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Editor of *1970 Annual*

D.B. Harrison
Department of Curriculum and Instruction
Faculty of Education
University of Calgary
Calgary 44, Alberta

Preface

The theme of this *Annual* is ACTIVE LEARNING IN MATHEMATICS - its major purpose is to serve as a set of resource materials for teachers interested in pursuing mathematics labs, workshops, and similar activities with their own classes. Each of the contributors was invited to describe sample mathematics activities in sufficient detail that another teacher could use them in his own classroom. The resulting papers give a brief account of the authors' conception of active learning in mathematics, followed by descriptions of activities that have been used successfully with elementary or secondary school mathematics students. The papers are arranged roughly in order of the grade level for which the activites are intended, from elementary through junior high to high school.

Trivett's article suggests a "systems approach" interpretation of active learning in mathematics with illustrative examples of how creative mathematics learning situations can be devised. *Vance* describes how to establish a mathematics laboratory program and details laboratory lessons that have been used in Grades IV to VIII. *George Cathcart* discusses the lab approach and provides some sample assignment card descriptions for elementary students. In her article, *Gloria Cathcart* describes drill activities that have been enjoyed by her Grade III and IV students.

Dawson describes a "Fallibilistic" teaching strategy and illustrates the approach with a sequence of lessons based on Madison Project techniques that have been used successfully with Grades II through IX students. *Neufeld* details a sequence of pencil and paper activities on systems of numeration designed to challenge upper elementary school and junior high school students and teachers.

Sigurdson discusses how to structure a unit along discovery lines and then recounts a two-week-long "inventing" unit on finding areas of geometric figures that he has tried with a Grade VII class. *Wasylyk* and *Kieren* provide principles for designing mathematics activities for low ability students and they detail sample "area of a circle" activities successfully used with low ability 14 to 15-year-olds. *Bale* outlines some general guidelines for teachers wishing to create their own mathematical laboratory experiences and gives some sample activities suggested by topics in *Seeing Through Mathematics*. *Fisher* describes some of the 46 student activities incorporated in his active learning unit on real numbers which has been tried with Grade VIII students and which covers all the topics found in the real numbers unit in the 1969 Alberta Grade VIII mathematics curriculum.

In an article reprinted from the November 1968 issue of the *Manitoba Journal of Education*, *Sigurdson and Johnston* discuss the meaning of discovery in mathematics and give detailed descriptions of 11 classroom activities designed to lead Grade XI students to discover properties and applications of the quadratic function through exploration, forming hypotheses, testing hypotheses, summing up and practising.

Finally, the editor has included an annotated bibliography of some presently available published resource materials for promoting active learning in mathematics.

The editor wishes to thank the contributors to the *Annual* for the excellent practical papers they have written and to thank the MCATA Executive for the free hand he has been given in putting together this issue. He would also like to thank his Ed. C.I. 470 students for their timely "eleventh hour" assistance.

Hopefully, mathematics teachers will find in these pages a wellspring of ideas for pursuing active learning in mathematics with their students.

The Editor