The Cultural Impact

Of

Mathematics

THE CULTURAL IMPACT OF MATHEMATICS

UNIT 1: MATHEMATICS AND THE VISUAL ARTS

INTRODUCTION

The following paragraph was written by a renowned art historian:[1]

"Studies on the problem of proportions are generally received with skepticism or, at most, with little interest. Neither attitude is surprising. The mistrust is based upon the fact that the investigation of proportions all too frequently succumbs to the temptation of reading out of the objects just what it has put into them; the indifference is explained by the modern, subjective viewpoint that a work of art is something utterly or irrational. A modern spectator still under the influence of this Romantic interpretation of art, finds it uninteresting, if not distressing, when the historian tells him that a rational system of proportions, or even a definite geometrical scheme, underlies this or that representation."

The conflict reflected in this excerpt is part of a general view that mathmatics is an analytical tool, useful in breaking nature down into comprehensible components. Art, on the other hand, is usually viewed as a synthesis, a molding of these components into a personal statement of the human condition. The former leads to knowledge, while the latter leads to feelings and values. Both increase awareness of ourselves and our environment but are created from opposite orientations. Contrary to this contemporary belief, neither the artist nor the mathematician has a monopoly on analysis or synthesis. Both depend on a high level of structural analysis and ordering to give coherence to their creative efforts. To say the artist's potential for freedom of personal expression is repressed by this kind of discipline is nonsense. On the contrary, it may stimulate the liberation of his inner world, unlocking new

possibilities in the realization fo compositional form.

We find evidence of this approach in every age, even our own. This is the way the old order changes, giving way to the new and evolving styles that in turn become codified by tradition. Viewed in this way, art is a dynamic and organic process, creating new styles out of the old, reflecting the evolution of cultures from which they arise.

The case will be made in this unit that art is a deliberate unfolding of reason and emotion. The artistic mind, like that of the scientist, orders the perceptions of reality it receives, finding hidden relationships between them, and reshapes them into a unique communicable form. The fact that artistic ideas frequently assume a mathematical form is no accident, since this is the basic language in which human beings order all of their ideas about forms in space.

In examining the relationships between art and mathematics, this unit will proceed from the particular to the general. First we shall survey the field of geometric forms to see how they have functioned as elements of style throughout the history of art. Chapters 2 and 3 will examine two works of art in detail; The School of Athens by Raphael, and the Melancholia I by Durer. These works were selected because their style and content provide considerable insight into the different levels of relationship between art and mathematics.

Chapter 4 will summarize the findings of the previous chapters and lead to a comprehensive picture of the interaction between art and mathematics, culminating in a mathematical view of abstraction in the arts.

[1]Panofsky, Meaning in the Visual Arts, Garden City, N.Y.: Doubleday, 1955-Ch. 2, p. 55.