



MATHEMATICS COUNCIL
NEWSLETTER

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THE CALGARY PUBLIC JUNIOR HIGH MATHEMATICS COUNCIL - A REPORT

Royce Williams, President

Mr. Williams is a mathematics teacher at Harold Panabaker Junior High School in Calgary.

Before commenting on the formation and activities of this Regional, I wish to record a few observations made as a result of our experiences in initiating the formation of a regional council in Calgary. These may be of benefit to members in other regions of the province who are contemplating such a step.

1. Get advice either from the Mathematics Council or from experienced council members near you. The suggestions that we received from experienced hands such as Len Pallesen and Marshall Bye were invaluable.
2. When you call your first meetings, it may be better not to raise the question of the formation of a regional. After all, your primary purpose is not to form a regional but to promote the better teaching of mathematics by bringing teachers together in order to discuss mutual problems and to exchange ideas and suggestions. Sooner or later, someone will raise the question of whether or not to form a legal body and affiliate with the Mathematics Council. You should be ready to supply what information is required and to outline the advantages that would accrue to your group by such a move, but I would suggest that you stay neutral and let the teachers decide. We found that some of our most enthusiastic teachers were quite vociferous in their antagonism towards such an affiliation.
3. Keep the program as practical as you possibly can. If a teacher can walk out of your meeting knowing that tomorrow he will be able to apply something that he heard at the meeting, he might just come to the next meeting which you call.
4. The unfamiliarity of the math courses gives you a good reason at this time to get teachers together. While we can expect turmoil and confusion in mathematics programs for many years to come, you may never have the opportunity which the present situation is providing you. In other words, don't wait. Do it now!
5. Encourage all mathematics teachers to attend your meeting. Only paid-up members of the Mathematics Council should be allowed a vote, but all others should be welcome.
6. I think that we have benefitted from our original decision to restrict the membership to public junior high school personnel. Teachers in junior high schools are not particularly interested in hearing about the problems of the Grade XII teacher and do

not want to concern themselves with the difficulties being encountered by teachers who use a text different from the one they are using. You can pontificate on the issue, but most teachers want to discuss their own problems and the solutions to their own problems. Goodness knows, they have enough of them.

In Calgary, we are fortunate in having a number of teachers with considerable experience in teaching the modern math programs. For our meetings we have drawn heavily on those with several years of teaching experience in the S.T.N. series. These teachers were involved in 1960 with experimental courses and have taken students through to Grade IX in the new programs for at least three years. Beginning in January, 1967, we called several meetings. We usually dealt with two or three topics during a meeting. Each topic was introduced by a different person who would lead the discussion that followed. Some examples of the topics we placed on the agenda were (1) the pacing of the Grade VII program, (2) the testing program in S.T.M., (3) different ways of utilizing the response verification books, and (4) how various teachers assigned and checked homework. A demonstration lesson was given (unrehearsed!) to a regular Grade VII class, a review made of resource materials available, and the usefulness of the overhead projector and overlays was emphasized. Only in May, 1967, we brought in a Constitution and formally adopted an affiliation with the provincial Mathematics Council.

With the assistance of our Mathematics Council, our inaugural lecture was given in October by Professor Cleveland entitled "New Trends in the Teaching of Mathematics". Our November meeting was held at the Calgary Instructional Aids Centre to view available films, filmstrips and overlays pertinent to mathematics and, upon request of the Director, to give him our thoughts and suggestions on what we would use in the classroom. The Grade IX S.T.M. program was discussed at the December meeting, special attention being given to its adaptation to a below-average ability group, the time factors involved, which areas need special attention, and where supplementary work and exercise will be required.

This is as far as we have come to date. We are optimistic - as we should be at this time of year - that we will be able to maintain the interest in the Regional shown thus far. However, the winds of change are blowing and the time has passed when teachers sat back and accepted, without comment, decisions vital to them as professionals made by people not as conversant with the problems as themselves. Already there has been some indication that members of this Regional will want to do more than meet and discuss curricular and methods problems. We will have to be prepared for such developments in the future.

DECEMBER, 1967, JOINT MEETING
OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE
AND THE NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS

Ray Cleveland

Mr. Cleveland, an associate professor at the University of Calgary and Faculty of Education Representative on the MCATA Executive, reviews a recent professional meeting which he attended in New York.

Of the sessions which I attended at the AAAS-NCTM meeting, three developments were of particular interest and impressed me very much.

One was related to the structure of mathematical models for particular phases of the biological sciences. "Graphical Analyses of Ecological Equations", "The Stability of Mating Behavior", and "Statistical Mechanics of Neutral Networks" were topics presented in a symposium which reinforced the opinions of those who believe that parts of probability, statistics, linear algebra, and calculus should be included in the secondary curriculum for those who wish to major in biological sciences.

Another was related to increasing interest in the various aspects of computer science in research and education. Representation of problems related to problem-solving itself is becoming an important field of research. The determination of lower bounds on the time and storage required by certain classes of programs, and the properties of programs which have such lower bounds are important research topics. Because of the necessity to refine bulk data, the computer is becoming a necessary part of research in high-energy physics.

Strictly related to mathematics education, talks were given by Stanley J. Bezuska on a guessing approach to the solution of equations, Burt Kaufman on a new mathematics program for gifted students in the setting of an ungraded school based on the recommendations of the Cambridge Conference, and Carl B. Allendoerfer on the state of mathematics of the CEEB.

Mathematics and science are no longer top priority on the list of educational concerns in the United States, while social problems have gained first place.

Mathematics is the first of the sciences and hence
is the key to all other sciences.

PROJECT CALCULATOR

Marshall P. Bye

Mr. Bye, past president of MCATA and consultant in mathematics for the Calgary public secondary schools, describes two exciting experiments in the teaching of mathematics with the help of calculators at the junior high school level.

"Students are asking if they can return after school to finish their math assignments."

"Students, during assemblies that run over into the math classes, are asking to be allowed to return to their math classes."

"Students are readily answering: $2 \times 19 \frac{3}{4} = 39 \frac{1}{2}$."

"Students are performing 5, 6, 7, or more step problems without assistance."

You may ask, "What is so different about all this?" Many teachers may not see anything different in this, but to two teachers in particular these 'happenings' are rewards for the extra work that has gone into two projects: *Project Calculator I* and *Project Calculator II*. The young people described above are not average students. They have been failing mathematics for years; some have not passed a math course since Grade II. They have hated mathematics. These students attend the junior and senior vocational mathematics classes being offered by two academic-vocational schools in the Calgary public school system.

There are two separate experimental projects under way at present. In the Van Horne Secondary Vocational School, Principal D.B. Murray and his mathematics teachers were searching for an approach to mathematics suitable to a special group of Grade IX students. This new program would have to be suitable as a terminal mathematics course. It would have to be different and yet provide practice in computation and problem-solving. The staff was looking for a program that would change the attitude of students with an extreme dislike for mathematics - a dislike caused by continual and prolonged failure. This program, then, would have to allow the student some measure of success daily. The staff was aware of the positive effect which the shop classes (in automotives, food servicing, and the like) were having not only on the students' attitudes but also on students' achievement in general.

In the Ernest Manning Academic-Vocational High School, Assistant Principal D.B. Dack has long been concerned about a suitable program for students in the vocational program. He solicited the cooperation of R.M. Radomsky who was teaching mathematics to this group. The two teachers assessed the type of students in question. The students, in general, had poor behavioral patterns in class and in the school. The ability of the students was generally low and the attitude of the group towards mathematics was negative.



Photo - Calgary School Board, Instructional Aids Department

C.S. Swaney with two students in *Project Calculator I*
at Van Horne Secondary Vocational School, Calgary

In September, Olivetti Underwood offered, on loan, 18 Divasumma Calculators for Ernest Manning and 10 for Van Horne School. The writer, while at the NCTM meeting in Las Vegas last April, had gathered some information and suggested lesson plans from "Concepts and Applications of Mathematics Project" (CAMP). This information was for calculator-centered mathematics courses and related to the use of low charts.

At Van Horne, C.S. Swaney worked these ideas from CAMP into his own thinking, and this is how *Project Calculator I* was born. Mr. Swaney is building a course centered around the use of the calculator to meet the interest and needs of the students. Among other advantages, the calculator develops interest and puts 'activity' into the math program. It provides a measure of success. Mr. Swaney and those associated with this project are amazed at the

level of achievement which the students are attaining and the changes in attitude towards the mathematics classes. The project continues.

At Ernest Manning, Principal T.T. Humphrey gave approval for R.M. Radomsky to teach *Project Calculator II* to three classes of Mathematics 15. Mr. Radomsky built his course to augment the current textual material and to encompass topics that are related to other vocational subjects. He found that the student could handle difficult and complex problems much more rapidly and to a greater extent than he had expected. The students could master a large number of problems daily and wanted more problems of a more challenging nature. When asked how the project was proceeding, Mr. Radomsky commented "Just come in and watch the students. See for yourself." I did just that. I saw students working diligently, in pairs, often one helping the other. There were no discipline problems. A student raised his hand and asked if he could come back early at noon to finish his assignment. I saw students do mental



Photo - Calgary School Board, Instructional Aids Department

R.M. Radomsky with a mathematics class in *Project Calculator II*
at Ernest Manning High School, Calgary

calculations with confidence, far beyond the level at which they were able to work just two months before that time. Many other positive changes were observed. I was convinced of the success of the program.

The second semester will soon start at Ernest Manning. Mr. Humphrey has given approval and support to the institution of a research project during the semester. Mr. Radomsky, with the assistance of Mr. Dack, will carry out a carefully tested and controlled experiment. N.J. Cameron, principal at James Fowler High School, is providing a comparable group in his school to be used as a control. In addition to testing, Mr. Radomsky will prepare material for a workbook text that can be used by other teachers. It is hoped that the data collected from this experiment will support the hypothesis that *Project Calculator II* results in a positive change in attitude towards mathematics, an increase in problem-solving ability, and an increase in ability to perform simple computation.

Perhaps it is too early to predict with sophistication the exact effect of the extended use of calculators in mathematics, but the results being obtained are exciting, promising, and favorable.

Project Calculator is launched.

Algebra is the intellectual instrument which has been created for rendering clear the quantitative aspect of the world.

Alfred North Whitehead

School teacher to waiter in restaurant: "Well, Hubert - I can't say your addition has improved any since I had you in sixth grade."

CURRICULUM NEWS

Excerpts from the Mathematics Subcommittee Report to the Senior High School Curriculum Committee Meeting, held October 26-27, 1967

The Senior High School Mathematics Subcommittee is conducting a study of materials which might be suitable for use in a revised Mathematics 31 course. The materials being tried include

Vectors and Matrices, by Elliott (Holt, Rinehart and Winston)
Calculus, by Elliott (Holt, Rinehart and Winston)
Analytic Trigonometry, by Bruce (Pergamon)
Trigonometry With Tables, by Welchons (Ginn)
Mathematics of Matrices, by Davis (Blaisdell)

The Subcommittee has not yet decided upon the nature of the revised Mathematics 31 course. Consideration is being given to developing a course consisting of a half year of trigonometry plus a half year of calculus or linear algebra.

The Subcommittee has proposed to the Senior High School Curriculum Committee that the senior high school mathematics courses consist of three sequences of programs:

1. Mathematics 10, 20, 30, and 31 would be the matriculation sequence and would be studied by approximately 35 percent of the students entering Grade X.
2. Mathematics 13, 23, and 33, which would be studied by about 35 percent of the students entering Grade X, would be less rigorous, would emphasize applications to a greater extent, and would treat essentially the same topics as Mathematics 10, 20 and part of 30, although the emphasis on combinatorial mathematics might be greater.
3. Mathematics 15 and 25 would be essentially the same as the present programs taught in a few centers. The content would be flexible and would include units of mathematical topics plus units on application of mathematics to business, vocational subjects, physical and social sciences.

All courses presently authorized other than Mathematics 10, 20, 30 and 31 would be deleted.

The proposal of the Mathematics Subcommittee was accepted in principle by the Senior High School Curriculum Committee.

Excerpts from the Mathematics Subcommittee Report
to the Elementary School Curriculum Committee Meeting

Ten new series are being evaluated. It was recommended that no new textbooks be authorized for September, 1968, as the Subcommittee wished to take a closer look at the various programs. In the present situation committee members felt that they should not be hurried into making a choice.

Comparative methods of evaluating any series of books were discussed. Some members of the Subcommittee had felt that classroom experimentation with the various series was superfluous and took too much time since most of the committee evaluation was both more efficient and time-saving. However, discussion in the Elementary School Curriculum Committee meeting appeared to favor classroom experimentation, especially if a program represented a substantial departure in method from the existing courses.

Mathematics - a tentative agreement that
two and two make four.
