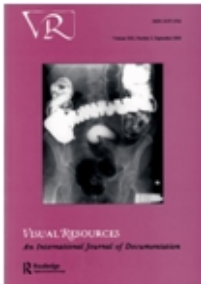

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Enumerating Infinity: Cloning Color

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Enumerating Infinity: Cloning Color

Anoka Faruqee

What makes the translation of color from perception into representation and then reproduction so evasive? Theorists such as Wittgenstein and Albers have championed the relativity of the human perception of color. This fluidity of perception has occupied painters from Monet to Reinhardt. Conversely, those developing new image technologies seek to organize color into an absolute and comprehensive system in order to ensure accurate replication. The painter Byron Kim also seeks to fix color. For each Kim painting is like an oversized pixel, and this isolation of a single color fact is inherent in all attempts to replicate color. We must first *isolate* if we are to label, code, name, and measure to ultimately replicate. Given our understanding of color's deception and contingency, why do we still insist on its truth and isolation? The inconsistency of color in printing, photography, and digital imagery reveal to us something very basic about human perception.

Keywords: Color; Reproduction; Painting; Pixel; Kim, Byron; Faruqee, Anoka

Color exists both as physical fact and optical illusion. The experience of color in perception is momentary and temporal: nearly impossible to remember, represent or reproduce. Yet in our daily lives, we believe only in color as fact. Historically, color as fact has been the concern of the physicist who quantifies it in wavelengths of light while color as illusion has been the concern of the philosopher and painter. Theorists of color, such as Ludwig Wittgenstein and Josef Albers, describe the impossibility of defining color as fact isolated from context. The uselessness of color as isolated fact has been the knowledge of painters from Rembrandt to Reinhardt, the latter of whose work represents the extreme assertion of color's formal relativity. However, as a painter myself, I still wonder about this seemingly useless side of color—the factual, scientific and quantifiable side of it. The work of Byron Kim also speaks about this side of color. Perhaps it is the unattainability, the ultimate fictiveness of color as fact that drives us into this very territory. It is the impulse to possess what is fleeting, to fix what is mutable, to contain what is infinite. Furthermore, though defining color as fact is, in the painter's eye, merely as impossible game, to those developing technologies of image making such as printing, photography and digital imaging, it is an ideal goal. The painter thus

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ventures into a kinship with the world of mechanical reproduction in trying to fix the unfixable.

The search for a universal color standard lies within the realm of factual color. For centuries, color theorists have created three-dimensional solids (called "color spaces") that strive to contain, locate and quantify every imaginable color. This search has been the subject of international conferences, but no one model of categorizing color prevails. Pictured in Figure 1 is one such model of color organization, known as the CIE chromaticity chart, first established in 1931. It is an irregular triangle with the three primary colors of light at each endpoint. Colors are located within the chart, measured in wavelengths, as percentages of these three primary colors. The ideal color model is systematic, comprehensive and blind to context. By contrast, the painter does not require the exhaustive color model, but rather engages the palette, which is unsystematic, limited and aware of context. What Albers calls "actual color" is color as perceived by the human eye, dependent on a host of variables, including the context of the colors around it or the quantity of the color.[1] In the view of an Albers problem shown in Figure 2, one color is made to look like two. Though the green grids are factually the same, they *actually* look different because of the human eye's inability to see color devoid of its context. According to Albers, "color is the most relative medium in art"[2] and it is color's optical instability, rather than its physical fact that should occupy the painter.

Furthermore, in addition to the constant optical deception of color, the painter must also consider the fluidity of color under varying lighting conditions. A painter calls color as fact "local color". Though a faith in local color is part of our everyday existence, the painters of post-Renaissance European painting knew that a one-to-one map from color in perception to color in representation would be inadequate. Ludwig Wittgenstein noted: "There is gold paint, but Rembrandt does not use it to paint a golden helmet."[3] Painting is a game of balancing relative color: even in the most mimetic of paintings, the painter is aware that recreating relationships yields a more convincing account of perception than recreating isolated facts. Painting is not about fact, but about act. As the history of painting evolves from Impressionism onwards, act seems to take more and more relevance over fact. In Monet's paintings of the Cathedral at Rouen (see Figures 3a and 3b) from 1892–1894, the local color of the Cathedral is abandoned in order to represent the effects of the changing color of light. By painting the Cathedral at different times of day, Monet seeks to represent the experience of perception, rather than represent an object in perception. By referencing time passing, Monet's images of the Cathedral become but still frames in a moving picture. Monet reacts to the factual nature of a recent invention—photography—seeking to assert what photography cannot.

In his black paintings of the 1960s (see Figure 4), Ad Reinhardt also seeks to challenge photography. Photography requires a bright light (the flash) to fix an image, whereas the eye is able to adjust to low lighting conditions over time. As Albers describes, the eye is therefore superior in observing subtly shifting values or lightness, while photography heightens contrast and loses middle grays.[4] Subtle value contrast is thus a powerful tool for Reinhardt to engage the human eye and not the camera. When photographed, these works are impossible to see, which explains why it is difficult to see the nine squares contained within the painting when viewing the reproduction in Figure 4. When confronted with the actual painting, our recognition of the nine squares happens only after a prolonged viewing.

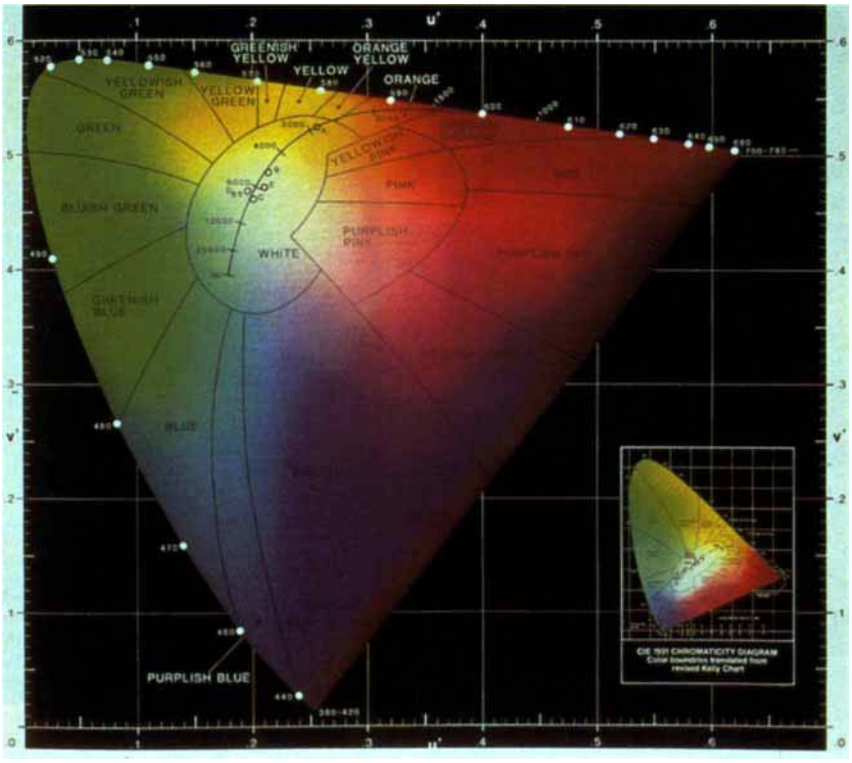

FIGURE 1 *CIE Chromaticity Chart, reproduced from Norman,* Electronic Color, *p. 57 (in public domain).*

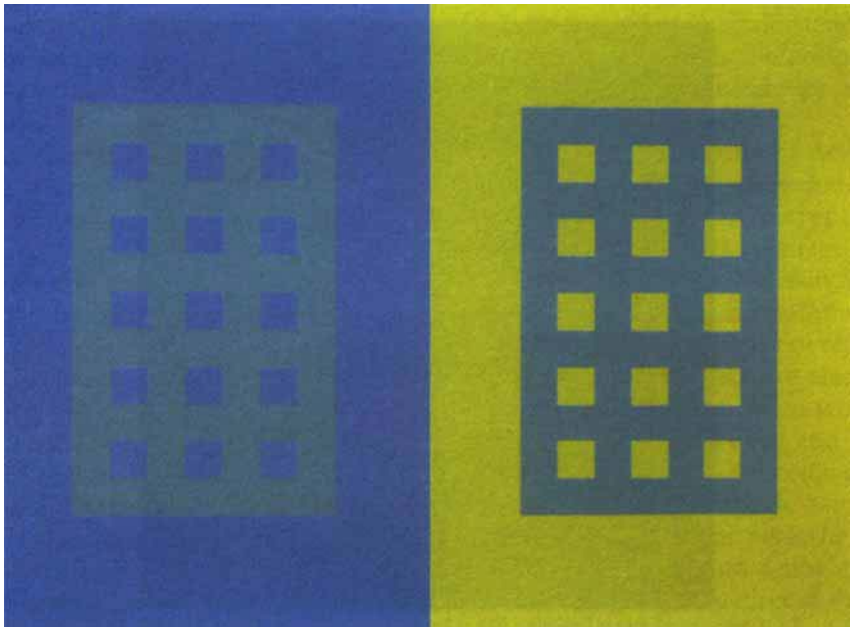

FIGURE 2 *Josef Albers,* One Color Appears as Two on Different Grounds, *silkscreen (courtesy of Josef and Anni Albers Foundation/Artists Rights Society, New York).*

FIGURE 3a *Claude Monet*, Rouen Cathedral in Full Sunlight, *oil on canvas, 42" × 29", 1893, Collection of Musee d'Orsay, Paris (courtesy of Artists Rights Society, New York/ADAGP, Paris).*

FIGURE 3b *Claude Monet*, Rouen Cathedral, *oil on canvas, 40" × 26", 1892, Collection of the National Gallery of Art, Washington, DC (courtesy of Artists Rights Society, New York/ADAGP, Paris/Art Institute of Chicago Slide Library).*

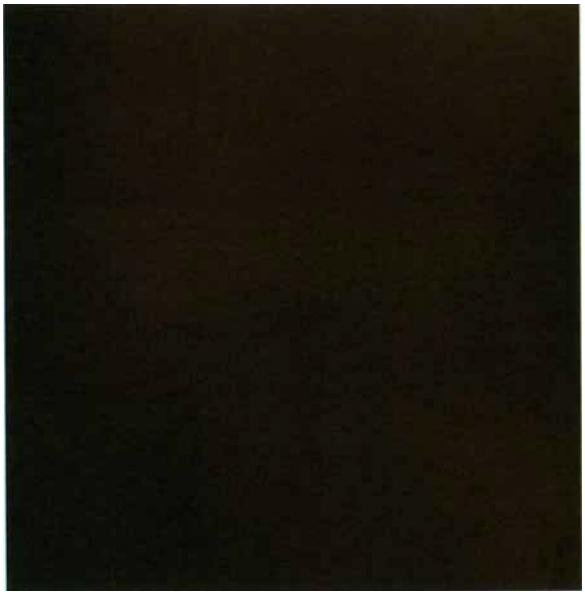

FIGURE 4 *Ad Reinhardt*, Abstract Painting #11, *oil on canvas, 152.4 × 152.4 cm., 1961–1966, Collection of the Art Institute of Chicago, Gift of Dr and Mrs Irving Forman, '1985.1067 (courtesy of the Art Institute of Chicago Museum).*

Photography, like seeing, is not only dependent on light but also on time. Whereas the camera's aperture controls the amount of light, the exposure determines the amount of time it takes to capture the image. Darker images require more time to photograph. If you view this painting at the Art Institute, it is as if it turns our eye into a camera, demanding a certain "exposure time" for us to see an image. Of course, the *camera* is an imitation of the eye, but Reinhardt's work calls to attention this very fact. Reinhardt uses color to tell us how both we, and a camera, see. The time needed to see the image provides the charge in Reinhardt's work: as Monet's paintings are a representation of time passing, Reinhardt's are an experience of it passing in the present.

Reinhardt describes his black paintings as "unphotographable, unreproducible, inexplicable icon(s)."[5] By finding that very point where perception and photography diverge, Reinhardt's work provides one of the most challenging examples of the efficacy of color reproduction. Reinhardt seeks not to mimic colors in perception, but rather negate perception itself: he describes the work as "intangible, invisible, illimitable" and "beyond seeing."[6] In presenting the desire to negate perception, Reinhardt asserts perception emphatically. For the painting *is* ultimately tangible, visible and limited. By pushing perception to its limits, we are made all the more aware of its imminent negation. The use of black is meant to be a pure state of absence of color, as in nature. Yet there is no real pure state of black in pigment. The state of absence that Reinhardt seeks is not possible in a painting—a material and tangible object. The longer we look, the squares cease to be a pure black: in relation to one another, one square becomes bluer, and another browner. They become present color. This impossibility of black in painting is acknowledged earlier by Reinhardt: "colorlessness in art is not colorlessness".[7] Furthermore, by limiting his palette so extremely, Reinhardt also relies on the convention of color's relativity that has arguably always been part of the intuitive knowledge of the painter. The Reinhardt painting brings us back to the palette's understanding of context over comprehensiveness. Perhaps Reinhardt's painting is the endpoint of this trajectory of pushing relative color, of relying on color's instability over its fixedness.

If Reinhardt's work is an endpoint, Byron Kim's paintings represent a new point of departure. Whereas Reinhardt's product offers a challenge to perception and to photography, so does Kim's process. Kim documents colors in perception by isolating color facts and reasserting local color. *Synecdoche* of 1991 (see Figure 5) is comprised of about 275 10″ × 8″ monochrome panels, color samples of skin tones of friends, strangers and acquaintances. Kim uses only his eye and his paintbrush to record color and thus has an advantage over the camera because he is not restricted by the economy of reproduction to three primary pigments. There are also fewer steps in his translation from perception into representation than there would be with a camera from negative to positive. Kim, equipped with an easel and panels, would venture to the park or library, approach people, observe the color of their skin, and make a close approximation of the color in paint. Though Kim chose areas of somewhat undifferentiated expanse, such as the arm or neck, he surely must have had to simplify the multiple tones that he observed into a single shade. In reasserting color as fact, Kim accepts a reduction and fragmentation of this very fact—as the title *Synecdoche* implies. What the paint recording gains in accuracy of particular color fact, it loses in context.

Kim arranges the series of paintings in alphabetical order by first name of the person observed. Context exists not within each painting, but outside of it, between the panels themselves and conceptually in the culture at large. Each panel is, on its own, an absolute color fact—an assertion of local color. Yet in a group they become relative to one another and to their titles, and in this way, Kim fills the void of formal relative color within a single painting.

In another work, in collaboration with Glen Ligon, Kim critiques the readymade of the paint tube, the ultimate culturally constructed color fact. In *Black and White* (see Figure 6), Kim paints sixteen panels with straight-out-of-the-tube oil paint—the "flesh" tones of various paint manufacturers. The racial bias in society's search for ideals of flesh tones presented here and in our culture is a metaphor for the absurdity of color as a formally fixed system and vice versa. Our faith in the truth of color as fact is mocked here. We find ourselves comparing the subtle differences between the tones, asking which one is the "true" flesh, stopping ourselves at the absurdity of the question. In *Black*, Glen Ligon paints sixteen corresponding panels, this time with each paint manufacturer's versions of black, playing with the schism between language and color. The meaning of the word "black" encompasses both the race excluded in Kim's flesh samples and the formal concept of color negation, as in a Reinhardt painting. Again we ask: "which one is the blackest black?," creating an inadvertent pun for racial "essence".

Kim's work represents a satirical rupture with monochrome painting. The blue in a Yves Klein painting is the ultimate in self-referentiality, and can therefore be named only after the artist—thus "Yves Klein international blue." By contrast, the color in a Kim painting is not just a single formal fact, but a fact distilled from perception. In a Klein painting, the fact is a material one—a fact only in the present—but in a Kim painting, the fact is both material and documentary—a fact alluding to a past perception. The viewer is confronted with a document of a color "reality," trusting the painter's color documentary skills in the way one might trust the camera's image documentary skills. On the other hand, the work also represents a rupture with traditions of mimetic painting in its isolation and fragmentation of color, making useful the uselessness of color as fact.

Kim embraces fact with the self-consciousness of a painter aware of the absurdity of recording color truths. Kim isolates color from its context in an attempt to reveal the deficiencies of this very act. In a 1995 work, *46 Halsey Drive, Wallingford, CT* (see Figure 7), Kim employs his family in remembering a color past, rather than recording a color present. Kim sent members of his family a chart of pink paint samples from a hardware store, asking them to identify the color of a childhood home. He then chose several of their selections, painting them in horizontal bands across the painting. Like *Synecdoche*, this work reveals the fascination with color as fact, but this time Kim is explicit about its impossibility. For there was indeed a correct pink, but this truth is no longer attainable, and is only relevant as an ideal. The schism between physical fact and perceived reality is especially poignant here in that the search for truth remains unrealized.

If a local color is a mirage, an optical illusion, impossible to even grasp or remember, much less represent, where does this leave those developing technologies of representation such as photography and digital imaging? The innovators of image technologies turn to the pixel (picture element) in an attempt to mimic the way the eye sees color. Our retina is lined with a layer of cells called "cones" that

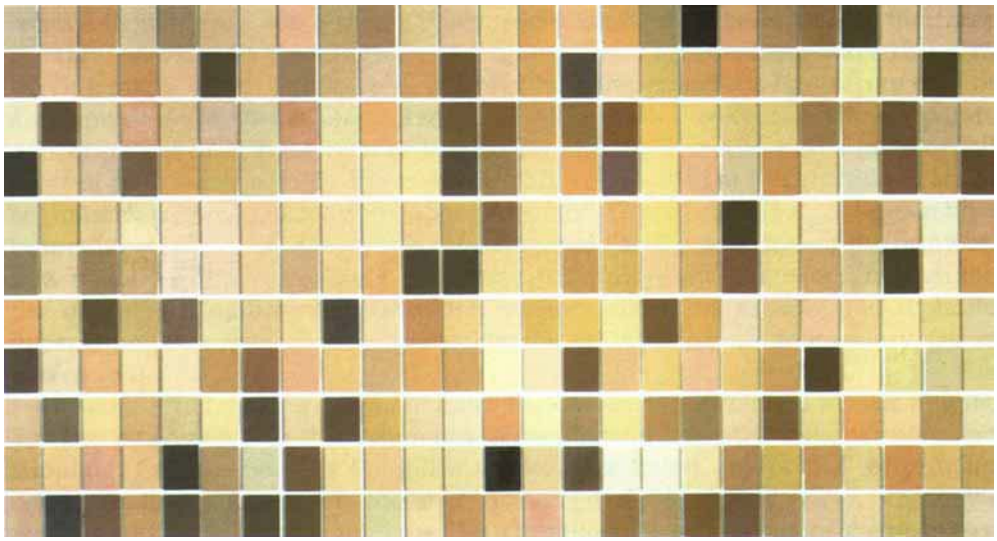

FIGURE 5 *Byron Kim,* Synecdoche, *oil and wax on wood, 275 panels, 10″ × 8″ each, 1991–1992 (courtesy of Max Protech Gallery, New York).*

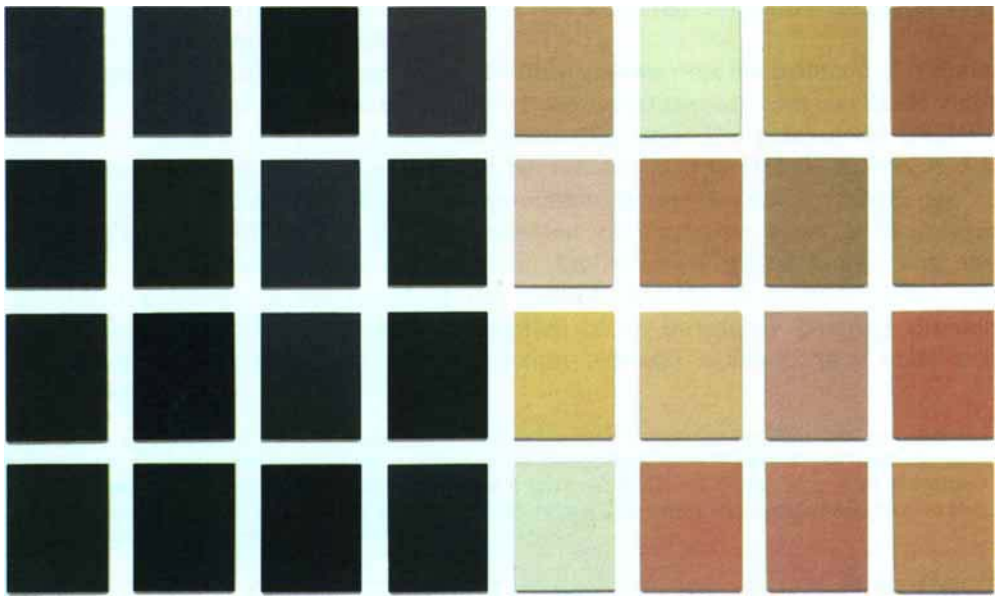

FIGURE 6 *Byron Kim and Glen Ligon,* Black and White, *oil on wood, 32 panels, 10″ × 8″ each, 1993 (courtesy of Max Protech Gallery, New York).*

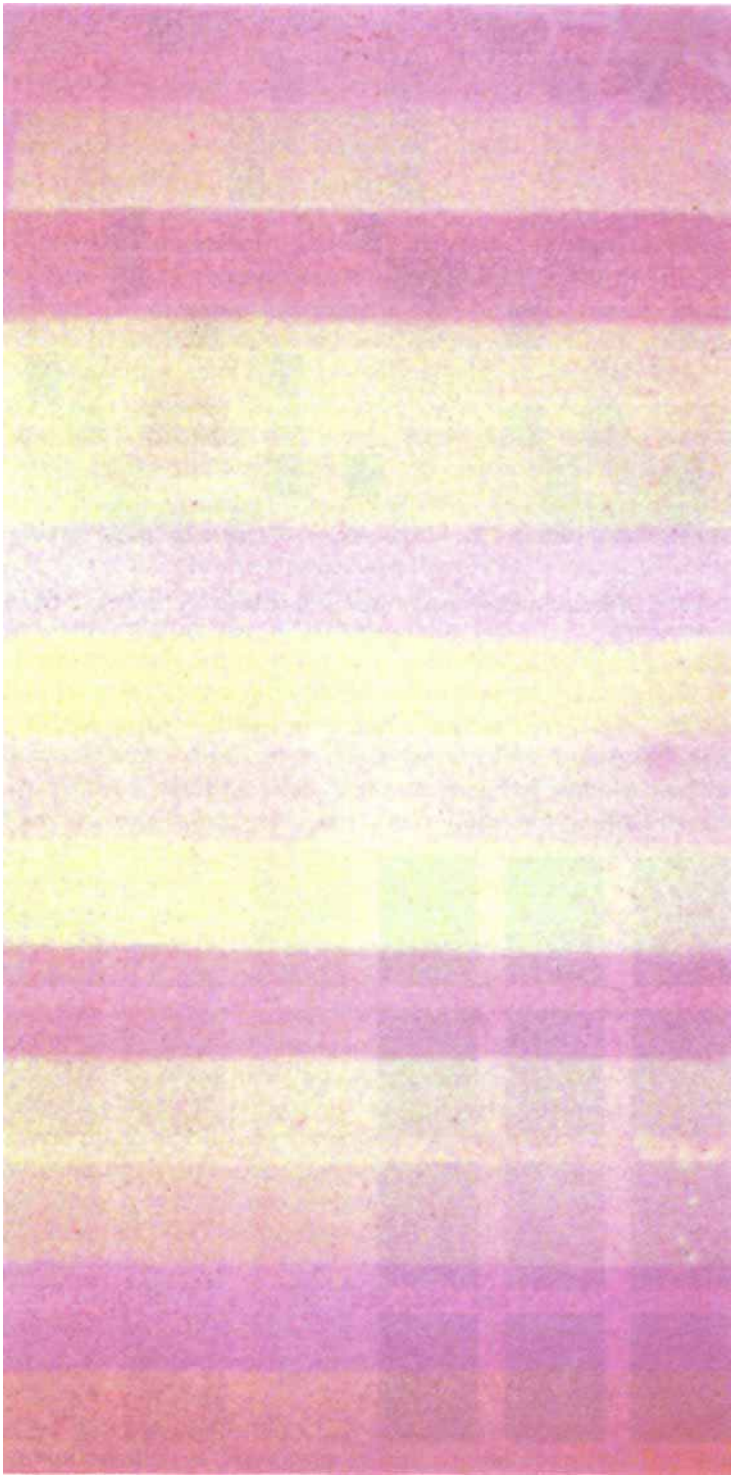

FIGURE 7 *Byron Kim*, 46 Halsey Drive, Wallingford, CT, *house paint on plywood, 96" × 48", 1995 (courtesy of Max Protech Gallery, New York).*

receive light. Cones are of three types, each tuned to perceive one of the three primary colors of light: red, green and blue-violet. Together these three colors in varying mixtures can duplicate all colors of human perception. The picture tube of a computer or television monitor is lined with pixels that contain three separate dots of phosphor, one for each primary color of light. The colors on a monitor fall short of perception because the three primary colors of light in perception cannot be mimicked adequately in the phosphors of a monitor.[8] This red-green-blue information on the monitor can then be converted to the tiny dots of the printout, now made of primary colors of pigment: cyan, yellow and magenta. Through the use of discreet building blocks, digital imagery allows us to store and replicate information that was once only singular (as in painting) or momentary (as in perception).

The concept of a picture element dates back at least to Byzantine mosaic murals, and has incarnations in the techniques of needlepoint, tapestry, crosshatching and stippling. Georges Seurat's Pointillist works were based on "points" of primary colors, small enough to mix together in the eye of the viewer. Victor Vasarely's work from the 1930s through to the 1960s parallels the technology of the pixel (see Figure 8). Furthermore, the advent of geometry makes his images even more like computer pixels. The use of the grid in digital imagery provides location crucial for replication. By keeping all color modulations discreet from one another, Vasarely reduces the traditional painterly tricks of creating illusory space and light into a deliberate, digital and, ultimately, replicable system. Again, the color mixing occurs perceptually rather than chemically. In computer graphics, this kind of digital blend of color is called a "color ramp," a feature found in computer software programs aptly called "paint systems." A ramp creates the effect of a traditional watercolor or painterly blend or wash. Each color ramp has two endpoints, and many stages of transitions between them.[9] A rendered computer image is thus merely a convincing optical illusion.

This quest for an autonomous color unit only underscores the primacy of context. The pixel is crucial in the world of color reproduction, for any universal color standard demands the idea of such an irreducible unit. The pixel is the ultimate color fact. It is a piece of color that can be named and quantified, and located if necessary. The pixel's insistence on autonomy seems to offer a challenge to painting's denial of it, but the contradiction remains: the pixel is useless in isolation, and therefore relies on relativity. Any finished digital image, and any Pointillist painting, is the result of the context that the individual pixels find themselves within. Wittgenstein's description of an imaginary painting divided into color patches addresses this distinction between isolated color units and overall color:

> Imagine a painting cut up into small, almost monochromatic bits which are then used as pieces in a jigsaw puzzle. Even when such a piece is not monochromatic it should not indicate any three-dimensional shape, but should appear as a flat color-patch. Only together with the other pieces does it become a bit of blue sky, a shadow, a highlight, transparent or opaque, etc. Do the individual pieces show us the *real colors* of the picture?[10]

Wittgenstein's example maintains the absurdity of any attempt to separate a color from its context, but he contemplates such attempts because they nonetheless demonstrate a compelling quandary. The isolated color patches, despite their *pretense* as fact, are no more "real" than our perception of them in a context. In a

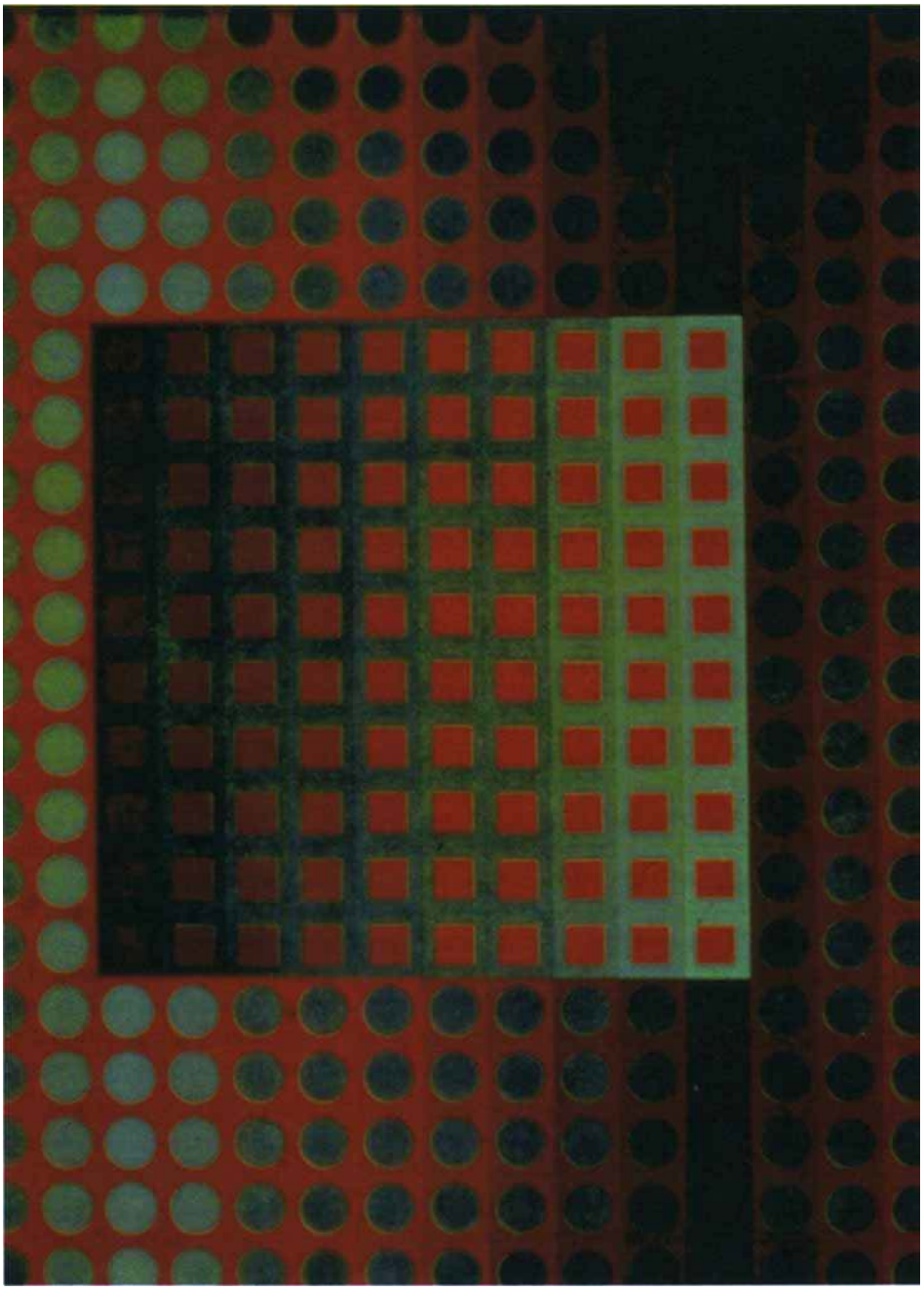

FIGURE 8 *Victor Vasarely, Zett-Z, 1965 (courtesy of Artists Rights Society, New York/ADAGP, Paris).*

sense, the pixels *from* the picture are not the real colors *in* the picture, but Wittgenstein's description indicates that someone might naïvely believe or hope that they are. The pretension of and desire for the absolute still exists in the realm of something so relative as color. The existence of the pixel embodies this interdependence of the absolute and the relative. Thus, digital color technology becomes the crux of understanding the collapse of color's duality.

This contradiction integral to the pixel might attract the painter to it. Though I do not actually use computers in the production of my own paintings, I do use concepts such as "color ramps." I sometimes record color shifts in naturally decaying objects, such as bananas and flowers. These are color ramps in nature. The colors in this ramp (Figure 9) represent a Gerber daisy petal drying out over four days. Though the ramp looks mechanical in its nature, it is a record of a natural phenomenon. The colors are digital and discreet, and can be saved in plastic jars. I then made a painting with pixel-like asterisk shapes that re-create a context for these colors (Figure 10). The finished painting thus allows the viewer to revel in factual color: the viewer may trust that the color he or she looks at is factually the same as what the painter held in her hand months ago. However, as in Kim's work, these paintings also accept a simplification, fragmentation and reinvention of this very fact.

I now mix colors with medical syringes yielding formulas in millimeters for any given color. It is my attempt to quantify color. I have abandoned the traditional painterly palette in favor of the chart. The introduction of the syringe seems insidious for it introduces a kind of simple machine into a process that was once utterly based on human perception. However, in using or imitating the machine, I can find its defects. For what is measurably or mathematically equal is not visually equal. When mixing paint in millimeters, I am aware of the schism between a mathematically symmetrical color ramp and a visually symmetrical one. For example, some pigments are chemically stronger than others and mathematical formulas have to be adjusted accordingly. Sometimes trial and error is the only foolproof system. Ultimately, numbers are abandoned to create a visual continuum. Richard Norman points out that this slippage between mathematical measurement and visual measurement is at the root of the problems in color reproduction, and the major hindrance in defining a uniform color model, for such a model depends on the idea that the space between each color is equal.[11]

Thus by engaging a process that mimics machines, I can differentiate the human component. For the computer may be able to measure, but it cannot really as yet *see*. To further mimic machines, I have started to replicate paintings, the task of replication made possible by the technology of the grid and the pixel. *Rainbow Triplets* (Figure 11) is comprised of three "identical" images that have different uniformly color grounds: the grounds are the primary colors of pigment, from left to right: cyan, yellow and magenta. As in Kim and Ligon's *Black and White*, I find myself asking: "which one is the true painting, and where is the inaccuracy?" However, unlike a similar inconsistency in mechanical reproduction, there is no "master." This work finds enjoyment, rather than error, in inconsistency. Again, as in the work of Monet and Kim, the relative color can be found outside a single painting, calling to mind the limits of the construct of Painting's frame, and demanding a temporal read of the work. In the view of three color photographs of a young girl processed by different means in Figure 12, we see the inconsistency

FIGURE 9 *Anoka Faruqee,* Crimson Gerber Daisy Colors, *flashe paint on wood, 5" × 20", 1999 (courtesy of the artist).*

FIGURE 10 *Anoka Faruqee,* Crimson Gerber Daisy Painting, *flashe paint on canvas, 48" × 40", 1999 (courtesy of the artist).*

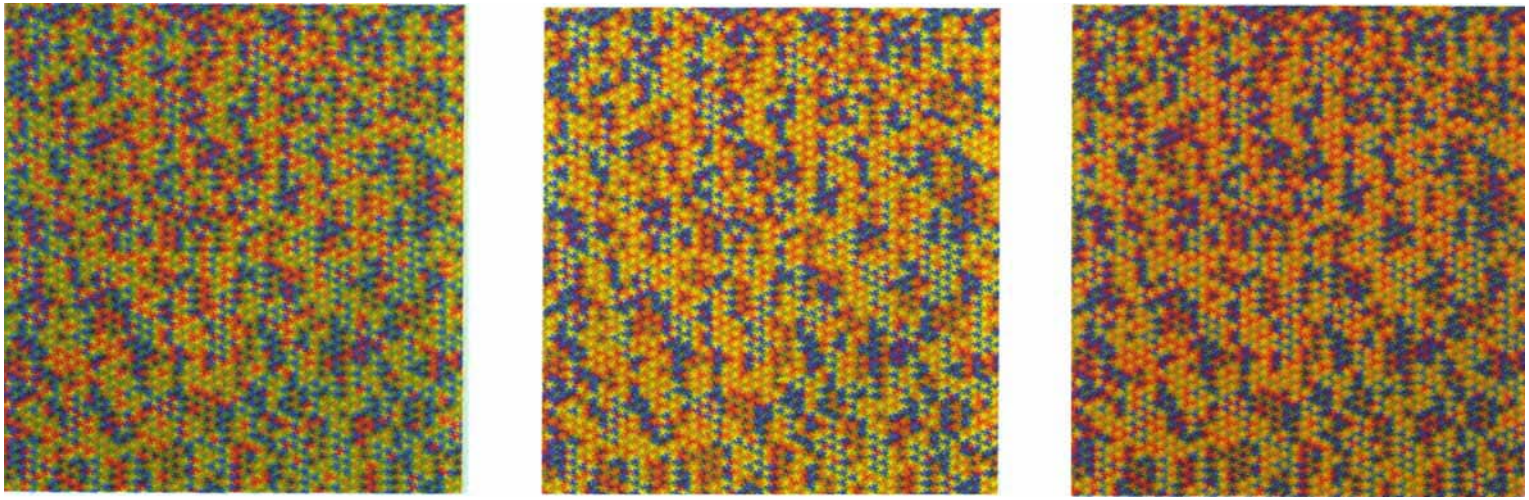

FIGURE 11 *Anoka Faruqee,* Rainbow Triplets, *flashe paint on wood, 3 panels, 36" × 33" each, 2000 (courtesy of the artist).*

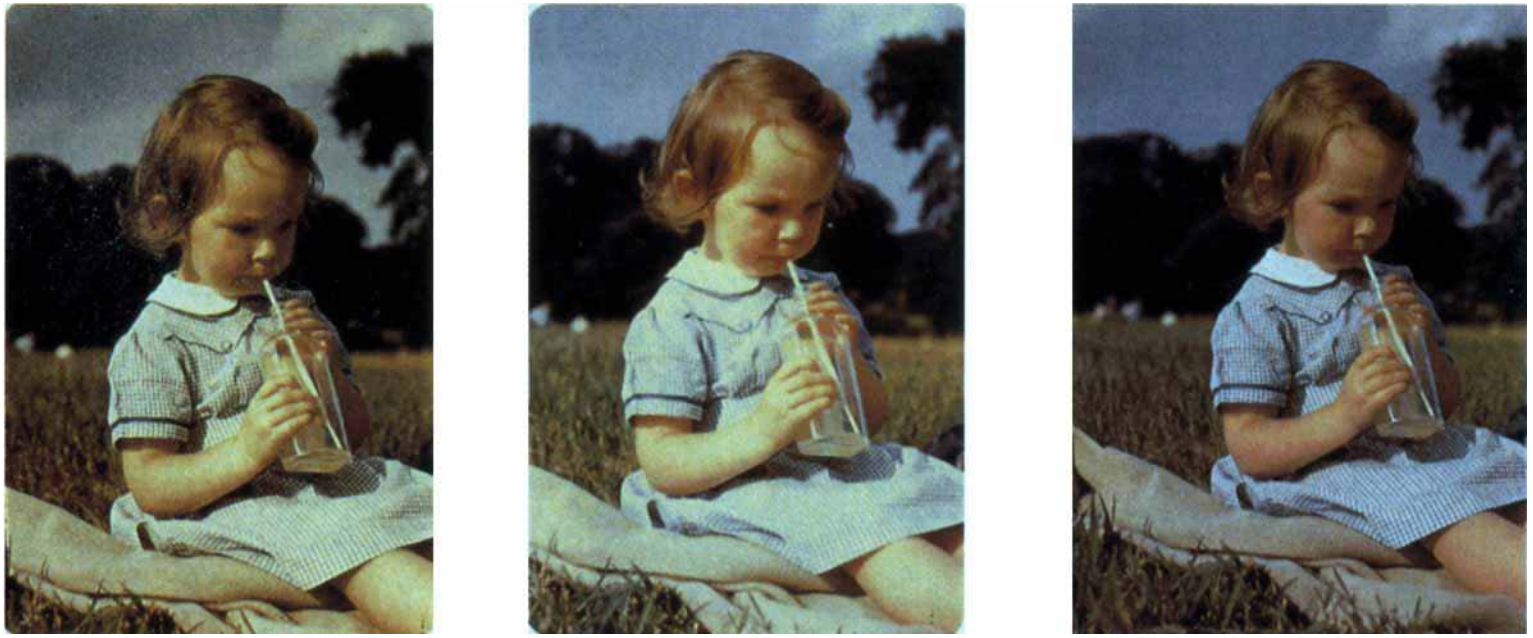

FIGURE 12 *Three color photographs printed by different processes, reproduced from,* An Illustrated History of Color Photography, *p. 204 (courtesy of the authorJack H. Coote).* *The Illustrated History of Colour Photography* (Oxon: Fountain Press, 1993), ISBN 0863433804.

of color that is still a part of our experience of mechanical reproduction. We could say that in mechanical reproduction, our experience of the formal relativity of color happens often between images as well as within them. Each single photograph strives to mimic, represent and transfer the colors in perception, and accepts a truth that this girl was comprised of an unfixed palette. The three photographs together, however, remind us that this belief is a fallacy. The inconsistency of color in printing, photography and digital imagery reveals to us something very basic about human perception.

The move from perception of color into representation and then reproduction is a journey that originates in the moment of seeing, moves into the singularity of painting, and ends in the multiplicity of mechanically reproduced images. Painters such as Monet and Reinhardt have tried to defy mechanical reproduction by championing the eye's fluidity over the camera's fixedness. Yet the painter Byron Kim seeks to fix color, and he achieves a more accurate mimesis of perceived color than a camera. In doing so, he accepts the fragmentation and isolation of color. For each Kim painting is like an oversized pixel, a single cell is made to represent the whole image. This isolation of a single color fact is inherent in all attempts to replicate color. We must first *isolate* if we are to label, code, name and measure to ultimately replicate. For example, the search to map human DNA code will enable us to clone. A universal color model, where colors can be isolated and quantified, will be essential in the accurate reproduction of images. Given our understanding of color's deception and contingency, why do we still insist on its truth and isolation? Perhaps it is because there is no deception without a need for truth, and no concept of contingency without isolated moments.

NOTES

1. Josef Albers, *Interaction of Color*, New Haven, CT: Yale University Press, 1963, 72–73.
2. Albers, *Interaction of Color*, 1.
3. Ludwig Wittgenstein, *Remarks on Color*, translated by Linda McAlister and Margarete Shättle, Los Angeles, CA: University of California Press, 1977, 3: 79.
4. Albers, *Interaction of Color*, 14–15.
5. Barbara Rose (ed.), *Art-as-Art: The Selected Writings of Ad Reinhardt*, New York, Viking Press, 1975, 83.
6. Rose, *Art-as-Art*, 106
7. Rose, *Art-as-Art*, 65.
8. Richard B. Norman, *Electronic Color*, New York: Van Nostrand Reinhold, 1990, 56–58.
9. Norman, *Electronic Color*, 86.
10. Wittgenstein, *Remarks on Color*, 2: 60 (emphasis in original).
11. Norman, *Electronic Color*, 91.

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