The 3D Illusion of 2D Regular Tessellations

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For the last several decades the Escher-like symmetry patterns have occupied wide area in the creative art. Strong geometrical basis, absence background, modularity, regularity, using more and more new mathematical ideas, etc., have opened new aesthetic and applied avenues for this style. I would like to emphasize one more peculiarity them, namely the 3D illusions of 2D regular tessellations. This illusion is based on viewing with two eyes. At focusing the eyes as shown in pic. 1 we will see:

a) normal;

\[ \text{pic. 1} \]

b) In b) and c) the object seem to be further away. (Note that the filled circles represent the real object, that the while the hollow circles are the respective false imiges)

c) d) and e) the images look closer.

\[ \text{pic. 2a} \]

For instance in pic. 2a* we can easily prove that. Pic. 2b and pic. 2c show the method of making additional periods, where we can see analogical illusions simultaneously at several different planes from the looker. In the case of color pictures (pic. 3)**, as a result from the summation of existing colors we will observe new colors, which are absent in the original picture. May be this effect is one of the reasons of the high attractivity of medieval architectural buldings, carpets, etc. decorated with geometrical ornaments.
Pic.2 created by Imameddin Amiraslanov, Baku, Azerbaijan

Pic.3 created by Jamal Jamalov, Baku, Azerbaijan