



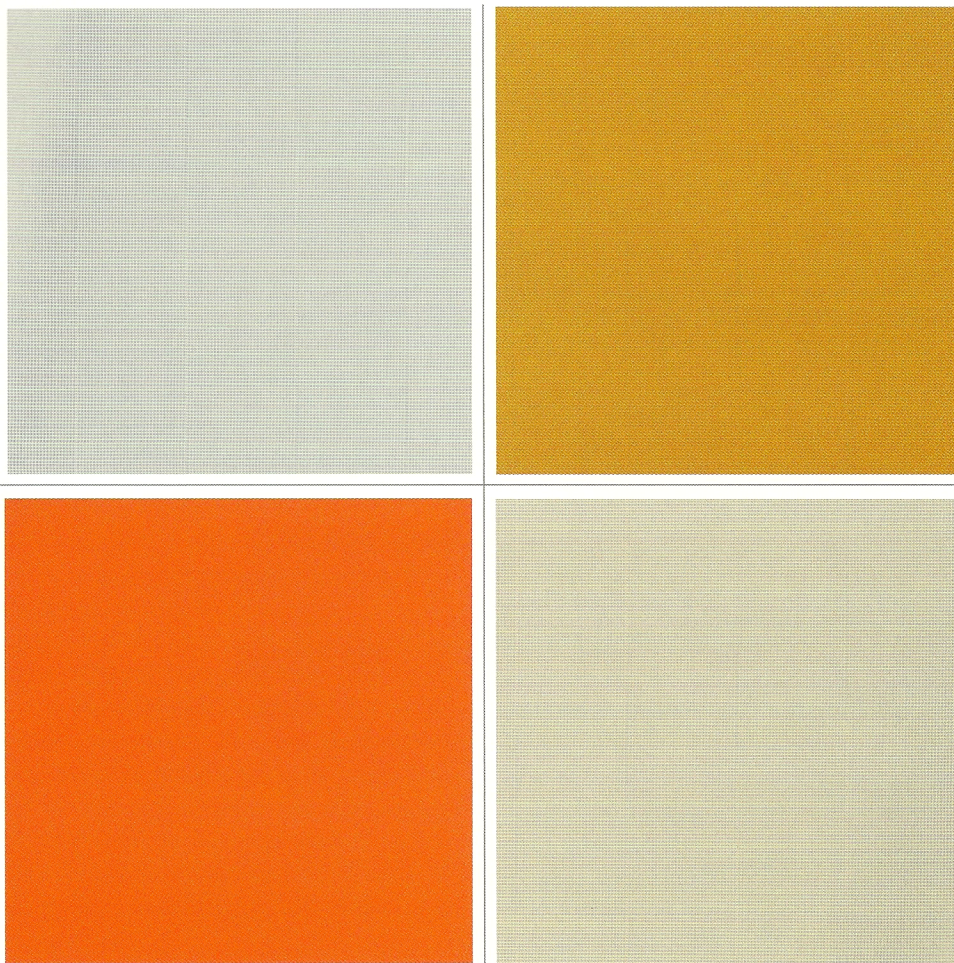
Elizabeth Turk

Kris Cox

Amy Ellingson

Jane Park Wells

MATTER AND MATRIX



Ruth Chandler Williamson Gallery
Scripps College, Claremont, California

November 1–December 14, 2003

MATTER AND MATRIX

Mary Davis MacNaughton

FROM THE GLOBAL ECONOMY TO THE WORLD WIDE WEB, networks permeate our lives. Networks inform the work of biologists charting the human genome, computer scientists expanding the information highway, and social scientists analyzing the patterns of urban organization. More than ever, networks are the subjects of new inquiries. Scientists interested in “small world theory” suggest that whatever the system, there is an underlying pattern to connectivity. Researchers in “emergence theory” study the way organic systems, like ants and humans, organize themselves to form more complex entities with higher-level behavior, such as colonies and neighborhoods.¹ Theorists of artificial emergence study the matrix of the World Wide Web to question whether it will evolve its own intelligence.

In this exhibition *Matter and Matrix*, networks and other visual systems are the subjects of works by four contemporary artists: Kris Cox, Amy Ellingson, Elizabeth Turk, and Jane Park Wells, who each use formal matrices to explore the idea of visual connectivity. Matrix is a word with many associations. The movie *The Matrix* conjures a sinister vision of a future world in which a cyber system threatens human life. In geology, a matrix is the material within which fossils are embedded, and in math a matrix is an algebraic entity, or a set of numbers in rows, forming a square or rectangular pattern. While the artists in this exhibition do not illustrate any of these particular meanings, they create visual networks, which, like the matrix, are ordered structures with multiple allusions. The artists embed their ideas in matter to evoke systems in nature, technology, and music. Their works also meditate on the universe’s dynamic relations of the simple and complex, ordered and random, and momentary and lasting.

Networks underlie the work of Kris Cox, who worked

in ceramics before turning to mixed media. In his *Curtain Series*, Cox draws on his ceramic background to create lushly layered works reminiscent of glazed surfaces. These constructed wood panels also allude to nature. For example, in *Curtain: Apri 8090.02.2* (fig. 1) Cox’s undulating vertical lines suggest wood grain, and, in *Curtain Red 9080.03.01* (pl. 1), densely drawn lines evoke a bamboo forest. In this work, the organic surface is like a membrane, both protective and permeable, that reveals what is under the skin, with red conjuring blood and segmented lines echoing bones. Like skin, Cox’s surfaces seem both opaque and transparent, an effect he achieves by layering colors. On a wood panel, after coating the surface with a thick layer of pigmented putty, Cox draws in the wet putty with a comblike tool, leaving multiple ridges and valleys. When the material dries, he paints it with acrylic and fills in the valleys with different colored putty. By a process of sanding, Cox takes away material to reveal embedded line and color. After applying washes of asphalt emulsion and tung

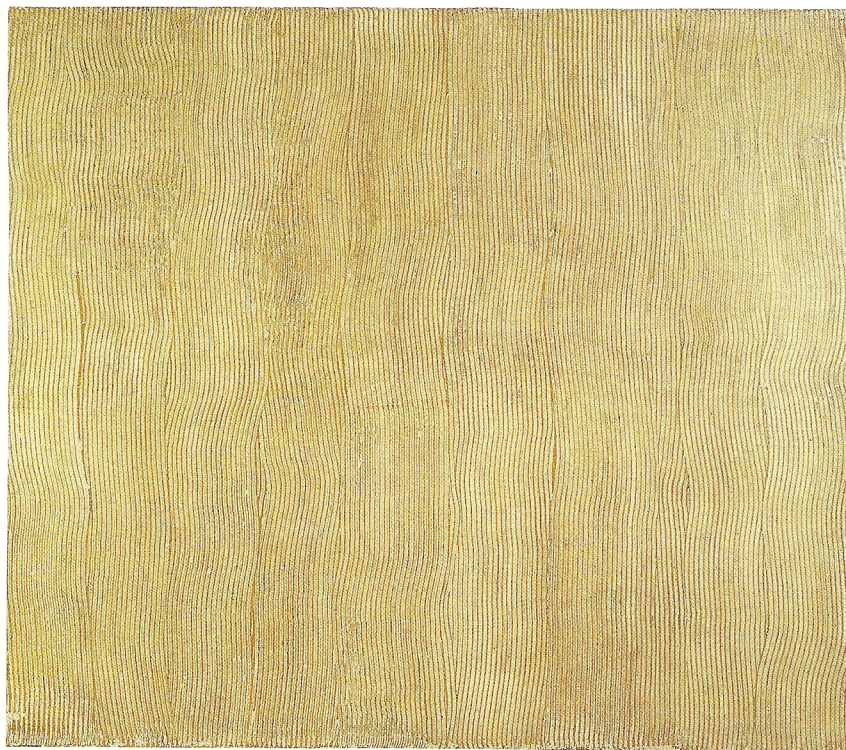
FIG. 1.

KRIS COX

Curtain, Apri 8090.02.2, mixed media

on wood panel, 80 x 90 in.,

John Berggruen Gallery, San Francisco



oil, he completes the process by applying and burnishing a wax medium, which produces a richly translucent surface.

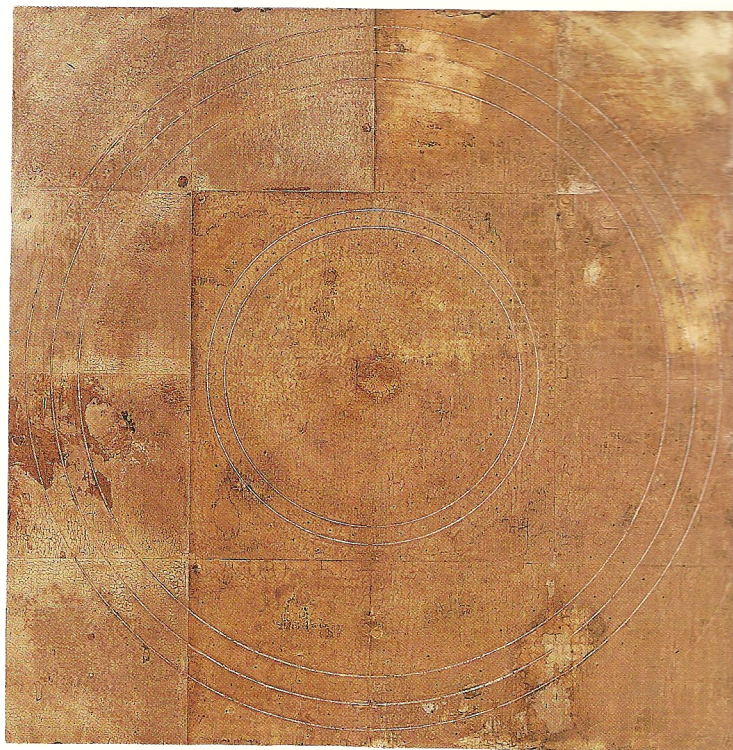
Cox also employs this layering technique in the works that precede the *Curtain* series, the *Concentric Episode Series*. "It is labor intensive," Cox says about his way of working, "and I like the physical process of making the work. My works are constructed more than painted."² In *C.E.S. Grey Bone 84.01.1* (fig. 2), he creates many levels of visual information. Cox begins by hammering a metal grid into the surface of a wood panel, which has both a 2 x 2 inch and a 1 x 1 inch structure. Before adding the grid, however, he snips out small sections to de-couple certain connections. Next Cox pulls the grid off the panel and fills the resulting impression with wood putty that stains all the subsequent layers. He then spreads and scrapes it to a flat surface. Over the grid, and into the wet putty, Cox inscribes concentric rings within the square format of the panel. This technique leaves grooves, which when dry he fills with variously pigmented putties. By sanding this layer, he reveals a fine line of color at the edge of the grooves. In some works, such as *Concentric Episode Series: Ebony 64.02.1* (pl. 3), Cox also drills holes, which he paints and refills, creating a ring of dots, parallel to the large rings. In this work, he punctuates the deep black of the field with the changing colors of the circles, a technique that also creates a sense of the circle moving in place.

Cox creates hybrid works that cross media. While his flat color planes belong to painting, his richly active surfaces derive from ceramics. For example, if the putty

dries quickly, it crackles like clay. Cox embraces these accidental effects, and stains these crackles with washes of tung oil and asphalt emulsion, recalling crackled raku. Cox learned the raku firing technique, with its roots in sixteenth-century Japanese ceramics, during his study at Scripps with ceramist Paul Soldner. The combination of asphalt, linseed oil, and mineral spirit washes, produces an extraordinary visual effect. "It is like dipping a rock in water," Cox explains. "When dry, the rock is pale and muted; when wet, the colors come alive."

The combination of the square and the circle has fascinated many artists; of course, the best known example is Leonardo's sixteenth-century *Vitruvian Man*. "Any artist has that image embedded in his unconscious," Cox says, "it conveys the perfection of the circle versus the imperfection of man." Unlike Leonardo, Cox puts the circle within the square; indeed, Cox refers more to Eastern than Western art. "I was introduced to tantric art by another teacher and mentor from Scripps, Paul Darrow, and it has been a major influence on my work for more than twenty years," Cox says. Tantric art, related to esoteric practices in Buddhism and Hinduism, seeks an image of basic oneness with the universe and a realization of non-duality. Similarly, Cox's work has this sense of wholeness. "I have been drawn to the interconnection of the rectilinear and the circular in tantric art. Though my interest in it is visual, I also share the idea that abstract images can be contemplative." In its extended steps and repetitive motion, Cox's process itself is also meditative. For instance, in the *Concentric Episode*

FIG. 2
Kris Cox
CES, Greybone 84.01.1,
2001, mixed media on wood
panel, 84 x 84 in.,
Collection of the artist.



Series, on any 6 x 6 ft. panel, he pounds the grid about 6,000 times to embed it in the surface.

In fact, Cox believes that his works are mediations on time. For him, the circles recall tree rings, which radiate out and mark the passing of years. In addition, Cox thinks of the grid as a metaphor for memory, which makes selective and incomplete connections. Likewise, his grid moves in and out of focus; in some places it is clearly etched and in others, it is blurred or lost. Cox's works also straddle the divide between painting and sculpture. "I read them as paintings," Cox says, "but I think of them as objects. These works are not a window onto the world." Moreover, Cox explores the boundaries between control and chance. He begins with a definite structure, but in the process he finds, "some degree of chaos and serendipity." Cox absorbed an appreciation for the accidental from his mentors Paul Darrow and Paul Soldner who imbued in him the belief that the accidental offers opportunity for new expression. "The process is an important element in my work, and it contains what I don't determine. I establish a rigid structure, which through the various stages of adding and subtracting materials, is thrown into chaos. When I look at the image, the structure is both veiled and revealed."

Process is a key aspect of Elizabeth Turk's intricately carved marble sculpture, which also draws on natural networks for inspiration. For example, in her *Wing Series* of 1997–1999, (figs. 4 and 5), Turk evokes the system of muscles, tendons, and feathers that engineer a bird's flight,

while her white, curving forms conjure the clouds through which birds fly. She creates visual paradoxes in her fusion of heavy stone and soaring shapes, which both embody and defy gravity. She recalls that after finishing the *Wing Series*, she began thinking about patterns like spider webs, lined skin, and crystalline forms, which she saw in the magazine *Nature*. "When I begin," Turk says, "I surround myself with images, whether lace or patterns in nature. I look at these all the time as I work, and layers of pattern resonate with other patterns." Turk also looked at pictures of synapses of the brain and the root structure of trees, and collected images of DNA structure, aerial river views, lightning patterns, and snowflakes, which she found in David Mallin's book *Heaven and Earth: Unseen by the Naked Eye*.³ Subsequently, her mother sent her a box of her grandmother's lace, and, as she recalls, "suddenly, these ideas came together."

In her *Collar Series* sculptures, Turk fuses images with different derivations. For example, in *Collar #7*, (pl. 6), she evokes the starched, elaborate collars in seventeenth-century portraits by Rembrandt. Turk says she wanted to have the viewer imagine stepping into the work and "feeling of the oppressive weight of the collar." Turk delights in the paradoxical, contrasting the massiveness of the marble with the lightness of her intricate carving. Further, Turk's work embodies a dialogue between the ordered and the random patterns that she also finds in nature. In some cases, different references coexist in one work. For example, on one side of *Collar #8* (pl. 7), a curving lattice suggests a rib



FIG. 3.
Elizabeth Turk in her studio in
Santa Ana, CA, carving *Collar #8*,
2003, marble

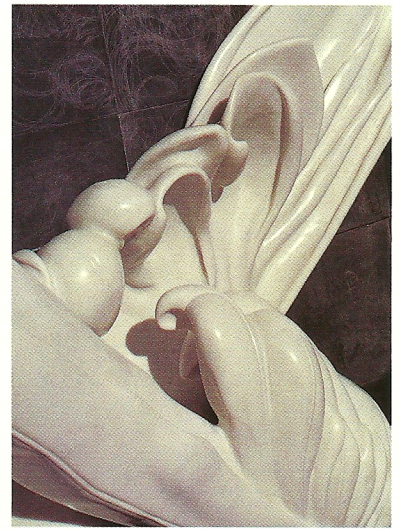


FIG. 4.
ELIZABETH TURK
Wing #1 and #2, 1997–1999,
marble on slate.
Hirschl & Adler Modern, New York

cage that protects the body's internal organs, while on the other side, fanning leaves recall an exotic plant in an ancient bas-relief. This stylized plant points to her interest in ancient Egyptian, Chinese, and Greek gardens, which she likes for their interplay of what she calls "structured plan and baroque growth." As form embedded in matter, these pieces also allude to stone as geological matrix.

Typically, before beginning a sculpture, Turk has a plan, in which she works out the basic form and pattern in her head. But instead of drawing the plan, she first starts sculpting, then draws later in her process. One reason for this approach is that she thinks in terms of mass. "When I draw two-dimensionally," she says, "I want to poke through the paper more than shade it." Instead of working from detailed drawings, she makes small pencil sketches. After she has a general outline in her mind, she intuitively roughs out a form, and she draws a design in pencil on the marble. However, she notes that, at any point, the pattern may change. For one thing, the process of carving "creates an increasing elaborateness that makes me return to the structural support," she says. Moreover, each level of carving can lead to other variations. She also alters her pattern in response to the marble, which she experiences as both resistant and responsive. "Marble is always humbling. It pushes back on my arm and my back. It also shapes me, so the process becomes more of a conversation." She often completes more detailed drawings (fig. 5) after, not before, completing her sculptures.

Turk likes marble's seductive physicality. She is es-

pecially sensitive to the tactile quality of marble, and tells the story of women in China who go to the river to find jade by feeling for it with their bare feet. Like these women, Turk has a keen sensitivity for the nuances of stone surfaces. She also believes that marble has a flow, and says her "forms have a fluid aspect of matter." Both her *Wing* and *Collar* series are elegiac in the way their patterns exude a sense of past lives.⁴ "I like making systems in this ancient material, which is connected to mourning," she says. In her *Collar* sculptures, she merges the concrete and the abstract: "In these works I move away from immortalizing a thing to immortalizing a trace of energy. I think of it as energy moving through matter."

In her approach to working in marble, Turk also makes connections to science. "I am looking at how small marks create self-organizing systems," she says, referring to the phenomena when entities on one level create behavior on a scale above, which she became interested in through conversations with the theoretical physicist Lee Smolin.⁵ "I see in these patterns, like in any organization, a structure. But thoughts jump levels." She wonders how thoughts develop in linear or non-linear form, and how intuitive thought gets organized into form. In contemplating the relationship between order and randomness, she has also been inspired by the science of complexity, especially the work of Stephen Wolfram. In *A New Kind of Science*, Wolfram notes that in order to explain the natural world, science has long used mathematical equations to establish its definite rules; now, he says that while "describ-



FIG. 5.
ELIZABETH TURK
Drawing, Wing Series, 1999,
graphite on paper
Hirsch & Adler Modern, New York

ing nature in terms of mathematical equations works well in cases like planetary motion where the behavior is fairly simple, it almost inevitably fails whenever the behavior is more complex.”⁶ Instead, Wolfram turns to computer programs to describe the behavior of cellular automata, and questions the assumption that complicated programs follow complicated rules. Wolfram asserts that simplicity yields complexity. He notes:

There are general rules that govern the behavior of a wide range of systems, independent of the precise details of each system....Even if we do not know all the details of what is inside some specific system in nature, we can still potentially make fundamental statements about its overall behavior. In the case of cellular automata, all the essential ingredients needed to produce even the most complex behavior already exists in elementary rules.⁷

Complexity within simplicity is also an idea at work in Turk’s sculptures, where a simple pattern becomes increasingly complex as it becomes multi-layered, as seen in her works in progress (pl. 7). “You have the pattern,” she notes, “then something happens, as different layers change the structure.” In addition to meditating on the relationship between order and intuition, Turk also embodies time in her work. Multitiered and intricately carved, her sculptures take months to produce. But it is this rich process that keeps her engaged with the work.

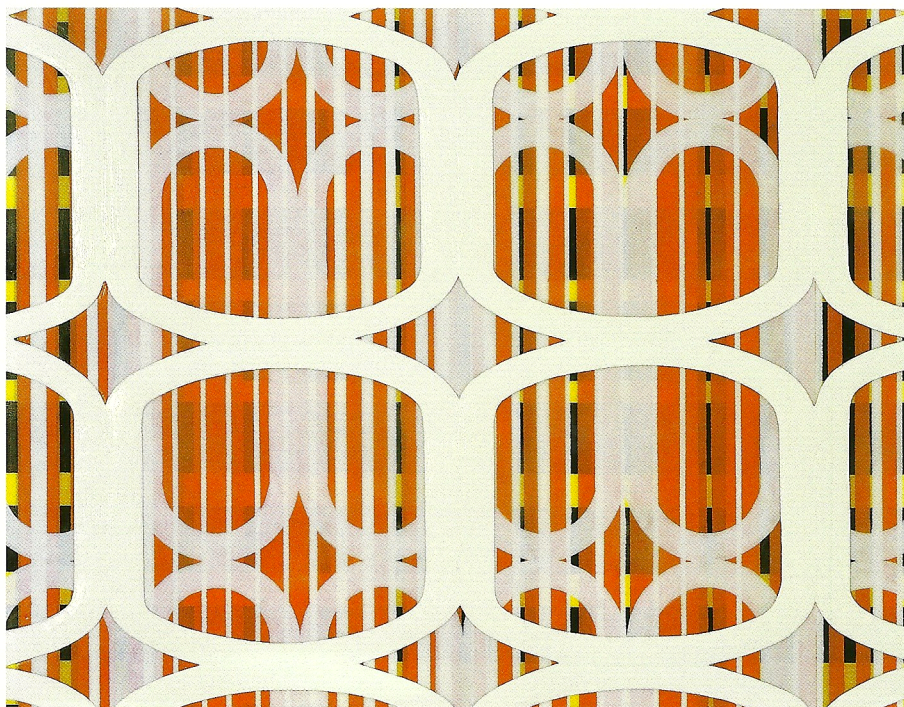
Amy Ellingson also creates visual systems; however, hers pull the viewer back and forth between what she thinks of as a “central focal point and peripheral information.”⁸ Thus, she calls her current series *Ec/centric Compositions*, which are comprised of discrete networks of colored lines superimposed to create layered linear systems. Her fascination with center versus periphery was fueled by her reading of Rudolf Arnheim’s book *The Power of the Center*,⁹ in which he traced the historical import and psychological potency of centered forms in art. Indeed, her images remind us of the mind’s neural networks, the human aptitude for pattern recognition, and the way the brain can recognize similar patterns in different fields of experience. Her work also materializes the concept of network, a system of connected nodes with links that follow specific rules, forming a pattern.

Ellingson’s *Ec/centric* works grow out of an earlier series, in which she appropriated visual elements from popular culture, splicing parts of textile patterns, comic books, advertising images, and typographic fragments. “At the time I was thinking of the digital ‘cut and paste’ process as the logical extension of collage as pioneered by the Cubists,” she says. In her current work, Ellingson has moved away from appropriating popular culture imagery, and initiates her composition with a single, simple element. For example, in *Even After a Century of Winter*, 2001, she began with an arc, which she intersected with other arcs and made into a grid by multiplying them. Throughout her career, Ellingson has been preoccupied with three

FIG. 6.

AMY ELLINGSON

Detail of *Untitled (Straight/curved: yellow, black, orange, white)*, encaustic and oil on panel, 33 x 132 in., Haines Gallery, San Francisco



themes that she describes as “repetition and difference, dissolution and resolution, and sameness and variety.”¹⁰ These forces are at work in *Even After a Century of Winter*, in which she repeated the layers of arcs, compressing one more than the other. Similarly, in *Untitled (straight/curved: yellow, black, orange, white)*, 2003, Ellingson started with vertical and horizontal lines, and bent the resulting perpendicular lines into an oblong form, transforming the 90-degree angle into an arc. She then created a square of overlapping arcs, which she crossed and extended to form a repeating grid. In other paintings, she begins with a simple dot or line, then replicates and multiplies the mark to make a pattern.

What connects these paintings with her earlier work is Ellingson’s ongoing fascination with repetition, also a major theme of Pop Art, which she acknowledges was a point of departure for her prior series. Fifteen years ago, she developed an interest in duplication by reading Gertrude Stein’s essay “Portraits and Repetition,” in *Lectures in America*. In this collection of essays, Ellingson was fascinated by Wendy Steiner’s introduction, which connects Stein’s ideas about repetition to the serial imagery of Andy Warhol.¹¹ Ellingson was struck by Stein’s assertion that repetition is not meaningless but meaningful. “In expressing anything there can be no repetition,” Stein said, “because the essence of that expression is insistence, and if you insist, you must each time use emphasis and if you use emphasis it is not possible while anybody is alive that they should use exactly the same emphasis.”¹² Ellingson’s works

demonstrate how repetition changes the aspect and impact of patterns. “I think of forms pushing through and coming up to the surface and being insistent,” she says. She dropped the appropriated images from advertising and popular culture because she felt they were distracting conduits to the outside world. Instead, in her current works, she is intent on keeping the viewer’s mind focused and “held,” as she describes it, as long as possible in the painting. “I use repetition, replication, and differentiation (of simple geometric forms) to create an object that is more self-contained and self-referencing.” To this end, Ellingson keeps opposing visual forces in balance. As she explains:

It is the dichotomy of the destabilizing and stabilizing effect of repetition that interests me right now, and the differences between repetition based on the appropriation of recognizable images, and the repetition and differentiation of abstract forms. The latter is more interesting to me because the “matrix” and its variations (changes in subsequent layers) all exist in the same physical space, connoting change, growth, movement, etc. and the development of a network of information that can be understood in relation to itself—through “insistence” and the assertion of forms.¹³

For example, in both *Even After a Century of Winter* and *Untitled*, Ellingson creates visually elastic patterns; her networks expand and contract, pulling outward in *Untitled* and stretching upward in *Even After a Century of Winter*. In these systems, which are both precise and pliant, she

FIG. 7

JANE PARK WELLS

Joyful Noise, 2001–2003(detail),

oil on panel,

Ruth Bachofner Gallery, Los Angeles



and small worlds through nodes. As more links are added to these nodes, the distance between them shrinks, so that within a few steps the viewer moves from one point to another. Though Ellingson does not think of the Web as she works, like this invisible structure, her colorful networks join the macrocosmic and the microcosmic. Both large and small, Ellingson's networks have no apparent beginning or end, and seem to be sliced from a larger whole. Indeed, her paintings pose the question of whether they are wholes or fragments of unseen wholes. Ultimately, Ellingson sees her images as metaphors of the feeling of being whole versus fragmented.

Jane Park Wells creates abstract paintings that merge analysis and intuition. She attributes her interest in reconciling these different ways of thinking to her background with its roots in Western and Eastern culture. Born and reared in Korea, as an adult she has studied and lived in the United States. Wells' analytical side appears in her fascination with math, in particular the Fibonacci Series, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, etc. In this famous sequence, each number is the sum of the two prior ones, and the quotient of adjacent numbers approximates the number 1.618, known as Phi, or the divine proportion. "Sometimes I play with the Fibonacci Series," Wells says, "by dividing compositions after its specific intervals." In other words, she uses the Fibonacci series to determine when to make an alteration in a pattern that she has chosen.

In contrast to this analytic approach is the intuitive one Wells absorbed from her interest in Chinese characters and calligraphy. "In high school we were supposed to learn 1,000 characters. I learned them, but not systematically." She was more interested in the aesthetic aspect of selected characters than in memorizing their meanings. In her recent work, Wells has devised a compositional system that fuses analysis and intuition. To start with, she paints monochromatic color fields with layers of acrylic paint on canvas. In her earlier *Vine* series, which she initiated in 1997 and continues today, she begins with a fifteen-inch square panel, using various types of wood. Then she creates eight points: four corners and one point between. Each of these panels is a single work, but she joins them in a grid composition of varying numbers, as in *Joyful Noise*, 2001–2003, (fig.7). In her current *Passacaglia* series, she uses a similar method; however, she draws squares with eight points within a rectangular canvas.

Wells says she was surprised to learn that "in order to paint Chinese characters, you have to learn to work with eight cardinal points within an imaginary square." Similarly, in her paintings, she connects eight barely visible marks within each square module. Thus, she melds strict scheme and intuitive rendering. Before she begins working, she visualizes the pattern she will create, but finds that the process alters the resulting image. "I am connecting the repetitive process of drawing lines in tight one, three, or

creates a dynamic tension between static form and optical movement. This visual combination recalls Op Art of the sixties, which Ellingson likes:

I have been very influenced by Bridget Riley's writings, particularly one in which she describes the use of color as a destabilizing factor that serves to remind us of our unstable world. Her compositions are unified and often regular and predictable (and comforting in that respect) but there is always an optical, chromatic, or compositional disruptor of some kind. ...The struggle between the center and the periphery is an Op Art strategy," she notes, "and I use that technique to keep the viewer focused on the painting."¹⁴

In addition to Riley, Ellingson has been interested in the writings of other twentieth-century abstract painters, Piet Mondrian, Barnett Newman, and Ad Reinhardt. However, in contrast to their art, which is totally flat, her work deliberately contrasts opacity and transparency. "I am layering not just to produce a visual vibrancy," she says, "but also to create a field that is both deep and illusionistic." What Ellingson seeks is a "fragile stability" in which she keeps different optical forces in balance (fig. 6).

Ellingson's works have a tangible physical presence, as she paints them in encaustic, an ancient technique in which pigment is mixed in hot wax and applied to the panel. The wax hardens quickly, so there is no margin of error. Though encaustic is a difficult medium to use, Ellingson, who has employed it since 1991, likes it precisely for its

demanding nature. "Yes, it's unforgiving, but a huge part of my process is controlling this uncontrollable medium, largely by going back into it repeatedly to add, subtract, and shape it. It is the most labor-intensive part of the process, but it is never right the first time." In each work, she carefully paints separate layers of oil followed by encaustic paint, and between idea and execution, the process is consuming. Ellingson's encaustic bands are both definite and dimensional. As is evident in a detail of *Untitled (Straight/curved: yellow, black, orange, white)*, 2003, she superimposes network upon network, and makes the last layer the thickest. Indeed, a close up view of *Even After a Century of Winter* (pl. 4), reveals thick overlapping systems as tactile as taffy.

In her paintings, Ellingson draws attention to our search for meaning in patterns. For some, her systems might allude to the invisible networks of the digital world. Her patterns echo the largest network ever built by humans, the World Wide Web, which in 1999 had almost a billion documents.¹⁵ Made up of nodes and links, or Uniform Resource Locators, which take us from one web page to another, gigantic databases are connected by the click of a mouse, and we access them at increasingly faster rates. Similarly, Ellingson's systems hit the eye instantaneously, suggesting sections of vast networks, such as the Web.

Moreover, Ellingson's networks also evoke the image of a huge distributed intelligence, as the Web has been predicted to become by some futurists. Further, Her paintings echo the Web's basic structure of connecting large



six-inch squares,” she says. “Sometimes I like to make subtle changes by shifting the pattern and making random intervals.” Wells’s approach is both systematic and irregular. “I paint one layer completely, then I go to the second layer,” she explains. But she also varies the density of her patterns by layering lines more heavily in some areas. “Even in black, I will look for gradations of black to gray,” Wells notes, and this effect is pervasive in the *Passacaglia Series*.

The abstract patterns of the *Passacaglia Series* relate to Wells’s interest in the order inherent in nature and music. For instance, in *No. 21* and *No. 23*, clusters of darker lines emerge out of the open expanses like gathering clouds. Over soft fields of blue and gold, Wells lays linear networks that imply the patterns of growth that unite nature’s varied forms. In this respect, she has been inspired by reading Gyorgy Doczi’s book *The Power of Limits: Proportional Harmonies in Nature, Art, and Architecture*.¹⁶ Doczi demonstrates how the *golden section*—a reciprocal relationship in which the small part stands in the same proportion to the large part as the large part stands to the whole—pervades nature, music, and art.¹⁷ The golden section appears in many patterns of nature, especially in the relationship between old and new segments of organic plant growth; for example, in the nautilus shell, in the ratio of each spiral’s diameter to the next chamber, or in the sunflower head, in the ratio of one spiral rotation’s diameter to the other. Given her interest in the golden section, which has long been

recognized for its harmonious effect,¹⁸ it is not surprising to find the five-to-eight ratio in Wells’s rectangular compositions. Moreover, her grids allude to the idea of matrix as material in which something is embedded. Matrix also means source or origin, and her imagery suggests an elementary pattern or some primal growth.

In addition to nature, music is a point of departure for Wells. For one, she names the series *Passacaglia*, borrowing a term with a rich musical history. Specifically, *Passacaglia* refers to a stately dance, with roots in Spain and Italy, which is similar to the *chaconne*, a dance popular in seventeenth- and eighteenth-century France. *Passacaglia* also refers to the slow music of this dance, and it is the structure of music that Wells thinks of in these works. Indeed, her linear scaffoldings evoke music as architecture. Like the *passacaglia*, which has two musical lines, a background and another melody, her paintings have two visual motifs, one, open color, and the other, linear tracery. Her works are also musical in their recurring formal themes and their fusion of structure and emotion.

The large scale of works by Cox, Ellingson, and Wells connects them with the tradition of abstraction in the last half-century, which mostly eschewed the small size and modest ambition of easel painting. Specifically, in their planar spaces, Cox, Ellingson, and Wells link with geometric abstraction, and in their repetitive shapes, they call forth the systemic art of the sixties and neo-geo paintings of

the nineties. But their common focus on layered visual systems and complex overlapping sets them apart from the flat, uninflected surfaces of these earlier modes of abstraction. Moreover, the paintings of Cox, Ellingson, and Wells, as well as the sculptures of Turk, share a new sense of harmony. Deriving from the Greek word *harmos*, "to join", harmony means the joining of contrasting entities; these artists visualize this idea in their fusions of straight and round, angular and curved, opaque and transparent. In some cases, their works are meditative; in all cases, they are transfixing. Finally, their vision is one of networks, made up of links and nodes, the component parts of the systems of the universe, from the neural web to the cyber Web. In other words, these artists materialize the immaterial, and make matrix into matter.

NOTES:

1. See Mark Buchanan, *Nexus: Small Worlds and the Groundbreaking Science of Networks*. (New York and London: W.W. Norton & Co., 2002), and Steven Johnson. *Emergence: The Connected Lives of Ants, Brains, Cities, and Software* (New York, London: Scribner, 2001.)
2. Unless otherwise noted, all quotations are from the author's interviews with artists.
3. She found many of these images in David Mallin, *Heaven and Earth: Unseen by the Naked Eye* (London: Phaidon Press, 2002).
4. See Meg Linton, *A Memorial to Nature I: An Installation by Elizabeth Turk* (Santa Barbara, CA: Contemporary Arts Forum, 2001). np.
5. Lee Smolin suggested that she read Per P. Bak, *How Nature Works: The Science of Self-Organized Criticality* (New York: Copernicus, 1996), passim. For a discussion of self-organizing behavior, see, also Johnson, *Emergence: The Connected Lives of Ants, Brains, Cities, and Software*, 19–20, 53–57, 66–67, 97–98.
6. Stephen Wolfram, *A New Kind of Science* (Champaign, IL: Wolfram Media, Inc., 2002), 1.
7. Ibid, 108, 62.
8. Amy Ellingson, "Ec/centric Compositions," unpublished statement for exhibition by the same title, at the Haines Gallery, San Francisco, Feb. 27–March 29, 2003.
9. Rudolf Arnheim, *The Power of the Center: A Study of Composition in the Visual Arts* (Berkeley: University of California Press, 1982).
10. Ellingson, "Ec/centric Compositions"
11. Gertrude Stein, "Portraits and Repetition," *Lectures in America*. Introduction by Wendy Steiner (New York: Virago, 1988),
12. Ibid.
13. Amy Ellingson, correspondence with the author, July 23, 2003.
14. Ibid.
15. For a discussion of the scale of the Web, see Albert-László Barabási, *Linked: The New Science of Networks*, (Cambridge, MA: Perseus Publishing, 2002), 31.
16. Gyorgy Doczi, *The Power of Limits: Proportional Harmonies in Nature, Art and Architecture* (Boston: Shambala Publications, Inc., 1981),
17. For a discussion of the golden section, see H.E. Huntley, *The Divine Proportion: A Study in Mathematical Beauty* (New York: Dover Publications, 1970), p. 64. See also "The Golden Section in Earliest Notated Music, *Fibonacci Quarterly*, vol. 16, no. 6 (December 1976), cited in Doczi, *The Power of Limits*, p. 114.
18. Doczi (p. 144) cites an 1876 experiment, which demonstrated that more than 75 percent of a sizeable group of randomly selected subjects who looked at rectangles, chose those with golden-section proportions.