THE CULTURAL IMPACT OF MATHEMATICS

Lectures by Stanley Cotter

Introductory Remarks

The Cultural Impact of Mathematics had its inception as a course in the fall of 1973 at Foothill Community College in Los Altos Hills, California. As a consequence of an innovations grant from the college, combined with a sabbatical leave, the author was able to create an extensive audio-visual presentation that initially related mathematics to the visual arts and music. In addition to amplifying class lectures, much of these materials were organized as individual slide shows and audio cassettes from student access in the college library. The units on Mathematics and the Visual Arts and Mathematics and Music were accompanied by a Student Guide published by the college. Other units that linked mathematics with nature, science, philosophy, economics, etc. were also covered and supplemented with films and slide shows in class.

The course was designed to satisfy the general education requirements in the humanities. The only prerequisites were basic backgrounds in elementary algebra and geometry. It was offered at the college for more than a decade and was one of the most satisfying experiences of my teaching career.

In 1978, a prospectus for a textbook was circulated to various publishers. All were in agreement that it had potential as a marketable property. However, as it was a so reliant on audio-visuals, it was seen as too costly to publish. So, it has lain dormant for over 30 years. With the advent of the Internet and its resources, however, it now seems possible to share this educational experience with a broad spectrum of the public.

The Cultural Impact of Mathematics is a work in progress. It currently consists of two completed units that focus on the visual arts and music. By entering into the structures and processes that characterize these human activities, mathematics becomes an essential part of our aesthetic response to them. Along the way it relates these activities to the histories and philosophies that propelled their development.

For examples, in Chapter 2 on Mathematics and the Visual Arts, an in depth analysis is given of Raphael's fresco The School of Athens. This is the work that captures the spirit of the Renaissance and relies so heavily on the mathematical foundations of ancient Greece. And, in Chapter 3 of Mathematics and Music, a logical outcome of Pythagorean music theory finds completion in the analysis of the first movement of Tchaikovsky's Pathetique Symphony.

It must be emphasized that this is not a mathematical textbook. In a few instances it was found

appropriate to interject the development of a mathematical concept in order to clarify it's cultural implications. In general, however, it was considered inadvisable to interrupt the flow of the general theme by forcing the reader to struggle with the mastery of a related mathematical topic. To augment this approach, links are inserted in each chapter to sites like Wikipedia and others for more in-depth analyses.

Aside from the formal presentation, I would like to capture some of the dynamics that were present in the classroom. Visitors to this site are encouraged to engage the materal with their own reactions and questions. As any educator knows, this kind of interaction can lead to deeper insights for everyone involved.

Finally, the author views this project as a commitment to open source educational ventures. In particular, I wish to link this to the student scholarship program instituted by the Foothill-De Anza Community College Foundation.

Anyone accessing this manuscript is invited to show their appreciation by contacting the Foundation's website http://foundation.fhda.edu/scholarships and making a suitable contribution to their scholarship fund.