Early Use of Projective Geometry in Art.

Projective geometry is a field of mathematics which deals which the relationship between the mappings and projections of real life three dimensional objects on to a two dimensional plane or paper. This kind of geometry provides certain rules and tools to transform a view or an object in a real world in the form of a picture where it appears as a three dimensional object and all the distances whether linear or nonlinear are mapped onto the drawing by scaling them either with eyes or through proper measurements. This branch of geometry has been vastly used in painting, drawings and other art forms for hundreds of years.

The techniques involved in this field of mathematics imply that whatever view we get of an object depends upon the distance of object from the eye, its size and shape. There can be many different views of a single object in a two dimensional space and all these view are imprinted onto a single plane with the help of a few laws and techniques. The distance between any two objects or things in a three dimensional view and changes in there location can be depicted by using perspective geometry (Artmann, 2016).

Perspective or type of way a person looks on to an objects is closely related to what he sees and beliefs. For example a six feet tall man standing far away from a viewer may appear shorter than a person with five feet of height standing closer to the viewer or a cone may appear to be a circle if a person only looks at its front view it might appear as a circle only. Similarly there are many other examples in our daily life which show that perspective geometry was present in our lives for a very long time.

This branch of geometry is very different from Euclidean geometry because there are certain rules and formulas that are used to solve the problems in Euclidean geometry but it has its

limitations. It only deal with the angles and lengths of lines for different shapes like triangles and squares and there are certain theorems which define certain rules for calculations. But parallel infinite lines and huge planes and problems in drawings and simulations which require the conversion of three dimensional figures on a two dimensional plane which can be used to distinguish the location of different objects not only in terms of distance between them but also to depict that whether an object is far away or nearer. Certain theorems like Pascal's Theorem, Brianchon's theorem, Butterfly theorem, Desargues's theorem have been introduced by mathematicians and artists to understand projective geometry (Projective Geometry: A Short Introduction, n.d.). Poncelet was also one of the artist that invented new concepts in the field of projective geometry, he developed the rule of duality (The Rise of Projective Geometry II, n.d.).

Mathematicians and artists have been using projective geometry for drawings and other artistic purposes for centuries. Renaissance artist are the most famous historical artist in the Italy which employed the use of projective geometry in their art. The use of perspective painting by these artist was started in the late 14th century and then its acceptance and appreciation inspired the renaissance to establish more techniques and rules in this type of art formation. The renaissance basically used to transform the live events and scenery onto the canvas using different geometrical techniques. This art became famous because of its individuality and reality in the way the live moments were captured on the paintings. Many famous artisans then emerged in the field of perspective drawing later on in the 15th and 16th centuries. Leonardo da Vinci is known as one of the masters of the renaissance art. His most famous painting include "Mona Lisa", "Virgin of the Rock" and the "Last supper". All these paintings are still known for the artistic and geometrical perfection the master showed in his work.

Another renowned artist in the field of renaissance art is Masaccio who was known for his realistic work in the church of Santa Maria Novella and also his floral work in the brancacci chapel of the church of Santa Maria. His work was appreciated because of its natural looking (Renaissance Art, n.d.).

The time period 1490s to 1527 is known as the peak time for the classical work done by the masters of the Renaissance art. They were famous for their projection of human body in a realistic form on the canvas and also for the perfection between the difference of light and dark areas which were shadowed by the objects in the view. The physical contact and distance between different objects, animals and human was also very clearly observed in the art work of these artist. As mentioned earlier the masters of this field were Leonardo da Vinci, Michelangelo and Raphael, and the time was named as period of High Renaissance (Renaissance Art, n.d.). The most popular paintings from the Michelangelo was "The School of Athens". Raphael was a well know sculpture in this era of high renaissance. Giotto, Cimabue and Lorenzetti brothers were very well known for their understanding of linear perspective, which was very clearly depicted in their work. An example of the work done by Giotto is given below which made use of the concept of convergent lines in this art piece called 'Jesus before the Caif' (The Role of Perspective in Shaping the Renaissance, n.d.).
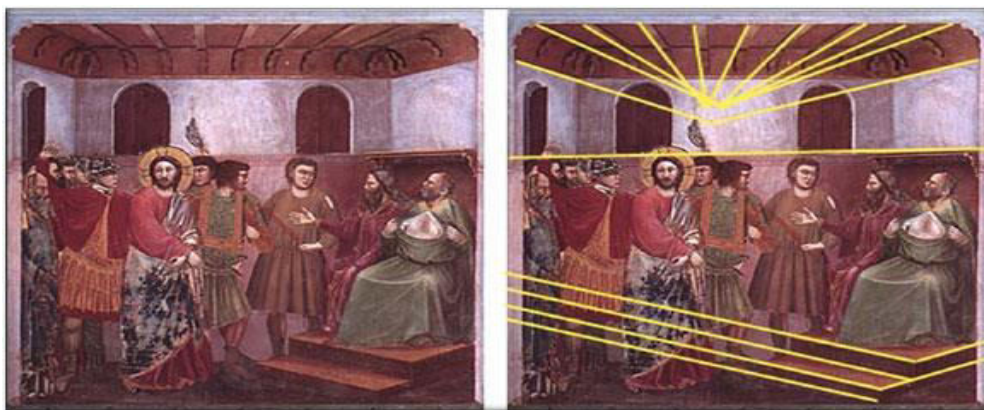
The work done by these great artist was hugely admired by the audiences and there were also certain art pieces which held religious attributions by its audiences and were used at certain praying areas, religious and cultural festival to perform rituals. Most of these art work was used at the time of any noble ceremony but now they are kept just for display at various art galleries and other location in the world. The detailed analysis of these art work in the modern sage shows that these artist were conceptually very well familiar with the different techniques of projective geometry like convergent lines, Vanishing point and other technical terms.

Another ancient art work from the Greek back ground known as the "Myth of Orestes". This art piece has used the shading techniques in order to introduce reality into the scenery and also the point of convergence to make sure that all the objects and building in the picture have been depicted at their rightful place and all the lines are converging at the single line. This artist has shown that he as very perfect with terms of using of linear perspective to copy a live view on to the canvas and in this painting he has employed central perspective to make sure that all the parts of picture are exactly aligned and viewer looks at this picture like he is looking right through the middle or central view.
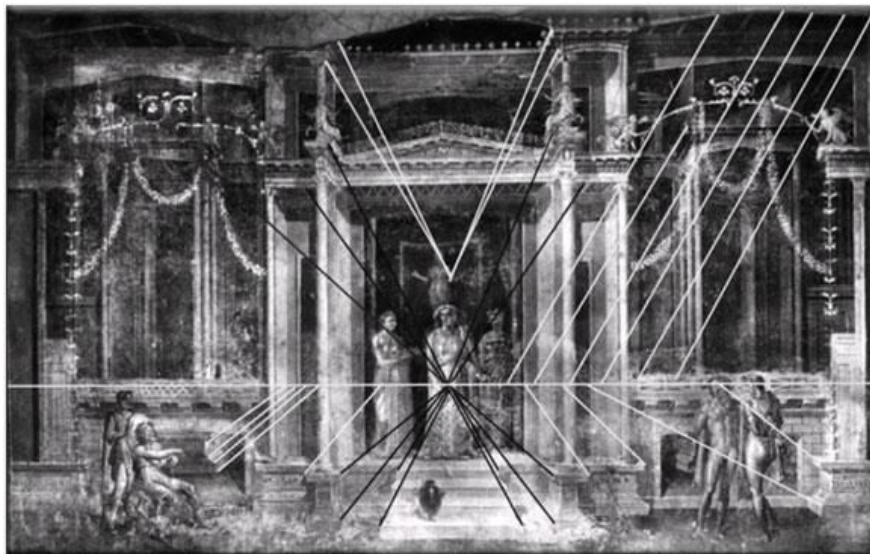
The black lines show that all the features are centrally converged at a point which was predetermined or defined by the artist. Although the white parallel lines are not perfectly parallel with each other but they show that the artist was well aware of the basic concept although he was not perfect but the reality of the scene is quite dominant. So an overview of the historical master pieces shows that the artists of those era were very well conceptualized about getting the projection of three dimensional world. Several paintings and sceneries and art pieces are available in the world which are hundreds of year ago and depict the use of perspective while putting their imagination or a real view on to the canvas. In the modern world various mathematical software's and computer simulations are available which use the projective geometry to give a three dimensional view of different objects or painting. This field is vastly used in various fields for medical purposes like analysis of organs and also in arts and media.

References

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