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A CASE OF SCIENCE AND PLAYFULNESS

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Abstract

Nineteenth-century Europe was the stage of extraordinary scientific and technological developments. The inquisitive spirit of the time led to the study of human perception. The understanding of the mechanisms of human vision was no exception, and it was of particular relevance since scientific knowledge was based on what was observable. The invention of the stereoscope in 1832 had profound consequences in education, entertainment and medical practices. Undoubtedly, the attentive eyes of the early 20th-century artists were not indifferent to such developments as a new paradigm for art and aesthetics was due. Indeed, around the turn of that century, we see the adoption of technical language and the introduction of the poetic function, self-reference, interactivity and the multiplicity of readings in art. This paper attempts to draw links between 19th-century philosophical toys, medical therapies with binocular images, and the aesthetics of the 20th-century vanguards. A 1912 set of orthoptic cards used in the medical treatment of strabismus, among other cards and philosophical toys, are used to illustrate and establish these relations.

Keywords: Stereoscopy; 20th-century vanguards; Philosophical toys; Stereoscopic Medical Charts; Orthoptics; Openwork.

The Introduction of Modern Concepts through Toys

The novelty of the 20th-century's Art vanguards resided heavily in the introduction of the notions of *process*, *chance*, *interpretation*, *immateriality* and *interaction* into art. Such concepts existed as conditions of art-making and were well known by artists and craftsman. Yet, up until that point, it had not been explored as the main focus of art. When these concepts were finally introduced by the early 20th-century art movements (such as Symbolism, Fauvism, Cubism or Surrealism), they were perceived as violent departures from the past. However, the association between these concepts and art was already present in many households in the Western world in the form of philosophical toys.

Philosophical toys, also known as optical toys, were media devices, popular and widespread in Western society between the 18th and 20th centuries. They made the particular link between the scientific and the artistic function, the educational and entertaining, spectatorship and authorship. The aim of these media devices was to provoke children's natural curiosity while making them aware of the trickeries of the senses. As Meredith A. Bak observes, "[optical toys'] pedagogical framing invited children to exercise a sense of visual mastery, understanding optical principles but simultaneously reveling in the perceptual experience of optical deception" (2020, p. 37). This concept was aligned with the central methodology of the educational system in place during the 18th century (the concept can be traced back to 17th-century alphabet blocks) which adopted hands-on exploration as a learning method (Bak, 2020, p. 35).[1] The era's educational methodology was highly influenced by John Locke's and Jean-Jacques Rousseau's theories (Bak, 2020, p. 35) and it can be summed in a line from Rousseau's *Émile*: "Remember always that the spirit of my education consists not in teaching the child many things, but in never letting anything but accurate and clear ideas enter his brain" (Rousseau, 1762, p. 171).

Throughout the nineteenth century, philosophical toys became common items in households and schools, serving both as entertainment and learning tools. Both a toy and a "media machine", these apparatuses fostered interaction and experimentation that allowed for the element of chance and multiple outcomes. They also reinforced the idea of "perception".

Process, chance, interpretation, immateriality and interaction are all strategies of "openness" and, one of the paradigms of the 20th century's art is, in fact, the openwork: a work that is not fixed in one stage, that is susceptible to variations, where the viewer is invited to participate with his particular reading or hand. Over the last century, different artistic currents adopted different approaches: openness in authorship, interpretation, assemblage, and temporality, among others.

Interactivity

It is often considered that it was Marcel Duchamp who introduced the concept of "interaction" in high art. Duchamp

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1. In *Playful Visions* (2020), p. 35, Meredith A. Bak refers to Richard and Maria Edgeworth's "Practical Education", from 1798, as a publication that popularised "hands-on" experimentation as a pedagogic methodology in the late 18th century.

was the first artist to break the physical distance between the object and the viewer by inviting people to touch the piece *Bicycle Wheel* (1913), a piece where the viewer could approach a bicycle wheel assembled upside down on a stool and spin it. We can look at the exact same interaction and even the same hand/arm gesture among viewers of some philosophical toys. Philosophical toys did not simply "show" images: for educational reasons, they demanded handling and maneuvering from the viewer in order for an image to be «performed». Phenakistoscopes, for instance, were turning wheels with images placed around the circular discs that the viewer should rotate with his hand, very much like Duchamp's piece. Of course, *Bicycle Wheel* has much absurdity to it, starting with the fact that it is a wheel that goes nowhere, and a machine that generates no images. It was this unrealised potential that Duchamp was aiming at, and this is where absurdity arises from. Erkki Huhtamo reflects on the core idea of interactive art:

> The idea of interactive art is intimately linked with touching. As it is usually understood, an interactive artwork is something that needs to be actuated by a "user." If the user "does nothing," it remains unrealized potential—rules, structures, codes, themes, and assumed behavioral models designed by the artist (...) An interactive work challenges one to undergo a transformation from an onlooker to an "interactor," an active agent. (2006, p.1)

From this perspective, philosophical toys were the precursors of interactive art. Still today, interactivity with an artistic object is often associated with the aspect of playfulness. This association comes, after all, from our relation to toys, which are meant to be explored. As Huhtamo notes, "not only does the emphasis on touch run counter to the customary idea of the 'untouchability' of the art object; it challenges us to compare art with a whole range of other human activities—from work to play—where physical contact is expected" (2006, p. 1).

Multiplicity of Readings

A common denominator of several of the 20th century's *openworks* is the openness in interpretation or the possibility of a multiplicity of readings. Up until the 19th century, the work of art had one correct way of being understood and the author pointed the viewer towards the one meaning the work was meant to convey. The concept of a multiplicity of readings is associated with the first abstractions of the 20th century. The scene of a man or woman trying to decipher which side is up while hanging an abstract painting is a comical scene often depicted in media culture. Yet, it translates the possibilities of different interpretations and points of view. Certain abstract paintings certainly played with this notion. This playful aspect of abstract art is parodied in Priscilla Fernandes's performative piece *Never Touch the Ground* (2020). The video depicts Fernandes skydiving with abstract paintings in a Dutch Attraction park, both the paintings and her body rotating freely in the air: an allusion to the link between art and play.

The same possibility of a multiplicity of readings was present in several philosophical toys prior to the abstract movement. The phenakistoscope, kaleidoscope, *toupie fantoche*, and spinning tops, for instance, offered multiple viewing angles. These apparatus could also be operated at different speeds,

adding further possible readings. In fact, most philosophical toys were customisable, a highly recognisable feature in contemporary culture. While several philosophical toys, like the ones mentioned above, could be operated at different speeds, some served as personal media machines that invited children (but not only children) to edit or create new narratives and images. An example is a commercialised Zoetrope that was accompanied by an instruction booklet that fostered the creation of new images (Huhtamo, 2012, p. 38). This possibility turned the viewer into an editor.

The Artistic Function in Binocular Medical Charts

The association between art and science was strongly present in the 18th- and 19th-century philosophical toys for which several technicians, doctors, and physicians carefully crafted images.

In the 19th century, the binocular vision and fusion faculty became a source of fascination both for the arts and science fields, and large amounts of binocular images, meant to be seen with a stereoscopic device, were created for didactic, ludic and medical purposes. American doctor David W. Wells, an early 20th-century optician, described binocular vision:

> Binocular single vision is a rather intricate psychic faculty dependent on certain exact physical conditions. With each eye we see a separate object and, according to the law of corresponding points, it is necessary that the images of the object fall upon corresponding points of the two retinae in order that single binocular

vision may be realized. (...) the field of binocular single vision is that portion of the two fields which can be seen by both eyes simultaneously..." (1912, pp. 7–8)

The fusion faculty is a question of degree: many people can fuse typography of a large size but fail when given typography of common reading size (Wells, 1912, p. 12). Several 19th-century optometrists and ophthalmologists believed that stereo blindness (or the lack of stereopsis) could be corrected by training the eyes to form a single image. Sets of medical binocular cards were created to be used in the treatment of stereo blindness called *Stereoscopic Fusion Training*. The therapy consisted of training the eyes to form a single vision by observing the binocular images through a stereoscopic device with prismatic glasses. Stereoscopic Fusion Training was usually employed to treat heterophoria, also known as strabismus. Some cards were used to obtain a diagnosis, while other «sets were prepared for use by the patient during consultation and as a home exercise in accordance with very exact instructions" (Raposo, 2016, p. 50), and they often combined scientific codes and markers with aesthetics and poetic expressions that were meant to motivate the patient into continuing the therapy.

In 1912 a selection of binocular cards by David W. Wells was published by the American Optical Company. Well's charts selection consisted of the re-editing and translation into English of cards previously published by Kroll, Dahlfeld, Hale, and Javal, who first proposed the stereoscope in the treatment of strabismus in his *Manuel du Strabisme* (Javal, 1896). Only a few cards were added by Wells. The set amounted to "50 black and white and 21 coloured charts and a chart for testing aviators in the

service of the U.S. government" (Raposo, 2016, p. 51) and was divided in series corresponding to several therapies:

> Series A – adapted for patients with almost total suppression of one image (Kroll's charts), Series B – used to measure fusion amplitude (Javal, Wells' charts), Series C – consisting of half pictures to force fusion (Dahlfeld, Hale, Wells's charts), Series E – devoted to the cultivation of perspective (Hale, Shuman's charts), Series F and G – used to develop a refinement of fusion by a gradual progression from large to smaller characters (Javal's charts), Series H and I – for cultivating amplitude of the fusion faculty (Javal, Wells' charts) and Series J – used for increasing adduction with perspective (Wells's chart). (Raposo, 2016, p. 52)

Observing the Wells set of cards, it is apparent the artistic considerations that went into it.

The card number C7 (by Wells) shows the letters ON on the left side and NE on the right side. The fusion of the two images reads "ONE". The single word is reinforced by the red colour in the letter N, indicating it is the same letter in binocular vision and also aiding the mind towards fusion. This exercise could be done with any other word, and in fact, in Kroll's Stereoscopic Picture set, the same exercise is done with the word Afrika split in the following manner: Afrika; also printed in black and with the letters "fri" in red. Well's choice of splitting the word ONE in two is a poetic choice. The C series has the word *One* separated at several distances.

The equal prioritising of the visual and the meaningful aspects of the printed word is the art of Concrete Poetry, also known as Visual Poetry. In Concrete Poetry, there is an interplay between form and meaning where often form reinforces the meaning or opposes it. French poet Mallarmé was a pioneer in the fusion of poetry with other arts and directly addressing the relation between content and form. In his poems, this relation is crafted through the purposeful use of blank spaces, masterful placement of the words on the page, and sound awareness. Such is the case in his most famous work, "Un coup de dés jamais n'abolira le Hasard" ("A roll of the dice will never abolish chance") of 1897. Making use of white spaces and a loose assembly of words, this poem, admits varied non-linear readings, therefore multiple "results" as in the metaphorical roll of the dice referenced in the title.

The phonetic play introduced by Mallarmé in his work can also be seen in the concrete poetry of the Canadian poet bpNichol. In bpNichol's piece "A / LAKE / A / LANE / A / LINE / A / LONE"[2] (est. 1965), a poem written in fragmented words on the pavement, the word "*alone*" is never written, yet, it is read aloud to significant effect. The mind's natural tendency to merge images is also explored in the word of concrete poet Aram Saroyan, "A poster-poem" (1966) and "lighght" (1968). "A poster-poem" is a one letter poem in which Saroyan combines two *m*'s in just one *m* with an extra leg. In "lighght", Saroyan plays with the meaning of the word and adds some letters in the centre of the word. The central letters add visual weight, yet they are mute. Both poems are meant to be perceived, rather than read.

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2. See: https://upload.wikimedia.org/wikipedia/commons/1/1d/A_LAKE_A_LANE_A_LINE_A_LONE_-_bpNichol.jpg

Fig. 1 Card C7 from David W. Wells stereoscopic card set, 1912. Original card by David W. Wells. ©Isabel Lucena. Courtesy of Early Visual Media Lab, CICANT.
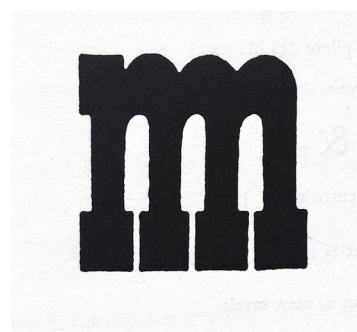

Fig. 2 "A poster-poem", Aram Saroyan, 1966. Source: www.are.na

Fig. 3 "Lighght", Aram Saroyan, 1968. From the Complete Minimal Poems (2007). Ugly Duckling Press. Source: concis.io.

Fig. 4 *Net/Net*, Ian Hamilton Finlay, 1968. By courtesy of the Estate of Ian Hamilton Finlay.

The Blue and the Brown Poems (1968), by Ian Hamilton Finlay include a poem that reads "netnetnetnetnetnet" repeatedly in the formation of a net, alternating letters from red to black and exploring the mental tendency to connect letters into words.

The set of cards from the series G shows a text mixed with symbols and signs. The text starts with large typography at card G1 and gradually gets smaller towards G9. The text is the same on the right and left sides of the cards; however, many letters are incomplete on one of the sides or accents, and

minor signs are added only on one side of the cards. Shapes like lines, circles, and squares are placed in either both or only one of the sides. This apparent artistic intervention in the text serves the scientific purpose of helping in the accurate assessment of the patient's vision. As the text in the cards explains, a patient may be tricked into seeing a predicted image, especially in the case of children who might be more tempted to please parents or doctors and might say they see something they don't. Well's set of cards has cards specially prepared for children since the Stereoscopic Fusion Training works better during childhood. The text of series G reads as follows:

> In this set the cards are combined to obtain binocular vision. Never begin with a new chart before mastering the preceding. After the chart can be well read at the easiest distance, practice reading it at different distances by varying the distance in the stereoscope. The Charts in series G should always be preceded by the series F which are more artfully designed. The signs and marks printed in connection with certain letters, for instance the dots above and below the i should be seen simultaneously. The desire to master the cards often produces a tendency to simulate which should be carefully guarded against. It has happened that a child in order to please its parents and the oculist pretended to see all the letters and the controlling marking in their proper places, when really he did not. In addition to this there exists another source of error owing to neutralization. The neutralization may be partial for instance on F3 the patient may well see the three letters one above the other but the letter which the left eye should see is blurred. This

condition is at once signalized by the absence of the vertical arm of the cross which must be made to reappear. In the preceding chart it is not only necessary that the first four lines be read without a break but it is also necessary that the text seen at the right and left of the upper black square itself furnishes the proof that it is seen by the left eye and that the text placed under the square is seen by the right eye only. Furthermore it is necessary that the upper square appears transparent and on the same vertical line with the following square seen with the right eye only. When this last result cannot be obtained or if the heavy black vertical lines in the present chart do not appear parallel it is because there is a rotation of the eyes on their axes." (Wells, 1912, in G1–G9 cards)

The markers are carefully engineered to both trick the viewer, who might think he is supposed to see something that he is not, but also to some artistic effect, as, for the example, the vertical lines floating above the other graphics in card G5, and small symbols like a candle in card G9 that is only drawn on one side of the card and therefore will appear as a trembling flickering light.

The schematic and engineering aspect of these graphics resemble the diagrammatic of concepts and performative mechanisms of the Futurist Poems. Both the Futurists and the Dada were interested in mechanisms and schematisation: Dada was interested in psychophysiology and the mechanisms of the mind, while the Futurists were interested in the industrial machine; Dada had a particular interest in the diagrammatic aesthetic of information while the Futurists in the

performance of text and form. Francis Picabia was a defining figure of the Dada movement that transitioned to the Futurist movement combining aspects from both.

What characterises Picabia's poetry is the diagrammatic systems and "syntactic and semantic disjunctiveness" (Schawabsky, 2007, para. 7). Picabia considered himself a non-artist and demonstrated a nihilistic side that was conveyed in a dysfunctional and often absurd side of his "poem machines." The cards in series G, with their marks and arrows, perhaps because they purposely contradict the viewer's logic, resemble a disassembled engine similar to Piccabia's futile machines.

The vanguards also created openness by abolishing the fixed spatial and temporal frame. Symbolist Henry Rousseau created a large canvas with odd, child-like relations between figures and backgrounds. These peculiar aspects of Rousseau's art were often attributed to the fact that he was a self-taught painter who was influenced by the discoveries of the subconscious just like the Surrealists were. Henri Rousseau's oneiric aesthetic resulted mostly from the compression of time and space. The painting *The football players* (1908) presents an odd exaggerated perspective, and space appears compressed. The figures of the football players seem out of proportion and as if they are not interacting correctly with one another as if we were looking at a montage of different moments in time. This illusion is reinforced by the fact that the figures seem to appear twice. Instead of four players, we see two players but four figures. The only suggestion that we are looking at four players is in the socks of the figures that are all different; however, they might be two players that changed socks in time. The sense that we are looking at multiple time
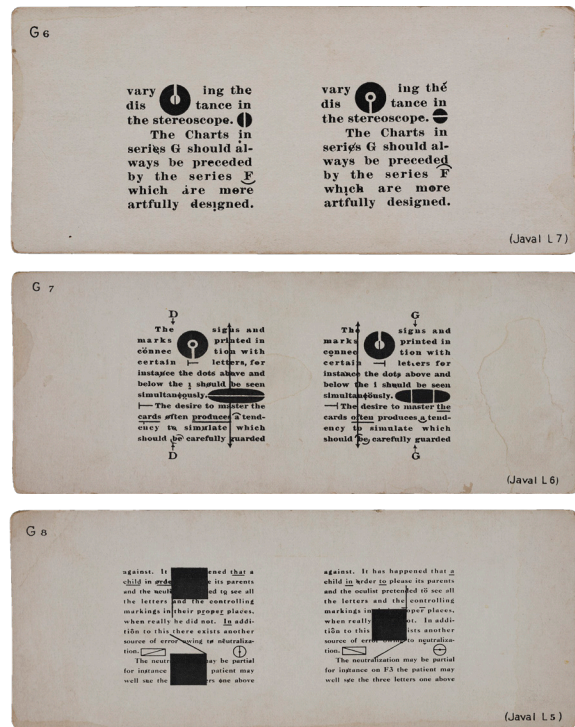

Fig. 5, 6 and 7 Cards G6 to G8 from David W. Wells stereoscopic card set, 1912. Original cards by Javal. ©Isabel Lucena. Courtesy of Early Visual Media Lab, CICANT.

frames is also conveyed in the strange interaction and poses of the players in relation to one another.

The reunion of different time frames in one space is present in phenakistoscope discs or zoetrope cards. On the other hand, some of Rousseau's paintings, like *The Banks of the Bièvre near Bicêtre* (1909) have an exaggerated frontal perspective
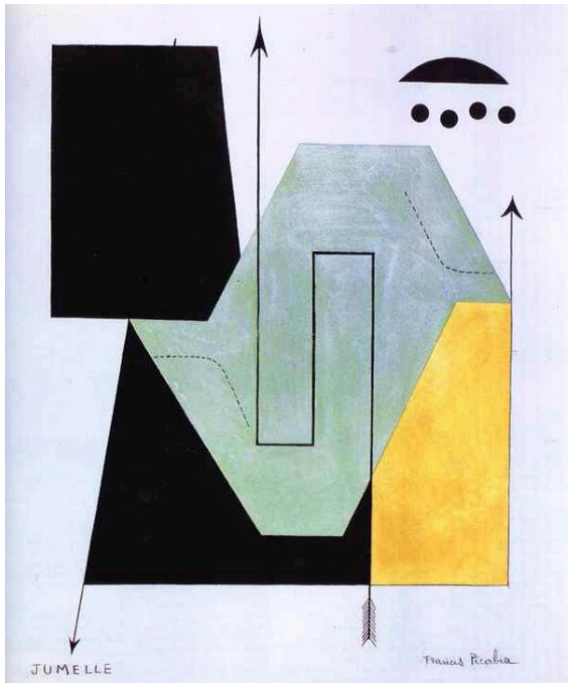
Fig. 8 *Junelle*, Francis Picabia, circa 1921–22. Private Collection.
Source: wikiart.org

Fig. 9 *Mechanomorphic series; 391. 5e année, numero 13*,
Francis Picabia, 1920. Front cover.
Additional title: "Ce numéro est entouré d'une

resembling the *vues d'optique* that used to be seen through a Zograscope.

Wells' card set included cards with themes especially for children. These cards share the visual narratives of the thaumatrope, a popular philosophical toy among children. These topics are simple narratives children are familiar with: the cat catching the mouse, the bird inside a cage, a child feeding a chicken, a lion jumping through a hoop. Symbolists like
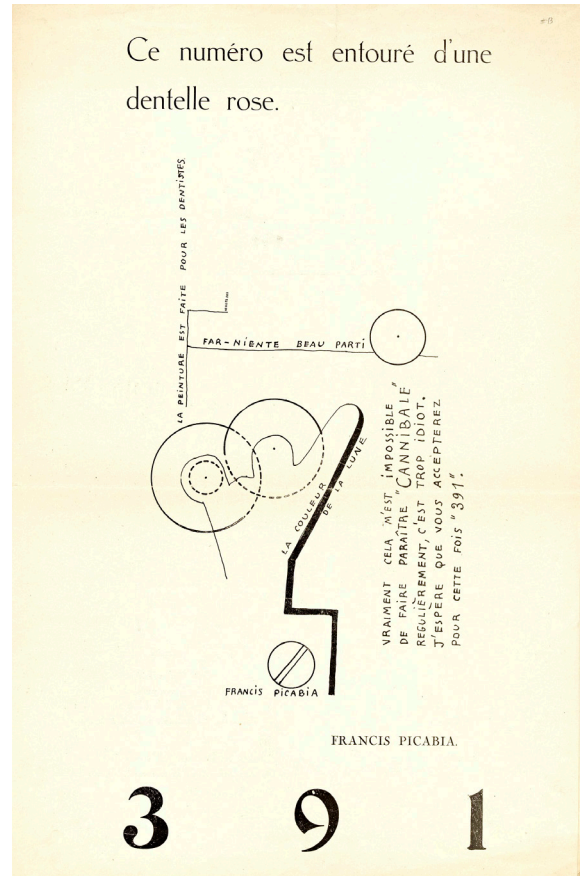
Rousseau constructed similar action-driven narratives in their work. Rousseau's themes include a lion or tiger catching prey, men catching a ball or a horse jumping. The cinematic aspect
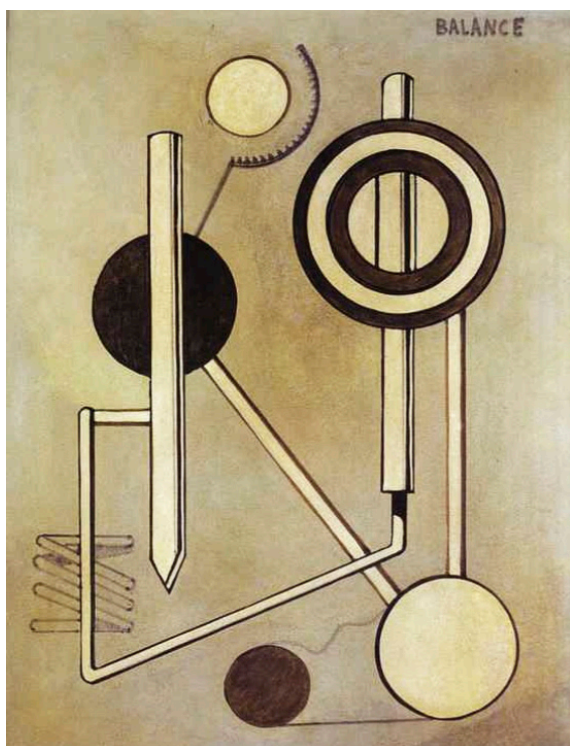
Fig. 10 *Dada Movement Balance* (1919), Francis Picabia., c. 1919. Private Collection. (Source: wikiart.org)

Fig. 11 Card C3 from David W. Wells stereoscopic card set, 1912. Original cards by Hale. ©Isabel Lucena. Courtesy of Early Visual Media Lab, CICANT.
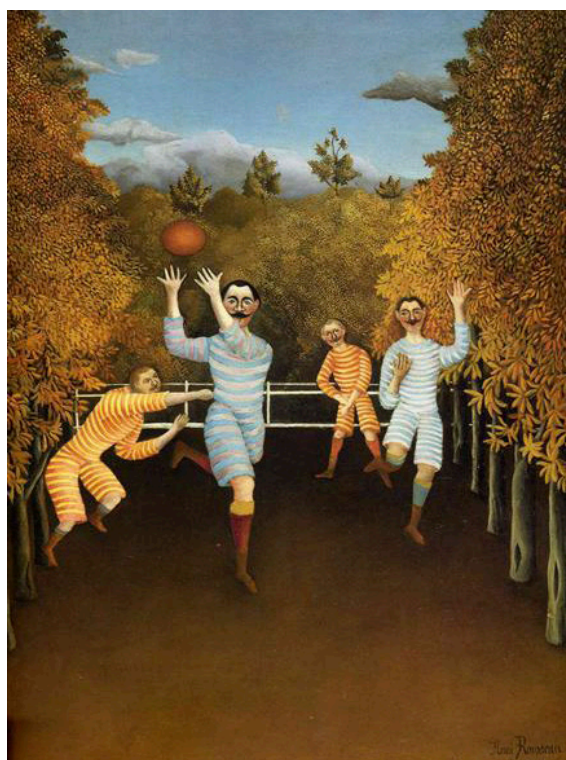

Fig. 12 *The Football players*, Henry Rousseau, 1908. Solomon R. Guggenheim Museum, New York City, NY, US. Source: www.wikiart.org.

of Rousseau's large canvas *The Hungry Lion* (1905) is augmented by the painting's subtitle given by the author (Sooke, 2015, para.16): "The lion, being hungry, throws itself on the antelope, [and] devours it. The panther anxiously awaits the moment when it too can claim its share. Birds of prey have

Fig. 13 19th-century phenakistoscopes card from Mclean's *Optical Illusions* (or *Magic Panorama*), published in 1833. Source: www.publicdomainreview.org

Fig. 14 *The Banks of the Bièvre near Bicêtre*, Henry Rousseau, 1908–1909. Met Museum. Source: www.metmuseum.org

each torn a piece of flesh from the top of the poor animal which sheds a tear. The sun sets."[3]

The first medical binocular cards showed only abstract markers or schematic drawings; however, it eventually became apparent that photographic images and text helped the eye fix the image. Doctors started to add ophthalmologic markers on top of photography (Adams, 2015, para. 41). Furthermore, photographic images were used to motivate the patients to do the exercises at home by creating a familiarity with subjects and imagery:

> Initially, before the use of photographic stereoscopic images, graphic marks for medical use were first drawn on their own on blank cards in order to isolate certain types of effect for diagnostic and therapeutic activities, but practice seems to have revealed

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3.   See https://en.wikipedia.org/wiki/The_Hungry_Lion_Throws_Itself_on_the_Antelope

difficulties in the visualization of the marks on the card. Lines and dots "floating" on their own on the cards seemed insufficient to allow the eyes to "grab" and comfortably fix the image. This fixing is necessary to stabilize the gaze for the operation at hand; that is, the interpretation of specific visual configurations. As the stereoscopic gaze at large had already been trained in the viewing of commercial stereoscopic photographs, the two forms were combined by drawing graphic marks over the existing photographs: the generic photographic image contained and helped the specific graphic mark to carry out its diagnostic or therapeutic function, as it provided a familiar visual field where the patient could carry out and hold stereopsis, which was the aim of the "stereoscopic exercises." The doctor observed the data obtained in the graphic markers (as related orally by the patient) and evaluated the condition of the viewer-patient. "He [the patient] is thus taught to appreciate the absolute reproduction of natural scenery, and is constantly able to verify his binocular perception by a glance at the dots." (Adams, 2015, para. 41).

Wells' selection of stereoscopic charts was accompanied by his manual *Stereoscopic treatment of heterophobia and heterotropia*. The manual shows a stereoscopic photograph of a statue with small dots, two on the left and one on the right. The dots are meant to be discreet, not to interfere with the neurological natural tendency to merge the two photographs, since the schematic language goes against the more "natural" visual language that is the photographic image.

Fig. 15 Card A3 from David W. Wells stereoscopic card set, 1912. Original card by Kroll. ©Isabel Lucena. Courtesy of Early Visual Media Lab, CICANT.

Fig. 16 *The Hungry Lion Throws Itself on the Antelope*, Henry Rousseau, 1905. Beyeler Foundation, Riehen, Switzerland. Aditional Subtitle: "The lion, being hungry, throws itself on the antelope, [and] devours it. The panther anxiously awaits the moment when it too can claim its share. Birds of prey have each torn a piece of flesh from the top of the poor animal which sheds a tear. The sun sets."
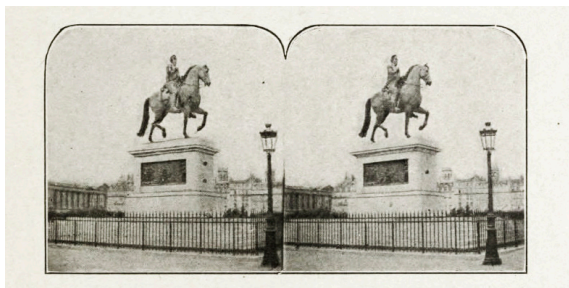Source: www.wikipedia.org

Fig. 17 Stereoscopic photograph with small dots painted on top, printed in Dr Wells' book, *Stereoscopic Treatment of Heterophoria and Heterotropia*, 1912. New York: EB Meyrowitz.

Fig. 18 Card E3 from David W. Wells stereoscopic card set, 1912. Original card by Hale. © Isabel Lucena. Courtesy of Early Visual Media Lab, CICANT

Marcel Duchamp explored relations between different language systems and different senses through haptic exercises. In the piece *Stereoscopie à la main*[4] (1918), Duchamp draws a geometric, see-through diamond shape above a stereographic photograph of the sea. The geometric form is drawn only in outline and in a perspective that seems to be floating at sea level with a part below and a part above water. From a distance the shape resembles a sail boat and its reflection but the 3D construction of the shape is more indicative of a floating sea buoy. Both the photograph and geometric form gain perspective and depth when seen with a stereographic device. The theme, a buoy floating out at sea, reinforces the natural impetus of the viewer of the 3D image: the impetus to reach out and grab the figure as a person that is out at sea might want to grab a buoy.

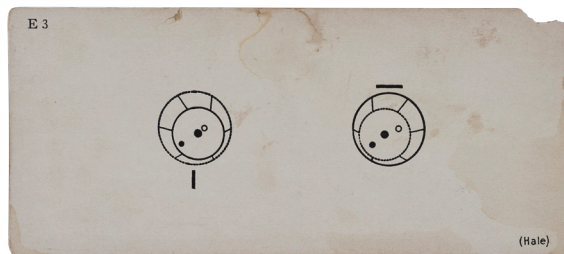With *Stereoscopie à la main* Duchamp created a semi-ready-made since the cards he used as a base for the work were not created by him (Adams, 2015, para. 2). But it is also worth noting that what Duchamp often did in his work, and this was no exception, was to let the media into the narrative.

Much early Dada and surrealist photography tended to play with plasticity to create strange and confusing layers of images inside an image. It was common for the viewers to question whether some elements were really "there" or pasted atop the photograph. Often in Dada's work, the fact that we are looking at images is always made obvious; the only question is "what image": the multiple layers of media, especially in the use of photography, often offer an uncomfortable sight and an aspect of absurdity.

Such aspects are present in the work of René Magritte (see *The Giant/Le Géant*, 1937 and *God, the Eight Day*, 1937) and photographic work by Man Ray (*Le Violon d'Ingres*, 1924 and *Cuisine*, 1931) and Breton, who explored the perception

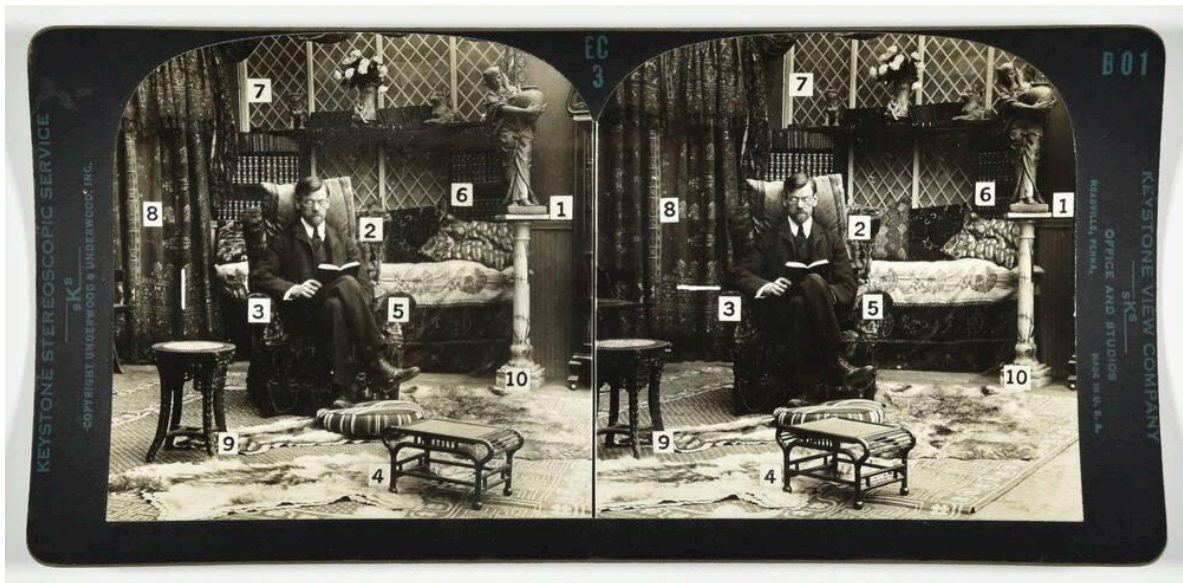4.   See in Museum of Modern Art: https://www.moma.org/collection/works/34823

Fig. 19 "Changing Fixation from 7 to 4 requires 11 1/2 prism diopters of Positive Convergence". Card from the Keystone View Company Eye Comfort and Depth-Perception series c. 1930. Gift of Malcolm Daniel and Darryl Morrison. The Museum of Fine Arts, Houston. Source: emuseum.mfah.org

of multiple layers and mixing of media. Later on in the 20th century, subversion of the image would lead to the appropriation of the image. Artists like John Baldessari, similarly to Duchamp, explored both the image appropriation absurdity and media plasticity, a tendency that would also touch the Punk movement.

Once again, we can go back to the early 20th century to find in Stereoscopic Fusion Training this same aesthetic, combining photography with expressive ophthalmologic markers, bringing language dissonance into the image. This absurd mixture of apparently meaningless signs atop landscape pictures and domestic scenarios can be seen in the popular set by Keystone View Company named "Comfort Depth-Perception Series" (*c.* 1930). In one of the cards, a black and white photo depicts a man leaning back in an arm chair reading a book in a living room. The image is punctuated by rectangular white rectangles with numbers on it. A caption reads "The Human Body is Strengthened by Proper Exercise – The Eyes Are No Exception", a message that strongly contrasts with the image depicted. This is only one of many images of the kind seen in Binocular Fusion Training cards of the time.

Fig. 20 *The Giant (Le Géant)*, Paul Nougé on the Belgian Coast, René Magritte, 1937. Private collection, René Magritte/ Courtesy Brachot Gallery, Brussels.

Fig. 21 *Self-portrait*, Jean Hans Arp, c. 1922. ©Stiftung Arp e.V. source: artandseek.org

Fig. 22 *God, the Eight Day,* René Magritte, 1937. Brussels, Rue Essenghem. René Magritte/ Courtesy Brachot Gallery, Brussels.

Fig. 23 *René Magritte and The Likeness* (La Resemblance), Shunk Kender (Harry Shunk and Janos Kender), c. 1962. Private collection, Courtesy Brachot Gallery, Brussels.
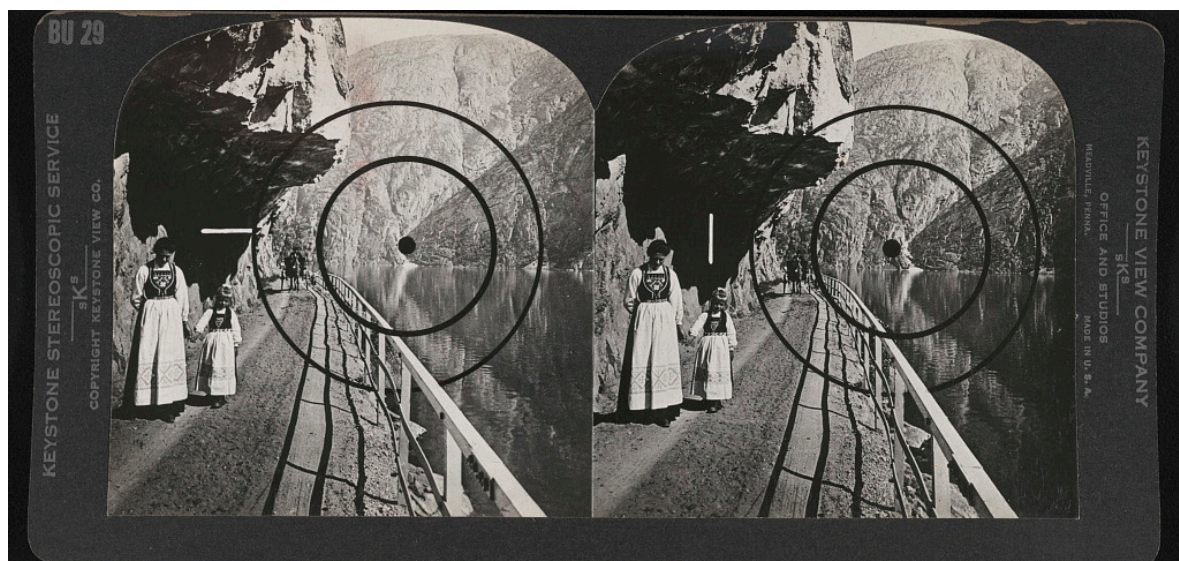
Fig. 24 *Woman and girl walking on path along water*. Card from the Keystone View Company eye-skill training series, c. 1943.
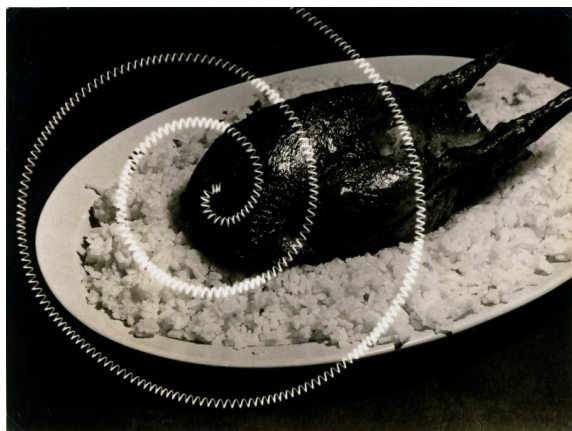The Library of Congress. Source: www.loc.gov

Fig. 25 *Cuisine*, Man Ray, 1931. The Israel Museum, Jerusalem,
Source: www.european.eu

Conclusion

Wells' set of stereoscopic cards was published in 1912 when philosophical toys and stereoscopic images were already familiar and customary in Western society. Ophthalmologists' concern in providing familiar narratives and aesthetics in binocular training is known through Wells' manual *Stereoscopic treatment of heterophobia and heterotropia* (1912), where Wells declares his intention to disguise the therapy as a daily entertainment moment in order to engage the patient in the home exercises (Wells, 1912, p. 46).

Fig. 26 *Le Violon d'Ingres*, Man Ray, 1924. Photograph. ©Man Ray Trust ARS-ADAGP. Source: www.wikiart.org

Some of the several different visual languages employed in Wells' stereoscopic cards are not addressed in this research, like the colour fusion function for instance; nevertheless, in the brief examples provided, we can observe the multiplicity of visual languages, the motives, and aesthetics that the viewers had been accustomed to through philosophical toys.

Wells' set of cards is an example of the link between science and leisure that was behind most philosophical toys which, throughout the 18th and 19th centuries, dealt with *perception*, *process*, *chance*, *immateriality* and *interaction*, concepts highly present in 20th-century art.

While artists like Marcel Duchamp actively explored technical novelties and developed optical experiments, others like Henry Rousseau and René Magritte played with narrative and perception. In fact, given the popularity of philosophical toys and stereoscopic photography in the 19th century, and considering the eagerness to break with tradition that was felt at the time, it is difficult not to imagine the vanguard artists' fascination with these modern images.

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