Symmetry to Assembly

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Abstract

Does the symmetry of a quilt block dictate assembly? If so, is there a direct connection between the symmetry group of a block design and the assembly of the block into a quilt? If there is not a direct connection, what kind of connection, is between the symmetry of a block and the assembly of said block?

1. Introduction

The 17 non-linear symmetry groups are well known to mathematicians. It is also a well-known fact that quilters ignore symmetry groups. It is possible to construct a quilt from each of the 17 groups [1]. There are books that deal with radial symmetry [2]. But why don't quilters use mathematical symmetry when it has been drawn to their attention? When asked, quilters will give replies such as, "I don't need it" or "I'm not very good with math" or the ever popular "What?"

Quilting is an intensely mathematical craft. There is measurement of the space for the quilt, measurement of the block, measurement of the pieces, how many pieces in each block, how much of each fabric and how much time to devote to the project. The basic problem comes when the language of symmetry does not conform to the construction as taught by quilters. Any patchwork book that discusses quilt making deals with block assembly without talking about symmetry. There is some mention of adding or subtracting construction lines, but that is all [3]. This seems to imply that the knowledge will come only with experience or needs to be dealt with on a block-by-block basis.

2. Blocks that work

The two main types of symmetry that quilters use are P4G and P4M. P4G takes a square cel and rotates it around a point, four times.

P4M takes a 45-degree triangle, mirrors it along the hypotenuse and then rotates it around a point, 4 times.
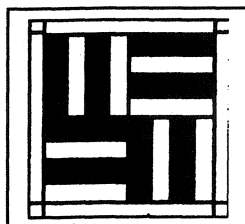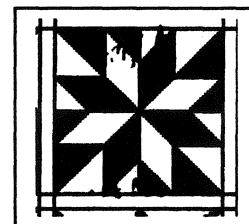

Figure 1

Figure 2

3. Proposed system for determining Assembly group

3.1 First the block needs to be isolated.

3.2 Are there pieces within the block or it is just a quilt design?
> If it is just a quilt design, it goes into the SECOND pile.

3.3 Is it pieced design or an appliqué design?
> Pieced means that there are pieces of cloth are sewn together with seams on the back while appliqué sits on top of a larger piece of fabric and is sewn to the larger piece.
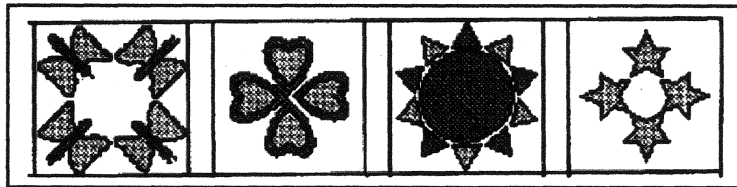> Appliqué gets put in the SECOND pile.

Figure 3

3.4 Is the design symmetrical at all?
> If there is no symmetry, that goes into the SECOND pile.

3.5 Does the line of symmetry match a major seam line that extends from one edge of the block to the opposite edge?

If it does not match, it goes into the SECOND pile.

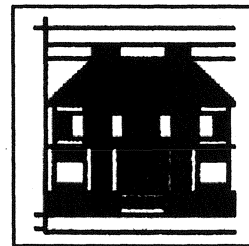If it does match, there are three categories.

Figure 4

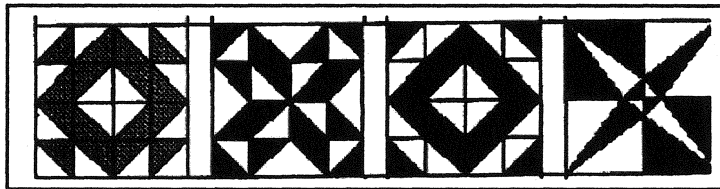**P+** - Blocks that have two major seam lines in the conventional x-y axis.

Figure 5

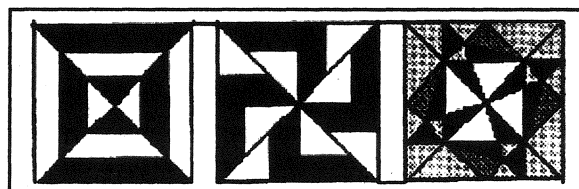**PX**- Blocks that have a set of seam lines from corner to corner.

Figure 6

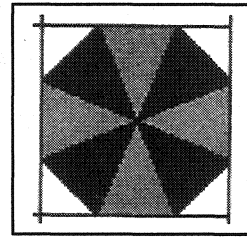**PO** – Blocks that have seam lines that are offset and not straight across or corner-to-corner.

Figure 7

3.6. How to deal with the **SECOND** pile.

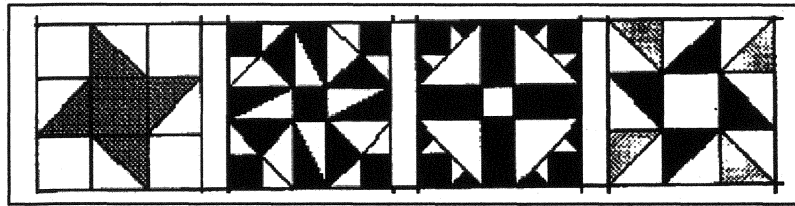**3D** - Blocks that have three major areas. They may be even or uneven.

Figure 8

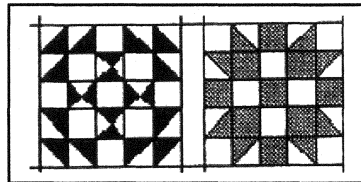**5D** - These blocks have five major divisions.

Figure 9

AS – These are blocks that need an added seam line to ease construction.
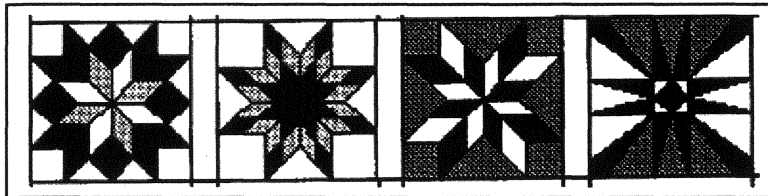
Figure 10

PS – These bocks use a method called partial seaming. A seam is left incomplete, allowing for an ease of seaming around the rest of the block.
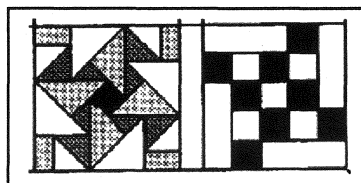
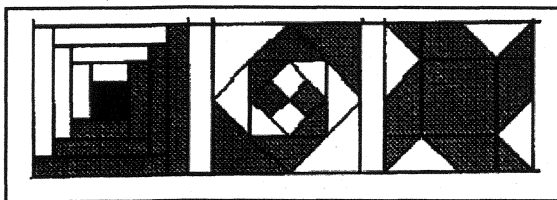**Figure 11**

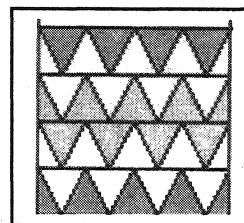**R** – These blocks are seamed from the center out.

Figure 12

Figure 13

S – Strips make up the blocks.

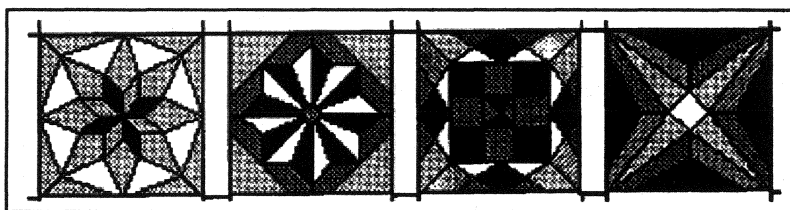**O** – Blocks that need to be dealt with on a case-by-case basis.

Figure 14

4. Discussion

To the best of my knowledge, there has been no attempt to organize assembly groups. There have been attempts to put quilt blocks into some form of order [4]. However, a mathematician did not put the system together. It might be best if there was a collaboration to fully formulate a system.

Conclusion

Symmetry does not have a direct link to assembly. There are many cases of blocks with P4G symmetry that have several different approaches to assembly; but this system is a good start to assembly groups. Through the analysis it was shown that some of these assembly groups have parts in common with symmetry groups.

References

[1] *Symmetry: A design System for Quilt makers* by Ruth McDowell 1994.
[2] *Kaleidoscopes & Quilts* by Nadine Paulsen 1996.
[3] *Patchworkbook* by Judy Martin 1983.
[4] *Block Base* by Barbara Brackman.

Electronic Quilt 4
Behind the pattern by Margit Echols, page 41 Threads Feb/Mar 1996.