TEACHER PREPARATION IN MATHEMATICS

W. F. Coulson*

What criteria should we use to develop the program of mathematical
preparation to be followed by the prospective teachers of mathe-
matics in the schools of Alberta? Does the present program meet
or attempt to meet these criteria? How should the present program
be modified to meet these criteria?

We will assume that a single set of criteria can be listed which
would apply to all teachers of mathematics, elementary and secon-
dary, and proceed to discuss these criteria. First, our teachers
should know secondary mathematics. It is necessary to know more
about your subject than the little area being taught. The inter-
relationships must be known. Knowledge of theory is as essential
as knowledge of the fundamental operations.

The second criterion is that requiring a breadth of mathematical
preparation. Daily classwork will not be simply textbook learning
or following the recipe. Stimulation and inspiration will be a
part of each teacher's teaching.

A third criterion that might be mentioned is that of the proper
attitude of the teacher toward the subject area of mathematics.
Mathematics of today is a living, growing subject. It is not
stagnant. The attitude of the student will be influenced by
that of the teacher.

Another aspect of the attitude of the mathematics teacher is
that of self-improvement, self-study, or the simple keeping
abreast of the everyday happenings in his field. Each teacher
should be reasonably familiar with the current thinking in
mathematics and mathematics education.

Experience in dealing with the interrelation of the various parts of the field of mathematics might be listed as the fourth criterion Are the areas into which the study of mathematics is traditionally divided - arithmetic, geometry, algebra, trigonometry - related, or are they again as tradition seems to imply, unrelated? What are some of the unifying concepts which could be used to interrelate the various areas of mathematics? Study and applications of these topics are essential.

The fifth, and for this discussion, the last of the criteria which might be used to design a program of mathematics preparation for prospective teachers, is the necessity of knowledge of the relationship of mathematics to other disciplines and to various fields of work. At one time mathematics was related only to the physical sciences and technology. Not so in this modern, fast moving world. A teacher must be aware of some of the uses to which the subject may be put.

Now considering the four basic certificates, does the holder of one of these certificates meet each of the five above mentioned criteria? The holders of the Standard E and Junior E certificates receive practically no formal instruction in mathematics at the university level. For the teacher in the elementary route, there is no provision for completion of a major in mathematics on the bachelor's degree. This might imply that mathematics is a relatively unimportant part of the elementary school curriculum. Experts in mathematics education at the elementary school level must come from two sources: (1) people who have been educated as secondary school teachers and have entered the elementary school field, and (2) individuals who studied mathematics outside any formal pattern. Do we want to leave the preparation of experts in elementary school mathematics to such chance?

For individuals following the secondary education route as majors in mathematics, the program does satisfy these criteria in a general way. In order that these people be even better prepared for a position in the teaching of mathematics, some revisions in course content or course sequence might be indicated. At any rate, a study of what is best for mathematics education in the Province of Alberta might be considered.

An attempt has been made to list the criteria of the program of preparation of prospective mathematics teachers. As can be seen, one group of teachers has a program which very nearly satisfies all of these criteria while another group has a program which does not meet any of the criteria. As a result of looking at the preparation of prospective mathematics teachers, some recommendations may be forthcoming from the ATA Mathematics Council, which will have an effect on the preparation of these individuals to teach mathematics.