

Review of: "The Uniqueness of the Medieval Persian Art"

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Potential competing interests: No potential competing interests to declare.

I find the work „The Uniqueness of Medieval Persian Art” interesting. The statistical approach used is a great advantage of this multi-disciplinary research. The work contains valuable results that could be useful for other researchers, including non-crystallographers and non-mathematicians, in their symmetry and cultural studies.

However, I also have some comments/remarks that could improve the quality of the work and increase its scientific impact:

1. Page 2, the sentence “I examine their symmetry properties, (...)”. The term “symmetry properties” used here can be misleading. It is very similar to “symmetry-related properties” (which were not studied in this research). I suggest writing just “symmetry” instead of “symmetry properties”. The same applies to the sentence “Analogous to the symmetry properties of atoms (...)” on page 3, where the word “arrangement” could be more suitable.
2. The section 2.1, “Persia,” is – in my opinion – too long and contains too many historical details irrelevant to the context of the research. I think that this section should be shorter.
3. To me, the section 2.1, “Persia,” and the section 6, “Conclusions,” should be more politically neutral. Strong phrases like: “brutally suppressed,” “massacring the people,” “often attracted invaders who destroyed Persian lands every time they crossed or occupied them,” “the glorious Persian culture,” etc., should be avoided. In my opinion, the critical overview of the history of Persia is not directly a matter of this research.
4. The section 2.2, “Symmetries and the Wallpaper Group,” contains several errors and should be corrected. In the first sentence in this section, “In crystallography, an ordered (...)” the term “point-group operations” is unclear. Does the author mean only non-translational symmetry operations? If so, the term is wrong because translation and glide planes (actually, glide lines) also belong to the set of symmetry operations characteristic/possible for wallpaper-type ornaments (and these operations are not possible in the point groups).
5. The phrase “the point group operations in which a unit cell, an atom, or molecule, is held stationary” is non-understandable to me, and I suggest rewriting the sentence.
6. In the same sentence, “(...) and rotations and reflections around one or more mirrors are applied,” the phrases “rotations around symmetry axes” and “reflections by one or more mirror planes” (actually, mirror lines) could be more accurate.
7. The sentence “This is the translational group, which consists of five crystal systems (...)” (section 2.2., page 5) should be rewritten. Symmetry groups consist of symmetry operations, not crystal systems. Moreover, I guess that in the sentence “(...) crystal systems: the oblique, the rectangular, the square, and two hexagonal systems,” the author

intended to say that there are five crystal lattices (not crystal systems) for wallpaper symmetry groups: square, rectangular centered, rectangular primitive, oblique, and hexagonal (only one).

8. The sentence “The letter c stands for a centered cell with a motive in the center of the grid” (section 2.2., page 5) should be corrected: “The letter c stands for a centered cell with a lattice point in the center of the cell.” When the lattice point (a point that represents the motif) is chosen to lie in the center of the motif, the motif is in the center of the centered cell too. But this is not a general truth – the lattice point can lie outside the motif, and then the motif does not lie in the center of the centered cell.
9. On page 6, the sentence “There are no symmetry features within the unit cell” is wrong. What about translational symmetry and one-fold axes?
10. I recommend changing the sentence “For the sake of simplicity, neither the glide reflection lines nor the axes of twofold and fourfold rotations are included” (section 2.2., page 6) to: “For simplicity, the glide lines and the two- and four-fold axes are not shown in Fig. 3c.” The symmetry elements are included in the symmetry group symbol.
11. In my opinion, Fig. 3b and Fig. 3c have too low resolution. The author could try to prepare suitable graphs of these patterns in any computer program for graphics instead of using magnified photos. I recommend drawing mirror lines (*m*) as thick solid lines and glide lines as thick dotted lines (- - -). The photo in Fig. 3c is very similar to the one in Fig. 2b. In my opinion, Fig. 2b could be rejected, and Fig. 2a could join Fig. 3, making one figure instead of two separate figures, 2 and 3.
12. I think that the idea expressed in the title “The Uniqueness of Medieval Persian Art” was not explored enough in the text. I recommend the author to write in the manuscript a few sentences explaining directly why medieval Persian art is unique and in which categories.