, which is a complete color-blindness, and the rarest one. While the color-blindness type of deuteranomaly has as a consequence that green looks redder, protanomaly works the other way around and thus makes red look closer to green. Protanopia and deuteranopia cause the affected person to be unable to tell any difference between red and green whereas tritanomaly makes it difficult to differ between blue and green, as well as yellow and red. Tritanopia leads to the person affected not being able to differ between blue and green, purple

8 ALBERS, Josef, Interaction of Color, New Haven and London, Yale University Press, 1963, p. 1.

9 ALBERS, Josef, Interaction of Color, New Haven and London, Yale University Press, 1963, p. 1.

10 BAILEY, Gretchyn, "Color Blindness: Types, Causes, Symptoms, Treatment", allaboutvision, (2019), https://www.allaboutvision.com/conditions/colordeficiency. htm, accessed July 2020.

lour-blindness/, accessed

12 HUDDART, Joseph,
"An account of persons who
could not distinguish color",
Philosophical transactions of
the Royal Society of London,
vol. 67, 1777, p. 260.

13 HUDDART, Joseph,
"An account of persons who
could not distinguish color",
Philosophical transactions of
the Royal Society of London,
vol. 67, 1777, p. 260.

14 MARMOR, Michael F., "John Dalton: The Recognition of Color Deficiency", in MARMOR, Michael F., ALBERT, Daniel M., Foundations of Ophthalmology, Switzerland, Springer, 2017,

15 DALTON, John, "Extraordinary facts relating to the vision of colors: with observations", Memoirs of the Literary and Philosophical Society of Manchester, vol. 5, 1798, p. 28-45.

16 Note : In a publication from 1798 Dalton wrote about

and red, as well as yellow and pink. Lastly, the rarest form of color-blindness, named achromatopsia, withholds the person from seeing any color, in a way that the world that reveals itself solely in black and white.¹¹.

The first writings on the perception of color-blindness date from 1777 and were documented by Captain Joseph Huddart. 12 Huddart wrote about the perception of a shoemaker named Thomas Harris. Just like his brothers, Harris noticed that he couldn't distinguish colors red and green from each other. As a child he discovered that "when other children could observe cherries on a tree some pretended difference of color, he could only distinguish them from the leaves by their difference of size and shape."13 The first one to examine this visual deficiency was John Dalton. Through analyzations of his own color perception defect, he was able to understand that his vision differed from other people's visual perception. Dalton was able to contact Harris's brother who he sent a set of colored ribbons in order for him to describe their colors.14 Harris had described their colors the same way Dalton did. This made him conclude that "a considerable number of individuals might be found whose vision differed from that of the generality, but at the same time agreed with my own."15, 16

Even though Dalton had developed an understanding of color-blindness in 1794, he was surprised that he had not encountered a female case to date: "it is remarkable that

WHAT IS THE EXTENT TO WHICH COLOR-BLINDNESS CAN BE DEFINED AS A FALSIFIED PERCEPTION AT ALL?

his discoveries, "I was always of opinion, though I might not often mention it, that several colors were injudiciously named. The term pink, in reference to the flower of that name, seemed proper enough; but when the term red was substituted for pink, I thought it highly improper; it should have been blue, in my apprehension, as pink and blue appear to me highly alied; whilst pink and red to me have scarcely any relation."

17 DALTON, John,
"Extraordinary facts relating
to the vision of colors: with
observations", Memoirs of
the Literary and Philosophical
Society of Manchester, vol. 5,
1798, p. 40.

18 AUTHOR UNKNOWN, "Exemple d'hérédité lié au sexe: le daltonisme chez l'homme", *La Science et la* vie, 1939, p. 472.

19 BAILEY, Gretchyn, "Color Blindness: Types, Causes, Symptoms, Treatment", allaboutvision, (2019), https://www.allaboutvision.com/conditions/colordeficiency.htm, accessed July 2020.

I have not heard of one female subject to this peculiarity." The reason why Dalton might not have encountered any female case is that, while for women, to be daltonic, both parents have to be colorblind, for men only one parent has to have a daltonic vision. Dalton attributed the reason for his different color perception to a slightly tinted liquid in his eyes. It was only after his death that it turned out that this was a false assumption. Other researchers found the reason for the deficient color to lie in the concept of the cones on the retina. Although Dalton's assumption about the reason of his color-blindness was wrong, his initial researches have led to lively discussions on visual color impairment. Thus, in recognition of his pioneering work people have been talking about daltonism ever since.

An impairment of the visual color perception can play a role in many areas of life. A particularly interesting question, however, is to understand how a restriction with regard to the perception of colors affects people whose visual perception is elementary to their professional activity. One could assume that the functionality of visual perception is for few people as elementary as it is for the artist. Being active in a profession that is based on perception, how does a false or distorted perception of our surroundings influence the practice of art? What is the extent to which color-blindness can be defined as a falsified perception at all? And, in what way has this influential factor changed the way art is created and percei-

24 MARMOR, Michael F.,

RAVIN, James G., The eye

of the artist. Philadelphia.

25 LANTHONY, Philippe

"Daltonism in Painting", Color

Research and Application,

Note: Author had no access

to the original source: MÜN-

CHOW, Wolfgang, "Color

MARRË, E., MIERDEL, P.,

Regional Symposium of the

Dresden, September 1978.

(no pagination).

International Research Group

on Colour Vision Deficiencies,

vision deficiencies in painting", in MARRË, M.,

vol. 26, 2001, p. 13.

Mosby, 1997.

ved by the public?

There are several artists in the history of art for which there were indications that they were color-blind. Posthumously, however, it is difficult to prove the artists' color-blindness and therefore, in retrospect, one can only speculate about the state of perception of certain artists. The artist Baccio Bandinelli (1488-1560), is a fitting example of an artist who has been speculated about being color-blind, as people said that he hired other artists in the 1500s to teach him how to use colors. Before that, his pictures were said to be of low quality and his handling of color was faulty.20

Another case was the Irish artist Paul Henry (1876-1953),

who was expected to be also color-blind but never made his deficiency public.²¹ Henry was told to have asked his wife to mix the colors for him. After Henry was divorced and remarried, it was said that the use of his colors, possibly due to the departure of his first wife, had changed as well.²² Because both women were independent artists, they may have been able to implement their personal color expression in his pictures, since Henry was already a well-known artist at the time, whose pictures were nationally recognized at the end of his life and later internationally shown.²³ Regardless of how he painted with colors, the question that arises is why an artist would create a piece of work in a spectrum he/she cannot really see himself? The case of the American artist Paul Manship

(1885-1965), who gave up painting after becoming aware of his color-blindness and turned to the art of sculpting, is one example of many daltonic artists, who decided to continue working with an art technique that did not necessarily involve the use of colors.²⁴ According to statistics led by the ophthalmologist Wolfgang Münchow in 1978, 17 out of 31 color-blind artists have turned away from painting and decided on a different medium.²⁵

Given the multitude of color-blind artists that existed so far, the analyzation of four different case studies offers the possibility to investigate how the working process of daltonic artists has changed in such a way that their color-blind deficiency is no longer seen as an obstacle in the creation of their art. The artists were chosen based upon their form of daltonism, their differing ways of handling their deficiency, as well as the diversity of art mediums they used within their artistic work.

The artists' case studies that were selected for the analyses conducted on the following pages are Charles Meryon, Meghan Sims, Daniel Arsham and Neil Harbisson. While the Frenchman Charles Meryon lived from 1821 to 1868, all the other artists are still alive, with Meghan Sims, from Ontario and Daniel Arsham, from Ohio, both being born in 1980 and Neil Harbisson from Spain, being born in 1984. For Charles Meryon it is not exactly proven which form of daltonism he had, but according to experiences he described in letters he wrote at the time

22 FLEGG, Eleanor, "Treasures, wedded to a life of color.", independent, (2018), https://www.independent ie/life/home-garden/ treasures-wedded-to-a-lifeof-colour-36987306.html, accessed July 2020.

20 MARMOR, Michael F., "Bandinelli era daltonico?", in

HEIKAMP, Detlef, STROZZI,

Giunti Editore, 2014, p. 498. 21 FLEGG, Eleanor,

"Treasures, wedded to a life of color.", independent, (2018),

https://www.independent. ie/life/home-garden/

treasures-wedded-to-a-lifeof-colour-36987306.html,

accessed July 2020.

Beatrice P., Baccio Bandinelli. Scultore e Maestro, Florence,

23 LAVERY, Brian, "From Irish Art Hero to Cliché and Back to Favor", nytimes, (2013), https://www.nytimes com/2003/03/06/arts/fromirish-art-hero-to-cliche-andback-to-favor.html, accessed October 2020.

and how he used colors in existing paintings, he is expected to have suffered from a form of protanopia²⁶ or deuteranopia²⁷. This form of daltonism is the same form which was diagnosed for Arsham. Sims and Harbisson however, both have the rarest form of daltonism, meaning that they suffer from achromatopsia and thus they see everything in greyscales.

By taking these four cases as a basis, the following work within this thesis aims to reveal how color-blindness affects the creation of artistic work, the instruments artists use to deal with their color impairment, and the extent to which appearance and acceptance of color-blindness has changed from the past to the present. Constance Rubini, director of the Musée des arts décoratifs et du design de Bordeaux, has succeeded very well in describing how people with a limited perception system subjectively perceive colors by saying that: "Color does not exist in and of itself. It is perceptible only in light, which reveals it in the moment but destroys it over time. Color is intractable, varying depending on its quantity, the substance that bears it and the eye that perceives it."²⁸

29 AUTOR UNKNOWN, "Meghan Sims", achromatopsia, (date unknown), http:// achromatopsia.squarespace. com/meghan-sims-artist/, accessed July 2020.

1/ THE INFLUENCE OF DALTONISM ON THE ARTISTIC CREATIVE BEHAVIOR

When one speaks of a visual deficiency in relation to an artistic work in which visual perception is fundamental, one can assume that this visual deficiency affects the way the artist works in one form or another.

1/1/ THE ARTISTIC CHOICES

The four artists analyzed show fundamental differences, both in the choice of their artistic medium and in relation to the thematic expression of their art.

Meghan Sims' various creative periods as well as the different approaches she tested to deal with her color-blindness, give an indication that Sims is constantly questioning and self-reflecting her visual perception in her artistic work. Thus, her work represents her visual perception of the world, that she tries to communicate to the public. "Although my works often appear to be surreal or even abstract, they are usually literal representations of my subject matter, which demonstrates my visual field to those with normal eyesight." As Meghan Sims is not only color-blind but also extremely sensitive to light, she prefers to paint night settings when light is the dar-

26 Note: Red-green



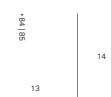


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kest. However, even if it hurts her to paint under strong light, she is of the opinion that when painting under conditions like these, her personal perception is represented best. Accordingly, paintings like Courtland at David (2010), Victoria Park Trees (2010), or Breithaupt Pines (2010), are representations of her vision at daylight. In these paintings, it is clearly visible how the dark shapes are practically engulfed by the blinding brightness. Interestingly, her night paintings seem to be more recognizable for the public, as she is able to include details that get lost when she paints by daylight. "Where others see life in detail and colors, I am limited to light, shades and shapes."30 Paintings that underline this argumentation are her almost monochromatic artworks like Queen at Courtland (2012) ... David Street at Night (2011) ... King at Queen (2012), or Night Life (2009), which visualize her more pronounced perception of detail in the absence of strong light. Until 2016 Sims had not used colors in any of her artworks and limited her color palette to grey tones as she distrusted colors in general. Accordingly, Sims argues: "I didn't see color, so I didn't use it. I had no interest."31

In contrast to Meghan Sims, who focuses primarily on painting, Daniel Arsham is a multidisciplinary artist, whose work focuses predominantly on structures and surfaces. In most of his art he avoids the use of colors because he prefers to work in black and white. Artworks such as Baseball Pile (2014).10, Moon Globe Black (2016)





30 AUTOR UNKNOWN, "Meghan Sims", achromatopsia, (date unknown), http:// achromatopsia.squarespace. com/meghan-sims-artist/, accessed July 2020.

31 AGGERHOLM. Barbara, "Meghan Sims, a Kitchener artist who is colour blind, makes the most of her unique vision" therecord, (2019), https:// www.therecord.com/news/ waterloo-region/2019/03/05/ meghan-sims-a-kitchenerartist-who-is-colour-blind-makes-the-most-of-her-uniquevision.html, accessed July

32 KINNEY, Bunny, "Daniel Arsham's Future Relic", nowness, (2018), https://www. nowness.com/story/future-relic-daniel-arsham-iuliette-lewis, accessed July 2020.

33 Note: A person whose physical abilities are extended beyond normal human limitations by mechanical elements built into the body.

and Televisions (2015) are only a few of many examples that visualize this systematic exclusion of color. This way of working without colors gives him the opportunity to perceive his art in the same way as the viewer. In 2016, however, Arsham began to add color to his work for the first time. Through the use of differing materials like volcanic ash, sand or selenite, his work revolves around the subject of fictitious artifacts that he creates and refers to as "future relics"32 of the present. Furthermore. the targeted selection of his objects, which through their digitization mostly shaped the end of the 20th century, allow Arsham to develop an interplay between the present, the future and the past.

Neil Harbisson who initially had no sense of color at all, as he sees the world in scales of grey, has gained the perception of sensing color through sound. Through a wavelength sensible antenna implanted into his head, Harbisson is able to hear the sound of colors and ever since calls himself a Cyborg³³. . 13 While Meryon, Sims and Arsham have realized, respectively, physical forms of art, Harbisson focuses not only on art creation, but feels the act of creating a new sense through a "new organ"34 as art in itself. "Cyborg art will eventually be seen as an art and I see the creation of senses and the creation of new body parts, the design of your perception of reality as an art movement, where art no longer needs to express itself through the traditional senses, but through new senses."35 Additionally, Harbisson uses this new sense THE ART OF DESIGNING NEW SENSES BY CREA-TING NEW OR-

WITH THEM"

GANS, AND THE

ART OF "MERGING

18

34 IYENGAR, Radhika, "This is the future, says world's first cyborg Neil Harbisson", livemint, (2018), https://www.livemint.com/Companies/TDIMfjB21T-P5eSB5kR0UtM/This-is-the-future-says-worlds-first-cyborg-Neil-Harbisson.html, accessed July 2020.

35 HSGUNISTGALLEN, "Neil Harbisson on being a Cyborg", youtube, (2017), https://www.youtube.com/watch?v=C_OnYqx3ynA&-list=WL&index=9&t=0s, accessed July 2020.

36 Note: The sonochromatic music scale is a microtonal and logarithmic scale with 360 notes in an octave, each note corresponds to a specific degree of the color wheel.

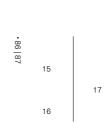
37 DESIGN INDABA, "Cyborg artists, Neil Harbisson and Moon Ribas, on physically merging oneself with technology", youtube, (2019), https://www.youtube.com/watch?v=U-tGk65wyYs&-list=WL&index=11 &t=0s, accessed August 2020.

to show people what he is able to do with his antenna. Therefore, he creates paintings of people and people's voices, as their voices have frequencies that he relates to colors. He calls his resulting art "sonochromatic" An example of a sonochromatic painting Harbisson created is the visualization of Beethoven's *Für Elise* (no date).

who expresses himself through the art of designing new senses by creating new organs, and the art of "merging with them"³⁷, the pieces resulting from his work can be seen as art itself. Consequently, in the case of Harbisson one should speak of two different forms of art, firstly the creation and adaption to his new sense, secondly the art which is created by the artist through the new sense he has gained. As a result, by permanently integrating this new sense in order to compensate for his lacking color perception, his limited visual perception has unintentionally become the constant thematic center of his art.

By comparing the contemporary artistic works of Sims, Arsham and Harbisson with the artworks of Charles Meryon, who was active in a different artistic period, it can be conceived that while Meryon specialized predominantly on black and white etchings, the other three artists all integrated some traces of color in their artworks. In the course of work of Meryon it is noticeable that even if he used colors at the beginning, around 1849 he changed to the medium of etching as this transition gave him the possibility to work predominantly with greyscales

and thus to hide his limited visual perception of colors.



38 GEFFROY, Gustave, Charles Meryon, Paris, H. Floury Éditeur, 1926, p. 184. Note: Original quotation translated by the author. "[...] par les signes certains de l'habitation, par l'expression soucieuse des visages de pierre, par la vieillesse des logis ouverts sur l'espace et le temps, il a suggéré, parce qu'il était un visionnaire des choses cachées, une humanité vivant sans cesse sa vie temporaire dans un décor qui semble éternel. Cette humanité absente, nos yeux la devinent, notre esprit l'évoque.'

39 GEFFROY, Gustave, Charles Meryon, Paris, H. Floury Éditeur, 1926, p. 184. Note: Original quotation translated by the author. "Ce qui donne aussi à ces œuvres sans pareilles leur caractère immobile d'éternité, c'est que le présent y est le décor du passé." In contrast to Sims' work topics of vision and reduced perception, as well as Harbisson's thematic subject of cyborgnatic perception, Meryon's thematic of his etchings had nothing to do with the human visual perception. Instead he depicted mostly Parisian landscapes with an incredible attention to detail. Thus, Gustave Geffrov. a French journalist, art critic, and historian, wrote about Meryon's style of work: "[...] by the sure signs of the habitation, by the concerned expression of the stone faces, by the old age of the dwellings open to space and time, he suggested, because he was a visionary of hidden things, a humanity endlessly living its temporary life in a setting that seems eternal. This absent humanity, our eves guess it, our mind evokes it."38 He was very fond of Paris and showed a great affection for depicting views of the cityscape, that would change due to rebuilds and captured these in his work. "What also gives these unprecedented works their immobile character of eternity is that the present in it is the setting of the past."39 If you have a look for instance at artworks such as L'Abside de Notre-Dame de Paris painted by Meryon in 1854, Gustave Geffroy is undoubtedly right. Meryon managed to develop a feeling of eternity in his engravings, even though the city was constantly changing. Nevertheless, the decision not to make the poor eyesight the subject of his art was certainly not only a decision to do justice to the artistic themes of the time, but also a decision that

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40 Note: The Ishihara test, is a color-blind test. named after the Japanese ophthalmologist who invented the colored plates. Each plate consists of a circle with colored dots including a composition forming the shape of a number, with a different color. People with a normal color vision don't have any problems to recognize the numbers, while they are hard to detect, or invisible to people with a red-green color deficiency

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allowed him to suppress his color-blindness as far as possible.

In contrast to Meryon, Sims and Harbisson treat their color-blindness thematically in their art. Compared to paintings like Courtland at David (2010), Victoria Park Trees (2010) or Breithaupt Pines (2010), which represent Sims' perception during daylight, the painting Night Town 2 (2009) depicts her perception at night which is generally richer in detail. Harbisson for his part has, based on the hue and light he detects through his antenna on human skin, developed a color wheel which he calls *The* Human Colour Wheel (2009) . 17. Arsham only deals with his daltonism indirectly in art and addresses it in rare cases on a thematic level. Ironically, in his series Static Mythologies Arsham has created relics using volcanic ash and rose quartz in combination with pink selenite. These relics depict a book on color-blindness, which include a typical color-blindness Ishihara⁴⁰ test plate in the form of Arsham's Studio Logo on the cover. . 18 & 19 However, he never tried to hide his color-blindness. In contrast, for Meryon who was looking for ways to elude from his daltonism in order to be able to keep working as an artist, the selection of his artistic subject focus allowed him to cover up his color-blindness also in a thematic sense. Through the interaction of his choice of medium and the implementation of his subject, Meryon succeeded in circumventing his color-blindness and suppressing it in his art.

"THIS COLOR **DEFECT OF** WHICH I SPEAK IS SUCH THAT I **OFTEN PREFER BEAUTIFUL BLACK** PRINTS. IN WHICH ONE CAN SEE THE GRADATION OF SHADING. TO THE MORE **VIVID EFFECTS OF** PAINTING."

41 RAVIN, James, ANDER-SON, Nancy, LANTHONY, Philippe, "An Artist with a Color Vision Defect: Charles Meryon", Survey of Ophthalmology, vol. 39, 1995, p. 403-408. Note: Author had no access to the original source: LEE, Sidney, Dictionary of National Biography, 1894. 42 DROST, Wolfgang,

"Documents Nouveaux sur l'Oeuvre et la Vie de Charles Meryon", Gazette des Beaux-Arts, vol. 63, 1964, p. 63-230.

43 RAVIN, James, ANDER-SON, Nancy, LANTHONY, Philippe, "An Artist with a Color Vision Defect: Charles Meryon", Survey of Ophthalmology, vol. 39, 1995, p. 405. Note: Author had no access to the original source: LEE, Sidney, Dictionary of National Biography, 1894.

1/2/ THE ARTIST'S PERCEPTION OF DALTONISM

While some of the artists analyzed in this thesis only became aware of their visual limitations in the course of their artistic work, others were aware of the visual obstacle very early on. This recognition leads to the guestion: How do artists perceive their own color-blindness? Do artists take their color-blindness as a physical impairment? Is daltonism perceived as an obstacle by an artist? Is it possible to determine whether daltonism has formed the artists in their artistic approach or even prescribed their artistic expression in one way or another?

Even though Meryon's hopes were high to work with colors when he first started as an artist, he later preferred the exclusion of colors in his artistic works.41 After serving the French navy, Meryon decided to study arts. In the early 1840s he started working with sepia, but guickly moved on to watercolor, as he wrote to his father to have stopped the use of sepia to begin watercolor. In the letters he wrote to his father he claimed that this change would allow him various other possibilities. 42 It can be assumed that he noticed his differing visual perception even if he was not aware of it at first. In writings Meryon sent to his father in 1846, he mentioned his color-blindness: "This color defect of which I speak is such that I often prefer beautiful black prints, in which one can see the gradation of shading, to the more vivid effects of painting."43 Al-

44 GEFFROY, Gustave, Charles Meryon, Paris, H.

Floury Éditeur, 1926, p. 30. Note: Original quotation

translated by the author.

vous l'avoir dit, j'ai bien

certainement dans la vue un défaut d'organisation qui

fait que certaines couleurs,

bien différentes pour tout le

monde, se confondent chez

moi. C'est assez singulier.

mais c'est très vrai, et vous

concevez que ce n'est qu'à

mon bien grand regret que

j'ai acquis la certitude de ce

45 JOUVE, Pierre-Jean, Le

quartier de Meryon I, La Nef,

46 MERYON, Charles,

Letter to E. Foleÿ, Paris, 20

quotation translated by the

author. "Les uns, que tente le

gain, adoptent une voie facile

qui leur réussit, et finissent

œuvres, ne parlant qu'avec

dédain des justes critiques

autres, plus consciencieux.

mais prompts à s'illusionner

reconnaissent bientôt leur

infériorité ; [...]".

que soulève leur manière : les

par s'aveugler sur leurs

Note: Original

September 1945, p. 5.

May 1849.

"Parce que, comme je crois

though Meryon has written about his color-blindness to his father, he has never spoken about it in public. At a later stage in Meryon's work process, he even wrote about the reason why he had resisted to the artform of colored paintings: "Because, as I believe I told you, I certainly have an organizational defect in my sight which causes certain colors, very different for everyone, to be confused by me. It is rather singular, but it is very true, and you can imagine that it was only to my great regret that I became certain of this defect."44 This statement indicates that Meryon's color-blindness represented a limitation in the exercise of his artistic work. However, even though he was aware of his congenital defect, he was convinced to continue creating art. While his initial intention was the painting of themes using colors, Meryon felt that he did have to abandon color in order to continue as an artist. Mervon's limitations in his art seemed to be a solution to further his personal artistic execution, but this decision led, among other things, to the fact that he gradually developed a feeling of having been abandoned by the society on an artistic level.⁴⁵ Accordingly, in letters to his friend Edouard Foley, Meryon regularly wrote in a plaintive manner: "Some, tempted by gain, adopt an easy path that succeeds them, and end up blinded by their works, speaking only with disdain of the just criticism that their manner raises; others, more conscientious, but quick to delude themselves, soon recognize their inferiority [...]."46 This personal development swung high until he eventu-

ally destroyed some of his own brass plates to keep them

from becoming part of the art industry.⁴⁷

"I SORT OF **KEPT THE DOOR** SHUT THERE. **BECAUSE IT WAS SOMETHING OUT** OF MY REACH AND I FELT THAT I DIDN'T NEED TO **UNDERSTAND IT."** Although Meghan Sims and Neil Harbisson have the same form of color-blindness, their visual perception is still different. Achromats normally experience a strong sensitivity to light, which makes it hard for them to be able to perceive their surroundings normally during daytime. While this is exactly the form of achromatopsia Sims experiences, Harbisson is lacking color perception without being sensible to light.

At a younger age Meghan Sims, just like many other people with a color perception deficiency, felt the need to hide her visual impairment.⁴⁸ Accordingly, in school she was bullied for having to wear light blocking glasses and coloring things in a different way than other children.⁴⁹ Against this background, it can be assumed that these circumstances led Meghan Sims to avoid the use of colors as an artist for a long time. Until 2016 Sims categorically excluded colors from her artistic approach: "I sort of kept the door shut there, because it was something out of my reach and I felt that I didn't need to understand it."50 It is only recently that she started integrating colors

For Daniel Arsham, who in the beginning of his career worked mainly in black and white, his color reductive perception was never really an obstacle in his artwork. He claimed that his work is not necessarily dependent

47 JOUVE, Pierre-Jean, Le quartier de Meryon II, La Nef, October 1945, p. 68. 48 AUTOR UNKNOWN, "Meghan Sims", achromatopsia, (date unknown), http:// achromatopsia.squarespace. com/meghan-sims-artist/, accessed July 2020.

49 AGGERHOLM, Barbara, "Meghan Sims, a Kitchener artist who is colour blind, makes the most of her unique vision", therecord, (2019), https:// www.therecord.com/news/ waterloo-region/2019/03/05/ meghan-sims-a-kitchenerartist-who-is-colour-blind-makes-the-most-of-her-uniquevision.html, accessed July

in her artworks.

50 SHARKEY, Jackie, "Colourblind artist Meghan Sims paints with full palette for first time with fascinating results", cbc, (2016), https:// www.cbc.ca/news/canada/ kitchener-waterloo/kitchener-artist-meghan-sims-colourblind-1.3811847. accessed July 2020.

"OFTEN WHEN
I'M LOOKING AT
MATERIALS, I'M
SELECTING THEM
FOR PROPERTIES
OTHER THAN
COLOR [...] SO
I SELECT THE
COLOR INADVERTENTLY THROUGH
THE SELECTION

OF THE MATERIAL."

nor related to his color-blindness, as his choice of colors within his work always relied on the materialistic choices he made. "Often when I'm looking at materials, I'm selecting them for properties other than color [...] so I select the color inadvertently through the selection of the material." Even though Arsham perceives his daltonism as a deficiency, for him it never really was an obstruction. "I knew that I was color-blind all my life, it's not something that was pointed out to me on many occasions nor something that I even thought about being part of my work." His blindness raised questions for him, regarding the difference in perception compared to other people, but it was never a strong hindrance in his artistic work.

Similar to Daniel Arsham, for Neil Harbisson the fact to not be able to see colors never really consisted in a physical problem. He is even of the opinion that being totally color-blind has its benefits. "To me, black and white vision has advantages. We see better at night. We see distances better than people that see color, and we also identify shapes more easily. So, to me, greyscale vision was an advantage." However, Harbisson felt that living in a colorful world that is grey to you affects you in a social way. A color-coded world where a minority of people are color-blind and only few of them suffer total color-blindness has the capability to make you feel excluded. "Being colorblind was always an advantage in many ways. The only issue I felt with color was that I felt socially excluded

"I HAVE NEVER SEEN COLOR, I DON'T KNOW WHAT BLUE OR RED MEAN VISUALLY, BUT I GREW UP IN A WORLD WHERE COLOR EXISTS."

54 SISLEY, Dominique, "Why this artist got an antenna implanted in his skull", dazeddigital, (2016), https://www.dazeddigital.com/arts-andculture/article/31102/1/why-this-artist-got-an-antenna-implanted-in-his-skull, accessed August 2020.

55 AUTHOR UNKNOWN, "Neil Harbisson Interview - Part 2: Hearing Colors", munsell, (date unknown), htt ps://munsell.com/color-blog/ neil-harbisson-hearing-colors/, accessed August 2020. 56 D&AD CREATIVE ADVERTISING, "Design and Digital, Neil Harbisson -D&AD Presidents's Lecture" youtube, (2015), https://www. youtube.com/watch?v=2I-HPpyRZujM&list=WL&index=28&t=0s, accessed August 2020.

August 2020.

57 SISLEY, Dominique,
"Why this artist got an antenna implanted in his skull",
dazeddigital, (2016), https://
www.dazeddigital.com/artsandculture/article/31102/1/
why-this-artist-got-an-antenna-implanted-in-his-skull,
accessed August 2020.

because color is used socially. I felt that I was missing out on something social, but I never felt like I was missing out something physical."⁵⁴ Nonetheless, not having any comprehension of colors didn't stop Harbisson from studying music and visual arts. In course he was allowed to create paintings in black and white and managed to develop an understanding of how people without a visual deficiency perceive colors. While he studied the theory of colors, Harbisson felt like studying a religion as the color effects were invisible to him and people seemed to attach something more than physical to it.⁵⁵ Thus it seems to be only natural that a certain curiosity evolved from what he wasn't able to perceive. "I have never seen color, I don't know what blue or red mean visually, but I grew up in a world where color exists."⁵⁶

It is evident that all three contemporary artists question themselves how their perception differs from the perception of normal-vision people. Although the color-blindness affects the artists differently in their creative process, it certainly affects them all on a personal level. It is conceivable that there is a connection between this personal affection and the psychology of someone concerned. As Harbisson expresses, a color-blind artist like him is well aware that in his profession he is constantly surrounded by colors that he cannot really perceive himself.⁵⁷ It seems only normal that a daltonic artist aims to understand what he is visually missing. However, a color-blind artist will never develop a real visual understan-

51 CARPENTER, Kim, "Playing with Perception: A Conversation with Daniel Arsham", sculpture, (2014), https://www.sculpture.org/documents/scmag14/dec_14/fullfeature.shtml, accessed August 2020.

52 COMPLEX HUSTLE, "How Daniel Arsham's Experimental Art Attracted Collaborations with Pharrell, Adidas and Usher", youtube, (2017), https://www.youtube.com/watch?v=YwURKXWz2h0&-list=WL&index=16&t=08, accessed August 2020.

accessed August 2020.
53 SISLEY, Dominique,
"Why this artist got an antenna implanted in his skull",
dazeddigital, (2016), https://
www.dazeddigital.com/artsandculture/article/31102/1/
why-this-artist-got-an-antenna-implanted-in-his-skull,
accessed August 2020.

SETTLED."

1/3/ CONQUERING THE VISUAL DEFICIENCY

By comparing the different means the artists use to carry out their artistic activities despite their color-blindness, it can be observed that the personal approaches of the artists differ one from another. While some of them found tools to work with, others found coding systems to overcome their visual hindrance in their art.

Of all the colored paintings that Meryon had done prior to the etchings, only one remains. The artwork *Ghost ship* (before 1840, exact date unknown) illustrates with which ideology Meryon started painting. This painting shows the selection of yellow and blue tones which is typical for deuteranopic color-blind artists. . 20 For color-blind artists with this form of daltonism, these are the colors they perceive best.60 However, Meryon did not succeed to attract the interest of the audience with his color paintings. Ghost ship seems like a remnant of a failed attempt to gain a foothold as a daltonic artist trying to paint colors, because from this point on, Meryon realized that his deficiency would not allow him to work with colors and thus he decided to circumvent his color-blindness in his art. The change of the medium and the change from color to black and white etchings gave Meryon the possibility to suppress his color visual impairment in his art. At the same time, this way of dealing with his visual deficiency seemed for Meryon to be the only escape to continue the practice of his art and to be recognized by the public. Thus, compared to the other artists analyzed in this thesis, Meryon is the only artist who changed to a medium where his deficiency could not be noticed by the public and, we can assume, that thereby he circumvented his

visual limitations in his artworks.

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THE INFLUENCE OF DALTONISM ON THE ARTISTIC CREATIVE BEHAVIOR

58 BERGER, John, Ways of Seeing, Great Britain, Penguin Books, 2008, p. 7. 59 BERGER, John, Ways of Seeing. Great Britain, Penguin

Books, 2008, p. 7.

60 RAVIN, James, ANDER-SON, Nancy, LANTHONY, Philippe, "An Artist with a Color Vision Defect: Charles Meryon", Survey of Ophthalmology, vol. 39, 1995. p. 405. "I DON'T KNOW WHAT ANY OF THE COLORS ARE, REALLY, I'M SEEING A GRADIENT OF LIGHT WHEN I LOOK AT THE COLOR ON THE TUBE. I NUMBER THEM ACCORDING TO THE AMOUNT OF LIGHT I SEE."

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61 AGGERHOLM, Barbara, "Meghan Sims, a Kitchener artist who is colour blind, makes the most of her unique vision", therecord, (2019), https://www.therecord.com/news/waterloo-region/2019/03/05, meghan-sims-a-kitchenerartist-who-is-colour-blind-makes-the-most-of-her-unique-vision.html, accessed July 2020.

62 SIMS, "Meghan Sims "Do You See What I See"", vimeo, (2015), https://vimeo. com/143038849, viewed August 2020.

63 AUTOR UNKNOWN,
"Meghan Sims - Visual
Artist", meghansimsartist,
(date unknown), https://www.
meghansimsartist.ca/pages/
biography, accessed July

Even though Meghan Sims will never be able to experience colors the way normal-vision people do, she felt the need to at least understand what she is not able to perceive. In that sense, she developed a system which helped her to code the greyscales she sees with the corresponding colors normal-vision people see, linking them to the tubes she uses for painting. "I don't know what any of the colors are, really, I'm seeing a gradient of light when I look at the color on the tube. I number them according to the amount of light I see."61 . 21 This method allowed her to constitute a scheme for mixing colors together in order to get the desired shade she aims to paint. "I've learned about color by comparison, and memorization. I will learn a certain shade of grey, of a granny smith apple, and from that point on, that will be to my best ability, be apple green."62 Although her red tinted glasses or lenses, which she wears daily, allow her to perceive more details, she uses photography as a support to gain time when analyzing lighted surfaces. 63 This way of working has become an important part of her artistic process, as she uses it to capture moments very precisely during daylight. These moments she can then visually analyze under different conditions such as in a darker room, allowing her to perceive a wider spectrum of details than in the direct daylight. ... She matches the tones of grey in the images taken with what she has learned related to the system she developed for her own color comprehension. . . . By combining photography with her approach to understand what colors mean to normal-vision people, Sims was able to develop a comprehension for color perception, although she will never be able to actually see these colors. "Red I attribute things like danger, blue expresses a sadness, or loneliness, yellow I'm not sure about, I don't really understand yellow." 64

HOW IS IT POS-SIBLE THAT PEOPLE WITH AN ACHROMATIC PERCEPTION DE-VELOP AN IDENTI-CAL CONCEP-TION OF COLORS AND THEIR EF-FECTS AS PEOPLE WITH A NORMAL VISION? In modern color psychology, color associations are described in a way that is very similar to Sims' color interpretation. While red is a signal color that is effectively associated with danger, a lot of people associate blue with a certain calmness but also sadness.65 This leads to the question of how it is possible that people with an achromatic perception develop an identical conception of colors and their effects as people with a normal vision. In this context, the question arises whether Sims associations are shaped by modern color psychology or whether the eventual confrontation with color psychology unconsciously influence her own color interpretation. Or could it be possible that even with a total absence of colors, a certain effect is transferred that comes close to the general color effect? A possible explanation for this observation, however, could also be that the way we use color in everyday life, aiming to cause the strongest possible color signaling, such as red for a stop sign, carried over to Sims' interpretation of color. Consequently, it is conceivable that the color perception of normal-vision people blended with her color perception over time. However, no matter how Sims developed a sense for color effects, she seems to use her understanding of these

64 SIMS, "Meghan Sims "Do You See What I See", vimeo, (2015), https://vimeo. com/143038849, viewed August 2020.

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65 JIN, Joy, "Colors and Emotions: How Different Colors Affect Perception and Mood", looka, (2019), https://looka.com/blog/colors-and-emotions/, accessed September 2020.

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66 YI, Hannah, "What it's like for an artist to suddenly see color", qz, (2017), https:// qz.com/quartzy/1116230/ daniel-arsham-a-colorblind artists-work-changed-withhis-new-glasses/, accessed August 2020

67 SEMAINE, "Daniel Arsham, Color-blind artist: In Full Color", youtube, (2016), https://www.youtube.com/ watch?v=ZCsEClia1Ck&list=WL&index=24&t=1341s, accessed August 2020.

68 SEMAINE, "Daniel Arsham, Color-blind artist: In Full Color", youtube, (2016), https://www.voutube.com/ watch?v=ZCsEClia1Ck&list=WL&index=24&t=1341s, accessed August 2020.

in her pictures. This observation is particularly evident in her series Solitary nature with Midnight Moonlight 2 (2012), a in which the light in the forest appears in a deep blue, as well as, in the piece Watered down coffee (2016) in which a man walks in solitude past a fountain.

Daniel Arsham's approach to deal with his color-blindness as an artist was in the beginning similar to Meryon's approach. However, while Meryon chose to forego colors in order to hide his deficiency, the reason why Arsham initially did not use paints in his creative work was rather due to the lack of interest in colors. "As an artist, within my work, I didn't think about the lack of color as being even part of my practice. Perhaps I was more drawn to them because I knew that in their lack of color, I was able to see them the way that everyone else would see them."66 Over time however, Arsham's curiosity to understand what he visually missed in relation to colors, was awakened by the treatment of an ophthalmologist. This has led him to try EnChroma glasses, which widen his color spectrum.⁶⁷ Nonetheless, the glasses Arsham tried present no permanent solution for his color-blindness, as they can rather be seen as an artificial correction, refracting light in a way that he is able to see a broader spectrum of colors. Arsham claims that he could not guess to what extent his color-blindness affected him until he tried these glasses. 68 Even though wearing the glasses for the first time felt magical to him, Arsham developed another feeling over the next few months of full-time usage. Ac-



69 SEMAINE, "Daniel Arsham, Color-blind artist: In Full Color", youtube, (2016), https://www.youtube.com/ watch?v=ZCsEClia1Ck&list=WL&index=24&t=1341s, accessed August 2020.

70 SEMAINE, "Daniel Arsham, Color-blind artist: In Full Color", youtube, (2016), https://www.youtube.com/ watch?v=ZCsEClia1Ck&list=WL&index=24&t=1341s, accessed August 2020.

71 BATTERSBY, Matilda "Blind artists and a unique vision: The visually impaired artists using tech to see things differently", independent, (2016), https://www. independent.co.uk/arts-enter tainment/art/features/ blind-artists-and-a-uniquevision-the-visually-impairedartists-using-tech-to-seethings-differently-a7311916. html, accessed August 2020

72 QUARTZ, "Colorblind artist sees colors with new glasses", youtube, (2017), https://www.voutube.com/ watch?v=MA7OV3HxcOw&list=WL&index=14&t=96s. accessed August 2020.

turated game. "There were consequences that I had not anticipated, almost like color-fatigue."69 As it is the case for many color-blind people, Arsham's visual perception, shows its strength in the perception of structures and forms. As the colors are less emphasized and fewer colors are visible in a way that the eye focuses predominately on constructs detached from colors. "When I'm looking at just architecture and things that I enjoy sort of spending time with, I'm distracted by all of the other [...] I look much more at the structure of the space rather than the nuances of color in it."70 In the course of his work as an artist, Arsham has reduced the regular wearing of his glasses in order to get back to how he saw the world initially without glasses. From then on, he decided to wear them only for artistic purposes in order to objectify his view on color in his work. "I use them within the studio to see what everyone else is seeing, and then I am able to take them off once I've selected the palette."71 The effect the glasses had on Arsham's art had translated into his work through the use of vibrant colors instead of staying with the material's color only. "It's not to say I will continue making all of my work in these vibrant hues, it's just that it has expanded the potential."72 Therefore, a clear shift of color usage is noticeable in the artwork Arsham created from 2016 onwards. His work Lunar Garden (2017-2019)

cordingly, he had the impression of living in an oversa-

. 26 & 27 from the series Static Mythologies, which he had created under different forms over the past few years, perfectly show his use of pink colored sand in combinati"I WANTED TO SENSE COLOR. AND IT DIDN'T **NEED TO BE VISIBLE THROUGH** THE EYES."

on with white sand. Although his interest in forms which are shaped by light could always been felt, a few years ago prior to these installations, it was unthinkable that Arsham would integrate colors with such intensity.

Neil Harbisson, who does not perceive his color-blindness as a physical hindrance, expresses the wish to know how colors really affect someone: "I wanted to sense color, and it didn't need to be visible through the eyes."73 Out of pure curiosity he experimented new ways of sensing colors while he was studying arts. "Even if I don't see color it is impossible for me to ignore that color exists. [...] I didn't feel the need, but I felt the curiosity to get to know what colors are."74 In order to distinguish different colors from each other, Harbisson created and implanted an antenna into his head, which allows him to perceive colors as sound through the transposition of light frequencies to vibrations. He sees his antenna as a new part of his body that allows him to extend his senses beyond human sight.75 The artist explains that while the adaptation of his body and brain to his new antenna took him two months, it took him three years to understand his new sense and to identify the visual spectrum and sounds the colors represented.⁷⁶ However, Harbisson claims that over time wearing such an antenna has become subliminal like any other sense of our body.77 Further, he disagrees that his perception of color has become synesthetic as he is of the opinion that he didn't have any perception of colors prior to his implantation. Interestingly, Harbisson explains

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> 78 ESSEC BUSINESS SCHOOL, "Hearing colors: my life experience as a cyborg, by Neil Harbisson, iMagination Week 2016", youtube, (2016), https://www.youtube.com/ watch?v=SYB3nnvX-3g&list=WL&index=6&t=0s, accessed July 2020.

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79 SISLEY, Dominique "Why this artist got an antenna implanted in his skull" dazeddigital, (2016), https:// www.dazeddigital.com/artsandculture/article/31102/1/ why-this-artist-got-an-antenna-implanted-in-his-skull, accessed August 2020.

80 LIVEMEDIA, "Neil Harbisson, The Renaissance of Human", youtube, (2018), https://www.youtube.com/ watch?v=sENJ4aUyWJY&list=WL&index=7&t=0s, accessed August 2020.

81 DESIGN INDABA, "Cyborg artists, Neil Harbisson and Moon Ribas, on physically merging oneself with technology", youtube, (2019), https://www.voutube.com/ watch?v=U-tGk65wyYs&list=WL&index=11&t=0s. accessed August 2020.

duction, he would not compare hearing colors to hearing conventional sounds. 78 While synesthesia represents the union of two or more senses, he rather regards his case as the creation of a new sense. 79 In connection to his new organ, Harbisson would not speak of artificial intelligence (AI) but rather of an artificial sense (AS). Accordingly, he perceives his reality not as a virtual reality (VR) nor as an artificial reality (AR) but rather as a revealed reality which he usually calls "RR"80. Harbisson does not perceive the utilization of his antenna as a technology because it has become something that he uses unconsciously: "The difference between using or wearing technology is that if you merge with technology, you don't feel you are using technology, while if you use it as a tool, you are conscious that you're using it."81 Consequently, the implantation of the antenna allowed him to sense colors and therefore was his solution to be able to start working creatively. Since the implantation Harbisson has created works of art which are based on the relationship between color and sound. He started to produce sound portraits of well-known people by analyzing their face with his antenna and combining what he perceives into micro tone cords. . 28 & 29 & 30 As Harbisson got accustomed to perceiving colors through hearing sounds, his brain began to use the process of recirculation to associate colors with the sounds he hears. "I had this secondary effect, that normal sounds started to become color. I heard the telephone tone, and it felt green, because it sounded just like

that even if he can hear colors now through bone con-

accessed August 2020. 74 ROCKET CAST, "Nei Harbisson Interview Trailerpark 2015", youtube, (2015), https://www.youtube.com/ watch?v=jTJcYYm9uAo&list=WL&index=5&t=0s, accessed August 2020.

73 THE FEED SBS, "Neil

Harbisson: Eyeborg", youtube (2014), https://www.youtube.

com/watch?v=Ts -XVPQOG-

M&list=WL&index=13&t=0s,

75 DONAHUE, Michelle Z., "How a Colour-Blind Artist Became the World's First Cyborg", nationalgeographic, (2017), https:// www.nationalgeographic. com/news/2017/04/worlds-first-cyborg-human-evolution-science/, accessed August 2020

76 HSGUNISTGALLEN. "Neil Harbisson on being a Cyborg", youtube, (2017), https://www.voutube.com watch?v=C_OnYgx3ynA& list=WL&index=9&t=0s, accessed July 2020.

77 HSGUNISTGALLEN "Neil Harbisson on being a Cyborg", youtube, (2017) https://www.voutube.com/ watch?v=C_OnYqx3ynA& list=WL&index=9&t=0s. accessed July 2020.

82 TED, "Neil Harbisson:
Ilisten to color", youtube,
(2012), https://www.youtube
com/watch?v=ygRNoieAnzl&list=WL&index=20&t=0s,
42 ceessed August 2020.

the color green."82 Harbisson then applied this principle to his artistic works and began to paint vinyl records in the colors that he perceived through the dominant tones in the music. In this way, he started converting speeches into colors and created color associations for cities through the main tones he heard when visiting these.

While the other artists were already artistically active and were looking for ways to deal with their daltonism, Harbisson started to deepen his artistic activity due to his color-blindness. In connection with Harbisson's method of dealing with his daltonism, one could speak of a prosthesis that enables him to implement previously impracticable skills through designing his perception of reality. For Harbisson, even though being daltonic, gaining this new sense was the ultimate solution to not be blind to color anymore.

1/4/ TRANSFORMATION OF DALTONISM AS A HINDRANCE

In regard to the solutions used by the different artists to deal with their color-blindness the question arises whether color-blindness consists a mental challenge for artists that are creatively active? Or in other words, has there been a transformation in working with the visual impediment that has allowed the artists concerned to no longer consider their deficiency as an obstacle?

83 MERYON, Charles, Letter to F. Bracquemond, Charenton, 21 Mars 1867. Note: Original quotation translated by the author. "[...] (celui) qui n'a pas dès le jeune âge hanté les mêmes écoles' 84GEFFROY, Gustave, Charles Meryon, Paris, H. Floury Éditeur, 1926, p.4. Note: Original quotation translated by the author. "[Meryon] était un fou, probablement né fou ou prédestiné à le devenir, candidat à la folie, comme les médecins aliénistes étiquettent ce genre de sujets." 85 AUTOR UNKNOWN. "Questions juridiques", Mercure de France, 1 mars 1930.

to find ways to deal with his color-blindness, could find neither happiness nor contentment in the course of his artistic life. Accordingly, he later wrote to a friend that he felt that he had not attended the same art schools as the great masters.83 A thought that seems to have influenced him throughout his entire creative process. Gustave Geffroy described Meryon in a biography as follows: "[Meryon] was a madman, probably born mad or predestined to become mad, a candidate for madness, as alienist physicians label these kinds of subjects."84 At the age of only 37, Meryon began showing signs of mental illness which gradually worsened over time. His later mental state caused him to destroy his prints by crossing them out in situations of complete madness.85 Nonetheless, the exact nature of Meryon's madness remains obscure. Further, having had a demented mother, who died at a young age, and a father who only played a minor role in his life certainly did not contribute to his well-being. After Meryon left the Navy, he dedicated his whole life to art, but one could assume that the constant pressure he put on himself in order to meet artistic requirements worsened the situation. Thus, one can suppose that Meryon's color-blindness presented an ever-present obstacle to him. Therefore, it cannot be excluded that if Meryon had succeeded to implement his artistic expression in color or expand his capabilities, his life might have taken a turn in a way that he might have been artistically successful.

Charles Meryon who had been looking for a long time

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87 AUTOR UNKNOWN, "Meghan Sims", achromatopsia, (date unknown), http:// achromatopsia.squarespace com/meghan-sims-artist/. accessed July 2020.

Although Meghan Sims used to be self-conscious about her distorted perception of colors, as an artist it took her a while to accept and to adapt to her exceptional situation. "Anyone with a disability has been raised to see a disability and that they're ,less than' in some way and that does a number on you. Being afraid of color was only natural. I was comparing myself to people who use color."86 In art Sims has found a catalysator that gives her the possibility to deal frankly with her color-blindness. "Through my creativity I have been able to openly express my difference and the way my eyes see."87 From this statement follows that she does not perceive her art as a hindrance anymore but rather strives to stimulate discussions about differences in perception. By raising awareness about visual color disabilities, Sims succeeds in showing people with normal visions how color-blind people see, as well as integrating color-blind people into society and art. Via her paintings, which she creates almost solely in black and white (e.g. City Silhouettes series), .31 & 32 Sims aims to let the public experience her personal form of sight with their own eyes. "I offer the audience a metaphysical experience by suggesting that what they are viewing transcends a two-dimensional image; it is an invitation to view the world through the eyes of an achromat."88 Her art allows Sims to share her disappointment about her lack of visual color perception with others, not only through the connections she makes with other achromats, but also with the viewer of her art. Hereby she constructs an opportunity to share her point of view and to create

"THE WAY WE SEE THINGS IS AFFECTED BY WHAT WE KNOW OR WHAT WE BELIEVE. [...] WE **NEVER LOOK AT** JUST ONE THING; **WE ARE ALWAYS** LOOKING AT THE RELATION **BETWEEN THINGS** AND OURSELVES."



88 AUTOR UNKNOWN, "Meghan Sims", achromatopsia, (date unknown), http:// achromatopsia.squarespace. com/meghan-sims-artist/, accessed July 2020. 89 AUTOR UNKNOWN. "Meghan Sims - Visual Artist", meghansimsartist, (date unknown), https://www.

meghansimsartist.ca/pages/ biography, accessed July

2020.

a unique understanding that is often not present prior to viewing her work. Sims is of the opinion that art represents a universal communicator and a form of social connection from which a healing and growth process can occur.89 This procedure has helped her to accept her visual deficiency and to overcome it in regard to the application of colors in her own art.

Besides using her paintings to sensitize people to her visual deficiency. Sims also creates colored artworks with her color identification system. When looking at Sims' colored work as a viewer without prior knowledge about her non-existent color recognition one does not necessarily notice that she is completely color blind. Her work Legacy Greens (2010) . 33 illustrates that she is using colors in a way that is amazingly similar to our reality. At this point we can raise the question of why an artist would create a piece of work in a spectrum he cannot purely perceive himself? It can be assumed that the answer to this question lies in psychology again. As Sims explained, she constantly compares herself with other people who integrate colors in their work. Therefore, it is comprehensible that the thought of having a limited visual perception creates a feeling of exclusion from those who have a normal vision. John Berger's reflections about how humans perceive things can be applied to Sims' perception of other people's color sight: "The way we see things is affected by what we know or what we believe. [...] We never look at just one thing; we are always looking at the relati-

90 BERGER, John, Ways of Seeing, Great Britain, Penguin Books, 2008, p. 8-9. 91 OUR CHOICES "DANIEL ARSHAM - The Angle Of Repose", youtube, (2017), https://www.youtube com/watch?v=L4QpmIV7opk. accessed August 2020.

on between things and ourselves."90 To a certain extent Sims tries to adapt her artistic view in her paintings to the view of normal-vision individuals. There seems to be an urge to do justice to the opposing parallel realism. Maybe Sims sees it in a certain form as a norm and tries to prove herself her affiliation through best possible adaptation. It can be assumed that the consciousness of a daltonic person having a physical deficiency, even though not optically visible (from the perspective of someone else), can nevertheless develop into an order of a psychological deficiency. In relation to artistic creation, one has to ask oneself whether the goal must be the striving for exact representation of color visual normality, or whether a reinterpretation of the color use of color-blind artists can be all the more interesting.

Through the experience of the glasses, Arsham feels more confident in the use of color within his artworks, although he openly admits that he is unsure about the interplay of multiple ones: "Every work has a single color, it's not a rainbow of color within that, I'm not quite sure or confident yet or know truly, how different colors within that spectrum react to each-other and how I feel in my work about that."91 Arsham's visual alteration caused him to value his initial perception in a way he didn't before. "When you are diagnosed with some deficiency, it's seen negative right? And this is how I interpreted it throughout my life and really up into the point that I've received these lenses. It took me a while to kind of realize that the gift WHEN TALKING **ABOUT VISUAL** PARALLEL WORLDS, THE QUESTION SHOULD BE AL-**LOWED WHETHER GLASSES OPEN UP A NEW ARTIFICIALLY CREATED VISUAL** PARALLEL WORLD.

> just as valuable.93 Furthermore, for Arsham the question arises whether the color spectrum he sees through his glasses actually corresponds to the color spectrum normal-vision people see. In this context the artist states the following: "Even though I may be able to identify a wider range of color with these lenses, there's still an open question as to whether I'm seeing what you see, or what other people see, and that opens up a larger question about objectivity and color."94 When talking about visual parallel worlds, the question should be allowed whether glasses open up a new artificially created visual parallel world. This could be a world in which effects are visible to both, color-blind and normal-vision individuals, even though both sides perceive this same world differently. Still no one will ever be able to see how the other side

to understand.

92 SEMAINE, "Daniel Arsham, Color-blind artist: In Full Color", youtube, (2016), https://www.youtube.com/ watch?v=ZCsEClia1Ck&list=WL&index=24&t=1341s, accessed August 2020.

93 YI, Hannah, "What it's like for an artist to suddenly see color", qz, (2017), https:// qz.com/quartzy/1116230/ daniel-arsham-a-colorblindartists-work-changed-withhis-new-glasses/, accessed August 2020.

94 YI, Hannah, "What it's like for an artist to suddenly see color", qz, (2017), https:// qz.com/quartzy/1116230/ daniel-arsham-a-colorblindartists-work-changed-withhis-new-glasses/, accessed August 2020

In contrast to Daniel Arsham. Neil Harbisson is not able to directly see colors, but due to his new technology he is able to perceive them through a new perceptual sense.

perceives, a reasoning that even Arsham took some time

actually was not having color vision in the first place. In

many ways that may have formed who I am, what I am

interested in and what I make."92 By experiencing this vi-

sual change, Arsham learned to appreciate the way he

saw things before, as he became aware that he will never

be capable to see things the way people without a visual

color deficit do. He is comforted in this thought that he

sees the world with his own eyes, which he feels to be

"KNOWLEDGE
COMES FROM
OUR SENSES, SO
IF WE EXTENT
OUR SENSES, WE
WILL CONSEQUENTLY EXTENT
OUR KNOWLEDGE."

95 HARBISSON, Neil, "Cosmic Senses", in HAR-BISSON, Neil, A Collection of Essays, 2017, no pagination. 96 AUTHOR UNKNOWN, "Design Yourself", cyborgfoundation, (date unknown), https://www.cyborgfoundation.com, accessed August

97 Note: The different types of relationships between technology and organisms.

98 DESIGN INDABA, "Cyborg artists, Neil Harbisson and Moon Ribas, on physically merging oneself with technology", youtube, (2019), https://www.youtube.com/watch?v=U-tGk65wyYs&-list=WL&index=11 &t=0s, accessed August 2020.

99 TED, "Neil Harbisson: I listen to color", youtube, (2012), https://www.youtube com/watch?v=ygRNoieAnzl&list=WL&index=20&t=0s, accessed August 2020. Even though Harbisson's daltonism consisted in a personal obstruction for the artist, his transformation has allowed him to develop a new awareness of colors, and has thus helped him to develop his personal identity.95 This way of merging with technology allowing the artist to reconnect with nature as Cyborgism^{96, 97} is possible through technology, and simultaneously derived form a natural phenomenon. Accordingly, Harbisson's perception of hearing through bone conduction was initially inspired by the hearing process of dolphins.98 Harbisson is of the opinion that cyborg art is not limited to his current application and he strives to invent other senses which could further extend his perception: "Knowledge comes from our senses, so if we extent our senses, we will consequently extent our knowledge."99 Additional transformations will allow him to expand his perception of his surrounding and thus will ultimately lead to an extension of his art as well as the creation of new forms of art. Harbisson succeeded not only in creating his own form of perception, which allowed him to overcome his color-blindness, but also in developing his own form of art which is ultimately an emergence from this change. Consequently, Harbisson does not reduce the creation of art to the use of human organs confined to our species but also allows the idea that technology can enable people to perceive and understand art differently. "[Cyborg art] is the art of building your own senses, the art of creating your own body part and then the art of expressing vourself through your senses. [...] I'm doing it through the

sound of color and the color of sound, but many other people are doing it though other senses."¹⁰⁰ Accordingly, Harbisson's handling of his color blindness has led to a situation in which not only the artist himself has changed his perception of colors, but which has also led to a new point in which the perception and acceptance of color-blind artists was sustainably changed. Therefore, we can suppose that in Harbisson's case daltonism, as a medicalized vision of color, has led to an extension of the senses, while influencing the artist in a way that it influences the perception of art in return.

100 ROCKET CAST, "Neil Harbisson Interview Trailer-park 2015", youtube, (2015), https://www.youtube.com/watch?v=jTlcYYm9uAo&-list=WL&index=5&t=0s, accessed August 2020.

101 VAUXCELLES, Louis, "La Semaine Artistique", L'Ère nouvelle, October 1923, (no pagination). Note: Original quotation translated by the author. "Puisque vous connaissez M. Meryon, dites-lui que ses splendides eaux-fortes m'ont ébloui sans la couleur, rien qu'avec l'ombre et la lumière, le clair-obscur tout seul et livré à lui-même : [...]".

2/ THE PUBLIC'S PERCEPTION OF DALTONIC ART

In art, the artist's intention is generally directly linked to the viewer's conception. This raises the question of how a viewer perceives a work of art created by an artist with a distorted visual perception. Are there any major differences in understanding daltonic art compared to understanding art created by artists with normal color perception?

2/1/ THE PUBLIC'S PERCEPTION ANALYZED

While the artist himself can never see the color of his work that is recognizable for people with normal color perception, the converse also applies. Thus, people who look with an unbiased vision at an artwork created by a daltonic artist will never see the work through the eyes of the artist. However, this does not preclude the viewers from developing their own point of view on the artwork based on what is visible to them.

The art critic Louis Vauxcelles wrote in 1923: "Meryon is known only to the elite, and the public ignores his work as well as his name."101 This statement has proven to be correct over time, as it were primarily well-known writers

102 GEFFROY, Gustave. Charles Meryon, Paris, H. Floury Éditeur, 1926. 103 WRIGHT, Harold

J.L., "Three Mater Etchers: Rembrandt, Meryon, Whistler: Lecture II. The Etchings of Charles Meryon (1821-1862)" Journal of the Royal Society of Arts, vol. 78, n° 4060, September 1930, p. 1084.

104 KOSPOTH, B. J., "Meryon, The Etcher Of Old Paris", The Chicago Tribune and the Daily News, April 1927, p. 5.

105 GEFFROY, Gustave, Charles Meryon, Paris, H. Floury Éditeur, 1926, p. 130 Note: Original quotation translated by the author. "Puisque vous connaissez M. Meryon, dites-lui que ses splendides eaux-fortes m'ont ébloui sans la couleur, rien qu'avec l'ombre et la lumière, le clair-obscur tout seul et livré à lui-même : [...]".

106 FROLLO, Jean, "Vernis sage", Le Petit Parisien, May 1883, (no pagination). 107 GEFFROY, Gustave, Charles Mervon, Paris, H. Floury Éditeur, 1926.

interested in Meryon's artwork.¹⁰² The public, however, seemed to have a different perception and was more and more bored by Meryon's outdated painting technique. 103 Baudelaire, in contrast, who was taken with Meryon's art showed interest in accompanying his etchings with sonnets. This proposition was, however, rejected by Mervon who was at that time already marked by his mental illness.¹⁰⁴ Whereas his oil-paintings such as his watercolor work hardly aroused interest from the audience, his strength in working with contrasts in his etchings did not remain hidden among art enthusiasts. Victor Hugo wrote in a letter to Baudelaire, "Since you know Mr. Meryon, tell him that his splendid etchings dazzled me without color, only with shadow and light, the chiaroscuro alone left to itself: [...]".105 However, as mentioned earlier, people from the elite showed keen interest in Meryon's art, whereas the public was rather disinterested. This made it difficult for the artist to sell his art, therefore he had to sell his etchings for 1 franc per work or even 50 centimes a print and thus lived in constant poverty. 106 This went so far that when Meryon asked La Chalcographie du Louvre to buy the brass Meryon had engraved, they refrained.¹⁰⁷ From this it can be deduced that the public, at least in Meryon's lifetime, was not willing to do without colorful works of art and therefore expected artists to offer works that fulfilled this exact request.

such as Charles Baudelaire and Victor Hugo who were

Nearly 200 years later, this demand seems to partially

have changed and the reaction of the audience to artwork from contemporary artists seems to differ fundamentally from the feedback Meryon received back in the days.

Meghan Sims, who was mainly painting for herself until 2006, was discovered by a local gallery owner from her hometown and encouraged to present her works of art to the public. This life-changing experience opened Sims the door to the art world, as from then on, she was able to exhibit her works in galleries. 108 The reactions of art enthusiasts to Sims exhibitions range from recognition to respect. At first glance, they question whether Sim's way of dealing with colors is possible, despite complete color-blindness; they will quickly find an answer when looking at her work. Through the confrontation of their own perception with Sims' irrepressible will to deal with her color-blindness and to display colors as detailed as possible, viewers often show great respect. Further, with her constant ambition to try to implement something that she found difficult to grasp and understand at first, Sims emits sign of courage and perseverance.

While there is a great interest in what Daniel Arsham will show before each exhibition, the interest was particularly high after the artist experienced his *EnChroma* glasses. Although art enthusiasts were hoping that Arsham was not getting too distracted by color, they were curious how this mental, emotional and artistic experience affected

109 SEMAINE, "Daniel Arsham, Color-blind artist: In Full Color", youtube, (2016), https://www.youtube.com/watch?v=ZCsEClia1Ck&-list=WL&index=24&t=1341s, accessed August 2020.

110 SEMAINE, "Daniel Arsham, Color-blind artist: In Full Color", youtube, (2016), https://www.youtube.com/watch?v=ZCsEClia1Ck&-list=WL&index=24&t=1341s, accessed August 2020.

111 Note: A multi-media art and fashion company.
112 WEISS, Zachary,
"Watch Colourblind Artist Daniel Arsham's Quest to See in Color", observer, (2016), https://observer.com/2016/09/watch-colorblind-artist-daniel-arshams-quest-to-see-color/, accessed August 2020.

113 SEMAINE, "Daniel Arsham, Color-blind artist: In Full Color", youtube, (2016), https://www.youtube.com/ watch?v=ZCsEClia1Ck&list=WL&index=24&t=1341s, accessed August 2020.

114 SEMAINE, "Daniel Arsham, Color-blind artist: In Full Color", youtube, (2016), https://www.youtube.com/watch?v=ZCsEClia1 Ck&list=WL&index=24&t=1341s, accessed August 2020.

his work.¹⁰⁹ Nevertheless, Arsham knows that every work he exhibits is first criticized until the viewer of his art has become accustomed: "I'm quite sure that the reaction will be of "I prefer the art in black and white", and this has been true for every single body of work that I've shown. The audience typically prefers the body of work that I've shown just before that until that body of work becomes what I'm known for and then on to the next."110 As Cecilia Dean, co-founder of *Visionaire*¹¹¹ responded to Arsham's first colorful exhibition in 2017 at Gallerie Perrotin in New York called Circa 2345: "I think it's also a great way of expressing what people think of as a deficiency are actually your strengths. [...] You talk about correcting your color-blindness, but clearly it didn't need correcting."112 Additionally, the American film producer Jane Rosenthal, praises the work from the same exhibition as following: "Seeing Daniels work in color [...] and knowing how he's tried to just overcome his color-blindness, the depth of color in all of this work is extraordinary." 113 Although viewers had to get used to discover colors in Arsham's art, his first colored exhibition caused great admiration.¹¹⁴ However, above all, the awareness that a color-blind artist dares to approach colors seemed particularly spectacular for the viewers of Arsham's art.

The reactions to the art of Arsham and Sims are more homogeneous than the reactions to Harbisson's art, which lead to a certain controversy among the viewers. The reactions vary, when it comes to the acceptance of

115 DESIGN INDABA, "Cy-

cyborgism, which is, according to Harbisson an art form of itself. The skepticism that arises from the public is not only due to the connection between the technology and the human body, but also due to the fear that art could, in the future, develop into an undesirable direction which could be ethically questionable. Harbisson, however, represents a different point of view: "People think that when we are merging with technology, we become less human, and becoming less human is bad. I don't think to become less human is bad."115 Nevertheless, in public life some people react to his newly acquired organ with confusion. They cannot associate his antenna with any direct function because the object appears strange to them. Harbisson himself has got used to his implant for a long time and thus he no longer sees any difference between an implant and an organ: "Only people remind me that I have an antenna."116 Although his physical and mental adaptation to his antenna was no great challenge for him, he saw the actual challenge in the social effects: "What really changed is, I had to get used to social reaction."117 Accordingly, Harbisson sees his antenna almost

Even if the enthusiasm to cyborgism is divided among people, the reactions are relatively homogeneous, when Harbisson shows people what he is capable of doing and how his antenna enlarges his ability of perceiving colors. Here again, like it is the case for Meghan Sims, people

as an interesting social experiment by examining how

the audience perceives unknown technology. 118

first develop a form of disbelief develops first, which then quickly turns into astonishment.

2/2/ THE RELEVANCE OF PRIOR KNOWLEDGE

IN WHAT WAY DOES THE KNOW-**LEDGE OF AN OBSERVER REGARDING THE DALTONISM OF** THE ARTIST HAVE AN INFLUENCE ON THE PERCEP-TION OF A **DALTONIC WORK** OF ART?

In what way does the knowledge of an observer regarding the daltonism of the artist have an influence on the perception of a daltonic work of art? Do viewers need to be aware about the artist's color-blindness in order to understand the work and must a color-blind artist publicly reveal his deficit in order to make his art receptive? When looking for answers to these questions, it is important to keep in mind that the viewer's knowledge about the limited visual perception of an artist could lead to a distorted objectivity and a prejudgment about the artist's artistic skills. Accordingly, the view is widely held that in order to simply perceive an artwork from a daltonic artist, one does not need to have foreground knowledge about the artist's color-blindness. This may, however, be different if a viewer wants to develop a deeper understanding about the artwork and the circumstances under which it was created. This reasoning whether their art has to be understood in connection with their disease inevitably leads us to the essential question in art: Does art have to be understood? As the answer to this question (if there is one) could fill the pages of a separate paper, the underlying thesis aims to refer solely to art as a form of ex-

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BAD."

THAT WHEN

116 FREETHINK, "The Cyborg Artist Who Hears Color", youtube, (2020), https://www.youtube.com/ watch?v=an_Qc0Q1MHE& list=WL&index=17&t=6s, accessed August 2020.

117 FREETHINK, "The Cyborg Artist Who Hears Color", youtube, (2020), https://www.voutube.com/ watch?v=an_Qc0Q1MHE& list=WL&index=17&t=6s, accessed August 2020.

118 FREETHINK, "The Cyborg Artist Who Hears Color", youtube, (2020), https://www.voutube.com/ watch?v=an_Qc0Q1MHE& list=WL&index=17&t=6s. accessed August 2020.

119 CARPENTER, Kim. "Playing with Perception: A Arsham", sculpture, (2014), https://www.sculpture.org/documents/scmag14/dec_14/ fullfeature shtml, accessed August 2020

pression that can be both understood or interpreted. But for some artists, their color-blindness plays an essential role in their art. Therefore, as a viewer in cases like these. one would have to know about the daltonic visuality in order to comprehend the total work of art in relation to the artistic context.

With regard to artworks by Daniel Arsham, whose art revolves primarily around the subject of futuristic artifacts, an understanding of his color-blindness does not seem to be a prerequisite for being able to follow his artistic intentions. When Arsham used colors, they always played a secondary role in his work and were mainly tied to the choice of the material processed. For a long time Arsham did not assign a major artistic role to the colors. For that reason, it would certainly be wrong to influence the viewer's interpretation of the works by pointing out Arsham's color blindness. As Arsham himself did not give the colors in his works much value prior to his experience with his glasses, viewers would possibly attach a higher significance to colors than he does. Even if he has used more colors in his works due to the knowledge he gained through his glasses, art enthusiasts do not need to know that he is color-blind in order to interpret or to understand his artworks. This contemplation is mainly explained by the fact that Arsham's intentions in his work, namely the disruption of people's reference for a recognizable object, take place detached from the colors used. 119

matic level. Therefore, for a viewer to understand both the creation process of her work as well as her artistic statements, it seems to be elementary to be informed about Sims' daltonism. However, it needs to be mentioned that from a visual point of view with regard to the processing of colors and the detail of the images, Sims' impairment is hardly noticeable. By comparing Sims' black and white works with her colored works one can say that, without any knowledge about her visual condition, it is certainly easier to interpret the work that is proceeded in black and white. In terms of content, these images are easier to understand because they realistically depict her visual limits. In order to be able to read her colored works, however, prior knowledge about her daltonism seems to be crucial for the viewing process of the audience. This is the case because here it is not only about what is visually depicted, but it is about Sim's attempt to live up to our colored vision. In her colored paintings, Sims manages to use colors in a way, that makes her color-blindness hard to notice for someone who is not aware of her deficiency. Sims tends to confuse greens and reds, such as blues and oranges, as these colors are complementary colors and have a very similar visual greyscale for Sims, but other than that, no major differences are visible regarding her color choice, in comparison with her photographed view. For this reason, it also seems to be important for Meghan Sims herself to provide the viewer with a certain point of reference, as at exhibitions she often hangs the original

color-blindness not only on a creative but also on a the-

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photo next to the finished work for comparison. 24 Regarding the above-mentioned idea of visual parallel worlds, it is interesting to analyze which parallels arise here. While the viewer with normal vision can define the photo as their own visual parallel, neither the painted picture nor the photography is a real representation for Sims, as she cannot perceive either of them in real colors.

Harbisson's sonochromatic artworks have to be understood in context of his new sensory perception. Merely exhibiting Harbisson's art without conveying the process of creation, makes his colored records appear as simple records and his colored images (e.g. Für Elise (no date)) as simple color squares instead of a musical composition. A viewer's exploration of Harbisson's artworks through simple visual perception and without prior knowledge about his visual impairment would put the proceeded colors in the center. A comparison of colors among different creations as well as a comparison of different creations themselves would be a logical approach to analyze Harbisson's art. However, for the artist it was never just about simple comparisons of colors and color combinations. Harbisson's main interests lies in the relationship between color and sound as well as the process of hearing colors and visualizing sound. Due to the fact that Harbisson has no visual understanding of colors he was never able to develop a feeling of how colors harmonize or discord together. His color perception is purely acoustic. For this reason, without any knowledge of his

color-blindness, one would reduce Harbisson's art to the simple color composition. Prior information about Harbisson's color-blindness enables the viewer to develop an awareness for the designed sense and an understanding of how a totally color-blind artist can develop a perception of something that is invisible to him. Thus, this information provides access to Harbisson's artistic intentions, which one would miss without prior knowledge. Moreover, besides that reasoning, it also enables the viewer to understand how art is currently being redefined and in which direction it could possibly develop in relation to the boundaries that art has long since broken down.

To conclude, for Sims and Harbisson, it seems elementary that the viewer perceives their artworks in the context of its artistic aura. For Meryon's art, on the other hand, prior knowledge does not appear to be necessary in order to be able to interpret the works and understand them holistically. Due to the fact that Meryon worked in black and white and his thematic representations are not related to his visual impairment, his daltonism is not the central subject of his art. Therefore, an understanding of the targeted selection of Meryon's art can be developed without a context to his color-blindness.

"THE ORDER OF

IS A MIRROR OF ITS TIME"

PRACTICALLY AND CONCEPTUALLY.

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2/3/ A CHANGE IN UNDERSTANDING THE ARTS

While daltonic artists in former times felt that they had to adapt to art forms where color was not a central part of their work, daltonic artists nowadays often integrate color into their creative process. From this observation and due to the fact that since the 19th century artists have used color more for the impression it can translate rather than using color for its figurative qualities, one could assume that the importance of colors in art has changed over the last decades. However, to be able to draw a historical comparison and to analyze how the viewer's perception of daltonic art has changed, it is important to bring the comparison into temporal context.

In this context, the art historian Alexandra Loske is of the opinion that: "The order of color, both practically and conceptually, is a mirror of its time". The understanding of colors has changed over in the past centuries mainly on the basis of research by scientists. The English Scientist Isaac Newton was among the first to analyze the relationship between light and color. His initial experiments led him to the discovery of the visible spectrum of light, which he published in his book Opticks in 1704. 121 . 35 Newton's color theory was followed by a number of other theoretical approaches of scientists and artists who all tried to explain colors in relation to each other. Interestingly, the significance of color seems to have changed around this time. Against this background, Alexandra



122 LOSKE, Alexandra, Color A Visual History, United Kingdom, ILEX, 2019, p.13. 123 LOSKE, Alexandra, Color A Visual History, United Kingdom, ILEX, 2019. 124 Note: Entomology is the scientific study of insects. 125 RAVIN, James, ANDERSON, Nancy, LANTHONY, Philippe, "An Artist with a Color Vision Defect: Charles Meryon", Survey of Ophthalmology, vol. 39, 1995, p. 405.

126 LOSKE, Alexandra, Color A Visual History, United Kingdom, ILEX, 2019.

Loske argues: "For centuries it had been considered inferior in the hierarchy of the elements of art. By the end of the eighteenth century, however, color had become a standard element in aesthetic discourse, teaching and academic publications, although colore had not quite achieved the same status as disegno [line drawing]."122 The first printed color circle was published in 1708 in the Traité de la peinture en mignature by the artist Claude Boutet. 123 Color theories, color wheels and Nomenclatures of scientists, artists, chemists and entomologists 124 like Moses Harris . 37, Johan Wolfgang von Goethe . 38, Abraham Gottlob Werner . 39 & 40 & 41 or Eugène Chevreul, followed, which have all shaped our understanding of color throughout the centuries. When analyzing Meryon's art, one notices that he started to paint in oil in the 1840s before moving on to his first engraving La sainte face in 1849. From his creative period during which he painted in oil, only the colorful painting *Ghost ship* from the 1840s remains. The picturesque capturing of ship scenes was thematically related to Meryon's experiences as a member of the French Navy. 125

In relation to aesthetic ideas of beauty and the "sublime", multiple artists and philosophers expressed their understanding of color. Accordingly, the writer and philosopher Edmund Burke wrote a chapter on "Colour considered as productive of the sublime" in his work *A Philosophical Inquiry Into the Origin of Our Ideas of the Sublime and Beautiful* in 1757.¹²⁶ Alexandra Loske took this phenome-

non as a basis for further analyses and explains: "While beauty was a standard that could be identified, measured and even created, the concept of the sublime described a more elusive reaction; an impression of grandeur, awe and fear. It encompassed things that were both fascinating and threatening, impressive and untamable, for example vast mountain ranges, storms and darkness."127 In this context, the Englishman William Turner produced the work Steamship in Snowstorm . 42 in 1842, almost at the same time as Meryon painted his last remaining colored work Ghost Ship . 43. In his paintings, William Turner has literally set the color matter in motion. He painted his own experience of the storm after he had admired the spectacle for several hours tied to a mast. 128 The works of these artists were shaped by their atmosphere and mood, brought about by light in interaction with the color expression. 129 An expression that artists mastered perfectly in a much more pronounced way than Meryon ever did.

While Turner's work is characterized by a depth and variety of colors which allows him to depict the feeling of the storm very concisely, Meryon's painting seems to be dominated by a distinct yellow-blue color tinge. This tinge is observable in the sky, the sea, as well as in the reproduction of the ship. Although Meryon's choice of perspective is guite successful, the color selection does not seem to reflect the impact of the storm. The clouds which appear lilac, together with the yellowish tinge create the impres-

sion of a sunset and not of a sea storm. An effect that certainly could not have matched Meryon's intention. Consequently, one could claim that Meryon was in a way defeated by color.

Turner and Meryon can be attributed to the romantic era of their respective country. For Turner, color in relation to light became the subject of his art, which made him an influencer of impressionism.¹³⁰ Unlike other artists who focused primarily on the form of objects, impressionists, attempted to capture fleeting sensory impressions using light and color. Through their way of working they increasingly abandoned the literary themes that museums and academies in particular cultivated. With the further development of art the neo-impressionists were especially interested in the newly researched scientific principles of optics and color. 131 Their work often grounded in research that dealt with Eugène Chevreul's theory of colors, a chemist who studied the interaction of colors and who is known today as "the most important and influential European color theorist of the later nineteenth century" 132.133 Chevreul was the first to realize that color combinations had different effects on our visual perception. Based on this insight he has created his laws of simultaneous contrast which, as no other theories, have later influenced several people from creative industries. 134 Instead of concentrating on colorants and materiality Chevreul focused purely on the human color perception. In 1839, he published his main findings in his work De la loi du contraste

130 HAHNE, Robert, KLIMA, Sigrid, PARTSCH, Susanne, RACHOW, Gerlinde, REZAC, Susanne, MAYER. Stefan, SOCKERL, Thomas, Kammerlohr Epochen der Kunst, Von der Renaissance bis zum Jugendstil, München, Oldenbourg Schulbuchverlag, 2015.

131 BITTERER, Maja, HAHNE, Robert, LEHNER, Günther, MAYER, Stefan, RACHOW, Gerlinde, REZAC Susanne, WEBER, Felix, Kammerlohr Epochen der Kunst, Von der Moderne zu aktuellen Tendenzen, München, Oldenbourg Schulbuchverlag,

132 LOSKE, Alexandra, Color A Visual History, United Kingdom, ILEX, 2019, p. 90. 133 BITTERER, Maja, HAHNE, Robert, LEHNER, Günther, MAYER, Stefan, RACHOW, Gerlinde, REZAC Susanne, WEBER, Felix, Kammerlohr Epochen der Kunst, Von der Moderne zu aktuellen Tendenzen, München, Oldenbourg Schulbuchverlag,

134 LOSKE, Alexandra, Color A Visual History. United Kinadom, ILEX, 2019.

Color A Visual History, United Kingdom, ILEX, 2019, p.30. 128 HAHNE, Robert, KLIMA, Sigrid, PARTSCH, Susanne, RACHOW, Gerlinde, REZAC, Susanne, MAYER, Stefan, SOCKERL, Thomas, Kammerlohr Epochen der Kunst, Von der Renaissance bis zum Jugendstil, München Oldenbourg Schulbuchverlag, 2015 129 HAHNE, Robert, KLIMA, Sigrid, PARTSCH, Susanne, RACHOW, Gerlinde, REZAC, Susanne, MAYER, Stefan, SOCKERL, Thomas

2015.

127 LOSKE, Alexandra,

Kammerlohr Epochen der

Kunst, Von der Renaissance

bis zum Jugendstil, München,

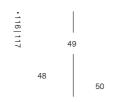
Oldenbourg Schulbuchverlag,

43

Kingdom, ILEX, 2019, p. 96.
138 BITTERER, Maja,
HAHNE, Robert, LEHNER,
Günther, MAYER, Stefan,
RACHOW, Gerlinde, REZAC,
Susanne, WEBER, Felix, Kamerlohr Epochen der Kunst,
Von der Moderne zu aktuellen Tendenzen, München,
Oldenbourg Schulbuchverlag,
2013.

simultané des couleurs (The laws of simultaneous contrast of color). In further publications he explored the effect of colors in relation to different backgrounds .44 by partly painting by hand in combination with the relatively new form of lithography printing. In his atlas of *Cercles Chromatiques* from 1839 Chevreul studied the development of colors from complete brightness to almost complete darkness. 45 This atlas, that was reprinted multiple times, represents the most sophisticated ever printed publications on color due to its numerous different tints. In masterpiece of color-printing in the later nineteenth century.

Around the same time as the achievements of Chevreul in color theory, art in the nineteenth century had developed in such a way that it had become more and more an expression of artistic personality. Consequently, this expression has therefore primarily influenced how an artist is appreciated and perceived by viewers. This artistic approach was mainly shaped by the three pioneers of modernism, Cézanne, Gauguin and Van Gogh. 138 Against the background of this paper, it makes sense above all to highlight the approaches of Paul Gauguin and Vincent Van Gogh as they added a subjective symbolism to colors, which was later adopted by Franz Marc in expressionism. As a formative example from 1894 Gaugin can be cited, who worked in his creation Mahana no atua, with the color pink in order to represent the sandy soil. Such implementations can also be seen in artworks like RouANY HISTORICAL DEVELOPMENT IN THE HISTORY OF ART HAS THEREFORE HAD AN INFLUENCE ON COLOR, HOW IT IS USED, BUT ALSO HOW IT IS PERCEIVED BY THE VIEWER.



139 BITTERER, Maja, HAHNE, Robert, LEHNER, Günther, MAYER, Stefan, RACHOW, Gerlinde, REZAC, Susanne, WEBER, Felix, Kammerlohr Epochen der Kunst, Von der Moderne zu aktuellen Tendenzen, München, Oldenbourg Schulbuchverlag, 2013.

140 BITTERER, Maja, HAHNE, Robert, LEHNER, Günther, MAYER, Stefan, RACHOW, Gerlinde, REZAC, Susanne, WEBER, Felix, Kammerlohr Epochen der Kunst, Von der Moderne zu aktuellen Tendenzen, München, Oldenbourg Schulbuchverlag 2013.

141 BITTERER, Maja, HAHNE, Robert, LEHNER, Günther, MAYER, Stefan, RACHOW, Gerlinde, REZAC, Susanne, WEBER, Felix, Kammerlohr Epochen der Kunst, Von der Moderne zu aktuellen Tendenzen, München, Oldenbourg Schulbuchverlag, 2013.

Gogh, who resorted to fire-like colors to paint the fields as well as to yellow and blue tones to represent the pasture. Similar art tendencies developed a short time later with the abstract expressionists in America, caused by the social ruptures in World War II and the profound renewals that followed. 139 The trend in color field painting in which color stood above form for good, is particularly noteworthy here.¹⁴⁰ In the context of this movement the artists mainly focused on the effect of the color as an artistic tool. The magically charged atmosphere emanating from paintings like those by Mark Rothko or Barnett Newman was created solely by the colors themselves. 141 Since then, these influences have shaped our understanding of color and even caused it to change over time. Any historical development in the history of art has therefore had an influence on color, how it is used, but also how it is perceived by the viewer. As a result, we have developed a broader understanding for colors that is not only bound to objects but also integrated in figurative representations. Consequently, the viewers have accepted the representation of color detached from the object. This effect can be observed for instance in the paintings Gaukel Green (2016) .48 and Multicultural texter (2016) .49 from Meghan Sims. In both paintings the artist used a green tone for the figures and their skin tones. However, this is probably an unconscious color decision as Sims often confuses the grey values of orange and green because they appear very similar to her. Nevertheless, here, the

te avec cyprès et ciel étoilé (1890) . 47 from Vincent Van

51

142 LOSKE, Alexandra, Color A Visual History, United Kingdom, ILEX, 2019. 143 LOSKE, Alexandra Color A Visual History, United Kinadom, ILEX, 2019

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viewer accepts the artist's color decision and regards the color usage as an aesthetic choice. The same is the case for the selected grey tones of the woman's skin color in the painting Wrong Way (2016). ... In the same vein, another example would be the work Lunar Cycle from 2017 of Daniel Arsham in which the shadows of the moon are represented in a strong blue tone. .51

Differences in our understanding of color have evolved, but not only as one would wrongly assume, through influences in art and science. Developments in the fields of technology and printing have contributed to the fact that we were always offered new possibilities in terms of color use and color perception. This has consequently led to new artistic possibilities due to an extended connection between colors and art. Specifically, technological developments in art have made it possible to create new forms of reproduction, which was among others illustrated by Thomas E. Griffits' book The Technique of Colour Printing by Lithography 1940.142 . 52 Such pigment and print developments made it possible to overtake manual hand-coloring, as Abraham Gottlob Werner had done in 1814, in order to be able to print Color Identification Systems, such as the Munsell Color System . 53 in 1915 or the Villalobos Colour Atlas . 54 in 1947 as well as the wellknown Pantone Matching System in 1963. 143

In addition to new forms of reproduction, however, photography also developed as a medium that was able to

assert itself more and more in art. Although the first color photography was shown in 1861 by James Clerk Maxwell, it was not until the 1970s that color photography became popular in art.¹⁴⁴ The use of technology for artistic creations was henceforth an integral part of art.

It is therefore not surprising that several decades later an artist like Harbisson turned to technology to further develop his understanding of colors. Even though Harbisson claims to not actually hear color but to rather feel color (as his new sense works through bone conduction), various forms of perceiving colors, other than through our visual perception, have already been subject of artworks from different artists such as Wassily Kandinsky or Robert and Sonia Delauney. Although they investigated the synesthetic aspects of color and music, while Harbisson differentiates his color perception from synesthetic perception, the works of these artists, to a certain extent, already affected the audience. Therefore, Harbisson's color perception alone is not shocking. What makes people feel insecure about Harbisson's use of his implant is the ethical aspect regarding the merging connection between humanity and technology. However, this question would thematically open a bottomless pit, which would go beyond the scope of the topics dealt with in this study.

144 SCHWENDENER. Martha, "Tracking the Rise of Color on Film", nytimes, (2010), https://www.nvtimes. com/2010/08/08/nyregion/08artsni.html, accessed September 2010.

Summarizing, it can therefore be assumed that due to the previously mentioned influences of research carried out by artists and scientists on the basis of color analy-

145 FAVRE, Antoine, Pronostic du Daltonisme, Lyon, Imprimerie du salut public.

sis, but also due the artistic context of the last two centuries as well as the technological advancements, it can be concluded that the social requirements of color in art have changed. Impacts like these brought about a greater value for color in art worldwide. Consequently, this has led to a further understanding of the artist's handling of color and suggests that the acceptance the public side, regarding daltonic art, had steadily increased.

2/4/ HINDRANCE OR VIRTUE

Various professions such as the navy and aviation have been inaccessible to daltonists since the discovery of color-blindness.145 In art industry this diagnosis is not so devastating and therefore many artists have tried to live and work with the diagnosis or to circumvent it. This paper has in the previous paragraphs shown which instruments artists use to deal with their color-blindness as well as how artworks from color-blind artists are received by the public. One question, however, remains unanswered: Is color-blindness an obstacle or a driver to artistic success?

Many artists would certainly agree that the success of their art in a certain aspect can be measured by the acknowledgement and appreciation of the public, although these forms of recognition are subjective. Another aspect that cannot be ignored is the emotional value of a

work of art for an artist. Thus, considering this variety of different factors on which the success of art can be determined, it is not presumptuous to claim that there are several views on the evaluation of success in art. While one artist might place a higher value on the monetary valuation of his artworks, another one might prefer the interpersonal and emotional assets related to his creations. Accordingly, although there exists no straightforward formula to measure artistic success uniformly, it is not impossible to investigate how the four artists analyzed in this paper define the success of their art and to what extent the works created by these daltonic artists can be considered successful.

"[T]HE PUBLIC IS **NOT VERY** RECEPTIVE TO **WORK OF THIS** KIND, OF WHICH THE USEFUL-NESS. HOWEVER. I DO NOT THINK CAN BE DOUBTED."

With regard to the artistic work of Charles Meryon, it is well-known that the public interest and appreciation towards his creations was very limited during his lifetime. The artist, who due to his color-blindness increasingly devoted himself to engraving, has repeatedly mentioned in letters how much he would like to see his work recognized by a large audience: "[T]he public is not very receptive to work of this kind, of which the usefulness, however, I do not think can be doubted."¹⁴⁶ Accordingly, it seems that the artist's personal artistic success is mainly based on the appreciation and recognition of his viewers. His personal satisfaction could also not be changed by the fact that, in contrast to the grand public, famous art enthusiasts and scholars tended to appreciate his creations: "Meryon is known only to the elite, and the public ignores

146 GEFFROY, Gustave, Charles Mervon, Paris, H. Floury Éditeur, 1926, p. 78

147 VAUXCELLES, Louis "La Semaine Artistique",

L'Ère nouvelle. October 1923. (no pagination).

Note: Original quotation translated by the author.

"Puisque vous connaissez M. Meryon, dites-lui que ses

splendides eaux-fortes m'ont ébloui sans la couleur, rien

qu'avec l'ombre et la lumière. le clair-obscur tout seul et

148 GEFFROY, Gustave, Charles Meryon, Paris, H.

Floury Éditeur, 1926, p. 24 Note: Original quotation

translated by the author. "Dans les arts comme

rebuter de l'insuccès." 149 FROLLO, Jean, "Vernissage", Le Petit Parisien, May

1883, (no pagination). 150 GEFFROY, Gustave,

Charles Meryon, Paris, H. Floury Éditeur, 1926.

Floury Éditeur, 1926, p. 36.

"Dans le moment présent, je ne suis pas très heureux,

je ralingue passablement; mais j'ai encore un assez bon

fond de philosophie pour me mettre au-dessus de toutes

ces petites misères qui peuvent ne pas être éternelles. Je

trouve de la consolation dans mon travail. Je me dis que si ie

n'avais pas quitté la marine, je

serais probablement encore

152 GEFFROY, Gustave,

Charles Mervon, Paris, H.

Floury Éditeur, 1926, p. 78.

moins heureux."

Note: Original quotation translated by the author.

151 GEFFROY, Gustave, Charles Meryon, Paris, H.

partout, la persévérance est de rigueur, il ne faut pas se

livré à lui-même : [...]".

his work as well as his name."147 Although Meryon equated the lack of public recognition with failure, the artist had not given up working: "In the arts as everywhere, perseverance is essential, one should not be discouraged from failure."148 Since it is conceivable that the monetary value of art is generally related to the appreciation and exaltation of the audience that is willing to pay, it is not surprising that Meryon was only able to sell his art at low prices during his lifetime. 149 This realization filled Meryon more and more with bitterness and led him to criticize the development of art in which the price and not the profound sense of an artwork turned out to be the central measure of success. 150 Consequently, confronted by the lack of recognition at both inclination and financial level, the artist had increasingly fallen into a mental deep that made him think he was an unsuccessful artist as, due to his color-blindness, he could not give the public what they expect from art: "In the present moment, I'm not very happy, I'm pretty much on the ropes; but I still have a good enough philosophical background to put myself above all these little miseries that may not be eternal. I find consolation in my work." 151 Although Meryon did not receive the recognition he desired during his lifetime and even if he himself occasionally considered his art as unsuccessful¹⁵², it can still be said that Meryon goes down in history as a pioneer who struggled with daltonism at a time when daltonism was a rarely discussed subject. Compared to the other artists analyzed in this

paper, who live in an age where they can use antennas,

glasses and rely on open exchanges with like-minded people, Meryon was left to his own and could only adapt his art completely to his visual impediment. The fact that this led him to devote himself to engraving rather than the colorful painting, which was most popular that time, does not necessarily mean that he was an unsuccessful artist, but perhaps that society at this time was not prepared to appreciate his form of art. This argumentation finds support in the fact that, in retrospect, art historians such as Harold J. L. Wright nevertheless valued Meryon's works as unique: "By the intensity of his vision, and scarcely less by the completeness of his performance, he goes down to later ages in association with Rembrandt and Dürer. Doubtless there are limitations to the things he saw and felt. His great plates are few in number — his whole work comprised only a hundred and two etchings — but how unique are his best, how arresting, how certain, how unforgettable! As Wedmore says: "Of the vast field of art Meryon tilled but a corner. But with what result!"153

In comparison to Charles Meryon, who did not personally experience success during his lifetime, the three contemporary artists Sims, Arsham, and Harbisson seem to have a certain success with their art already during their lifetime. While Meryon did not face his illness directly and tried to avoid it by changing the medium of art, the other three have concretely dealt with their visual impairment and tried to find instruments that enable them to

153 WRIGHT, Harold J.L., "Three Mater Etchers: Rembrandt, Meryon, Whistler: Lecture II. The Etchings of Charles Mervon (1821-1862)". Journal of the Royal Society of Arts. vol. 78, n° 4060, September 1930, p. 1084.

recognize and reproduce colors in the best possible way. Through this approach, which has certainly been facilitated by the technological progress of today, Sims and Arsham were able to overcome their visual deficiency. By integrating their color-blindness into their art rather than bypassing it, they have been able to develop and shape an unmistakable new art style that is difficult to imitate. Aware of the complexity of colors but eager to implement them in a way it is hardly noticeable to the public that she is totally color-blind, Sims has managed to deal with her deficit and to establish her art in the art world. Through practice and dedication as well as the development of a processing method that gives her an understanding of the colors she cannot actually see, Sims has succeeded in overcoming her color-blindness. She has managed to transform the deficiency into her strength and created and inimitable artistic value in her art.

Daniel Arsham, who was already internationally recognized for his art that he exhibited all around the world, was not afraid to openly identify as color-blind. 154 The artist, who has never seen his daltonism as a real barrier but rather as a challenge to discover things he could not perceive before, has learned how to use his handicap to stand out from the crowd and can be considered a unique artist. 155 His coming-out as a daltonic artist did not harm Arsham's success. On the contrary, when he used colors in his works for the first time, this aroused additional interest among viewers. People were curious

about how he handles colors and perceives different objects so that they could explore his art from a new angle. 156 Thereby, he has not disappointed the viewers of his art. His art is seen by many as a successful attempt to "overcome his color-blindness" as film producer Jane Rosenthal explains. In reference she describes Arsham's application of his colors through the use of his glasses to have an extraordinary depth. 157 Further, it is not presumptuous to say that Arsham can also be called successful on a personal level, since, through his curiosity in colors and the experience of the glasses, he has succeeded in transforming an initial deficit into a personal appreciation a stand-alone feature.

The recognition of Neil Harbisson's art can be seen in the fact that his works have been exhibited in various places around the world, such as the 54th Venice Biennale or various other recognized galleries and museums. 158 His extravagant appearance, which also includes his antenna, his open approach to his daltonism as well as his unique method of perceiving color through sound, have helped Harbisson to become well known in the art world. However, the artist is not only known for his unique new sense, but his work also meets with great recognition and enthusiasm among art enthusiasts. Harbisson's success comes primarily from the fact that he has developed a unique artistic expression with which he further expands the notion of color in relation to sound in art. He has succeeded in expanding his limited color perception and de-

156 SEMAINE, "Daniel Arsham Color-blind artist: In Full Color", youtube, (2016), https://www.youtube.com/ watch?v=ZCsEClia1Ck&list=WL&index=24&t=1341s accessed August 2020. 157 SEMAINE, "Daniel Arsham Color-blind artist: In

Full Color", youtube, (2016), https://www.youtube.com/ watch?v=ZCsEClia1Ck&list=WL&index=24&t=1341s. accessed August 2020. 158 AUTHOR UKNOWN

"Neil Harbisson", saatchiart, (date unknown), https://www. saatchiart com/neilharhisson accessed September 2020.

veloping an art form from it, for which he is the only artist who is able to carry it out. His unique artistic expression enables him to be invited to talks in order to bring his art closer to people. Despite initial skepticism his art impresses people every day. Furthermore, Harbisson's curiosity and his optical aberration have led him to strive for new perceptual possibilities and to further develop cyborgism as well as new body organs to create new senses and with it, new art.

CONCLUSION

This paper pursued the core objective, based on the case studies of four specific artists, to analyze the extent to which color-blind artists are affected by their visual impairment, how their approaches to face this visual deficiency differ between each other, as well as how daltonism itself is recognized in the art world. The investigated case studies reveal that the handling of daltonism in art seems to have changed over time on a personal artistic level as well as on a public awareness level. Even if color-blindness is not visible to outsiders, this visual deficiency seems to affect the personal subconsciousness of artists. The approach of contemporary artists to deal with color-blindness is in comparison to the approach of Meryon fundamentally different. Nowadays, artists have the opportunity to use tools (e.g. coding system, glasses, antenna) that enable them to expand their visual perception and actively address the problem of visual impairment by learning how to properly apply colors and how they affect normal-vision people. Thus today, artists can artistically explore differences in perception and therefore seek to create, despite their visual limitations, new ways of processing colors which result in unprecedented forms of art. Previously, however, during Meryon's lifetime, these tools were not accessible and artists had -

to find other ways to deal with their color-blindness. This led Meryon to avoid the use of color in his work whenever necessary and to turn to engraving in order to avoid working with colors.

Besides the different methods the artists have developed to deal with their color-blindness, there further arises the question of what daltonism does to artists on a psychological level. As previously discussed, one can assume that daltonic artists live in parallel visual worlds in which they can never be sure that what they see corresponds to what the public sees and vice versa. Thus, even though Meghan Sims has unquestionably developed an impressive coding system which allows her to accurately process colors, the question also arises in her case: Why an artist would create a piece of work in a spectrum they can't really see. By analyzing this question psychologically it was shown that one can assume that Sims strives for artistic recognition by painting the colors in her paintings as close as possible to the reality of the underlying photos. The fact that Sims measures her artistic talent by how the public perceives her work shows that personally she has not fully accepted her daltonism yet. In this way, the use of color in a figurative sense could be much more desirable for Sims and would offer her space for her own color interpretation and expressiveness. Nevertheless, the achievements that Sims has made as a color-blind artist are still remarkable.

WHEN RECEIVING PREVIOUSLY UNKNOWN INFORMATION ABOUT SOMETHING THAT SEEMS OUT OF OUR REACH, WE NURTURE OUR CURIOSITY FOR MORE.

Arsham and Harbisson have both shown a pronounced curiosity about the colors which they can, due to their visual impairment, only perceive distorted. This behavior is not unusual because people often develop a curiosity for things they cannot understand at first sight. When receiving previously unknown information about something that seems out of our reach, we nurture our curiosity for more. The human species constantly tries to extend its comprehension and knowledge of the unknown. However, the tools developed or used on the basis of this curiosity are not a universal remedy for every daltonic artist. As previously shown in the case of Daniel Arsham, this artist used his tool (e.g. glasses) only for a temporary period and, as a result, he now prefers to stick to his unaltered perception of things. Accordingly, Cecilia Dean explained about Arsham's change of perception: "To be color-blind and then to be given color, there's probably a double edge saw, it's not necessarily a gift. Not everyone wants another person's reality."159 The case of Arsham shows that not every physical change has to be permanent but can lead to new views which influence how one comprehends and perceives daltonism itself. Thus, his personal experience has brought rather a psychological change (e.g. the preference to keep his personal, distorted view of things) rather than an optical one, which can be just as valuable.

Even if over the past decades color-blindness in art has become more and more receivable, the question arises whether the processing of colors by a daltonic artist is

159 SEMAINE, "Daniel Arsham, Color-blind artist: In Full Color", youtube, (2016), https://www.youtube.com/watch?v=ZOsEClia1Ck&-list=WL&index=24&t=1341s, accessed August 2020.

THE PERSONAL COMMITMENT TO OVERCOME THIS VISUAL HINDRANCE CRE-**ATES NEW FORMS OF ART** AND UNPRECE-**DENTED EX-**PRESSIONS OF CREATIVITY.

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bound to limits. Although the answer is probably yes, people should be aware that these limits are constantly being pushed back due to technological progress and the personal dedication of color-blind artists. The personal commitment to overcome this visual hindrance creates new forms of art and unprecedented expressions of creativity. All three contemporary artists analyzed in this paper, have developed solutions which enable them to adapt to their visual impairment and to be successful in today's art world. Although Sarah Former, Arsham's ophthalmologist commented that even if the brain is not made for major alterations of perception, 160 Harbisson, through the implantation of his antenna, has created a new sense. His case is proof that while science and technology constantly develop, color impaired individuals are also able to surpass their physical impairments. Accordingly, in Sims' and Arsham's case, technology has also made a major contribution and plays a pivotal role regarding how daltonic artists nowadays deal with colors. The use of photography or the reference to spectrum-widening glasses was unthinkable 200 years ago. Thus, if one looks at the evolution of the handling of daltonism in art, one can relate to Maya Angelou's citation, which even though was meant figuratively, it still applies to the subject of color-blindness in art: "We are only as blind as we want to be." 161 In this sense the cases of Sims, Arsham and Harbisson are proof of how artists managed to continue their artistic work despite severe color-blindness. These artists have unique visions, which do not only allow

us to understand what they see, but also to make people see something beyond their own vision that might present them a new visual and thematical perspective.

Their approaches tempt the viewers to guestion their own perception and rethink their preconceptions and understanding of daltonism in general. Further, they were able to help color-blindness gain a new position in art. Thus, the artists' confrontation with their daltonism in art has led to a change in the consciousness (in regards to daltonism) of both themselves and the viewers. Therefore, the analysis carried out remove any remaining doubts that the contemporary artists, in contrast to Meryon, have managed to formulate strategies to overcome their deficient color perception and even to transform it into an artistic strength, or as the researcher and ophthalmologist Maureen Neitz had expressed in 1997, that color-deficient people have learned to survive in a world surrounded by people who see what they cannot. 162

COLOR-DEFICIENT PEOPLE HAVE **LEARNED TO SUR-VIVE IN A WORLD** SURROUNDED BY PEOPLE WHO SEE WHAT THEY CANNOT.

162 LANTHONY, Philippe, MARMOR, Michael F., "The Dilemma of Color Deficiency and Art", Survey of Ophthalmology, vol. 45, n° 5, April 2001, p. 409. Note: Author had no access to the original source: NEITZ. Maureen. Society and colorblindness. in 14th Biennal Eye Research Symposium, Research to prevent blindness, 1997.

160 SEMAINE, "Daniel Arsham, Color-blind artist; In Full Color", youtube, (2016), https://www.youtube.com/ watch?v=ZCsEClia1Ck&list=WL&index=24&t=1341s, accessed August 2020.

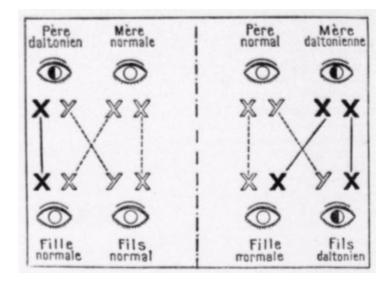
161 AUTHOR UKNOWN, "Mava Angelou Unforgettable Quotes You Should Know", pmcaonline, (2020), https://www.pmcaonline.org/ maya-angelou-unforgettable-auotes-vou-should-know/. accessed September 2020.

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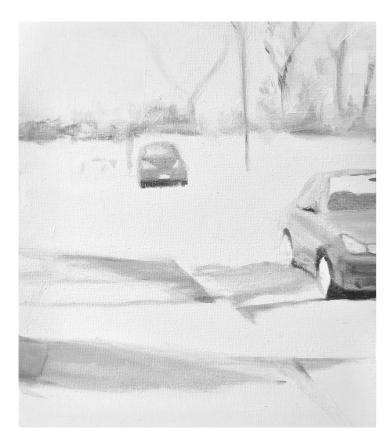
IMAGES

92%	Normal Vision	
2.7%	Deuteranomaly	
0.66%	Protanomaly	
0.59%	Protanopia	
0.56%	Deuteranopia	
0.016%	Tritanopia	
0.01%	Tritanomaly	
<0.0001%	Achromatopsia	

• 1 Daltonism chart: Normal color vision in comparison with the different forms of daltonism.



^{• 2} Visualisation of the sex-related inheritance of color blindness.



• 3 SIMS, Meghan, *Courtland at David*, 2010, oil on canvas, 25 cm × 20 cm, place of conservation unknown.



• 5 SIMS, Meghan, Breithaupt Pines, 2010, oil on canvas, 76 cm × 61 cm, place of conservation unknown.



• 4 SIMS, Meghan, Victoria Park Trees, 2010, oil on canvas, 91 cm × 66 cm, place of conservation unknown.



• 7 SIMS, Meghan, David Street at Night, 2011, acrylic on canvas, 30 cm \times 23 cm, place of conservation unknown.



• 8 SIMS, Meghan, King at Queen, 2012, acrylic on canvas, 30 cm × 25 cm, place of conservation unknown.



• 9 SIMS, Meghan, *Night Life*, 2009, acrylic on canvas, 91 cm × 61 cm, place of conservation unknown.

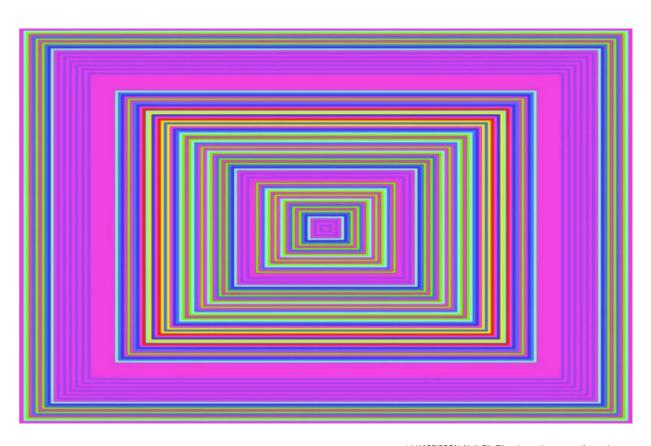






•• X

• 12 ARSHAM, Daniel, *Televisions*, 2015, selenite (left) glacial rock, crushed marble, shattered glass and hydrostone (right), 24 cm × 35 cm × 25 cm (size of one television), place of conservation unknown.



• 14 HARBISSON, Neil, Für Elise, date unknown, medium unknown, size unknown, place of conservation unknown.

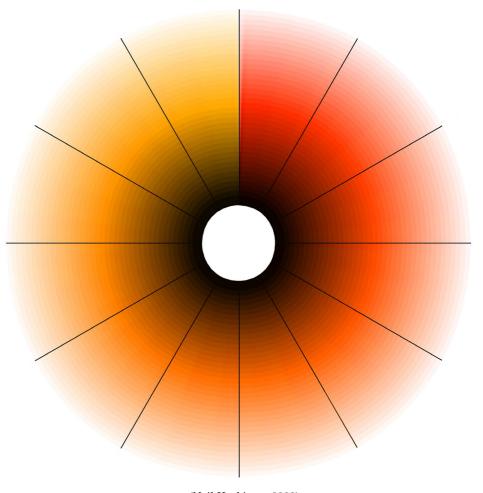


• 15 MERYON, Charles, L'Abside de Notre-Dame de Paris, 1854, etching and drypoint printed in black ink on laid paper, 16.5 cm × 29.8 cm, National Gallery of Art, Washington, D.C.



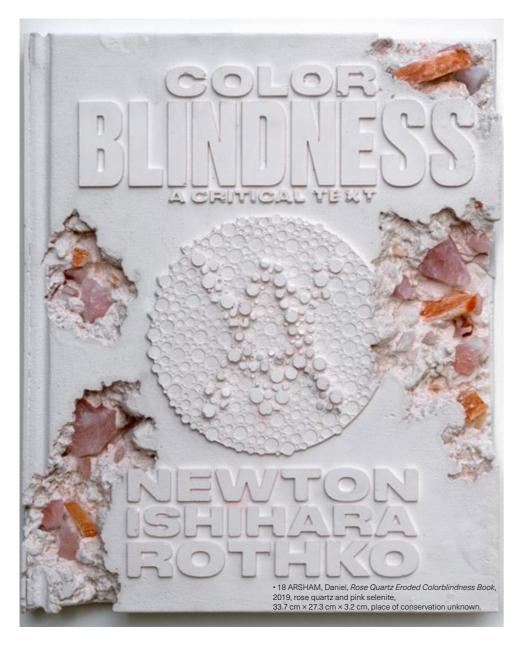
THE HUMAN COLOUR WHEEL

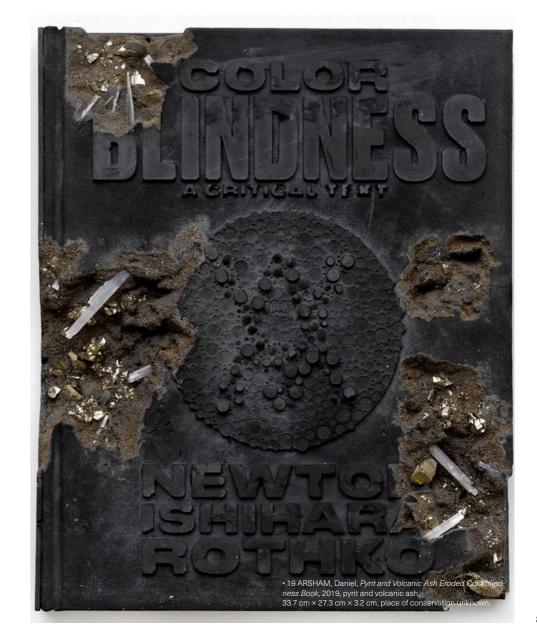
Colour wheel based on the hue and light detected on human skins.



(Neil Harbisson 2009)

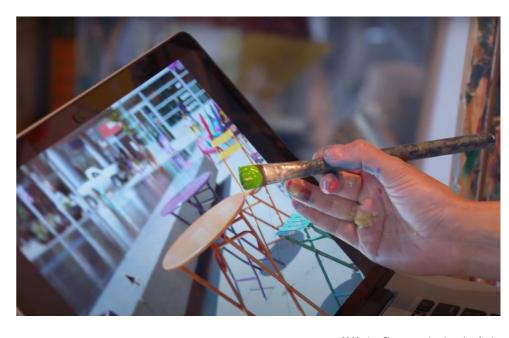
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• 23 Meghan Sims comparing the color of paint with the colors of a photo she took.

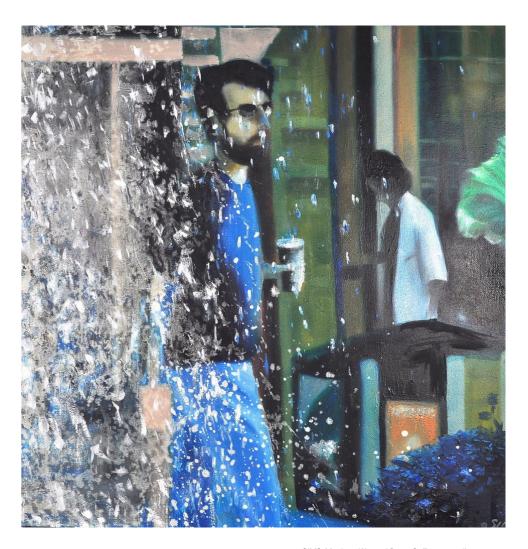


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• 25 SIMS, Meghan, Watered Down Coffee, 2016, oil on canvas, 61 cm × 61 cm, place of conservation unknown.

•• X



• 27 ARSHAM, Daniel, *Lunar Garden*, 2017, white and colored sand, size unknown, temporary exhibition at the gallery at Cadillac House New York.

 26 ARSHAM, Daniel, Lunar Garden, 2017, white and colored sand, size unknown, temporary exhibition at the gallery at Cadillac House New York.

•• X





• 29 Neil Harbisson doing a sound portrait of Judi Dench.

•• X



• 28 Neil Harbisson doing a sound portrait of Philip Glass.

• 30 Neil Harbisson doing a sound portrait of James Cameron.



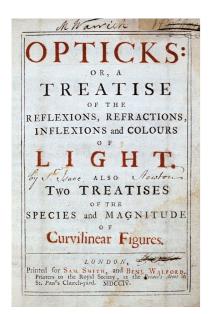




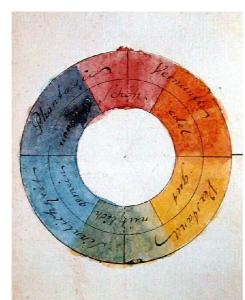
• 33 SIMS, Meghan, *Legacy Greens*, 2010, oil on canvas, 61 cm × 61 cm, place of conservation unknown.

• 34 Meghan Sims' art exhibited with the photography oft he scene next to it.

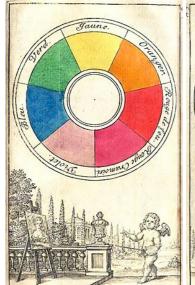


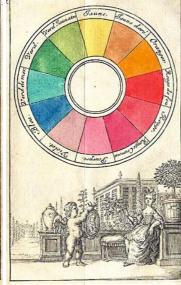


•35 Isaac Newton's Book *Opticks* on the visual colors of light, published in 1704.

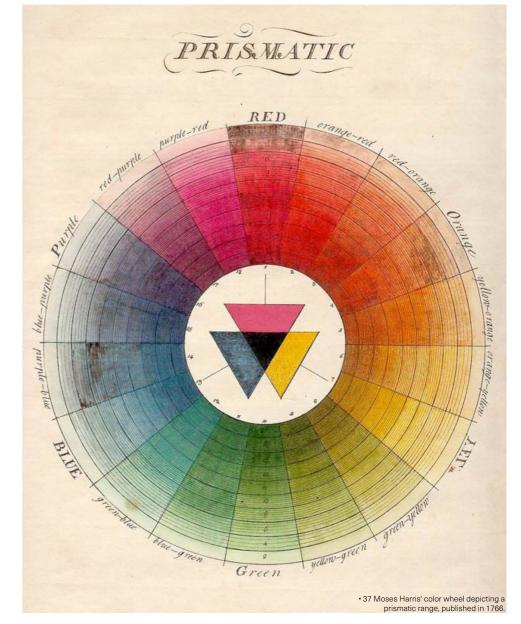


 38 Johann Wolfgang von Goethe's color wheel from 1809.





• 36 Color wheels by Claude Boutet published in 1708.



No.	Names	Colours	ANIMAL	VEGETABLE	MINERAL
24	Scotch Blue		Throat of Blue Titmouse.	Stamina of Single Purple Anemone.	Blue Copper Ore.
25	Prussian Blue		Beauty Spot on Wing of Mallard Drake.	Stamina of Bluish Purple Anemone.	Blue Copper Ore
26	Indigo Blue				Blue Copper Ore
27	China Blue		Rhynchites Nitens	Back Parts of Gentian Flower.	Blue Copper Ore from Chess
28	Azure Blue.		Breast of Emerald- crested Manakin	Grape Hyacinth, Gentian.	Blue Copper Ore
29	Ultra marine Bhue.		Upper Side of the Wings of small blue Heath Butterfly.	Borrage.	Azure Stone or Lapis Lazuli.
30	Flax- flower Blue.		Light Parts of the Margin of the Wings of Devil's Butterity.	Flax flower.	Blue Copper Ore
31	Berlin Blue		Wing Feathers of Jay.	Hepatica.	Blue Sapphire.
32	Verditter Blue				Lenticular Ore.
33	Greenish Blue			Great Fennel Flower.	Turquois. Flow Spar
34	Greyish Blue		Back of blueTitmouse	Small Fennel Flower.	Iron Earth

• 39 Extract of Abraham Gottlob Werner's Werner's Nomenclature from 1821.

Nº Names, Colours.

Tile

Hyacinth Red.

Scarlet

Aurora Red. 86

87 Arterial Blood Red

88 Red .

89

Flesh

Rose Red.

90 Peach Blossom Red.

82 Red.

83

84 Red. • 40 Extract of Abraham Gottlob Werner's Werner's Nomenclature from 1821.

Jasper.

Red

Figure Stone.

Ore.

RED.

Shrubby

Red on the golden Rennette Apple .

Large red Oriental Poppy, Red Parts of red and black Indian Peas,

Love Apple.

Red on the Naked Apple .

Corn Poppy, Cherry .

Larkspur.

Common Garden Rose .

Peach Blossom.

Pimpernel .

ANIMAL.

Breast of the

Cock Bullfinch .

Red Spots of the

Lygous Apterus Fly .

Searlet Ibis or Curlew, Mark on Head of Red Grouse .

Red Coral .

Vent converts of Pied Wood-Pecker.

Head of the Cock

Gold-finch .

Human Skin .

VEGETABLE. MINERAL. Porcelain Hyacinth . Light red Cinnaber. Orpiment . Heavy Spar, Limestone Red Cobalt

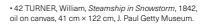
• 41 Extract of Abraham Gottlob Werner's Werner's Nomenclature from 1821.

Primrose Yellow. Pale Ganary Bird. Wild Primrose Sulphur. Pale Coloured Sulphur. Larva of large Water Beello. Semi Opal. Semi Opal. Semi Opal. Semi Opal. Mings of Goldfinch. Canary Bird. Yellow Jasmine. Sulphur. Wild Primrose Sulphur. Semi Opal. Semi Opal. Semi Opal. Semi Opal. Sellow Orpinent. Wings of Goldfinch. Canary Bird. Yellow Jasmine. Sulphur. Mings Yellow. Mings of Golden Pheasant. Tall Coverts of Golden Anthers of	No.	Names .	Colours	ANIMAL .	VEGETABLE	MINERAL
Friencese Yellow. Pale Canary Bird. Wild Primrose coloured Sulphur. Rellow. Larva of large Water Beetle. Somi Opal. Somi Opal. Lemon Yellow. Larva of large Water Beetle. Somi Opal. Sollow Station. Organent. Fillow Jasmine. Sollow Sulphur. Sollow Fallow. Sulphur. Sollow Sulphur. Theorems. Sollow Sulphur. Sollow Sulphur. Theorems. Sollow Sulphur. Sollow Sulphur. Sollow Sulphur. Theorems. Th	62					Sulphur
64 Wax Yellow. Larva of large Water Seemish Parts of Nonpared Apple. Semi Opal. Nonpared Apple. 65 Lemon Yellow. Large Wasp or Shrabby Goldulocks. Orpinnent. 66 Gamboge Yellow. Wings of Goldinch. Gamary Bird. Yellow Jasmine. Coloured Sulphur. 67 Kings Head of Golden Yellow Talip. Cinque toil.	63			Pale Canary Bird.	Wild Primrose	coloured
65 Yellow. Hornet. Goldwlocks. Orponent. 66 Gamboge Yellow. Wings of Goldwlock. Yellow Jasmine Octowed Sulphur. 67 Kings Head of Golden Yellow Thip. Cinque toil.	64				of	Semi Opal.
66 Vellow. Camary Bird. Yellow Jasmine. vollowed Sulptur. 67 Kings Yellow. Head of Golden Yellow Thilip. Canque toil. 68 Saffron Tail Coverts of Golden Anthers of	65					
Yellow. Pheasant. Conque toil. Saffron Tull Coverts of Golden Anthers of	66				Yellow Jasmine.	coloured
68	67					
Team. Daniphervella.	68	Sallron Yellow.		Tail Coverts of Golden Pheasant.	Anthers of Saffron Crocus.	

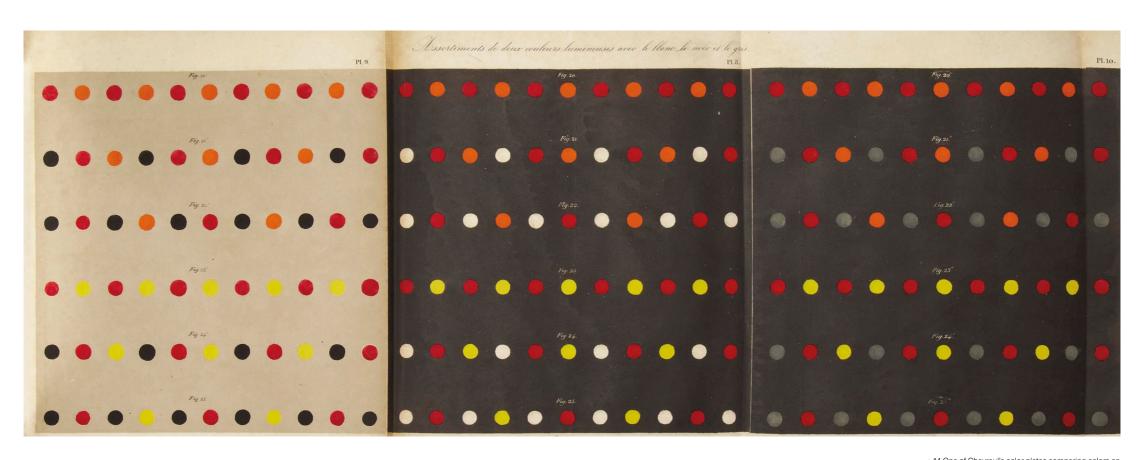
•• X



• 43 MERYON, Charles, *Ghost Ship*, date unknown, oil pastel on paper, size unknown, Musée du Louvre.



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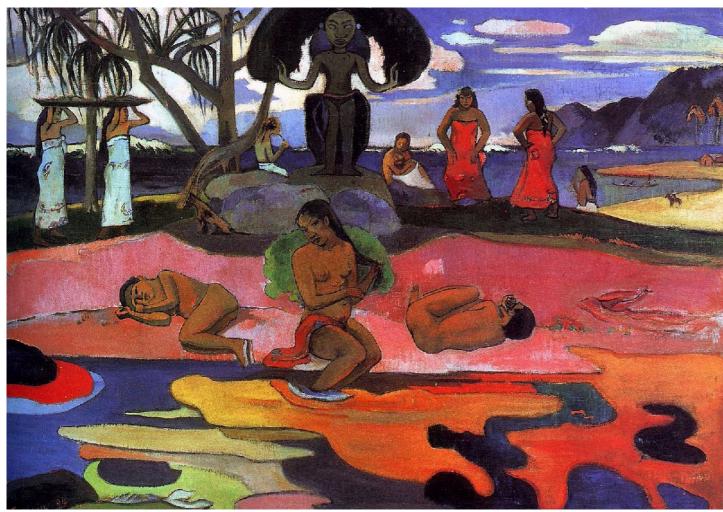


 44 One of Chevreul's color plates comparing colors on different backgrounds. From the publication De la loi du contraste simultané des couleurs from 1839.

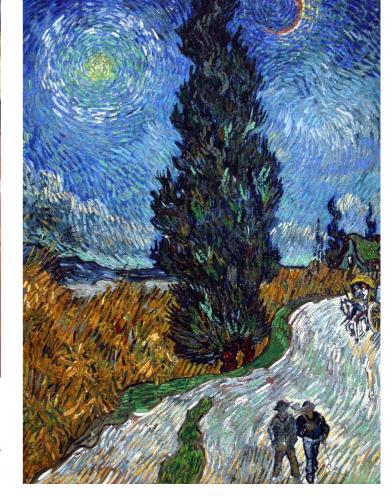
112



• 45 Chevreul's 12 graded *Cercles chromatiques* published the first time in 1839.



• 46 GAUGUIN, Paul, *Mahana no atua*, 1894, oil on canvas, 91 cm \times 68 cm, Art Institute of Chicago.



• 47 VAN GOGH, Vincent, Route avec cyprès et ciel étoilé, 1890, oil on canvas, 92 cm × 73 cm, Kröller-Müller Museum.

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• 49 SIMS, Meghan, Multicultural Texter, 2016, oil on canvas, 76 cm \times 61 cm, place of conservation unknown.





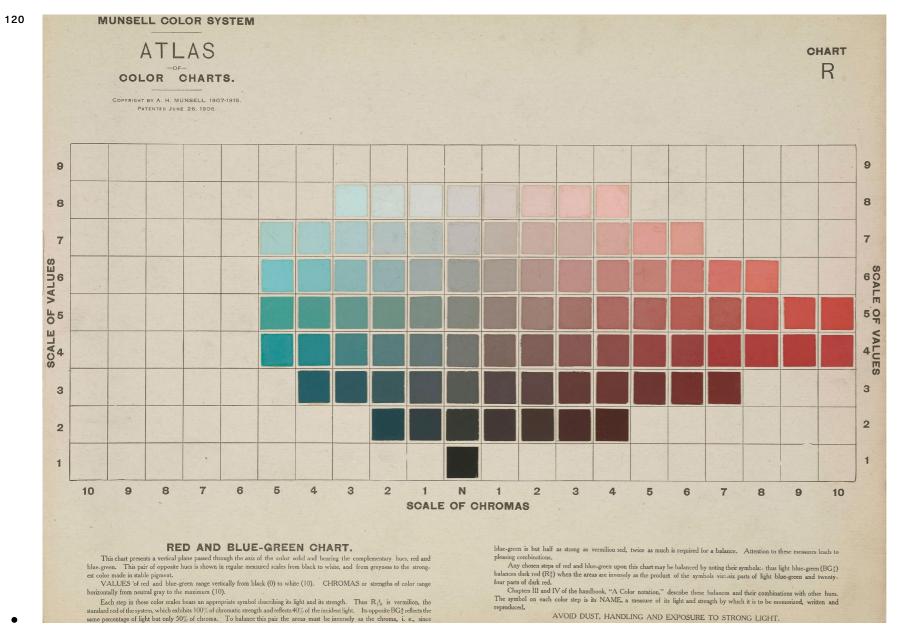
• 48 SIMS, Meghan, Gaukel Green, 2016, oil on canvas, 61 cm × 61 cm, place of conservation unknown.

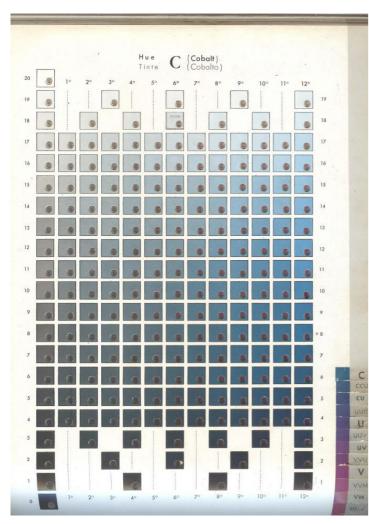




• 52 Thomas E. Griffits' book *The Technique of Colour Printing by Lithography* from 1940.

• 51 ARSHAM, Moon Phases I, 2017, material unknown, 162.6 × 162.6 × 36.8 cm, place of conservation unknown.





• 54 Extract of the *Villalobos Colour Atlas* published by Cándido Villalobos-Domínguez and his son in 1947.



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- 12 ARSHAM, Daniel, Televisions, 2015, selenite (left) glacial rock, crushed marble, shattered glass and hydrostone (right), 24 cm × 35 cm × 25 cm (size of one television), place of conservation unknown, https://www.danielarsham.com/collection/televisions
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COLOPHON

THE END OF DALTONISM AS AN OBSTRUCTION

Master Thesis

Rachel Hoffmann

Supervisor: Jérémie Cerman

HEAD MA Space andGENÈVE Communication Design

Haute École d'Art et du Design Genève

This book can be read from both sides, with the reader taking in the color perspective of a person with a normal color vision or the daltonic vision of the artist case studies from the thesis. The daltonic perspective is an anticipation of representation and does not represent the artist's real view. As this thesis explains, a real imitation of a view is impossible, as we cannot fully know what another person's color vision looks like.

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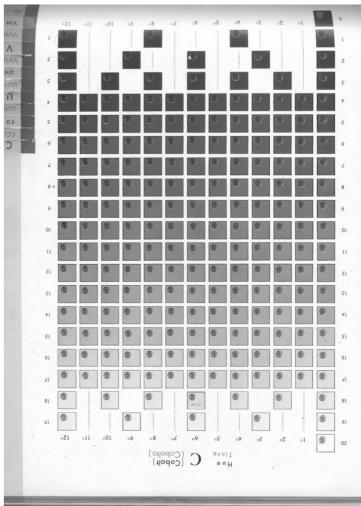
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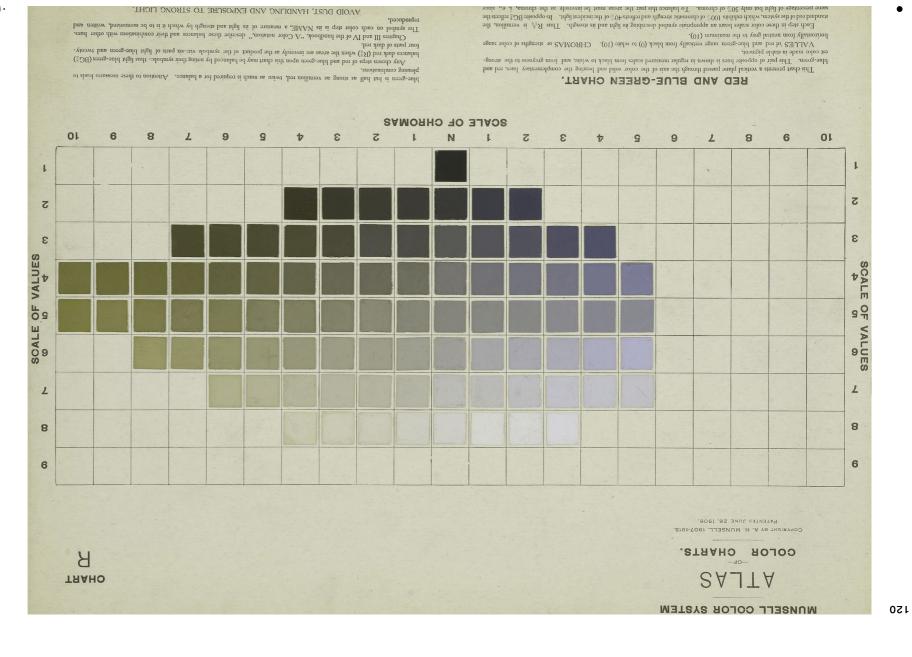
• 64 Extract of the Willalobos Colour Atlas published by Cáring of the Willalobos Colour Atlas published by



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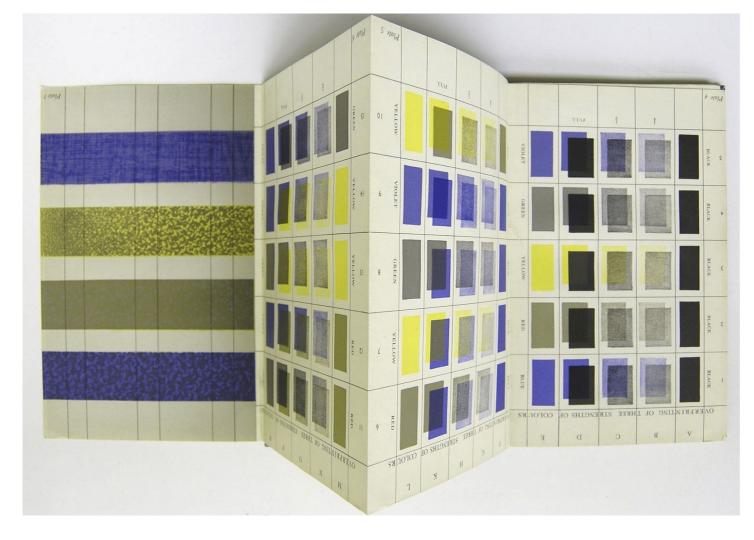
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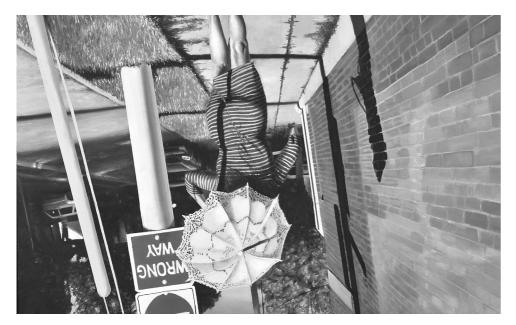
• 62 Thomas E. Griffits' book The Technique of Colour Printing by Lithography from 1940.

4 Tarana, Moon Phases I, 2017, material unknown, 162.6 × 162.6 × 36.8 cm, place of conservation unknown.





411



 \bullet 50 SIMS, Meghan, Wrong Way, 2016, oil on canvas, 76 cm \times 61 cm, place of conservation unknown.



 \bullet 49 SIMS, Meghan, Multicultural Texter, 2016, oil on canvas, 76 cm \times 61 cm, place of conservation unknown.

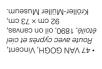


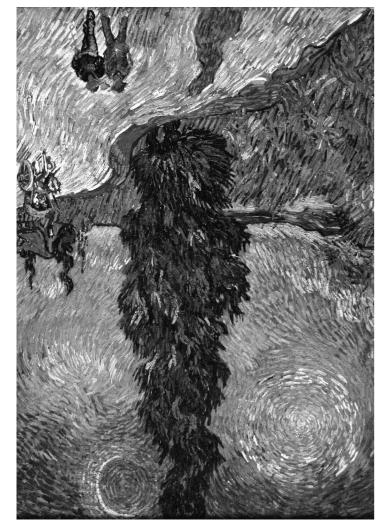
• 48 SIMS, Meghan, Gaukel Green, 2016, oil on carvas, 61 cm × 61 cm, place of conservation unknown.

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• 46 GAUGUIN, Paul, Mahana no atua, 1894, oil on canvas, 91 cm \times 68 cm, Art Institute of Chicago.

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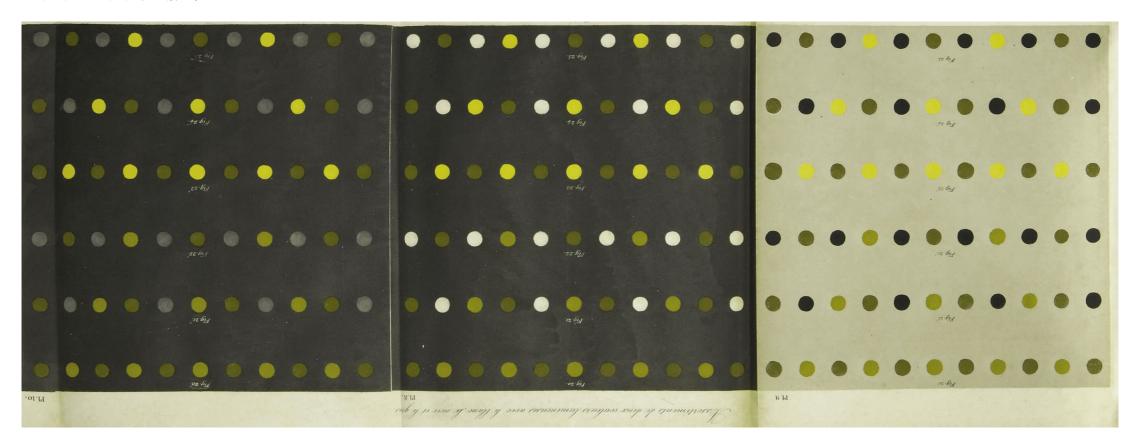
• 45 Chevreul's 12 graded Cercles chromatiques published the first time in 1839.



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• 44 One of Chevreul's color plates comparing colors on different backgrounds. From the publication De la loi du contraste simultané des couleurs from 1839.



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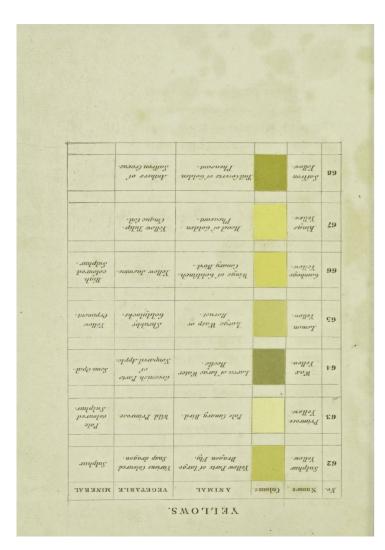
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• 43 MERYON, Charles, *Ghost Ship*, date unknown, oil pastel on paper, size unknown, Musée du Louvre.

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• 42 TURNER, William, Steamship in Snowstorm, 1842, oil on canvas, 41 cm \times 122 cm, J. Paul Getty Museum.



• 41 Extract of Abraham Gottlob Werner's Werner's Nomenclature from 1821.

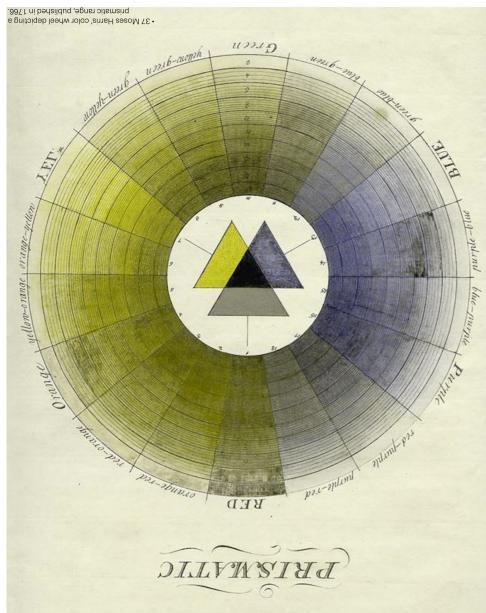
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• 40 Extract of Abraham Gottlob Werner's Werner's Nomenclature from 1821.

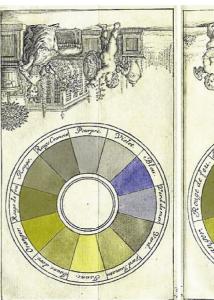
• 39 Extract of Abraham Gottlob Werner's Werner's Nomenclature from 1821.

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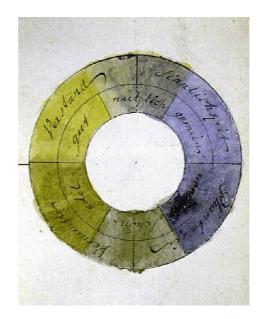


 36 Color wheels by Claude Boutet published in 1708.



Daniel States

 38 Johann Wolfgang von Goethe's color wheel from 1809.



 35 Isaac Newton's Book Opticks on the visual colors of light, published in 1704.



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• 34 Meghan Sima' art exhibited with the photography off he scene next to it.



- 33 SIMS, Meghan, Legacy Greens, 2010, oil on canvas, 61 cm \times 61 cm, place of conservation unknown.

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doing a sound portrait of James Cameron. • 30 Neil Harbisson

• 29 Meil Harbisson doing a sound portrait of Judi Dench.

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• 28 Weil Harbisson doing a sound portrait of Philip Glass.



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 Se ARSHAM, Daniel, Lunar Garden, 2017, white and colored sand, size unknown, temporary exhibition at the gallery at Cadillac House New York.

 TA PRSHAM, Daniel, Lunar Garden, 2017, white and colored sand, size unknown, temporary exhibition at the gallery at Cadillac House New York.



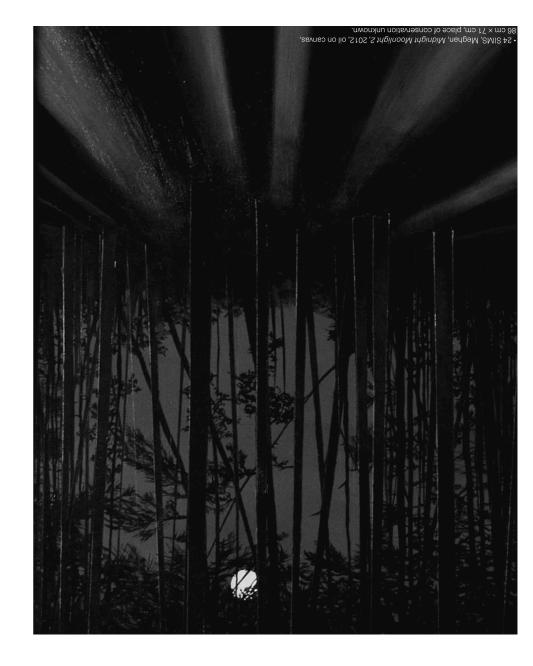


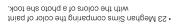
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• 25 SIMS, Meghan, Watered Down Coffee, 2016, oil on canvas, 61 cm x 61 cm, place of conservation unknown.











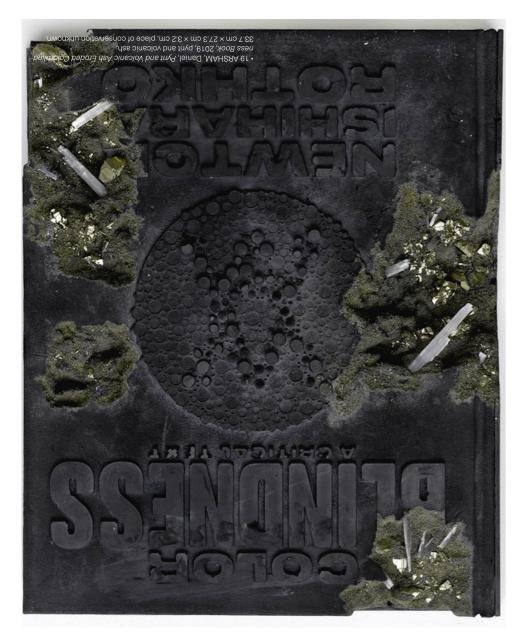


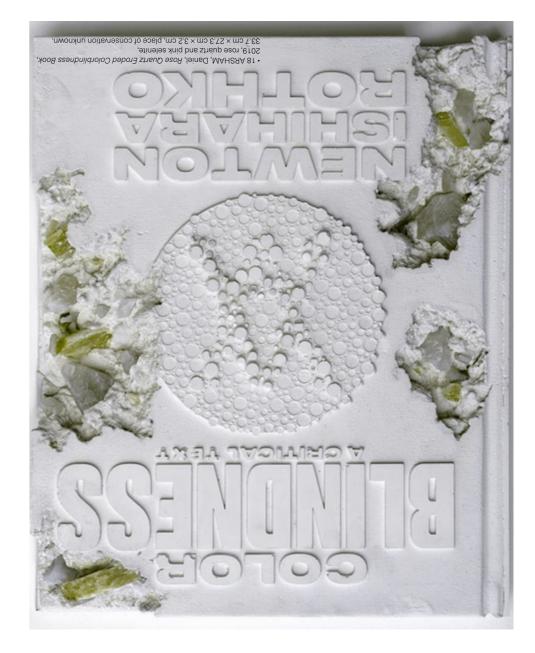
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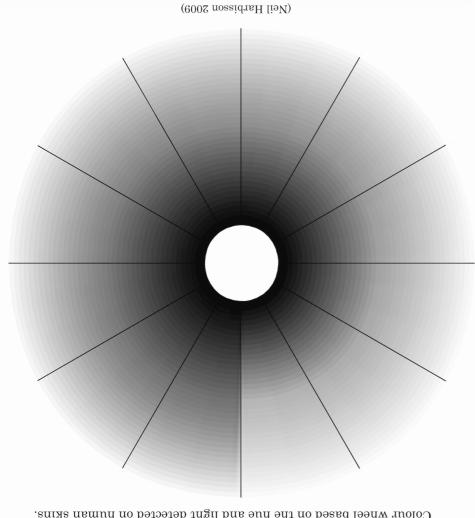


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THE HUMAN COLOUR WHEEL

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Colour wheel based on the hue and light detected on human skins.



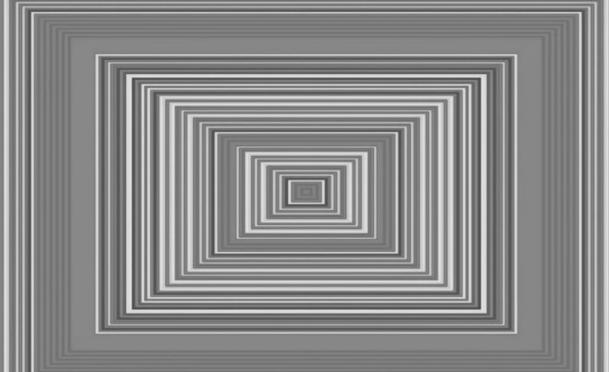


• 15 MERYON, Charles, L'Abside de Notre-Dame de Paris, 1854, etching and drypoint printed in black ink on laid paper, 16.5 cm \times 29.8 cm, National Gallery of Art, Washington, D.C.









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• 14 HARBISSON, Neil, Für Elise, date unknown, medium unknown.



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• 13 Profile view of Neil Harbisson with his antenna implant.

place of conservation unknown.

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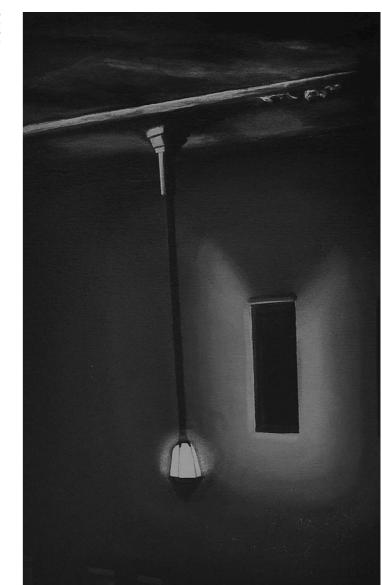
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• 8 SIMS, Meghan, King at Queen, 2012, acrylic on canvas, 30 cm × 25 cm, place of conservation unknown.



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• 9 SIMS, Meghan, Might Life, 2009, acrylic on canvas, 91 cm \times 61 cm, place of conservation unknown.

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- 7 SIMS, Meghan, David Street at Wight, 2011, acrylic on canvas, 30 cm \times 23 cm, place of conservation unknown.

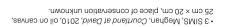
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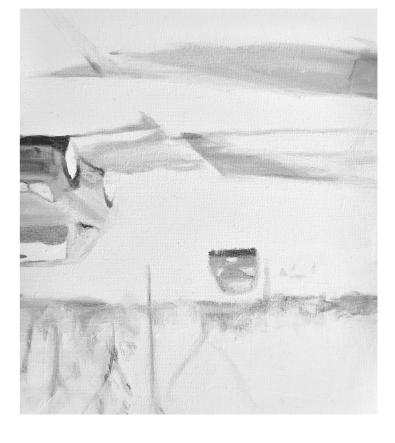




• 4 SIMS, Meghan, Victoria Park Trees, 2010, oil on canvas, 91 cm × 66 cm, place of conservation unknown.

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• £ SIMS, Meghan, blace of conservation oil on carvas, 76 cm × 61 cm, unknown.



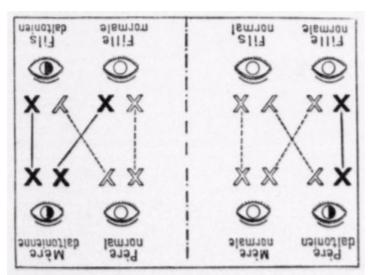
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 Daltonism chart: Normal color vision in comparison with the different forms of daltonism.



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ficient people have learned to survive in a world surroungist Maureen Neitz had expressed in 1997, that color-deartistic strength, or as the researcher and ophthalmoloficient color perception and even to transform it into an managed to formulate strategies to overcome their dethat the contemporary artists, in contrast to Meryon, have re, the analysis carried out remove any remaining doubts daltonism) of both themselves and the viewers. Theretohas led to a change in the consciousness (in regards to Thus, the artists' confrontation with their daltonism in art able to help color-blindness gain a new position in art. understanding of daltonism in general. Further, they were own perception and rethink their preconceptions and Their approaches tempt the viewers to question their

ded by people who see what they cannot. 162

CANNOT **SEE WHAT THEY** BY PEOPLE WHO **20KROUNDED** VIVE IN A WORLD LEARNED TO SUR-PEOPLE HAVE COLOR-DEFICIENT

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prevent blindness, 1997. Symposium, Research to in 14th Biennal Eye Research Society and colorblindness, source: NEITZ, Maureen, had no access to the original 2001, p. 409. Note: Author lingA, d°n, d4. lov, vgolom and Art", Survey of Ophthal-Dilemma of Color Deficiency MARMOR, Michael F., "The 162 LANTHONY, Philippe,

tinue their artistic work despite severe color-blindness. and Harbisson are proof of how artists managed to conwant to be."161 In this sense the cases of Sims, Arsham ject of color-blindness in art: "We are only as blind as we though was meant figuratively, it still applies to the subone can relate to Maya Angelou's citation, which even looks at the evolution of the handling of daltonism in art, ning glasses was unthinkable 200 years ago. Thus, if one use of photography or the reference to spectrum-wideding how daltonic artists nowadays deal with colors. The made a major contribution and plays a pivotal role regardingly, in Sims' and Arsham's case, technology has also also able to surpass their physical impairments. Accornology constantly develop, color impaired individuals are new sense. His case is proof that while science and techthrough the implantation of his antenna, has created a made for major alterations of perception, 160 Harbisson, ophthalmologist commented that even if the brain is not in today's art world. Although Sarah Former, Arsham's to adapt to their visual impairment and to be successful this paper, have developed solutions which enable them of creativity. All three contemporary artists analyzed in ates new forms of art and unprecedented expressions nal commitment to overcome this visual hindrance crethe personal dedication of color-blind artists. The persobeing pushed back due to technological progress and people should be aware that these limits are constantly bound to limits. Although the answer is probably yes,

These artists have unique visions, which do not only allow

ie-quotes-you-should-know/, waya-angelou-unforgettabhttps://www.pmcaonline.org/ Know", pmcaonline, (2020), table Quotes You Should "Maya Angelou Unforget-161 AUTHOR UKNOWN, accessed August 2020. list=WL&index=24&t=1341s, watch?v=ZCsEClia1Ck&https://www.youtube.com/ Full Color", youtube, (2016), Arsham, Color-blind artist: In 160 SEMAINE, "Daniel

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working with colors.

shows that not every physical change has to be permawants another person's reality." The case of Arsham double edge saw, it's not necessarily a gift. Not everyone color-blind and then to be given color, there's probably a explained about Arsham's change of perception: "To be tered perception of things. Accordingly, Cecilia Dean riod and, as a result, he now prefers to stick to his unalartist used his tool (e.g. glasses) only for a temporary pe-As previously shown in the case of Daniel Arsham, this riosity are not a universal remedy for every daltonic artist. ver, the tools developed or used on the basis of this cucomprehension and knowledge of the unknown. Howemore. The human species constantly tries to extend its that seems out of our reach, we nurture our curiosity for ving previously unknown information about something things they cannot understand at first sight. When receinot unusual because people often develop a curiosity for anal impairment, only perceive distorted. This behavior is

curiosity about the colors which they can, due to their vi-

Arsham and Harbisson have both shown a pronounced

whether the processing of colors by a daltonic artist is become more and more receivable, the question arises Even if over the past decades color-blindness in art has be just as valuable.

ted view of things) rather than an optical one, which can

change (e.g. the preference to keep his personal, distor-

personal experience has brought rather a psychological

comprehends and perceives daltonism itself. Thus, his

nent but can lead to new views which influence how one

MORE. **CURIOSITY FOR NURTURE OUR** OUR REACH, WE SEEMS OUT OF SOMETHING THAT **TUOBA NOITAM NUKHOWN INFOR-PREVIOUSLY МНЕИ ВЕСЕІЛІИ**В

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https://www.youtube.com/ Full Color", youtube, (2016),

Arsham, Color-blind artist: In 159 SEMAINE, "Daniel

> ver necessary and to turn to engraving in order to avoid led Meryon to avoid the use of color in his work wheneto find other ways to deal with their color-blindness. This

the achievements that Sims has made as a color-blind color interpretation and expressiveness. Mevertheless, desirable for Sims and would offer her space for her own the use of color in a figurative sense could be much more she has not fully accepted her daltonism yet. In this way, how the public perceives her work shows that personally photos. The fact that Sims measures her artistic talent by tings as close as possible to the reality of the underlying for artistic recognition by painting the colors in her painly it was shown that one can assume that Sims strives can't really see. By analyzing this question psychologicalan artist would create a piece of work in a spectrum they cess colors, the question also arises in her case: Why sive coding system which allows her to accurately pro-Meghan Sims has unquestionably developed an impreswhat the public sees and vice versa. Thus, even though tyek can never be sure that what they see corresponds to that daltonic artists live in parallel visual worlds in which logical level. As previously discussed, one can assume question of what daltonism does to artists on a psychoto deal with their color-blindness, there further arises the Besides the different methods the artists have developed

artist are still remarkable.

with it, new art.

CONCINCION

lifetime, these tools were not accessible and artists had ted forms of art. Previously, however, during Meryon's ways of processing colors which result in unprecedentore seek to create, despite their visual limitations, new artistically explore differences in perception and therethey affect normal-vision people. Thus today, artists can ment by learning how to properly apply colors and how tion and actively address the problem of visual impairantenna) that enable them to expand their visual percepthe opportunity to use tools (e.g. coding system, glasses, Meryon fundamentally different. Nowadays, artists have with color-blindness is in comparison to the approach of of artists. The approach of contemporary artists to deal ficiency seems to affect the personal subconsciousness it color-blindness is not visible to outsiders, this visual deartistic level as well as on a public awareness level. Even in art seems to have changed over time on a personal gated case studies reveal that the handling of daltonism tonism itself is recognized in the art world. The investificiency differ between each other, as well as how dalimpairment, how their approaches to face this visual deto which color-blind artists are affected by their visual case studies of four specific artists, to analyze the extent This paper pursued the core objective, based on the

as well as new body organs to create new senses and perceptual possibilities and to further develop cyborgism and his optical aberration have led him to strive for new ses people every day. Furthermore, Harbisson's curiosity closer to people. Despite initial skepticism his art impresenables him to be invited to talks in order to bring his art who is able to carry it out. His unique artistic expression veloping an art form from it, for which he is the only artist

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transforming an initial deficit into a personal appreciation and the experience of the glasses, he has succeeded in on a personal level, since, through his curiosity in colors tuous to say that Arsham can also be called successful have an extraordinary depth. The Further, it is not presumpapplication of his colors through the use of his glasses to Rosenthal explains. In reference she describes Arsham's "overcome his color-blindness" as film producer Jane art. His art is seen by many as a successful attempt to le.156 Thereby, he has not disappointed the viewers of his lects so that they could explore his art from a new angspont how he handles colors and perceives different ob-

a stand-alone feature.

ceeded in expanding his limited color perception and dethe notion of color in relation to sound in art. He has sucunique artistic expression with which he further expands comes primarily from the fact that he has developed a enthusiasm among art enthusiasts. Harbisson's success sense, but his work also meets with great recognition and However, the artist is not only known for his unique new helped Harbisson to become well known in the art world. unique method of perceiving color through sound, have tenna, his open approach to his daltonism as well as his His extravagant appearance, which also includes his anor various other recognized galleries and museums. 158 ces around the world, such as the 54th Venice Biennale the fact that his works have been exhibited in various pla-The recognition of Meil Harbisson's art can be seen in

accessed September 2020.

saatchiart.com/neilharbisson,

(qate nuknown), https://www.

158 AUTHOR UKNOWN,

list=WL&index=24&t=1341s,

watch?v=ZCsEClia1Ck&-

https://www.youtube.com/

Full Color", youtube, (2016),

Arsham Color-blind artist: In

157 SEMAINE, "Daniel

list=WL&index=24&t=1341s,

Full Color", youtube, (2016), Arsham Color-blind artist: In

156 SEMAINE, "Daniel

accessed August 2020.

watch?v=ZCsEClia1Ck&https://www.youtube.com/

"Neil Harbisson", saatchiart,

accessed August 2020.

and inimitable artistic value in her art. transform the deficiency into her strength and created in overcoming her color-blindness. She has managed to the colors she cannot actually see, Sims has succeeded processing method that gives her an understanding of bractice and dedication as well as the development of a deficit and to establish her art in the art world. Through is totally color-blind, Sims has managed to deal with her them in a way it is hardly noticeable to the public that she Aware of the complexity of colors but eager to implement an unmistakable new art style that is difficult to imitate. bypassing it, they have been able to develop and shape integrating their color-blindness into their art rather than Arsham were able to overcome their visual deficiency. By tated by the technological progress of today, Sims and Through this approach, which has certainly been facilirecognize and reproduce colors in the best possible way.

used colors in his works for the first time, this aroused not harm Arsham's success. On the contrary, when he a unique artist. 155 His coming-out as a daltonic artist did cap to stand out from the crowd and can be considered not perceive before, has learned how to use his handier but rather as a challenge to discover things he could artist, who has never seen his daltonism as a real barriwas not afraid to openly identify as color-blind. 154 The nized for his art that he exhibited all around the world, Daniel Arsham, who was already internationally recog-

additional interest among viewers. People were curious

watch?v=ZCsEClia1Ck&uttps://www.youtube.com/ Full Color", youtube, (2016), Arsham Color-blind artist: In 155 SEMAINE, "Daniel September 2020. daniel-arsham/, accessed https://ocula.com/artists/ ocula, (date unknown), "Daniel Arsham biography", 154 AUTHOR UKNOWN,

accessed August 2020.

list=WL&index=24&t=1341s,

TTHE PUBLIC'S PERCEPTION OF DALTONIC ART

salti"153

field of art Meryon tilled but a corner. But with what retain, how unforgettable! As Wedmore says: "Of the vast — but how unique are his best, how arresting, how cerwhole work comprised only a hundred and two etchings he saw and felt. His great plates are few in number — his and Dürer. Doubtless there are limitations to the things goes down to later ages in association with Rembrandt sucely less by the completeness of his performance, he works as unique: "By the intensity of his vision, and scsuch as Harold J. L. Wright nevertheless valued Meryon's finds support in the fact that, in retrospect, art historians pared to appreciate his form of art. This argumentation artist, but perhaps that society at this time was not predoes not necessarily mean that he was an unsuccessful the colorful painting, which was most popular that time, this led him to devote himself to engraving rather than his art completely to his visual impediment. The fact that people, Meryon was left to his own and could only adapt glasses and rely on open exchanges with like-minded

ment and tried to find instruments that enable them to other three have concretely dealt with their visual impairand tried to avoid it by changing the medium of art, the lifetime. While Meryon did not face his illness directly have a certain success with their art already during their temporary artists Sims, Arsham, and Harbisson seem to ly experience success during his lifetime, the three con-In comparison to Charles Meryon, who did not personal-

paper, who live in an age where they can use antennas, subject. Compared to the other artists analyzed in this tonism at a time when daltonism was a rarely discussed goes down in history as a pioneer who struggled with dalhis art as unsuccessful¹⁶², it can still be said that Meryon tetime and even it he himself occasionally considered did not receive the recognition he desired during his linal. I find consolation in my work." The Although Meryon myself above all these little miseries that may not be eterhave a good enough philosophical background to put not very happy, I'm pretty much on the ropes; but I still what they expect from art: "In the present moment, I'm ane to his color-blindness, he could not give the public that made him think he was an unsuccessful artist as, level, the artist had increasingly tallen into a mental deep by the lack of recognition at both inclination and financial central measure of success. 150 Consequently, confronted not the protound sense of an artwork turned out to be the criticize the development of art in which the price and Meryon more and more with bitterness and led him to at low prices during his lifetime. This realization filled not surprising that Meryon was only able to sell his art and exaltation of the audience that is willing to pay, it is netary value of art is generally related to the appreciation ged from failure." 148 Since it is conceivable that the moperseverance is essential, one should not be discourahad not given up working: "In the arts as everywhere,

ted the lack of public recognition with failure, the artist

his work as well as his name." 147 Although Meryon equa-

fond de philosophie pour me wais Jai encore un assez bon le ralingue passablement; le ue ania bas frès heureux, 151 GEFFROY, Gustave, 150 GEFFROY, Gustave, sage", Le Petit Parisien, May 149 FROLLO, Jean, "Vernispartout, la persévérance est 148 GEFFROY, Gustave, dn'avec l'ombre et la lumière, splendides eaux-fortes m'ont M. Meryon, dites-lui que ses L'Ere nouvelle, October 1923, "La Semaine Artistique", 147 VAUXCELLES, Louis,

XSMHA ..

"Dans le moment présent, translated by the author. Note: Original quotation Floury Éditeur, 1926, p. 36. Charles Meryon, Paris, H. Floury Éditeur, 1926. Charles Meryon, Paris, H. (noiteniged on), £881 rebuter de l'insuccès." de rigueur, il ne faut pas se "Dans les arts comme translated by the author. Note: Original quotation Floury Éditeur, 1926, p. 24. Charles Meryon, Paris, H. livré à lui-même : [...]". le clair-obscur tout seul et ébloui sans la couleur, rien "Puisque vous connaissez translated by the author. Note: Original quotation (no pagination).

Floury Editeur, 1926, p. 78. Charles Meryon, Paris, H. 152 GEFFROY, Gustave, moins heureux." serais probablement encore

n'avais pas quitté la marine, je

mon travail. Je me dis que si Je

trouve de la consolation dans vent ne pas être éternelles. Je

ces betites wiseres dui beumettre au-dessus de toutes TTHE PUBLIC'S PERCEPTION OF DALTONIC ART

ber 1930, p. 1084.

Arts, vol. 78, n° 4060, Septem-Journal of the Royal Society of

Charles Meryon (1821-1862)",

Rembrandt, Meryon, Whistler: J.L., "Three Mater Etchers:

Lecture II. The Etchings of

153 WRIGHT, Harold

what extent the works created by these daltonic artists zed in this paper define the success of their art and to not impossible to investigate how the four artists analyward formula to measure artistic success uniformly, it is tions. Accordingly, although there exists no straightforinterpersonal and emotional assets related to his creavaluation of his artworks, another one might prefer the one artist might place a higher value on the monetary several views on the evaluation of success in art. While termined, it is not presumptuous to claim that there are different factors on which the success of art can be dework of art for an artist. Thus, considering this variety of SI DIJAE PUBLIC IS

DOUBTED." CAN BE I DO NOT THINK **NESS' HOMENEB'** THE USEFUL-KIND' OF WHICH **MORK OF THIS** RECEPTIVE TO **NOT VERY**

"Meryon is known only to the elite, and the public ignores unsiasts and scholars tended to appreciate his creations: fact that, in contrast to the grand public, famous art entbersonal satisfaction could also not be changed by the on the appreciation and recognition of his viewers. His that the artist's personal artistic success is mainly based I do not think can be doubted."146 Accordingly, it seems ve to work of this kind, of which the usefulness, however, zed by a large audience: "[T]he public is not very receptiin letters how much he would like to see his work recogni-

devoted himself to engraving, has repeatedly mentioned

The artist, who due to his color-blindness increasingly

wards his creations was very limited during his lifetime.

well-known that the public interest and appreciation to-

With regard to the artistic work of Charles Meryon, it is

can be considered successful.

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Floury Editeur, 1926, p. 78. Charles Meryon, Paris, H. 146 GEFFROY, Gustave,

> side, regarding daltonic art, had steadily increased. ling of color and suggests that the acceptance the public has led to a further understanding of the artist's handater value for color in art worldwide. Consequently, this pave changed. Impacts like these brought about a grebe concluded that the social requirements of color in art turies as well as the technological advancements, it can sis, but also due the artistic context of the last two cen-

2/4/ HINDRANCE OR VIRTUE

success? red: Is color-blindness an obstacle or a driver to artistic by the public. One question, however, remains unanswewell as how artworks from color-blind artists are received ruments artists use to deal with their color-blindness as baber has in the previous paragraphs shown which instlive and work with the diagnosis or to circumvent it. This so devastating and therefore many artists have tried to color-blindness. 145 In art industry this diagnosis is not been inaccessible to daltonists since the discovery of Various professions such as the navy and aviation have

pect that cannot be ignored is the emotional value of a these forms of recognition are subjective. Another asnowledgement and appreciation of the public, although their art in a certain aspect can be measured by the ack-Many artists would certainly agree that the success of

imprimerie du salut public, nostic du Daltonisme, Lyon, 145 FAVRE, Antoine, Pro-

go beyond the scope of the topics dealt with in this study. would thematically open a bottomless pit, which would ween humanity and technology. However, this question ethical aspect regarding the merging connection betteel insecure about Harbisson's use of his implant is the lor perception alone is not shocking. What makes people already affected the audience. Therefore, Harbisson's coperception, the works of these artists, to a certain extent, son differentiates his color perception from synesthetic the synesthetic aspects of color and music, while Harbis-Robert and Sonia Delauney. Although they investigated works from different artists such as Wassily Kandinsky or our visual perception, have already been subject of artvarious forms of perceiving colors, other than through color (as his new sense works through bone conduction), bisson claims to not actually hear color but to rather feel develop his understanding of colors. Even though Haran artist like Harbisson turned to technology to further It is therefore not surprising that several decades later

out by artists and scientists on the basis of color analythe previously mentioned influences of research carried Summarizing, it can therefore be assumed that due to

Martha, "Tracking the Rise 144 SCHMENDENEB'

XSMHA ..

September 2010.

on/Usartsnj.html, accessed

(2010), https://www.nytimes.

com/2010/08/08/nyregi-

of Color on Film", nytimes,

hand-coloring, as Abraham Gottlob Werner had done in print developments made it possible to overtake manual Printing by Lithography 1940.142. 52 Such pigment and ted by Thomas E. Griffits' book The Technique of Colour torms of reproduction, which was among others illustradevelopments in art have made it possible to create new tion between colors and art. Specifically, technological to new artistic possibilities due to an extended conneclor use and color perception. This has consequently led we were always offered new possibilities in terms of cotechnology and printing have contributed to the fact that ences in art and science. Developments in the fields of but not only as one would wrongly assume, through influ-

tography also developed as a medium that was able to In addition to new forms of reproduction, however, pho-

the Villalobos Colour Atlas, 54 in 1947 as well as the well-

tems, such as the Munsell Color System. 63 in 1915 or

1814, in order to be able to print Color Identification Sys-

Differences in our understanding of color have evolved,

of Daniel Arsham in which the shadows of the moon are

ther example would be the work Lunar Cycle from 2017 the painting Mong Way (2016). . 60 In the same vein, ano-

for the selected grey tones of the woman's skin color in

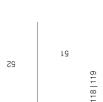
color usage as an aesthetic choice. The same is the case

viewer accepts the artist's color decision and regards the

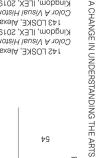
represented in a strong blue tone..61

known Pantone Matching System in 1963.143









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Kingdom, ILEX, 2019 Color A Visual History, United 143 LOSKE, Alexandra, Kingdom, ILEX, 2019. Color A Visual History, United 142 LOSKE, Alexandra,

confuses the grey values of orange and green because is probably an unconscious color decision as Sims often tone for the figures and their skin tones. However, this Meghan Sims. In both paintings the artist used a green Green (2016), 48 and Multicultural texter (2016), 49 from fect can be observed for instance in the paintings Gaukel presentation of color detached from the object. This eftions. Consequently, the viewers have accepted the reto objects but also integrated in figurative representaa broader understanding for colors that is not only bound perceived by the viewer. As a result, we have developed had an influence on color, how it is used, but also how it is historical development in the history of art has therefore ding of color and even caused it to change over time. Any Since then, these influences have shaped our understan-Newman was created solely by the colors themselves. 141 ting from paintings like those by Mark Rothko or Barnett artistic tool. The magically charged atmosphere emanaartists mainly tocused on the effect of the color as an noteworthy here. 140 In the context of this movement the in which color stood above form for good, is particularly newals that followed. 139 The trend in color field painting the social ruptures in World War II and the profound rewith the abstract expressionists in America, caused by ture. Similar art tendencies developed a short time later as well as to yellow and blue tones to represent the pas-Gogh, who resorted to fire-like colors to paint the fields te avec cyprès et ciel étoilé (1890), 47 from Vincent Van

they appear very similar to her. Nevertheless, here, the

THE VIEWER. IS PERCEIVED BY **TI WOH OSJA** IT IS USED, BUT ои согов' ном AN INFLUENCE THEREFORE HAD **SAH TAA 40** IN THE HISTORY DEVELOPMENT **ANY HISTORICAL**

09 87

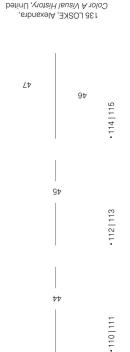
Günther, MAYER, Stefan, НАНИЕ, Robert, LEHNER, 140 BITTERER, Maja, Oldenbourg Schulbuchverlag, ellen Tendenzen, München, Von der Moderne zu aktumerlohr Epochen der Kunst, Susanne, WEBER, Felix, Kam-RACHOW, Gerlinde, REZAC, Günther, MAYER, Stefan, НАНИЕ, Robert, LEHNER, 139 BITTERER, Maja,

141 BITTERER, Maja, Oldenbourg Schulbuchverlag, ellen lendenzen, Munchen, Von der Moderne zu aktumerlohr Epochen der Kunst, Susanne, WEBER, Felix, Kam-RACHOW, Gerlinde, REZAC,

Oldenbourg Schulbuchverlag, ellen Tendenzen, München, Von der Moderne zu aktumerlohr Epochen der Kunst, Susanne, WEBER, Felix, Kam-RACHOW, Gerlinde, REZAC, Günther, MAYER, Stefan, нАНИЕ, Яорел, ГЕНИЕЯ,

> century".137 "A masterpiece of color-printing in the later nineteenth blications on color due to its numerous different tints. 136 times, represents the most sophisticated ever printed puplete darkness. . 45 This atlas, that was reprinted multiple ment of colors from complete brightness to almost com-Chromatiques from 1839 Chevreul studied the developnew form of lithography printing. In his atlas of Cercles partly painting by hand in combination with the relatively effect of colors in relation to different backgrounds. 44 by trast of color). 136 In further publications he explored the simultané des couleurs (The laws of simultaneous con-

> implementations can also be seen in artworks like Routhe color pink in order to represent the sandy soil. Such cited, who worked in his creation Mahana no atua. 46 with onism. As a formative example from 1894 Gaugin can be lors, which was later adopted by Franz Marc in expressi-Van Gogh as they added a subjective symbolism to cohighlight the approaches of Paul Gauguin and Vincent the background of this paper, it makes sense above all to modernism, Cézanne, Gauguin and Van Gogh. 138 Against approach was mainly shaped by the three pioneers of tist is appreciated and perceived by viewers. This artistic expression has therefore primarily influenced how an aran expression of artistic personality. Consequently, this veloped in such a way that it had become more and more in color theory, art in the nineteenth century had de-Around the same time as the achievements of Chevreul



Oldenbourg Schulbuchverlag, ellen Tendenzen, München, Von der Moderne zu aktumerlohr Epochen der Kunst, Susanne, WEBER, Felix, Kam-RACHOW, Gerlinde, REZAC, Günther, MAYER, Stefan, НАНИЕ, Робећ, ∟ЕНИЕР, 138 BITTERER, Maja, Kingdom, ILEX, 2019, p. 96. Color A Visual History, United 137 LOSKE, Alexandra, printed with a total of 14'420

136 Note: The atlas was

Kingdom, ILEX, 2019.

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Turner and Meryon can be attributed to the romantic era

lished his main findings in his work De la loi du contraste purely on the human color perception. In 1839, he pubcentrating on colorants and materiality Chevreul focused several people from creative industries. 134 Instead of contrast which, as no other theories, have later influenced this insight he has created his laws of simultaneous conhad different effects on our visual perception. Based on Chevreul was the first to realize that color combinations pean color theorist of the later nineteenth century," 132, 133 known today as "the most important and influential Eurochemist who studied the interaction of colors and who is arch that dealt with Eugène Chevreul's theory of colors, a of optics and color.131 Their work often grounded in reseinterested in the newly researched scientific principles velopment of art the neo-impressionists were especially academies in particular cultivated. With the turther desingly abandoned the literary themes that museums and light and color. Through their way of working they increaattempted to capture fleeting sensory impressions using tocused primarily on the form of objects, impressionists, influencer of impressionism. 130 Unlike other artists who light became the subject of his art, which made him an of their respective country. For Turner, color in relation to

НАНИЕ, Robert, LEHNER, 131 BITTERER, Maja, Oldenbourg Schulbuchverlag, pis znm Ingendstil, München, Kunst, Von der Renaissance қаттегіолг Ероспеп дег Stefan, SOCKERL, Thomas, REZAC, Susanne, MAYER, Susanne, RACHOW, Gerlinde, KLIMA, Sigrid, PARTSCH, 130 HAHNE, Robert,

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Color A Visual History, United 132 LOSKE, Alexandra, Oldenbourg Schulbuchverlag, ellen Tendenzen, München, Von der Moderne zu aktuwerlohr Epochen der Kunst, Susanne, WEBER, Felix, Kam-RACHOW, Gerlinde, REZAC, Günther, MAYER, Stefan,

Oldenbourg Schulbuchverlag, ellen Tendenzen, München, Von der Moderne zu aktumerlohr Epochen der Kunst, Susanne, WEBER, Felix, Kam-RACHOW, Gerlinde, REZAC, Günther, MAYER, Stefan, НАНИЕ, Robert, LEHNER, 133 BITTERER, Maja, Kingdom, ILEX, 2019, p. 90.

Kingdom, ILEX, 2019. Color A Visual History, United 134 LOSKE, Alexandra,

> ever did. bertectly in a much more pronounced way than Meryon lor expression. 129 An expression that artists mastered mood, brought about by light in interaction with the coof these artists were shaped by their atmosphere and spectacle for several hours tied to a mast. 128 The works own experience of the storm after he had admired the has literally set the color matter in motion. He painted his lored work *Ghost Ship*.43. In his paintings, William Turner the same time as Meryon painted his last remaining cothe work Steamship in Snowstorm. 1842, almost at In this context, the Englishman William Turner produced example vast mountain ranges, storms and darkness." 127 cinating and threatening, impressive and untamable, for awe and fear. It encompassed things that were both fasbed a more elusive reaction; an impression of grandeur, red and even created, the concept of the sublime describeauty was a standard that could be identified, measunon as a basis for further analyses and explains: "While

> lilac, together with the yellowish tinge create the impresreflect the impact of the storm. The clouds which appear is quite successful, the color selection does not seem to tion of the ship. Although Meryon's choice of perspective opservable in the sky, the sea, as well as in the reproducminated by a distinct yellow-blue color tinge. This tinge is storm very concisely, Meryon's painting seems to be doety of colors which allows him to depict the feeling of the While Turner's work is characterized by a depth and vari-



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Oldenbourg Schulbuchverlag, pis zum Jugendstil, Munchen, Kunst, Von der Renaissance қаттегіолг Ероспеп дег Stefan, SOCKERL, Thomas, REZAC, Susanne, MAYER, Susanne, RACHOW, Gerlinde, KLIMA, Sigrid, PARTSCH, 128 HAHNE, Robert, Kingdom, ILEX, 2019, p.30. Color A Visual History, United 127 LOSKE, Alexandra,

2015. Oldenbourg Schulbuchverlag, bis zum Jugendstil, Munchen, Kunst, Von der Renaissance қаттегіолг Ероспеп дег Stefan, SOCKERL, Thomas, REZAC, Susanne, MAYER, Susanne, RACHOW, Gerlinde, KLIMA, Sigrid, PARTSCH, 129 HAHNE, Robert,

remains. The picturesque capturing of ship scenes was in oil, only the colorful painting Ghost ship from the 1840s 1849. From his creative period during which he painted before moving on to his first engraving La sainte face in one notices that he started to paint in oil in the 1840s throughout the centuries. When analyzing Meryon's art, lowed, which have all shaped our understanding of color raham Gottlob Werner. 39 & 40 & 41 Or Eugène Chevreul, follike Moses Harris. 37, Johan Wolfgang von Goethe. 38, Abtures of scientists, artists, chemists and entomologists 124 Boutet. 123 Golor theories, color wheels and Momencla-Traité de la peinture en mignature by the artist Claude The first printed color circle was published in 1708 in the achieved the same status as disegno [line drawing]."122 scademic publications, although colore had not quite standard element in aesthetic discourse, teaching and of the eighteenth century, however, color had become a ferior in the hierarchy of the elements of art. By the end Loske argues: "For centuries it had been considered in-

Beautiful in 1757. 126 Alexandra Loske took this phenomebne əmilduz əht to zeəbl ruO to niginO əht otni yriupni as productive of the sublime" in his work A Philosophical Edmund Burke wrote a chapter on "Colour considered standing of color. Accordingly, the writer and philosopher multiple artists and philosophers expressed their under-In relation to aesthetic ideas of beauty and the "sublime",

thematically related to Meryon's experiences as a mem-

ber of the French Navy. 125



Ophthalmology, vol. 39, 1995, Charles Meryon", Survey of with a Color Vision Defect: THONY, Philippe, "An Artist ANDERSON, Nancy, LAN-125 RAVIN, James, the scientific study of insects. 124 Note: Entomology is Kingdom, ILEX, 2019. Color A Visual History, United 123 LOSKE, Alexandra, Kingdom, ILEX, 2019, p.13. Color A Visual History, United 122 LOSKE, Alexandra,

Kingdom, ILEX, 2019.

Color A Visual History, United

126 LOSKE, Alexandra,

2/3/ A CHANGE IN UNDERSTANDING THE ARTS

bring the comparison into temporal context. perception of daltonic art has changed, it is important to a historical comparison and to analyze how the viewer's anged over the last decades. However, to be able to draw could assume that the importance of colors in art has chte rather than using color for its figurative qualities, one have used color more for the impression it can translaand due to the fact that since the 19th century artists color into their creative process. From this observation of their work, daltonic artists nowadays often integrate to adapt to art forms where color was not a central part While daltonic artists in former times felt that they had

around this time. Against this background, Alexandra tingly, the significance of color seems to have changed tried to explain colors in relation to each other. Interestheoretical approaches of scientists and artists who all Newton's color theory was followed by a number of other which he published in his book Opticks in 1704.121 $_{\cdot\,35}$ led him to the discovery of the visible spectrum of light, tionship between light and color. His initial experiments tist Isaac Newton was among the first to analyze the relaon the basis of research by scientists. The English Scienof colors has changed over in the past centuries mainly conceptually, is a mirror of its time". 120 The understanding opinion that: "The order of color, both practically and In this context, the art historian Alexandra Loske is of the

> ITS TIME" IS A MIRROR OF CONCEPTUALLY, PRACTICALLY AND согов, вотн "THE ORDER OF

Kingdom, ILEX, 2019.

Color A Visual History, United

121 LOSKE, Alexandra,

Color A Visual History, United

120 LOSKE, Alexandra,

Kingdom, ILEX, 2019, p. 7.

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THE RELEVANCE OF PRIOR KNOWLEDGE TTHE PUBLIC'S PERCEPTION OF DALTONIC ART

relation to the boundaries that art has long since broken fined and in which direction it could possibly develop in viewer to understand how art is currently being redege. Moreover, besides that reasoning, it also enables the intentions, which one would miss without prior knowledthis information provides access to Harbisson's artistic a perception of something that is invisible to him. Thus, standing of how a totally color-blind artist can develop an awareness for the designed sense and an underpisson's color-blindness enables the viewer to develop simple color composition. Prior information about Har-

color-blindness, one would reduce Harbisson's art to the

without a context to his color-blindness. the targeted selection of Meryon's art can be developed central subject of his art. Therefore, an understanding of related to his visual impairment, his daltonism is not the black and white and his thematic representations are not them holistically. Due to the fact that Meryon worked in in order to be able to interpret the works and understand hand, prior knowledge does not appear to be necessary text of its artistic aura. For Meryon's art, on the other tary that the viewer perceives their artworks in the con-To conclude, for Sims and Harbisson, it seems elemen-

> cannot perceive either of them in real colors. the photography is a real representation for Sims, as she their own visual parallel, neither the painted picture nor le the viewer with normal vision can define the photo as it is interesting to analyze which parallels arise here. Whiding the above-mentioned idea of visual parallel worlds, byoto next to the finished work for comparison. 34 Regar-

> acoustic. For this reason, without any knowledge of his nize or discord together. His color perception is purely was never able to develop a feeling of how colors harmothat Harbisson has no visual understanding of colors he of hearing colors and visualizing sound. Due to the fact tionship between color and sound as well as the process combinations. Harbisson's main interests lies in the relanever just about simple comparisons of colors and color to analyze Harbisson's art. However, for the artist it was ferent creations themselves would be a logical approach among different creations as well as a comparison of difproceeded colors in the center. A comparison of colors or knowledge about his visual impairment would put the works through simple visual perception and without pricomposition. A viewer's exploration of Harbisson's art-(no date)) as simple color squares instead of a musical simple records and his colored images (e.g. Für Elise cess of creation, makes his colored records appear as exhibiting Harbisson's art without conveying the prostood in context of his new sensory perception. Merely Harbisson's sonochromatic artworks have to be under-

34

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reference, as at exhibitions she often hangs the original Sims herself to provide the viewer with a certain point of For this reason, it also seems to be important for Meghan color choice, in comparison with her photographed view. than that, no major differences are visible regarding her and have a very similar visual greyscale for Sims, but other and oranges, as these colors are complementary colors Sims tends to confuse greens and reds, such as blues to notice for someone who is not aware of her deficiency. nse colors in a way, that makes her color-blindness hard colored vision. In her colored paintings, Sims manages to depicted, but it is about Sim's attempt to live up to our the case because here it is not only about what is visually crucial for the viewing process of the audience. This is wever, prior knowledge about her daltonism seems to be limits. In order to be able to read her colored works, hoto understand because they realistically depict her visual and white. In terms of content, these images are easier ly easier to interpret the work that is proceeded in black any knowledge about her visual condition, it is certainworks with her colored works one can say that, without is hardly noticeable. By comparing Sims' black and white of colors and the detail of the images, Sims' impairment from a visual point of view with regard to the processing Sims' daltonism. However, it needs to be mentioned that ments, it seems to be elementary to be informed about creation process of her work as well as her artistic statematic level. I herefore, for a viewer to understand both the color-blindness not only on a creative but also on a the-

pression that can be both understood or interpreted. But for some artists, their color-blindness plays an essential role in their art. Therefore, as a viewer in cases like these, one would have to know about the daltonic visuality in order to comprehend the total work of art in relation to the artistic context.

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disruption of people's reference for a recognizable obthe fact that Arsham's intentions in his work, namely the his artworks. This contemplation is mainly explained by that he is color-blind in order to interpret or to understand through his glasses, art enthusiasts do not need to know more colors in his works due to the knowledge he gained significance to colors than he does. Even if he has used with his glasses, viewers would possibly attach a higher the colors in his works much value prior to his experience Arsham's color blindness. As Arsham himself did not give the viewer's interpretation of the works by pointing out For that reason, it would certainly be wrong to influence Arsham did not assign a major artistic role to the colors. the choice of the material processed. For a long time ed a secondary role in his work and were mainly tied to intentions. When Arsham used colors, they always playto be a prerequisite for being able to follow his artistic an understanding of his color-blindness does not seem volves primarily around the subject of futuristic artifacts, With regard to artworks by Daniel Arsham, whose art re-

ject, take place detached from the colors used. 119 In contrast to Arsham, Meghan Sims deals with her total

119 CARPENTER, Kim, "Playing with Perception: A Conversation with Daniel Araham", sculpture, (2014), https://www.sculpture.org/documents/scmag14/dec_14/ lilleature.shtml, accessed August 2020. TTHE PUBLIC'S PERCEPTION OF DALTONIC ART THE RELEVANCE OF PRIOR KNOWLEDGE

BAD."

SI NAMUH SSEJ

LESS HUMAN AND BECOMING

LESS HUMAN, GY, WE BECOME

WITH TECHNOLO-

WE ARE MERGING **N**HW TAHT

XSMHA ..

"PEOPLE THINK

THINK TO BECOME I'NOO I . DAB SI

quickly turns into astonishment. first develop a form of disbelief develops first, which then

KNOMLEDGE **3/3/ THE RELEVANCE OF PRIOR**

STAA 40 DALTONIC WORK A 40 NOIT ON THE PERCEP-AN INFLUENCE *EXAMPLE ARTIST HAVE* **DALTONISM OF** REGARDING THE OBSERVER LEDGE OF AN DOES THE KNOW-**YAW TAHW NI**

derlying thesis aims to refer solely to art as a form of exis one) could fill the pages of a separate paper, the unbe understood? As the answer to this question (if there leads us to the essential question in art: Does art have to understood in connection with their disease inevitably was created. This reasoning whether their art has to be about the artwork and the circumstances under which it It a viewer wants to develop a deeper understanding artist's color-blindness. This may, however, be different does not need to have foreground knowledge about the to simply perceive an artwork from a daltonic artist, one skills. Accordingly, the view is widely held that in order objectivity and a prejudgment about the artist's artistic ted visual perception of an artist could lead to a distorted keep in mind that the viewer's knowledge about the limilooking for answers to these questions, it is important to reveal his deficit in order to make his art receptive? When derstand the work and must a color-blind artist publicly be aware about the artist's color-blindness in order to unperception of a daltonic work of art? Do viewers need to ding the daltonism of the artist have an influence on the In what way does the knowledge of an observer regar-

the audience perceives unknown technology. The as an interesting social experiment by examining how tion."117 Accordingly, Harbisson sees his antenna almost "What really changed is, I had to get used to social reacfor him, he saw the actual challenge in the social effects: mental adaptation to his antenna was no great challenge me that I have an antenna."116 Although his physical and between an implant and an organ: "Only people remind a long time and thus he no longer sees any difference them. Harbisson himself has got used to his implant for direct function because the object appears strange to confusion. They cannot associate his antenna with any life some people react to his newly acquired organ with to become less human is bad."116 Nevertheless, in public human, and becoming less human is bad. I don't think when we are merging with technology, we become less represents a different point of view: "People think that could be ethically questionable. Harbisson, however, in the future, develop into an undesirable direction which the human body, but also due to the fear that art could, only due to the connection between the technology and of itself. The skepticism that arises from the public is not cyborgism, which is, according to Harbisson an art form

Here again, like it is the case for Meghan Sims, people how his antenna enlarges his ability of perceiving colors. Harbisson shows people what he is capable of doing and people, the reactions are relatively homogeneous, when Even if the enthusiasm to cyborgism is divided among

list=WL&index=17&t=6s, watch?v=an_Qc0Q1MHE&https://www.youtube.com/ Color", youtube, (2020), Cyborg Artist Who Hears 117 FREETHINK, "The accessed August 2020. ist=WL&index=17&t=6s, watch?v=an_Qc0Q1MHE&https://www.youtube.com/ Color", youtube, (2020), Cyborg Artist Who Hears 116 FREETHINK, "The accessed August 2020. list=WL&index=11&t=0s, watch?v=U-tGk65wyYs&https://www.youtube.com/ technology", youtube, (2019), cally merging oneself with and Moon Ribas, on physiborg artists, Neil Harbisson 116 DESIGN INDABA, "Cy-

IC'S PERCEPTION accessed August 2020.

THE PUBLIC'S PERCEPTION OF DALTONIC ART

accessed August 2020. list=WL&index=17&t=6s, watch?v=an_Qc0Q1MHE&pttps://www.youtube.com/ Color", youtube, (2020), Cyborg Artist Who Hears 118 FREETHINK, "The

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tist dares to approach colors seemed particularly specta-However, above all, the awareness that a color-blind arhis first colored exhibition caused great admiration. 114 wers had to get used to discover colors in Arsham's art, color in all of this work is extraordinary."113 Although vietried to just overcome his color-blindness, the depth of "Seeing Daniels work in color [...] and knowing how he's praises the work from the same exhibition as following: Additionally, the American film producer Jane Rosenthal, color-blindness, but clearly it didn't need correcting."112 tually your strengths. [...] You talk about correcting your expressing what people think of as a deficiency are ac-York called Circa 2345: "I think it's also a great way of first colorful exhibition in 2017 at Gallerie Perrotin in New Dean, co-founder of Visionaire¹¹¹ responded to Arsham's what I'm known for and then on to the next." The As Cecilia shown just before that until that body of work becomes The audience typically prefers the body of work that I've been true for every single body of work that I've shown. will be of "I prefer the art in black and white", and this has become accustomed: "I'm quite sure that the reaction he exhibits is first criticized until the viewer of his art has his work. 109 Nevertheless, Arsham knows that every work

The reactions vary, when it comes to the acceptance of which lead to a certain controversy among the viewers. homogeneous than the reactions to Harbisson's art, The reactions to the art of Arsham and Sims are more

cular for the viewers of Arsham's art.

watch-colorblind-artist-danieltps://observer.com/2016/09/ in Color", observer, (2016), ht-Daniel Arsham's Quest to See "Watch Colourblind Artist 112 WEISS, Zachary, art and fashion company. 111 Note: A multi-media accessed August 2020. list=WL&index=24&t=1341s, watch?v=ZCsEClia1Ck&https://www.youtube.com/ Full Color", youtube, (2016), Arsham, Color-blind artist: In 110 SEMAINE, "Daniel accessed August 2020. list=WL&index=24&t=1341s, watch?v=ZCsEClia1Ck&https://www.youtube.com/ Full Color", youtube, (2016), Arsham, Color-blind artist: In 109 SEMAINE, "Daniel

arshams-quest-to-see-color/,

accessed August 2020. list=WL&index=24&t=1341s, watch?v=ZCsEClia1Ck&https://www.youtube.com/ Full Color", youtube, (2016), Arsham, Color-blind artist: In 114 SEMAINE, "Daniel accessed August 2020. list=WL&index=24&t=1341s, watch?v=ZCsEClia1Ck&https://www.youtube.com/ Full Color", youtube, (2016), Arsham, Color-blind artist: In 113 SEMAINE, "Daniel accessed August 2020.

> days. mentally from the feedback Meryon received back in the work from contemporary artists seems to differ fundahave changed and the reaction of the audience to art-

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emits sign of courage and perseverance. she found difficult to grasp and understand at first, Sims her constant ambition to try to implement something that possible, viewers often show great respect. Further, with her color-blindness and to display colors as detailed as own perception with Sims' irrepressible will to deal with looking at her work. Through the confrontation of their te color-blindness; they will quickly find an answer when way of dealing with colors is possible, despite completo respect. At first glance, they question whether Sim's enthusiasts to Sims exhibitions range from recognition to exhibit her works in galleries. The reactions of art the door to the art world, as from then on, she was able to the public. This life-changing experience opened Sims hometown and encouraged to present her works of art 2006, was discovered by a local gallery owner from her Meghan Sims, who was mainly painting for herself until

this mental, emotional and artistic experience affected not getting too distracted by color, they were curious how Although art enthusiasts were hoping that Arsham was high after the artist experienced his EnChroma glasses. show before each exhibition, the interest was particularly While there is a great interest in what Daniel Arsham will

accessed July 2020. com/meghan-sims-artist/, acpromatopsia.squarespace. obsia, (date unknown), http:// "Meghan Sims", achromat-108 AUTOR UNKNOWN,

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the public was rather disinterested. This made it difficult the elite showed keen interest in Meryon's art, whereas itself: [...]". Tob However, as mentioned earlier, people from only with shadow and light, the chiaroscuro alone left to him that his splendid etchings dazzled me without color, in a letter to Baudelaire, "Since you know Mr. Meryon, tell remain hidden among art enthusiasts. Victor Hugo wrote strength in working with contrasts in his etchings did not lor work hardly aroused interest from the audience, his ness. 104 Whereas his oil-paintings such as his watercowho was at that time already marked by his mental illnets. This proposition was, however, rejected by Meryon showed interest in accompanying his etchings with son-Baudelaire, in contrast, who was taken with Meryon's art more bored by Meryon's outdated painting technique. 103 seemed to have a different perception and was more and interested in Meryon's artwork. The public, however, such as Charles Baudelaire and Victor Hugo who were Charles Meryon, Paris, H. 1926. Floury Editeur, 1926. 103 WRIGHT, Harold LL. "Three Mater Etchers: Lecture II. The Etchings of Charles Meryon (1821-1862)", Journal of the Royal Society of Arts, vol. 78, n°, 4060, September 1930, p. 1084. 104 KOSPOTH, B.J., "Meryon, The Etcher Of Old Paris," The Chrisego Tribune and the Daily Mews, April 1927, p. 5.

102 GEFFROY, Gustave,

106 GEFFROY, Guerave, Charles Meyon, Paris, H. H. Floury Editeur, 1926, p. 130.

Note: Original quotation translated by the author. Pursque vous connaisaez Splendides eau-viches mont, out see splendides eau-viches mont, out see Gebloui sans la couleur, rien qu'avec l'ombre et la lumière, le clair-obscur tout seul et le clair et le c

sage", Le Petit Parisien, May 1883, (no pagination). 107 GEFFROY, Gustave, Charles Meryon, Paris, H. Floury Éditeur, 1926.

this exact request.

OF DALTONIC ART

In art, the artist's intention is generally directly linked to the viewer's conception. This raises the question of how a viewer perceives a work of art created by an artist with a distorted visual perception. Are there any major differences in understanding daltonic art compared to understanding art created by artists with normal color perception?

2/1/ THE PUBLIC'S PERCEPTION ANALYZED

While the artist himself can never see the color of his work that is recognizable for people with normal color perception, the converse also applies. Thus, people who look with an unbiased vision at an artwork created by a daltonic artist will never see the work through the eyes of the artist. However, this does not preclude the viewers from developing their own point of view on the artwork based on what is visible to them.

The art critic Louis Vauxcelles wrote in 1923: "Meryon is known only to the elite, and the public ignores his work as well as his name." This statement has proven to be correct over time, as it were primarily well-known writers

101 VAUXCELLES, Louis,
"La Semaine Artistique",
L'Ére nouvelle, October 1923,
Note: Original quotation
Inote : Original quotation
Instansiated by the author.
"Puisque vous connaissez
M. Meryon, direa-lui que ses
spiendides eaux-fortes m'ont
spiendides eaux-fortes m'ont
qu'avec l'onner et la lumière,
qu'avec l'onner et la lumière,
qu'avec l'onter et la lumière,
le olair-obscur tout seul et

ivré à lui-même : [...]".

3

THE PUBLIC'S PERCEPTION OF DALTONIC ART
THE PUBLIC'S PERCEPTIONANALYZED

Mearly 200 years later, this demand seems to partially 43

and therefore expected artists to offer works that fulfilled

lifetime, was not willing to do without colorful works of art

this it can be deduced that the public, at least in Meryon's

the brass Meryon had engraved, they refrained. 107 From

when Meryon asked La Chalcographie du Louvre to buy

and thus lived in constant poverty. This went so far that

etchings for 1 franc per work or even 50 centimes a print

for the artist to sell his art, therefore he had to sell his

influences the perception of art in return. the senses, while influencing the artist in a way that it a medicalized vision of color, has led to an extension of we can suppose that in Harbisson's case daltonism, as color-blind artists was sustainably changed. Therefore, a new point in which the perception and acceptance of ged his perception of colors, but which has also led to situation in which not only the artist himself has chan-Harbisson's handling of his color blindness has led to a people are doing it though other senses."100 Accordingly, sound of color and the color of sound, but many other

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ating your own body part and then the art of expressing art] is the art of building your own senses, the art of creple to perceive and understand art differently. "[Cyborg but also allows the idea that technology can enable peoof art to the use of human organs confined to our species Consequently, Harbisson does not reduce the creation art which is ultimately an emergence from this change. color-blindness, but also in developing his own form of form of perception, which allowed him to overcome his art. Harbisson succeeded not only in creating his own tension of his art as well as the creation of new forms of of his surrounding and thus will ultimately lead to an extransformations will allow him to expand his perception will consequently extent our knowledge."99 Additional comes from our senses, so if we extent our senses, we which could further extend his perception: "Knowledge current application and he strives to invent other senses son is of the opinion that cyborg art is not limited to his inspired by the hearing process of dolphins. 98 Harbistion of hearing through bone conduction was initially natural phenomenon. Accordingly, Harbisson's percepthrough technology, and simultaneously derived form a to reconnect with nature as Cyborgism^{96, 97} is possible This way of merging with technology allowing the artist has thus helped him to develop his personal identity.95 allowed him to develop a new awareness of colors, and sonal obstruction for the artist, his transformation has Even though Harbisson's daltonism consisted in a per-

yourself through your senses. [...] I'm doing it through the

ONE KNOWLEDGE." **QUENTLY EXTENT** MILL CONSE-OUR SENSES, WE **TN3TX3 3W 7I** OUR SENSES, SO COMES FROM "KNOWLEDGE

tion.com, accessed August uttps://www.cyborgfoundafoundation, (date unknown), "Design Yourself", cyborg-96 АПТНОЯ UNKNOWN, Essays, 2017, no pagination. BISSON, Neil, A Collection of "Cosmic Senses", in HAR-95 HARBISSON, Neil,

zl&list=WL&index=20&t=0s, com/watch?v=ygRNoieAn-(2012), https://www.youtube. I listen to color", youtube, 99 TED, "Neil Harbisson: accessed August 2020. list=WL&index=11&t=0s, watch?v=U-tGk65wyYs&https://www.youtube.com/ technology", youtube, (2019), csily merging oneself with and Moon Ribas, on physiborg artists, Neil Harbisson 98 DESIGN INDABA, "Cyrechnology and organisms. pes of relationships between 97 Note: The different ty-

accessed August 2020.

THE INFLUENCE OF DALTONISM ON THE ARTISTIC CREATIVE BEHAVIOR

though both sides perceive this same world differently. to both, color-blind and normal-vision individuals, even world. This could be a world in which effects are visible glasses open up a new artificially created visual parallel parallel worlds, the question should be allowed whether about objectivity and color."94 When talking about visual other people see, and that opens up a larger question question as to whether I'm seeing what you see, or what der range of color with these lenses, there's still an open following: "Even though I may be able to identify a wimal-vision people see. In this context the artist states the glasses actually corresponds to the color spectrum norsuises whether the color spectrum he sees through his just as valuable.93 Furthermore, for Arsham the question sees the world with his own eyes, which he feels to be color deficit do. He is comforted in this thought that he be capable to see things the way people without a visual saw things before, as he became aware that he will never sual change, Arsham learned to appreciate the way he interested in and what I make."92 By experiencing this vimany ways that may have formed who I am, what I am actually was not having color vision in the first place. In

sple to perceive them through a new perceptual sense.

to directly see colors, but due to his new technology he is

In contrast to Daniel Arsham, Neil Harbisson is not able

perceives, a reasoning that even Arsham took some time

Still no one will ever be able to see how the other side

e'ti tedW" ,denneH ,lY 49 August 2020. pis-uew-glasses/, accessed artists-work-changed-withqsuiej-stapsm-s-colorblindqz.com/quartzy/1116230/ see color", qz, (2017), https:// like for an artist to suddenly 93 YI, Hannah, "What it's accessed August 2020. list=WL&index=24&t=1341s, watch?v=ZCsEClia1Ck&https://www.youtube.com/ Full Color", youtube, (2016), Arsham, Color-blind artist: In 92 SEMAINE, "Daniel

PARALLEL WORLD.

CREATED VISUAL

SHOULD BE AL-**QUESTION**

MORLDS, THE

WHEN TALKING

YJJAIDIHITAA OPEN UP A NEW

GLASSES LOWED WHETHER

> PARALLEL **JAUSIV TUOBA**

August 2020. pis-uew-glasses/, accessed sıtısts-work-changed-withdaniel-arsham-a-colorblindqz.com/quartzy/1116230/ see color", qz, (2017), https:// like for an artist to suddenly

to understand.

accessed August 2020. lenses. It took me a while to kind of realize that the gift com/watch?v=L4QpmlV7opk, my life and really up into the point that I've received these negative right? And this is how I interpreted it throughout "When you are diagnosed with some deficiency, it's seen to value his initial perception in a way he didn't before. work about that."91 Arsham's visual alteration caused him that spectrum react to each-other and how I feel in my or confident yet or know truly, how different colors within it's not a rainbow of color within that, I'm not quite sure interplay of multiple ones: "Every work has a single color,

be all the more interesting.

although he openly admits that he is unsure about the

more confident in the use of color within his artworks,

Through the experience of the glasses, Arsham feels

reinterpretation of the color use of color-blind artists can

act representation of color visual normality, or whether a

sak oneself whether the goal must be the striving for ex-

cal deficiency. In relation to artistic creation, one has to

can nevertheless develop into an order of a psychologi-

optically visible (from the perspective of someone else),

person having a physical deficiency, even though not

It can be assumed that the consciousness of a daltonic

herself her affiliation through best possible adaptation.

Sims sees it in a certain form as a norm and tries to prove

urge to do justice to the opposing parallel realism. Maybe

view of normal-vision individuals. There seems to be an

Sims tries to adapt her artistic view in her paintings to the

on between things and ourselves." To a certain extent

(2017), https://www.youtube. Angle Of Repose", youtube, "DANIEL ARSHAM - The 91 OUR CHOICES, Books, 2008, p. 8-9. Seeing, Great Britain, Penguin 90 BERGER, John, Ways of

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plication of colors in her own art. visual deficiency and to overcome it in regard to the apcan occur.89 This procedure has helped her to accept her connection from which a healing and growth process presents a universal communicator and a form of social to viewing her work. Sims is of the opinion that art rea unique understanding that is often not present prior

look at just one thing; we are always looking at the relati-

fected by what we know or what we believe. [...] We never

ofher people's color sight: "The way we see things is af-

ans perceive things can be applied to Sims' perception of

normal vision. John Berger's reflections about how hum-

on creates a feeling of exclusion from those who have a

sible that the thought of having a limited visual percepti-

integrate colors in their work. Therefore, it is comprehen-

she constantly compares herself with other people who

this question lies in psychology again. As Sims explained,

perceive himself? It can be assumed that the answer to create a piece of work in a spectrum he cannot purely

point we can raise the question of why an artist would

lors in a way that is amazingly similar to our reality. At this

Legacy Greens (2010), 33 illustrates that she is using co-

sarily notice that she is completely color blind. Her work

her non-existent color recognition one does not neces-

colored work as a viewer without prior knowledge about

her color identification system. When looking at Sims'

sual deficiency, Sims also creates colored artworks with

Besides using her paintings to sensitize people to her vi-

AND OURSELVES."

BETWEEN THINGS

HE RELATION

SYAWJA 39A 3W

JUST ONE THING; **NEVER LOOK AT**

BELIEVE. [...] WE **3W TAHW 9O**

WHAT WE KNOW

YEFECTED BY SEE THINGS IS

3W YAW 3HT³

LOOKING AT

piodraphy, accessed July meghansimsartist.ca/pages/ (qste nuknown), https://www. Artist", meghansimsartist, leusiV - smiS nedgeM" 89 АПТОЯ UNKNOWN, accessed July 2020. com/meghan-sims-artist/, acpromatobala.squarespace. obsia, (date unknown), http:// "Meghan Sims", achromat-88 АПТОЯ UNKNOWN,

but also with the viewer of her art. Hereby she constructs rough the connections she makes with other achromats, lack of visual color perception with others, not only thart allows Sims to share her disappointment about her view the world through the eyes of an achromat."88 Her transcends a two-dimensional image; it is an invitation to cal experience by suggesting that what they are viewing with their own eyes. "I offer the audience a metaphysito let the public experience her personal form of sight and white (e.g. City Silhouettes series), .31 & 32 Sims aims her paintings, which she creates almost solely in black as integrating color-blind people into society and art. Via with normal visions how color-blind people see, as well anal color disabilities, Sims succeeds in showing people differences in perception. By raising awareness about vimore but rather strives to stimulate discussions about that she does not perceive her art as a hindrance anyand the way my eyes see."87 From this statement follows ativity I have been able to openly express my difference to deal frankly with her color-blindness. "Through my cre-Sims has found a catalysator that gives her the possibility was comparing myself to people who use color."86 In art a number on you. Being afraid of color was only natural. I lity and that they're, less than' in some way and that does "Anyone with a disability has been raised to see a disabiwhile to accept and to adapt to her exceptional situation. her distorted perception of colors, as an artist it took her a Although Meghan Sims used to be self-conscious about

su obbortunity to share her point of view and to create

".TAMORHJA **NA 40 Saya aht** мовгр тнвоисн **TO VIEW THE** *NOTATIVNI NA SI* TI ;3DAMI JAN -OISNAMID-OWT A **TRANSCENDS ARE VIEWING** Y3HT TAHW TAHT SUGGESTING EXPERIENCE BY **METAPHYSICAL A BONBIGUA** "I OFFER THE

31

87 АUTOR UNKNOWN, 2020. vision.html, accessed July kes-the-most-of-her-uniquestrist-who-is-colour-blind-mameghan-sims-a-kitchenerwaterloo-region/2019/03/05/ www.therecord.com/news/ therecord, (2019), https:// most of her unique vision" colour blind, makes the a Kitchener artist who is Barbara, "Meghan Sims, 86 AGGERHOLM,

THE INFLUENCE OF DALTONISM ON THE ARTISTIC CREATIVE BEHAVIOR

accessed July 2020. com/meghan-sims-artist/, acpromatobaia.squarespace. obsia, (date unknown), http:// "Meghan Sims", achromator expand his capabilities, his life might have taken a turn ancceeded to implement his artistic expression in color him. Therefore, it cannot be excluded that if Meryon had color-blindness presented an ever-present obstacle to ned the situation. Thus, one can suppose that Meryon's on himself in order to meet artistic requirements worsebut one could assume that the constant pressure he put Meryon left the Navy, he dedicated his whole life to art, his life certainly did not contribute to his well-being. After young age, and a father who only played a minor role in Further, having had a demented mother, who died at a the exact nature of Meryon's madness remains obscure. out in situations of complete madness.85 Nonetheless, state caused him to destroy his prints by crossing them which gradually worsened over time. His later mental of only 37, Meryon began showing signs of mental illness nist physicians label these kinds of subjects."84 At the age tined to become mad, a candidate for madness, as alie-"[Meryon] was a madman, probably born mad or predesve Geffroy described Meryon in a biography as follows: ced him throughout his entire creative process. Gustagreat masters.83 A thought that seems to have influenfelt that he had not attended the same art schools as the artistic life. Accordingly, he later wrote to a friend that he neither happiness nor contentment in the course of his to find ways to deal with his color-blindness, could find Charles Meryon who had been looking for a long time

in a way that he might have been artistically successful.

rough the main tones he heard when visiting these. into colors and created color associations for cities thin the music. In this way, he started converting speeches the colors that he perceived through the dominant tones to his artistic works and began to paint vinyl records in the color green."82 Harbisson then applied this principle

anymore. seuse was the ultimate solution to not be blind to color Harbisson, even though being daltonic, gaining this new ble skills through designing his perception of reality. For sis that enables him to implement previously impracticadealing with his daltonism, one could speak of a prosthelor-blindness. In connection with Harbisson's method of bisson started to deepen his artistic activity due to his cowere looking for ways to deal with their daltonism, Har-While the other artists were already artistically active and

DALTONISM AS A HINDRANCE 1/4/ TRANSFORMATION OF

longer consider their deficiency as an obstacle? impediment that has allowed the artists concerned to no there been a transformation in working with the visual artists that are creatively active? Or in other words, has whether color-blindness consists a mental challenge for to deal with their color-blindness the question arises In regard to the solutions used by the different artists

accessed August 2020. zl&list=VVL&index=20&t=0s, com/watch?v=ygRNoieAn-(2012), https://www.youtube. l listen to color", youtube, 82 TED, "Neil Harbisson:

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cure de France, 1 mars 1930.

"Questions juridiques", Mer-

85 AUTOR UNKNOWN, genre de sujets."

aliénistes étiquettent ce folie, comme les médecins

à le devenir, candidat à la blement né fou ou prédestiné

> translated by the author. Note: Original quotation

Floury Éditeur, 1926, p.4. Charles Meryon, Paris, H.

84GEFFROY, Gustave, âge hanté les mêmes écoles"

> Note: Original quotation Charenton, 21 Mars 1867.

Letter to F. Bracquemond,

83 MERYON, Charles,

(celui) qui n'a pas dès le jeune translated by the author. "[...]

"[Meryon] était un fou, proba-

cords. .28 & 29 & 30 As Harbisson got accustomed to perceitenna and combining what he perceives into micro tone of well-known people by analyzing their face with his ancolor and sound. He started to produce sound portraits works of art which are based on the relationship between creatively. Since the implantation Harbisson has created and therefore was his solution to be able to start working implantation of the antenna allowed him to sense colors are conscious that you're using it."81 Consequently, the are using technology, while if you use it as a tool, you is that if you merge with technology, you don't feel you "The difference between using or wearing technology it has become something that he uses unconsciously: ve the utilization of his antenna as a technology because which he usually calls "RR"80. Harbisson does not perceian artificial reality (AR) but rather as a revealed reality he perceives his reality not as a virtual reality (VR) nor as ce (AI) but rather of an artificial sense (AS). Accordingly, organ, Harbisson would not speak of artificial intelligenas the creation of a new sense. 19 In connection to his new union of two or more senses, he rather regards his case conventional sounds. While synesthesia represents the duction, he would not compare hearing colors to hearing that even if he can hear colors now through bone con-

byone tone, and it felt green, because it sounded just like

normal sounds started to become color. I heard the tele-

the sounds he hears. "I had this secondary effect, that

use the process of recirculation to associate colors with

ving colors through hearing sounds, his brain began to

pttps://www.youtube.com/ technology", youtube, (2019), cally merging oneself with and Moon Ribas, on physiborg artists, Neil Harbisson 81 DESIGN INDABA, "Cyaccessed August 2020. ist=WL&index=7&t=0s, watch?v=sENJ4aUyWJY&https://www.youtube.com/ of Human", youtube, (2018), Harbisson, The Renaissance 80 LIVEMEDIA, "Neil accessed August 2020. tenna-implanted-in-his-skull, why-this-artist-got-an-anandculture/article/31102/1/ www.dazeddigital.com/artsdazeddigital, (2016), https:// fenna implanted in his skull", "Why this artist got an an-79 SISLEY, Dominique, accessed July 2020. list=WL&index=6&t=0s, watch?v=SYB3nnvX-3g&https://www.youtube.com/ Week 2016", youtube, (2016), Neil Harbisson, iMagination life experience as a cyborg, by SCHOOL, "Hearing colors: my **18 ESSEC BOSINESS**

accessed August 2020.

ist=WL&index=11&t=0s,

watch?v=U-tGk65wyYs&-

the opinion that he didn't have any perception of colors perception of color has become synesthetic as he is of other sense of our body.77 Further, he disagrees that his wearing such an antenna has become subliminal like any presented.16 However, Harbisson claims that over time to identify the visual spectrum and sounds the colors reit took him three years to understand his new sense and body and brain to his new antenna took him two months, sight. The artist explains that while the adaptation of his body that allows him to extend his senses beyond human to vibrations. He sees his antenna as a new part of his as sound through the transposition of light frequencies tenna into his head, which allows him to perceive colors from each other, Harbisson created and implanted an anwhat colors are." In order to distinguish different colors I didn't feel the need, but I felt the curiosity to get to know color it is impossible for me to ignore that color exists. [...] sing colors while he was studying arts. "Even if I don't see Out of pure curiosity he experimented new ways of senlor, and it didn't need to be visible through the eyes."73 how colors really affect someone: "I wanted to sense coness as a physical hindrance, expresses the wish to know Meil Harbisson, who does not perceive his color-blind-

Arsham would integrate colors with such intensity.

ago prior to these installations, it was unthinkable that

are shaped by light could always been felt, a few years

on with white sand. Although his interest in forms which

prior to his implantation. Interestingly, Harbisson explains

THE EYES." **VISIBLE THROUGH NEED TO BE** T'NDID TI DNA TO SENSE COLOR, "I WANTED

Intion-science/, accessed Ids-first-cyborg-human-evocom/news/2017/04/worwww.nationalgeographic. graphic, (2017), https:// First Cyborg", nationalgeo-Artist Became the World's Z., "How a Colour-Blind 75 DONAHUE, Michelle accessed August 2020. list=WL&index=5&t=0s, watch?v=jTlcYYm9uAo&https://www.youtube.com/ bark 2015", youtube, (2015), Harbisson Interview Trailer-74 ROCKET CAST, "Neil accessed August 2020. M&list=WL&index=13&t=0s, com/watch?v=Ts_-XVPQOG-(2014), https://www.youtube. Harbisson: Eyeborg", youtube, 13 THE FEED SBS, "Neil

watch?v=C_OnYqx3ynA&https://www.youtube.com/ a Cyborg", youtube, (2017), "Neil Harbisson on being 76 HSGUNISTGALLEN, August 2020.

accessed July 2020. ist=WL&index=9&t=0s, watch?v=C_OnYdx3ynA&pttps://www.youtube.com/ a Cyborg", youtube, (2017), "Neil Harbisson on being 77 HSGUNISTGALLEN, accessed July 2020.

list=WL&index=9&t=0s,

THE INFLUENCE OF DALTONISM ON THE ARTISTIC CREATIVE BEHAVIOR

trom the series Static Mythologies, which he had from 2016 onwards. His work Lunar Garden (2017-2019) color usage is noticeable in the artwork Arsham created has expanded the potential."72 Therefore, a clear shift of making all of my work in these vibrant hues, it's just that it with the material's color only. "It's not to say I will continue work through the use of vibrant colors instead of staying the glasses had on Arsham's art had translated into his take them off once I've selected the palette."71 The effect see what everyone else is seeing, and then I am able to view on color in his work. "I use them within the studio to them only for artistic purposes in order to objectify his tially without glasses. From then on, he decided to wear glasses in order to get back to how he saw the world inian artist, Arsham has reduced the regular wearing of his the nuances of color in it."70 In the course of his work as look much more at the structure of the space rather than spending time with, I'm distracted by all of the other [...] I looking at just architecture and things that I enjoy sort of minately on constructs detached from colors. "When I'm colors are visible in a way that the eye focuses predoand forms. As the colors are less emphasized and fewer tion, shows its strength in the perception of structures tor many color-blind people, Arsham's visual percepanticipated, almost like color-fatigue."69 As it is the case turated game. "There were consequences that I had not cordingly, he had the impression of living in an oversa-

perfectly show his use of pink colored sand in combinati-

created under different forms over the past few years,

69 SEMAINE, "Daniel

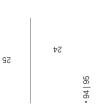
accessed August 2020. ist=WL&index=14&t=96s, watch?v=MA7OV3HxcOw&pttps://www.youtube.com/ glasses", youtube, (2017), artist sees colors with new 72 QUARTZ, "Colorblind html, accessed August 2020. things-differently-a7311916. artists-using-tech-to-seevision-the-visually-impaired--eupinu-a-bnists-and-a-uniquetainment/art/features/ independent.co.uk/arts-enterdent, (2016), https://www. things differently", indepenartists using tech to see vision: The visually impaired Blind artists and a unique 71 BATTERSBY, Matilda, accessed August 2020. list=WL&index=24&t=1341s, watch?v=ZCsEClia1Ck&https://www.youtube.com/ Full Color", youtube, (2016), Arsham, Color-blind artist: In 70 SEMAINE, "Daniel accessed August 2020. list=WL&index=24&t=1341s, watch?v=ZCsEClia1Ck&https://www.youtube.com/ Full Color", youtube, (2016), Arsham, Color-blind artist: In

color spectrum.⁶⁷ Nonetheless, the glasses Arsham tried has led him to try EnChroma glasses, which widen his awakened by the treatment of an ophthalmologist. This stand what he visually missed in relation to colors, was them."66 Over time however, Arsham's curiosity to undersple to see them the way that everyone else would see them because I knew that in their lack of color, I was even part of my practice. Perhaps I was more drawn to my work, I didn't think about the lack of color as being due to the lack of interest in colors. "As an artist, within initially did not use paints in his creative work was rather in order to hide his deficiency, the reason why Arsham approach. However, while Meryon chose to forego colors ness as an artist was in the beginning similar to Meryon's Daniel Arsham's approach to deal with his color-blind-.25 in which a man walks in solitude past a fountain. blue, as well as, in the piece Watered down coffee (2016)

(2012), 24 in which the light in the forest appears in a deep in her series Solitary nature with Midnight Moonlight 2

in her pictures. This observation is particularly evident

teeling over the next tew months of full-time usage. Acfirst time felt magical to him, Arsham developed another these glasses.⁶⁸ Even though wearing the glasses for the what extent his color-blindness affected him until he tried trum of colors. Arsham claims that he could not guess to ting light in a way that he is able to see a broader specthey can rather be seen as an artificial correction, refracpresent no permanent solution for his color-blindness, as



qs.com/quartzy/1116230/ see color", qz, (2017), https:// like for an artist to suddenly e'it Hannah, "What it's

Arsham, Color-blind artist: In 68 SEMAINE, "Daniel accessed August 2020. list=WL&index=24&t=1341s, watch?v=ZCsEClia1Ck&https://www.youtube.com/ Full Color", youtube, (2016), Arsham, Color-blind artist: In 67 SEMAINE, "Daniel August 2020. his-new-glasses/, accessed artists-work-changed-withqsuiej-stapsm-s-colorblind-

accessed August 2020. THE INFLUENCE OF DALTONISM ON THE ARTISTIC CREATIVE BEHAVIOR list=WL&index=24&t=1341s, watch?v=ZCsEClia1Ck&pttps://www.youtube.com/ Full Color", youtube, (2016),

about, I don't really understand yellow."64 expresses a sadness, or loneliness, yellow I'm not sure see these colors. "Red I attribute things like danger, blue perception, although she will never be able to actually le, Sims was able to develop a comprehension for color

observation, however, could also be that the way we use

the general color effect? A possible explanation for this

colors, a certain effect is transferred that comes close to

Or could it be possible that even with a total absence of

gy unconsciously influence her own color interpretation.

whether the eventual controntation with color psycholo-

associations are shaped by modern color psychology or

sion. In this context, the question arises whether Sims

of colors and their effects as people with a normal vi-

achromatic perception develop an identical conception

to the question of how it is possible that people with an

with a certain calmness but also sadness. Es This leads

associated with danger, a lot of people associate blue

pretation. While red is a signal color that is effectively

scribed in a way that is very similar to Sims' color inter-

In modern color psychology, color associations are de-

-SOG TI SI WOH

VISION? JAMRON A HTIW **FECTS AS PEOPLE** -AAD THEIR EF-TION OF COLORS CAL CONCEP-VELOP AN IDENTI-PERCEPTION DE-*STAMORHOA* PEOPLE WITH AN **TAHT 318IS**

effects, she seems to use her understanding of these wever, no matter how Sims developed a sense for color people blended with her color perception over time. Hoconceivable that the color perception of normal-vision over to Sims' interpretation of color. Consequently, it is sible color signaling, such as red for a stop sign, carried color in everyday life, aiming to cause the strongest pos-

XSMHA ..

September 2020. lors-and-emotions/, accessed uttps://looka.com/blog/coand Mood", looka, (2019), Colors Affect Perception Emotions: How Different 65 JIN, Joy, "Colors and August 2020. com/143038849, viewed vimeo, (2015), https://vimeo. "Do You See What I See", 64 SIMS, "Meghan Sims

the system she developed for her own color comprehenin the images taken with what she has learned related to in the direct daylight. . 22 She matches the tones of grey lowing her to perceive a wider spectrum of details than under different conditions such as in a darker room, aldaylight. These moments she can then visually analyze as she uses it to capture moments very precisely during has become an important part of her artistic process, when analyzing lighted surfaces. This way of working details, she uses photography as a support to gain time lenses, which she wears daily, allow her to perceive more lity, be apple green."62 Although her red tinted glasses or apple, and from that point on, that will be to my best abition. I will learn a certain shade of grey, of a granny smith "I've learned about color by comparison, and memorizadether in order to get the desired shade she aims to paint. allowed her to constitute a scheme for mixing colors toaccording to the amount of light I see."61, 21 This method light when I look at the color on the tube. I number them what any of the colors are, really, I'm seeing a gradient of them to the tubes she uses for painting. "I don't know corresponding colors normal-vision people see, linking helped her to code the greyscales she sees with the perceive. In that sense, she developed a system which the need to at least understand what she is not able to rience colors the way normal-vision people do, she felt Even though Meghan Sims will never be able to expe-

to understand what colors mean to normal-vision peop-

ajour . 23 By combining photography with her approach

THE AMOUNT ОТ ЭИІОВООО А **NUMBER THEM** ON THE TUBE. I AT THE COLOR **MHEN I FOOK** DIENT OF LIGHT SEEING A GRA-ARE, REALLY, I'M THE COLORS **40 YNA TAHW** "I DON'T KNOW

XSMHA ..

OF LIGHT I SEE."



leusiV - amiS nedgeM" 63 АUTOR UNKNOWN, August 2020. com/143038849, viewed vimeo, (2015), https://vimeo. "Do You See What I See"", 62 SIMS, "Meghan Sims S0S0. vision.html, accessed July kes-the-most-of-her-uniqueartist-who-is-colour-blind-mameghan-sims-a-kitchenerwaterloo-region/2019/03/05/ www.therecord.com/news/ therecord, (2019), https:// most of her unique vision", colour blind, makes the a Kitchener artist who is Barbara, "Meghan Sims,

THE INFLUENCE OF DALTONISM ON THE ARTISTIC CREATIVE BEHAVIOR piodraphy, accessed July meghansimsartist.ca/pages/ (qste nuknown), https://www. Artist", meghansimsartist,

and, we can assume, that thereby he circumvented his where his deficiency could not be noticed by the public sis, Meryon is the only artist who changed to a medium Thus, compared to the other artists analyzed in this thethe practice of his art and to be recognized by the public. seemed for Meryon to be the only escape to continue same time, this way of dealing with his visual deficiency to suppress his color visual impairment in his art. At the to black and white etchings gave Meryon the possibility The change of the medium and the change from color he decided to circumvent his color-blindness in his art. ciency would not allow him to work with colors and thus because from this point on, Meryon realized that his defigain a foothold as a daltonic artist trying to paint colors, Ghost ship seems like a remnant of a failed attempt to tract the interest of the audience with his color paintings. perceive best. 60 However, Meryon did not succeed to attists with this form of daltonism, these are the colors they for deuteranopic color-blind artists..20 For color-blind arthe selection of yellow and blue tones which is typical ideology Meryon started painting. This painting shows (before 1840, exact date unknown) illustrates with which the etchings, only one remains. The artwork Ghost ship Of all the colored paintings that Meryon had done prior to

visual limitations in his artworks.

• 90 | 91

.304, vol. 39, 1995, p. 405.

Meryon", Survey of Ophthal-

Color Vision Defect: Charles

60 RAVIN, lames, ANDER-

Philippe, "An Artist with a

SON, Nancy, LANTHONY,

that allows both sides to interpret what they are unable tiful expression that can be used to describe the space gap which he called "The Key of Dreams" 69. A very beaudescriptive words of paintings, spoke of an ever-present plains that René Magritte, who related to images and the berience the other person's view. In his book, Berger exrestriction of shades, but will never be able to visually exthe situation of working like a color-blind person with a around, a person with a normal vision can put himself in visual understanding of these colors. Or the other way truly perceive the colors of her paintings nor develop a standing in front of her colored paintings she can neither we know is never settled."68 For instance, when Sims is sual perception: "The relation of what we see and what of the writer John Berger regarding the context of our viworld of visual parallel realities. Similar to the description tist. This being the case, one can assume that we live in a her see the world through the eyes of the color-blind aris also applicable. Someone with a normal vision can neding of what normal sighted people see, and the reverse

1/3/ CONQUERING THE VISUAL DEFICIENCY

to perceive themselves.

artists differ one from another. While some of them found it can be observed that the personal approaches of the out their artistic activities despite their color-blindness, By comparing the different means the artists use to carry

Books, 2008, p. 7. Seeing, Great Britain, Penguin 58 BERGER, John, Ways of

> SETTLED." KNOM IS NEVER

> > **3W TAHW GNA**

OF WHAT WE SEE

NOITAJ3R 3HT"

Seeing, Great Britain, Penguin 59 BERGER, John, Ways of

72

I don't know what blue or red mean visually, but I grew up what he wasn't able to perceive. "I have never seen color, to be only natural that a certain curiosity evolved from tach something more than physical to it.55 Thus it seems effects were invisible to him and people seemed to atcolors, Harbisson felt like studying a religion as the color deficiency perceive colors. While he studied the theory of develop an understanding of how people without a visual to create paintings in black and white and managed to studying music and visual arts. In course he was allowed any comprehension of colors didn't stop Harbisson from sing out something physical." Monetheless, not having out on something social, but I never felt like I was misbecause color is used socially. I felt that I was missing

in a world where color exists."56

lor-blind artist will never develop a real visual understanunderstand what he is visually missing. However, a coself.⁵⁷ It seems only normal that a daltonic artist aims to aurrounded by colors that he cannot really perceive himhim is well aware that in his profession he is constantly cerned. As Harbisson expresses, a color-blind artist like personal affection and the psychology of someone conis conceivable that there is a connection between this cess, it certainly affects them all on a personal level. It ness affects the artists differently in their creative protion of normal-vision people. Although the color-blindthemselves how their perception differs from the percep-It is evident that all three contemporary artists question

> COLOR EXISTS." A WORLD WHERE GREW UP IN I TUB ,YJJAUSIV NA3M Q39 **90 JUJB TAHW** I DON'T KNOW SEEN COLOR, **MAYE NEVER**

neil-harbisson-hearing-cobs://wnusell.com/color-blog/ munsell, (date unknown), htt-- Part 2: Hearing Colors", "Neil Harbisson Interview 55 АПТНОЯ UNKNOWN, accessed August 2020. tenna-implanted-in-his-skull, why-this-artist-got-an-anandculture/article/31102/1/ -strs/moo.latigibbeaseb.www dazeddigital, (2016), https:// tenna implanted in his skull", "Why this artist got an an-54 SISLEY, Dominique,

57 SISLEY, Dominique, August 2020. dex=28&t=0s, accessed -mi&JW=teil&MiuSAyq9H youtube.com/watch?v=2Iyoutube, (2015), https://www. D&AD Presidents's Lecture", Digital, Neil Harbisson -ADVERTISING, "Design and **26 D&AD CREATIVE** ors/, accessed August 2020.

accessed August 2020. tenna-implanted-in-his-skull, why-this-artist-got-an-anandculture/article/31102/1/ -strs/moo.latigibbeatab.www dazeddigital, (2016), https:// tenna implanted in his skull", "Why this artist got an an-

> MOLK. people, but it was never a strong hindrance in his artistic darding the difference in perception compared to other my work."62 His blindness raised questions for him, renor something that I even thought about being part of mething that was pointed out to me on many occasions on. "I knew that I was color-blind all my life, it's not soas a deficiency, for him it never really was an obstructiterial."51 Even though Arsham perceives his daltonism the color inadvertently through the selection of the mating them for properties other than color [...] so I select he made. "Often when I'm looking at materials, I'm selecwithin his work always relied on the materialistic choices nor related to his color-blindness, as his choice of colors

only issue I felt with color was that I felt socially excluded colorblind was always an advantage in many ways. The ness has the capability to make you feel excluded. "Being color-blind and only tew of them suffer total color-blindway. A color-coded world where a minority of people are in a colorful world that is grey to you affects you in a social was an advantage."63 However, Harbisson felt that living identify shapes more easily. So, to me, greyscale vision stances better than people that see color, and we also sion has advantages. We see better at night. We see dicolor-blind has its benefits. "To me, black and white visical problem. He is even of the opinion that being totally not be able to see colors never really consisted in a phy-Similar to Daniel Arsham, for Meil Harbisson the fact to

> **OF THE MATERIAL."** THE SELECTION TENTLY THROUGH COLOR INADVER-SELECT THE COLOR [...] SO **NAHT RIHTO** FOR PROPERTIES SELECTING THEM

> > M'I, SJAIRETAM TA ENOKING AT

"OFTEN WHEN

rations with Pharrell, Adidas mental Art Attracted Collabo-"How Daniel Arsham's Experi-52 COMPLEX HUSTLE, fullfeature.shtml, accessed cnments/scmag14/dec_14/ https://www.sculpture.org/do-Arsham", sculpture, (2014), Conversation with Daniel "Playing with Perception: A 21 CARPENTER, Kim,

accessed August 2020. tenna-implanted-in-his-skull, why-this-artist-got-an-anandculture/article/31102/1/ www.dazeddigital.com/artsdazeddigital, (2016), https:// tenna implanted in his skull", "Why this artist got an an-53 SISLEY, Dominique, accessed August 2020. list=WL&index=16&t=0s, watch?v=YwURKXWz2h0&https://www.youtube.com/ and Usher", youtube, (2017),

being sensible to light. periences, Harbisson is lacking color perception without While this is exactly the form of achromatopsia Sims exto perceive their surroundings normally during daytime. sensitivity to light, which makes it hard for them to be able still different. Achromats normally experience a strong same form of color-blindness, their visual perception is Although Meghan Sims and Neil Harbisson have the

it."60 It is only recently that she started integrating colors out of my reach and I felt that I didn't need to understand of kept the door shut there, because it was something cally excluded colors from her artistic approach: "I sort lors as an artist for a long time. Until 2016 Sims categoricircumstances led Meghan Sims to avoid the use of co-Against this background, it can be assumed that these coloring things in a different way than other children.49 was bullied for having to wear light blocking glasses and hide her visual impairment.48 Accordingly, in school she ple with a color perception deficiency, telt the need to At a younger age Meghan Sims, just like many other peo-

worked mainly in black and white, his color reductive For Daniel Arsham, who in the beginning of his career

in her artworks.

He claimed that his work is not necessarily dependent

berception was never really an obstacle in his artwork.

UNDERSTAND IT. DIDN'T NEED TO I TAHT TJ37 I QNA **OF MY REACH** SOMETHING OUT **BECAUSE IT WAS** SHUT THERE, **KEPT THE DOOR** "I SORT OF

results", cbc, (2016), https:// for first time with fascinating Sims paints with full palette "Colourblind artist Meghan 50 SHARKEY, Jackie, vision.html, accessed July kes-the-most-of-her-uniqueartist-who-is-colour-blind-mameghan-sims-a-kitchenerwaterloo-region/2019/03/05/ www.therecord.com/news/ therecord, (2019), https:// most of her unique vision", colour blind, makes the a Kitchener artist who is Barbara, "Meghan Sims, 49 AGGERHOLM, accessed July 2020. com/meghan-sims-artist/, acpromatopsia.squarespace. obsia, (date unknown), http:// "Meghan Sims", achromat-48 AUTOR UNKNOWN, October 1945, p. 68.

quartier de Meryon II, La Nef,

47 JOUVE, Pierre-Jean, Le

accessed July 2020. ,748118E.1-bnild1uol ner-artist-meghan-sims-cokitchener-waterloo/kitchewww.cbc.ca/news/canada/

ally destroyed some of his own brass plates to keep them This personal development swung high until he eventudelude themselves, soon recognize their interiority [...]."46 manner raises; others, more conscientious, but quick to speaking only with disdain of the just criticism that their that succeeds them, and end up blinded by their works, ve manner: "Some, tempted by gain, adopt an easy path friend Edouard Foley, Meryon regularly wrote in a plaintisociety on an artistic level. 45 Accordingly, in letters to his developed a feeling of having been abandoned by the on led, among other things, to the fact that he gradually to further his personal artistic execution, but this decisi-Meryon's limitations in his art seemed to be a solution have to abandon color in order to continue as an artist. painting of themes using colors, Meryon felt that he did continue creating art. While his initial intention was the was aware of his congenital defect, he was convinced to exercise of his artistic work. However, even though he Meryon's color-blindness represented a limitation in the me certain of this defect." This statement indicates that imagine that it was only to my great regret that I becaby me. It is rather singular, but it is very true, and you can certain colors, very different for everyone, to be confused have an organizational defect in my sight which causes paintings: "Because, as I believe I told you, I certainly the reason why he had resisted to the artform of colored ter stage in Meryon's work process, he even wrote about his father, he has never spoken about it in public. At a lathough Meryon has written about his color-blindness to

Letter to E. Foley, Paris, 20 46 MERYON, Charles, September 1945, p. 5. quartier de Meryon I, La Nef, 45 JOUVE, Pierre-Jean, Le j'ai acquis la certitude de ce mon bien grand regret que coucevez due ce n'est qu'à mais c'est très vrai, et vous moi. C'est assez singulier, monde, se confondent chez bien différentes pour tout le tait que certaines couleurs, un défaut d'organisation qui certainement dans la vue vous l'avoir dit, j'ai bien "Parce que, comme je crois translated by the author. Note: Original quotation Floury Editeur, 1926, p. 30. Charles Meryon, Paris, H. 44 GEFFROY, Gustave,

que soulève leur manière; les geggiu ges înates cutidnes cenales, ne parlant qu'avec bar s'aveugler sur leurs qui leur réussit, et finissent gain, adoptent une voie facile author. "Les uns, que tente le quotation translated by the May 1849. Note: Original

infériorité; [...]".

reconnaissent bientot leur

wais prompts à s'illusionner,

antres, plus consciencieux,

the artists in their artistic approach or even prescribed Is it possible to determine whether daltonism has formed ment? Is daltonism perceived as an obstacle by an artist? artists take their color-blindness as a physical impair-How do artists perceive their own color-blindness? Do acle very early on. This recognition leads to the question: their artistic work, others were aware of the visual obstbecame aware of their visual limitations in the course of While some of the artists analyzed in this thesis only

their artistic expression in one way or another?

on of shading, to the more vivid effects of painting."43 Albeautiful black prints, in which one can see the gradaticolor detect of which I speak is such that I often prefer 13ther in 1846, he mentioned his color-blindness: "This was not aware of it at first. In writings Meryon sent to his that he noticed his differing visual perception even if he allow him various other possibilities.42 It can be assumed he wrote to his father he claimed that this change would stopped the use of sepia to begin watercolor. In the letters moved on to watercolor, as he wrote to his father to have the early 1840s he started working with sepia, but quickly ving the French navy, Meryon decided to study arts. In the exclusion of colors in his artistic works.41 After serlors when he first started as an artist, he later preferred

Fven though Meryon's hopes were high to work with co-

". DNITNIAG." **NIVID EFFECTS OF** TO THE MORE OF SHADING, **THE GRADATION** ONE CAN SEE **Р**ВІИТЅ, ІИ WHICH BEAUTIFUL BLACK **OFTEN PREFER** I TAHT HOUS SI **WHICH I SPEAK** DEFECT OF THIS COLOR

Meryon", Survey of Ophthal-Color Vision Defect: Charles Philippe, "An Artist with a SON, Nancy, LANTHONY, 43 RAVIN, James, ANDER-.q ,4961 ,63 .lov ,21A-xuse8 Charles Meryon", Gazette des sur l'Oeuvre et la Vie de "Documents Nouveaux 42 DROST, Wolfgang, Biography, 1894. Sidney, Dictionary of National to the original source: LEE, Note: Author had no access 1995, p. 403-408. of Ophthalmology, vol. 39, Charles Meryon", Survey a Color Vision Defect: Philippe, "An Artist with SON, Nancy, LANTHONY, 41 RAVIN, lames, ANDER-

Biography, 1894. Sidney, Dictionary of National to the original source: LEE, Note: Author had no access mology, vol. 39, 1995, p. 405.

> possible. allowed him to suppress his color-blindness as far as

> cumventing his color-blindness and suppressing it in his implementation of his subject, Meryon succeeded in cir-I hrough the interaction of his choice of medium and the cover up his color-blindness also in a thematic sense. the selection of his artistic subject focus allowed him to tonism in order to be able to keep working as an artist, Meryon who was looking for ways to elude from his dalnever tried to hide his color-blindness. In contrast, for Arsham's Studio Logo on the cover. 18 & 19 However, he typical color-blindness Ishihara⁴⁰ test plate in the form of relics depict a book on color-blindness, which include a and rose quartz in combination with pink selenite. These thologies Arsham has created relics using volcanic ash ses on a thematic level. Ironically, in his series Static Myhis daltonism indirectly in art and addresses it in rare ca-Human Colour Wheel (2009). 17. Arsham only deals with wan skin, developed a color wheel which he calls The the hue and light he detects through his antenna on hurally richer in detail. Harbisson for his part has, based on (2009). 16 depicts her perception at night which is geneperception during daylight, the painting Might Town 2 (2010) or Breithaupt Pines (2010), which represent Sims' tings like Courtland at David (2010), Victoria Park Trees lor-blindness thematically in their art. Compared to pain-In contrast to Meryon, Sims and Harbisson treat their co-

61 81

deficiency. beoble with a red-green color pard to detect, or invisible to the numbers, while they are any problems to recognize normal color vision don't have different color. People with a shape of a number, with a a composition forming the with colored dots including Each plate consists of a circle invented the colored plates. se obythalmologist who named after the Japanetest, is a color-blind test, 40 Note: The Ishihara

THE INFLUENCE OF DALTONISM ON THE ARTISTIC CREATIVE BEHAVIOR

and thus to hide his limited visual perception of colors.

to the artistic themes of the time, but also a decision that of his art was certainly not only a decision to do justice the decision not to make the poor eyesight the subject though the city was constantly changing. Mevertheless, to develop a feeling of eternity in his engravings, even Gustave Geffroy is undoubtedly right. Meryon managed de Notre-Dame de Paris 15 painted by Meryon in 1854, have a look for instance at artworks such as L'Abside is that the present in it is the setting of the past."39 If you precedented works their immobile character of eternity captured these in his work. "What also gives these unof the cityscape, that would change due to rebuilds and Paris and showed a great affection for depicting views eyes guess it, our mind evokes it."38 He was very fond of a setting that seems eternal. This absent humanity, our things, a humanity endlessly living its temporary life in he suggested, because he was a visionary of hidden py the old age of the dwellings open to space and time, itation, by the concerned expression of the stone faces, Meryon's style of work: "[...] by the sure signs of the haba French journalist, art critic, and historian, wrote about an incredible attention to detail. Thus, Gustave Geffroy, on. Instead he depicted mostly Parisian landscapes with chings had nothing to do with the human visual percepticyborgnatic perception, Meryon's thematic of his etperception, as well as Harbisson's thematic subject of In contrast to Sims' work topics of vision and reduced

Floury Editeur, 1926, p. 184. Charles Meryon, Paris, H. 39 GEFFROY, Gustave, yeux la devinent, notre esprit Cette humanite absente, nos décor qui semble éternel. a vie temporaire dans un humanité vivant sans cesse qes cyoses cacyees' nue parce qu'il était un visionnaire et le temps, il a suggèrè, logis ouverts sur l'espace bierre, par la vieillesse des sonciense des visages de l'habitation, par l'expression bar les signes certains de translated by the author. "[...] Note: Original quotation Floury Editeur, 1926, p. 184. Charles Meryon, Paris, H.

38 GEFFROY, Gustave,

91

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Note: Original quotation

ie present y est le decor du immobile d'éternité, c'est que sans pareilles leur caractère dni donne aussi à ces œuvres translated by the author. "Ce the possibility to work predominantly with greyscales ged to the medium of etching as this transition gave him if he used colors at the beginning, around 1849 he chan-In the course of work of Meryon it is noticeable that even tists all integrated some traces of color in their artworks. minantly on black and white etchings, the other three arcan be conceived that while Meryon specialized predo-Meryon, who was active in a different artistic period, it Arsham and Harbisson with the artworks of Charles By comparing the contemporary artistic works of Sims, nally become the constant thematic center of his art.

perception, his limited visual perception has unintentio-

new sense in order to compensate for his lacking color

has gained. As a result, by permanently integrating this

which is created by the artist through the new sense he

creation and adaption to his new sense, secondly the art

one should speak of two different forms of art, firstly the

seen as art itself. Consequently, in the case of Harbisson

with them"31, the pieces resulting from his work can be senses by creating new organs, and the art of "merging

who expresses himself through the art of designing new

While Harbisson positions himself as a cyborg artist

is the visualization of Beethoven's Für Elise (no date).

example of a sonochromatic painting Harbisson created

to colors. He calls his resulting art "sonochromatic"36. An

voices, as their voices have frequencies that he relates Therefore, he creates paintings of people and people's

to show people what he is able to do with his antenna.

WITH THEM" **ART OF "MERGING** GANS, AND THE TING NEW OR-**SENSES BY CREA-DESIGNING NEW 40 TRA 3HT**

XSMHA ..

matic music scale is a micro-36 Note: The sonochroaccessed July 2020. ,e0=1x8e=x9bnix∠W=teil watch?v=C_OnYqx3ynA&https://www.youtube.com/ a Cyborg", youtube, (2017), "Neil Harbisson on being 35 HSGUNISTGALLEN, accessed July 2020. cyborg-Neil-Harbisson.html, the-future-says-worlds-first-P5eSB5kR0UtM/This-is-Companies/TDIMfjB21Thttps://www.livemint.com/ Harbisson", livemint, (2018), world's first cyborg Neil This is the future, says 34 IYENGAR, Radhika,

specific degree of the color escu vote corresponds to a with 360 notes in an octave, tonal and logarithmic scale

accessed August 2020.

ISI=VVL&Index=11 &t=US,

watch?v=U-tGk65wyYs&-

pttps://www.youtube.com/

cally merging oneself with

and Moon Ribas, on physi-

borg artists, Neil Harbisson

37 DESIGN INDABA, "Cy-

technology", youtube, (2019),

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the future and the past. low Arsham to develop an interplay between the present, digitization mostly shaped the end of the 20th century, althe targeted selection of his objects, which through their fers to as "future relics"32 of the present. Furthermore, the subject of fictitious artifacts that he creates and revolcanic ash, sand or selenite, his work revolves around the first time. Through the use of differing materials like 2016, however, Arsham began to add color to his work for tunity to perceive his art in the same way as the viewer. In This way of working without colors gives him the opporamples that visualize this systematic exclusion of color. and Televisions (2015). 12 are only a few of many ex-

senses."35 Additionally, Harbisson uses this new sense

itself through the traditional senses, but through new an art movement, where art no longer needs to express body parts, the design of your perception of reality as and I see the creation of senses and the creation of new art in itself. "Cyborg art will eventually be seen as an art act of creating a new sense through a "new organ"34 as Harbisson focuses not only on art creation, but feels the Arsham have realized, respectively, physical forms of art, since calls himself a Cyborg³³.13 While Meryon, Sims and Harbisson is able to hear the sound of colors and ever wavelength sensible antenna implanted into his head, perception of sensing color through sound. Through a as he sees the world in scales of grey, has gained the Meil Harbisson who initially had no sense of color at all,

XSMHA ..

32 KINNEY, Bunny, "Daniel vision.html, accessed July kes-the-most-of-her-uniqueartist-who-is-colour-blind-mawaterloo-region/2019/03/05/ www.therecord.com/news/

33 Note: A person whose wis, accessed July 2020. lic-daniel-arsham-juliette-lenowness.com/story/future-reness, (2018), https://www. Arsham's Future Relic", now-

built into the body. tions by mechanical elements peloud normal human limitabhysical abilities are extended



wedysu-sims-s-kitchenertherecord, (2019), https:// most of her unique vision", colont blind, makes the a Kitchener artist who is Barbara, "Meghan Sims, 31 AGGERHOLM, accessed July 2020. com/meghan-sims-artist/, achromatopsia.squarespace. obsia, (date unknown), http:// "Meghan Sims", achromat-30 АПТОЯ UNKNOWN,

anch as Baseball Pile (2014), 10, Moon Globe Black (2016) because he prefers to work in black and white. Artworks surfaces. In most of his art he avoids the use of colors whose work focuses predominantly on structures and painting, Daniel Arsham is a multidisciplinary artist, In contrast to Meghan Sims, who tocuses primarily on

Sims argues: "I didn't see color, so I didn't use it. I had

tones as she distrusted colors in general. Accordingly,

any of her artworks and limited her color palette to grey

ce of strong light. Until 2016 Sims had not used colors in

uer more pronounced perception of detail in the absen-

at Queen (2012), or Might Life (2009), which visualize

Courtland (2012), bavid Street at Night (2011), King are her almost monochromatic artworks like Queen at

shapes."30 Paintings that underline this argumentation

life in detail and colors, I am limited to light, shades and

get lost when she paints by daylight. "Where others see

able for the public, as she is able to include details that restingly, her night paintings seem to be more recogniz-

are practically engulfed by the blinding brightness. Inte-

these paintings, it is clearly visible how the dark shapes

(2010). are representations of her vision at daylight. In

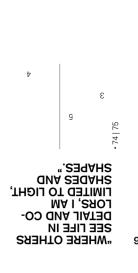
(2010), Victoria Park Trees (2010), or Breithaupt Pines

ted best. Accordingly, paintings like Courtland at David

qıfıouz like fuese, her personal perception is represen-

light, she is of the opinion that when painting under con-

kest. However, even if it hurts her to paint under strong







no interest."31

10

artistic work in which visual perception is fundamental, When one speaks of a visual deficiency in relation to an

one can assume that this visual deficiency affects the

1/1/ THE ARTISTIC CHOICES

way the artist works in one form or another.

ON THE ARTISTIC CREATIVE BEHAVIOR

1) THE INFLUENCE OF DALTONISM

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to the thematic expression of their art. both in the choice of their artistic medium and in relation The four artists analyzed show fundamental differences,

she prefers to paint night settings when light is the darnot only color-blind but also extremely sensitive to light, field to those with normal eyesight."29 As Meghan Sims is tions of my subject matter, which demonstrates my visual real or even abstract, they are usually literal representato the public. "Although my works often appear to be surperception of the world, that she tries to communicate her artistic work. Thus, her work represents her visual questioning and self-reflecting her visual perception in lor-blindness, give an indication that Sims is constantly different approaches she tested to deal with her co-Meghan Sims' various creative periods as well as the

> ning that they suffer from achromatopsia and thus they however, both have the rarest form of daltonism, meawhich was diagnosed for Arsham. Sims and Harbisson deuteranopia27. This form of daltonism is the same form pected to have suffered from a form of protanopiaze or and how he used colors in existing paintings, he is ex-

> ble, varying depending on its quantity, the substance that in the moment but destroys it over time. Color is intractaand of itself. It is perceptible only in light, which reveals it perceive colors by saying that: "Color does not exist in how people with a limited perception system subjectively sign de Bordeaux, has succeeded very well in describing bini, director of the Musée des arts décoratifs et du dehas changed from the past to the present. Constance Ruto which appearance and acceptance of color-blindness use to deal with their color impairment, and the extent fects the creation of artistic work, the instruments artists within this thesis aims to reveal how color-blindness af-By taking these four cases as a basis, the following work

bears it and the eye that perceives it."28

see everything in greyscales.

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THAT PERCEIVES **IT AND THE EYE SAA38 TAHT** THE SUBSTANCE YTITNAUD STI NO **DEPENDING** TABLE, VARYING COLOR IS INTRAC-IT OVER TIME. **BUT DESTROYS** IT IN THE MOMENT WHICH REVEALS ONLY IN LIGHT, IT IS PERCEPTIBLE **OF ITSELF. UNA NI TSIXE TON COTOK DOES**

Bordeaux, Les éditions - Bordeaux, Oh! Couleurs, arts décoratifs et du design does not exist", in Musée des "Color is everywhere Color 28 RUBINI, Constance, 27 Note: Green blindness. color-blindness. 26 Note: Red-green

confluences, 2017, p. 22.

accessed July 2020. com/meghan-sims-artist/, achromatopsia.squarespace. obsia, (date unknown), http:// "Meghan Sims", achromat-29 АПТОЯ UNKNOWN,

XSMHA ..

1978, 17 out of 31 color-blind artists have turned away tistics led by the ophthalmologist Wolfgang Münchow in necessarily involve the use of colors.²⁴ According to stato continue working with an art technique that did not is one example of many daltonic artists, who decided of his color-blindness and turned to the art of sculpting, (1885-1965), who gave up painting after becoming aware

from painting and decided on a different medium.26

mediums they used within their artistic work. handling their deficiency, as well as the diversity of art sed upon their form of daltonism, their differing ways of in the creation of their art. The artists were chosen bacolor-blind deficiency is no longer seen as an obstacle of daltonic artists has changed in such a way that their the possibility to investigate how the working process tar, the analyzation of four different case studies offers Given the multitude of color-blind artists that existed so

experiences he described in letters he wrote at the time proven which form of daltonism he had, but according to being born in 1984. For Charles Meryon it is not exactly both being born in 1980 and Meil Harbisson from Spain, han Sims, from Ontario and Daniel Arsham, from Ohio, 1821 to 1868, all the other artists are still alive, with Megson. While the Frenchman Charles Meryon lived from Meryon, Meghan Sims, Daniel Arsham and Neil Harbislyses conducted on the following pages are Charles The artists' case studies that were selected for the ana-

(no bagination).

Dresden, September 1978,

on Colour Vision Deficiencies,

International Research Group

Regional Symposium of the

MARRE, E., MIERDEL, P.,

CHOW, Wolfgang, "Color

to the original source: MUN-

Note: Author had no access

Research and Application,

of the artist, Philadelphia,

RAVIN, James G., The eye

24 MARMOR, Michael F.,

"Daltonism in Painting", Color

25 LANTHONY, Philippe,

"M, JARAM ni "gnitnisq

vision deficiencies in

vol. 26, 2001, p. 13.

.Yee1, ydsoM

ved by the public?

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of color was faulty.²⁰ bictures were said to be of low quality and his handling the 1500s to teach him how to use colors. Before that, his color-blind, as people said that he hired other artists in ample of an artist who has been speculated about being The artist Baccio Bandinelli (1488-1560), is a fitting exspeculate about the state of perception of certain artists. lor-blindness and therefore, in retrospect, one can only mously, however, it is difficult to prove the artists' cothere were indications that they were color-blind. Posthu-There are several artists in the history of art for which

himself? The case of the American artist Paul Manship piece of work in a spectrum he/she cannot really see the question that arises is why an artist would create a nally shown.23 Regardless of how he painted with colors, nally recognized at the end of his life and later internatiowell-known artist at the time, whose pictures were natiolor expression in his pictures, since Henry was already a they may have been able to implement their personal coas well.22 Because both women were independent artists, sibly due to the departure of his first wife, had changed and remarried, it was said that the use of his colors, poswife to mix the colors for him. After Henry was divorced his deficiency public.21 Henry was told to have asked his who was expected to be also color-blind but never made Another case was the Irish artist Paul Henry (1876-1953),

itish-art-hero-to-cliche-andcom/2003/03/06/arts/from-(2013), https://www.nytimes. Back to Favor", nytimes, Irish Art Hero to Cliché and 23 LAVERY, Brian, "From accessed July 2020. of-colour-36987306.html, treasures-wedded-to-a-lifeie/life/home-garden/ https://www.independent. of color.", independent, (2018), Treasures, wedded to a life 22 FLEGG, Eleanor, accessed July 2020. of-colour-36987306.html, treasures-wedded-to-a-lifeie/life/home-garden/ https://www.independent. of color.", independent, (2018), Treasures, wedded to a life 21 FLEGG, Eleanor, Giunti Editore, 2014, p. 498. Scultore e Maestro, Florence, Beatrice P., Baccio Bandinelli: HEIKAMP, Detlef, STROZZI, "Bandinelli era daltonico?", in 20 MARMOR, Michael F.,

October 2020.

pack-to-tavor.html, accessed

uis bioneering work people have been talking about dalons on visual color impairment. Thus, in recognition of wrong, his initial researches have led to lively discussiassumption about the reason of his color-blindness was concept of the cones on the retina.19 Although Dalton's chers found the reason for the deficient color to lie in the turned out that this was a false assumption. Other researtinted liquid in his eyes. It was only after his death that it the reason for his different color perception to a slightly rent has to have a daltonic vision. 1812 Dalton attributed both parents have to be colorblind, for men only one paany female case is that, while for women, to be daltonic, ty."17 The reason why Dalton might not have encountered I have not heard of one female subject to this peculiari-

tonism ever since.

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ential factor changed the way art is created and perceifalsified perception at all? And, in what way has this influthe extent to which color-blindness can be defined as a onr surroundings influence the practice of art? What is perception, how does a false or distorted perception of the artist. Being active in a profession that is based on perception is for few people as elementary as it is for tivity. One could assume that the functionality of visual visual perception is elementary to their professional acregard to the perception of colors affects people whose tion, however, is to understand how a restriction with role in many areas of life. A particularly interesting ques-An impairment of the visual color perception can play a

> **?JJA** PERCEPTION AT **AS A FALSIFIED BE DELINED BLINDNESS CAN** мнісн согов-**EXTENT TO 3HT SI TAHW**

17 DALTON, John, have scarcely any relation." lied; whilst pink and red to me plue appear to me highly alwy apprehension, as pink and it should have been blue, in I thought it highly improper; red was substituted for pink, enough; but when the term rnat name, seemed proper reference to the flower of named. The term pink, in colors were injudiciously often mention it, that several of opinion, though I might not his discoveries, "I was always

sexe: le daltonisme chez "Exemple d'hérédité lié au 18 АПТНОЯ UNKNOWN, .04.q ,8671 Society of Manchester, vol. 5, the Literary and Philosophical observations", Memoirs of to the vision of colors: with Extraordinary facts relating

19 BAILEY, Gretchyn, vie, 1939, p. 472. l'homme", La Science et la

htm, accessed July 2020. conditions/colordeficiency. www.allaboutvision.com/ allaboutvision, (2019), https:// ses, Symptoms, Treatment", "Color Blindness: Types, Cau-

> reveals itself solely in black and white. person from seeing any color, in a way that the world that of color-blindness, named achromatopsia, withholds the and red, as well as yellow and pink. Lastly, the rarest form

> differed from that of the generality, but at the same time le number of individuals might be found whose vision Dalton did. This made him conclude that "a considerabcolors.14 Harris had described their colors the same way set of colored ribbons in order for him to describe their ton was able to contact Harris's brother who he sent a sion differed from other people's visual perception. Dalperception defect, he was able to understand that his viwas John Dalton. Through analyzations of his own color shape."13 The first one to examine this visual deficiency guish them from the leaves by their difference of size and some pretended difference of color, he could only distin-"when other children could observe cherries on a tree and green from each other. As a child he discovered that Harris noticed that he couldn't distinguish colors red shoemaker named Thomas Harris. Just like his brothers, seph Huddart. 12 Huddart wrote about the perception of a date from 1777 and were documented by Captain Jo-The first writings on the perception of color-blindness

> encountered a female case to date: "it is remarkable that color-blindness in 1794, he was surprised that he had not Even though Dalton had developed an understanding of

> > agreed with my own."15, 16

unknown), https://www.

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Switzerland, Springer, 2017, ,vgolomlentingO to enoiteb ALBERT, Daniel M., Founin MARMOR, Michael F., nition of Color Deficiency", "John Dalton: The Recog-14 MARMOR, Michael F., .005. q , 1777 f , 76 .lov the Royal Society of London, Philosophical transactions of conjq not distinguish color", "An account of persons who 13 HUDDART, loseph, .085. q , 1777 f , 78 . lov the Royal Society of London, Philosophical transactions of could not distinguish color", "An account of persons who 12 HUDDART, Joseph, lour-blindness/, accessed colonr-blindness/types-of-cocolourblindawareness.org/ colourblindawareness, (date "Types of Colour Blindness", 11 AUTHOR UNKNOWN,

from 1798 Dalton wrote about 16 Note: In a publication 1798, p. 28-45. Society of Manchester, vol. 5, the Literary and Philosophical observations", Memoirs of to the vision of colors: with "Extraordinary facts relating 15 DALTON, John,

X2MHA •• X2MHA ••

ject ever know that one perceives the color of the object in the same way? The answer is simple: we cannot. As losef Albers writes in his book *Interaction* of color: "In visual perception a color is almost never seen as it really is—as it physically is." Accordingly, he claims that "this is—as it physically is."

fact makes color the most relative medium in art."9 Knowing that the perception of color is relative, how do we know that our visual perception corresponds to reality? Knowing that other people see differently, what can be called reality? Is reality the one that corresponds to the perception of the majority of people or do we live in a world of visual parallel realities? How do people whose

People with severe color vision deficiency are called to

reality looks different reflect their reality?

be daltonic or color-blind. Research shows that 8% of men and 1% of women have a form of color impairment. To From deuteranomaly, which is a red-green color-blindness, and the most common form, to tritanopia or achromatopsia, which is a complete color-blindness, and the rarest one. While the color-blindness type of deuteranomaly has as a consequence that green looks redder, protenomaly works the other way around and thus makes red look closer to green. Protanopia and deuteranopia cause the affected person to be unable to tell any difference between red and green whereas tritanomaly makes it difficult to differ between blue and green, as well as yellow and red. Tritanopia leads to the person affected not being able to differ between blue and green, purple

KNOWING THAT THE PERCEPTION OF COLOR IS RELATIVE, HOW DO WE KNOW THAT OUR USUAL THE PERCEPTION OF COLOR IS TO REALITY?

8 ALBERS, losef, Interaction of Color, New Haven and 1963, p. 1. 9 ALBERS, losef, Interaction of Color, New Haven and London, Yale University Press, 1963, p. 1.

10 BAILEY, Gretchyn, 10 BAILEY, Gretchyn, 10 BAILEY, Gretchyn, "Color Blindness: Types, Cau-ses, Symbioms, Trestment", allaboutvision, (2019), https://www.allaboutvision.com/conditions/colordeficiency.htm, accessed July 2020.

thought process, which gives an understanding of what is seen, where it is and how to react to it. It combines information from many sensory systems and thus creates a perception of reality."3

perception among people with complete visual functio-Scientists have found that there are differences in color bousiple for what colors our eyes perceive. But not only. called "wavelengths" are being reflected. These are resparts of the light are being absorbed, while some parts them is the one or the other."5 When light hits the object, light falls on them or whether the angle from which I see se they seem to be different depending on the way the off the thought that these colors are lying to me becauof Peter Paul Rubens in the 18th century: "I cannot shake Friedrich von Schiller already wrote about the paintings object and its properties as well as of the light source. lor nuances.4 Which color we perceive, depends on the dure, we are capable of distinguishing over 10 million co-The brain then processes the image. Through this procewhat is seen is transmitted as optic nerves to the brain. sitive nerve endings and color cells the information of onto the retina at the back of our eyes. Through light-sen-Through the pupil of our eyes, light is refracted and falls

With the awareness that even the visual perception of human beings without congenital defect creates differences in vision, how can we as viewers of the same ob-

structure-of-atoms-ap/ sb-cyemistry/electronickhanacademy.org/science/ nuknown), https://www. khanacademy, (date spectrum and photons", waves, the electromagnetic "Light: Electromagnetic 6 AUTOR UNKNOWN, confluences, 2017, p. 211. leurs, Bordeaux, Les éditions design - Bordeaux, Oh! Coudes arts décoratifs et du on Color" (1997), in Musée 5 PANTON, Verner, "Notes éditions confluences, 2017, p. Conleurs, Bordeaux, Les design - Bordeaux, Oh! des arts décoratifs et du on Color" (1997), in Musée 4 PANTON, Verner, "Notes on/, accessed July 2020. au/eyecare/eyesight-vs-visiswartvisionoptometry.com. nuknown), https://www. smartvisionoptometry, (date between sight and vision", "Eyecare, the difference 3 АПТНОЯ UNKNOWN,

December 2008, p.1.

Cambridge University Press,

natural color environments",

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TER, Michael A., "Variations

ueric-sbecrum, accessed

light-and-the-electromag-

popr-model-hydrogen-ap/a/

7 JURICEVIC, Igor, WEBS-

nality.′

in normal color vision. V.

TRODUCTION

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ИИТВОРИСТІОИ

aconstic perception.

le partially touching the subject of an advanced form of following pages focuses mainly on visual perception whiof perception in general, the analyses conducted on the ral sciences." In accordance with Cali's understanding hed from the world as the object of research of the natuof sound, visual and tactual appearances and distinguisas the perceivable environment specified in the modes jects have access. Accordingly, the world is considered the world at the environmental scale to which the subtion is considered an independent mode of knowledge of as follows: "from the epistemological standpoint, percepof cognitive science, recognizes the general perception at the University of Palermo specialized in the philosophy losophical studies. Carmelo Calì, an assistant professor decades been subject to various psychological and phi-The phenomenology of perception has over the past

Mondolpy of perception:

To CALI, Carmelo, Phenomon one notogy of perception:

Theories and experimental evidence, Leiden and Boston,

Brill Rodopi, 2017, p. 1-2.

EVALHOR UNKNOWN,

Tyecsne, the difference

To Mill Rodopi and vision,

To Mill Rodopi and

on/, accessed July 2020.

smartvisionoptometry.com. au/eyecare/eyesight-vs-visi-

When speaking of visual perception, we have to differ between sight and vision. Sight represents our sensory experience, namely "the physical attributes and performance of the many organic components involved in the visual system." Vision, however, refers to how our mind interprets the images perceived by the eyes. It is "a

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	1/ THE INFLUENCE OF DALTONISM
L	ІИТВОРИСТІОИ

ted itself into art history. the extent to which daltonic art has successfully integrasufists are understood by people with a normal vision and tion aims to identify how artworks created by color-blind on. Consequently, The End of Daltonism as an Obstructo overcome the obstacle of their limited visual perceptistudied in order to explore whether the artists achieved and differences in overcoming this visual deficiency are analyzing four case studies of daltonic artists, parallels seeks to unveil the influence of color-blindness in art. By well as the public's reception of daltonic art, this paper ween the artists handling of his color vision defect as work. Through an in-depth analysis of the interplay betto incorporate their visual color limitation in their artistic on with their art, contemporary artists seem to find ways struggled to cope with their color-blindness in connectias much as that of an artist. While 200 years ago artists nosis has probably not influenced any other profession made it difficult to practice several professions, the diag-1794 and although the symptoms of color-blindness have The phenomenon of daltonism was first researched in

ABSTRACT

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Rachel Hoffmann supervised by Jérémie Cerman

Space and communication HEAD Genève

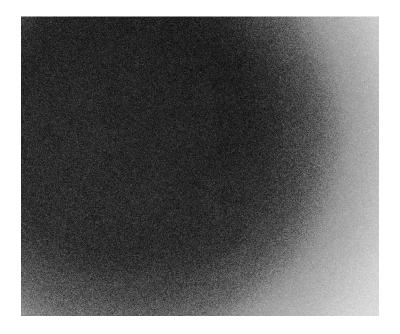
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THE END OF DALTONISM AS AN OBSTRUCTION

THIS BOOK MUST NOT BE TURNED OVER. IN ORDER TO UNDERSTAND THE CONTENT, ONE MUST CHANGE THE PERSPECTIVE.