Honors Theses

Carl Goodson Honors Program

1969

Selections from "Mathematics: Our Great Heritage" Edited by William L. Schaaf

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Recommended Citation

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Submitted by

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Special Studies H290

Fall, 1968

January 17, 1969

MATHEMATICS: OUR GREAT HERITAGE

MATH AS AN ART by J. W. N. Sullivan

Mathematics probably originated with Pythagoras. To the
Pythagoreans, overwhelmed by the aesthetic charm of the theorems
they discovered, number became the principle of all things.
Number was the very essence of the real; other things that could
be predicted of the real were merely aspects of number.

The number one stood for reason because it was unchangeable.
Number two was opinion because it was unlimited and indeterminate.
Number four represented justice because it was the product of
equals. Number Five stood for marriage because it was the com-
bination of three and two, the first masculine and the first
feminine number. Six was the perfect number; God created all
things in six days because it was the perfect number.

Pythagoras' doctrine developed in a respectable philosophic
manner on one hand, and on the other descended to mystical imbe-
cilities. This tendency to associate a mystical significance
to mathematics continued for many years. Euclid established a
system of geometry which many considered to be part of the Divine
Word even.

Not until Lobachevsky and Bolyai published the first non-
Euclidean geometry was it realized that Euclid's axioms were not
unescapable truths, that they had no celestial origin whatever.

Einstein further developed non-Euclidean geometry, and it was discovered that one can start from any set of axioms, provided they are consistent witn eaen other...add work out the logical consequences of them.

Then, mathematics is an entirely free activity and should be called an art rather than a science.

ON THE SERIOUSNESS OF MATH by G. H. Hardy

The seriousness of a mathematical theorem lies, not in its practical applications, but in the signigicance of the mathematical ideas which it connects. A serious mathematical theorem is likely to lead to important advances in mathematics itself and perhaps in the other sciences. The "beauty" of a mathematical theorem depends a great deal on its seriousness, just as in poetry the beauty of a line depends to some extent on the signigicance of the ideas which it contains.

There are two things which are essential in a serious mathematical theorem: generality and depth. To be general, a theorem should be one which is used in the proof of theorems of many different kinds. It should be capable of considerable extension and typical of a whole class of theorems of its kind. The theorem should connect many different mathematical ideas.

The second quality, depth, has to do with difficulty; the deeper ideas are uaually harder to understand. This rule has many exceptions, but the idea of depth is an elusive one and this is the best way to define it.

MATHEMATICS--THE SUBTLE FINE ART by James Byrnie Shaw

If one used his imagination, mathematics could be considered
the study of and the expression of beauty. The elements of
beauty, such as rhythm, order, design, and harmony, are all found
in mathematics. These elements may be considered as dynamic,
giving motion to the elements, or static, giving pattern to the
elements. Mathematics, on the dynamic side, creates new rhythms,
orders, designs, and harmonies, and on the static side, is a
systematic study of these various elements.

ON THE DEVELOPMENT OF MATH by Eric Temple Bell

Mathematics has come down to the present by the two main
streams of number and form. The first stream carried arithmetic
and algebra; the second, geometry. In the seventeenth century
these two united to form the ever-broadening river of mathema-
tical analysis.

Other concepts have also influenced the course of mathematics.
Two concepts which have been interlocked in a struggle for suprem-
acy are discreteness and continuity. The existence of technolog-
ical problems in such fields as astronomy, engineering, and
industry has stimulated mathematical creation also.

Mathematical scholars have divided mathematical history into
seven periods:

1) From the earliest times to ancient Babylonia and Egypt

2) The Greek contributions, about 600 B.C. to about 300 A.D.

3) the Oriental and Semitic peoples

4) Europe during the Renaissance and the Reformation

5) The seventeenth and eighteenth centuries

6) The nineteenth century

7) The twentieth century

In each of the seven periods there was a well-defined rise to maturity and a subsequent decline in each of several limited classes of mathematical thought.