

Thinking *Inside* the Box:
Infinity Within the Finite
by Judy Bales



ROSIE LEE TOMPKINS *Half-Squares Put-Together* Pieced fabric, 68" x 81", 1988. Quilted by Irene Bankhead, 1992.
Collection of Eli Leon. Photo: Sharon Risedorph.

To view *Half-Squares Put-together* by Rosie Lee Tompkins

is to observe patterns that teeter precariously on the edge of chaos. Simultaneously, the mind is tantalized as the eye moves across freely constructed and improvisationally arranged groups of simple geometric figures. What is it that keeps these hundreds of shapes from dissolving into complete disorder? What makes this quilt so engaging while defying the standards of geometric order we are familiar with in standard block quilting?

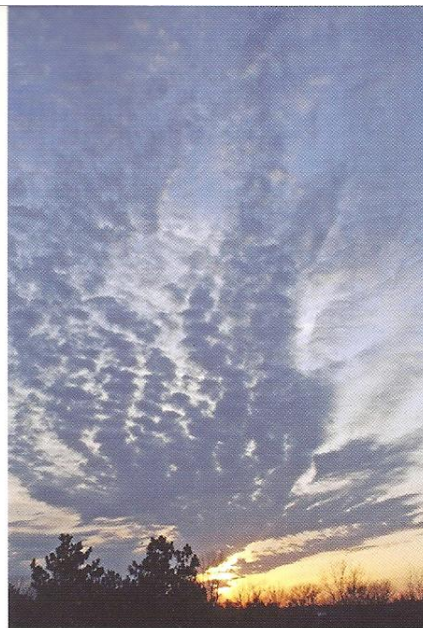
These questions arose for me in the 1980s when I first encountered a style of quilts that has been defined by some scholars as Afro-traditional. At first puzzled, but quite intrigued by these quilts, I found them to have had an underlying, ongoing influence on my own fiber work for almost three decades and to have helped me understand working methods that come naturally to me.

More recently, I discovered the area of mathematics known as fractal geometry and my immediate thought was that there was a relationship to the African-American quilts that fascinate me. Researching fractals further led me to the work of ethnomathematician Dr. Ron Eglash. His research indicates that African cultures have a high prevalence of fractal geometry while Western cultures tend to use Euclidean geometry.

Fractals are characterized by patterns that repeat themselves, or approximations of themselves, at many different scales, a property called self-similarity. So a small section enlarged will look much like the whole, and the entire pattern reduced will look similar to a part. A powerful component of fractals is that the output of one stage becomes the input of the next, a process known as recursion.

Quilt researcher Eli Leon has studied, collected, and written eloquently about Afro-traditional quilting traditions for almost 30 years. Among the characteristics of Afro-traditional quilting that he and others describe are: strip construction, multiple patterning, flexible patterning, asymmetry, percussion, and improvisation. One or more of these characteristics may dominate in a particular quilt, and improvisation seems especially prevalent. To the many voices that speculate about African-American quilts, I would like to add my own by suggesting that a fractal aesthetic may be another element connected to African traditions, and that perhaps this is intimately tied with improvisation.

It is important to note that identifying characteristics of one style of African-American quilts does not mean that all African American quilters use these exclusively, or that they do it all the time, or that other quilters do not make use of these processes. It is simply a way of finding possible connections to the quilter's heritage. In the



Clouds are an example of fractals in nature. They have the same amount of roughness over many levels of magnification.

NANCY PETTWAY *Housetop* Corduroy and cotton twill, 72" x 72", 2003.



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words of Dr. Eglash: "African-Americans suffered not only the trauma of slavery, but also a severing of cultural ties unlike any other US minority. The rare cases in which some aspect of African culture was transmitted—musical traditions like blues and jazz, adornment styles like cornrows, etc.—are both precious and profound."

In standard block quilting, a primary goal is to maintain the consistency of the pattern, even when the quilt is constructed of various scraps of fabrics. (In this discussion, the art quilt is not relevant.) Benoit Mandelbrot, best known as founder of fractal geometry, describes fractal geometry as "the first broad attempt to investigate the ubiquitous notion of roughness." He also uses the term "irregularity" and, indeed, in our man-made environment, we are constantly squaring, sanding, smoothing, and leveling. Repeating a block pattern relates to this process of maintaining smoothness or regularity.

Now consider an innovative quilter piecing scraps together to make a beginning standard block pattern. This quilter does not have a particular desire to maintain that exact pattern. Rather she is improvisational in her working methods, and has a welcoming attitude toward the unexpected or even accidentals. In the words of quiltmaker Sherry Byrd, "... I don't like to do the same things over and over, and so I just kind of build my own quilts as I sit at the machine." As she trims her fabric scraps, similar bits fall on the table and mix with other scraps. Her tendency then is to pick these up and sew them into new compositions, as they are, rather than attempt to maintain the exact pattern of the starting block. These new compositions are then sewed into the growing quilt, and the process is repeated.

Just as fractal patterns theoretically can continue into infinity, this process could continue infinitely. In looking at a *Half-Squares Put-Together* by Rosie Lee Tompkins or a *Strips and Strings* by Mary Lee Bendolph, one can imagine the quilter continually working her leftover bits back into the composition until they become too small to sew.

By putting myself in the place of such a quilter and actually sewing this way as an experiment, I began to understand Mandelbrot's advice to not think only of what we see, but what it took to get there and to experience how the patterns might unfold in a recursive process. This same scaling principle is evident in the very minimal *Housetop* by Nancy Pettway. The off-center meditation, an almost perfect golden rectangle, spirals inward, creating a breathtaking elegance.

Fulbright scholar Remi Kouessi-Tanoh

Douah, who is from an Ivory Coast family of Akan weavers, says that improvisation involves "getting to the highest level of communication with yourself. In other words, out of a form of communication that you have with yourself, you produce something that comes through the spirit."

Scholars of Afro-traditional quilts such as Eli Leon, Maude Southwell Wahlman, and others, have given us a new vocabulary that aides in understanding the aesthetic preferences of the quilters. Likewise, we may not realize the logic in the design process until we understand the fractal process and that the working methods are perhaps based on a mathematical system that is prevalent in African cultures, but is not so familiar to Western cultures. Looking at the quilts through those eyes, they take on an order and logic that we may have missed earlier.

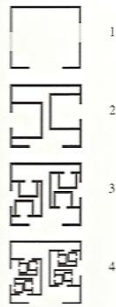
When we think of symmetry, we usually think of reflection or mirror symmetry. Mandelbrot has described how an object viewed in a mirror produces reflection symmetry. However, if we add another parallel mirror, the object repeats itself in smaller and smaller images forever. This analysis helps illustrate the symmetry and logic of the asymmetrical patterns shown in this article.

It may seem that introducing mathematics to the investigation of improvisational quilts would spoil the

magic. I have, however, found that analysis does not make the viewing drier, but more engaging. When we fall in love with a person, we want to know what makes that person "tick." Likewise, when we fall in love with an art form, we find exhilaration in uncovering deeper and deeper layers of meaning.

In fractal geometry, as we view any part, we see a version of the whole. In quilts by artists such as Rosie Lee Tompkins or Mary Lee Bendolph, no matter where you look, you are still home—the part always contains the whole. Ultimately, when we find connections between artists across time and place or between disciplines such as art and math, we come closer to experiencing the interconnectedness of all life. When that begins to happen, we come to realize that no matter where we go, no matter whom we meet or what we learn, we are still home.

—Judy Bales is an artist living in Fairfield, Iowa. Her portfolio of sculpture and public art is on her web site: <http://www.judybales.com>. See "Bridge Work: Judy Bales Designs New Connections," *Surface Design Journal*, Vol. 34, No. 1 (Fall 2009), pp. 36–41.





MARY LEE BENDOLPH *Strips-and-Strings Quilt* Cotton, denim, corduroy, 81" x 78, 2005.
LEFT: Example of computerized iteration of a seed shape (1) through four iterations. Courtesy Dr. Ron Eglash