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SURVEY COURSES IN MATHEMATICS

O. C. KREIDER

Many ideas have invaded mathematical discussions in recent times and have pointed out the need for survey courses in mathematics. By some, the people who presented these ideas have been considered fifth columnists to entice us away from our national traditional courses in mathematics. In our present crisis we find our national educational domain disarmed and at a disadvantage in the mathematical field.

True, the power of accurate computation, quantitative thinking, and logical reasoning has not perished in our nation, but traditional mathematics has not fulfilled the mission of mathematics in the educational scheme. Too large a group has been side stepping the traditional courses, hence the embarrassing results in the present crisis.

There are two common ways of reaching this large group of students. One is guidance and much of the so called guidance just now is the same as pressure. The other way is to admit our glaring weaknesses and attempt doing something about them. If we must add new courses to allow mathematics to fulfill its mission then we should not hesitate to make the necessary change. With the proper courses the guidance problem will be simplified.

In a few cases the survey program has invaded the realm of mathematics instruction. Some have been alarmed but others have encouraged its entrance. For the past few years the speaker has been interested in every text, old and new, which might be used as a text for a survey course. As would be expected the texts or courses were very cosmopolitan, yet they were rather easily classified into a half dozen distinct types.

Most of the *Review Types* regard mathematics as computational with little or no concern with the question of how to avoid extensive calculation. Arithmetic is dominate. The order is generally haphazard and the chapters unrelated. Such a course would have the greatest value to prospective grade teachers or nurses.

The *Eclectic Type* contains three books in one, namely college algebra, trigonometry, and analytic geometry or the arrangement of topics of the three subjects to achieve a little relationship between chapters. It could be used in most traditional courses.

One of the *Analysis Type* stresses the mathematics used in var-

ious vocations. It is of course important to know the mathematics that is being used in various vocations but an interesting question is, what mathematics may be used to advantage that are not in use now?

The other *Analysis Type* introduces algebra, trigonometry, analytic geometry and some calculus. The arrangement of topics is traditional with the notion of functions at the outset. Generally the graphical methods of functional relations are gradually refined and differential calculus introduced.

The *Cultural Type* is characterized by its essay form and challenging figures of speech. The induction of the student into the various fields of human learning via mathematics is the chief objective. A few of these books are being used as texts and most of them would be fine supplementary material. Generally speaking most of them are too difficult for the average freshman with two years of high school mathematics.

Books vary in the *Historical Type* from the minimum represented by a straight mathematics course with a sprinkling of historical notes to the history book with a sprinkling of mathematics. Most of the books have a fine way of showing use and effect in the social need.

The *Psychological Type* takes account of the psychic processes in the boy in order to grip his interest. Mathematics is associated with everything that is seriously interesting to the pupil at that particular state of his development.

Today survey mathematics is well known, but not a very well defined term. There have been associated with it many shades of meaning and interpretation, yet they all represent efforts to bring out values held to be more or less submerged in the traditional courses. Few writers or committees venture to make any except broad general recommendations. However, it seems to the writer that a few rather distinct characteristics should be adhered to.

The main characteristic of survey mathematics is breadth, i.e. survey courses are not confined to a small single body of subject matter. Not only is the mathematics scope broader, but many non-mathematical notions are included to complete the understanding of certain principles.

The second characteristic of survey mathematics is psychological organization. Many will at once cry out for logical organization because it is more easily achieved. To present a subject logically and enable a student to understand it logically are not

always the same. If the teacher must take into account the psychic processes in a boy in order to attract his interest, why not write a little of it into books?

The third characteristic of survey mathematics is value. Three values uppermost at the present time are: (1) comprehensive principles (2) cultural contributions and (3) utility.

After considering the discussions concerning the improvement of mathematics the next turn is to the guidance of our best students toward mathematics. But in no way should the other type of students be excluded. The key note for a survey course should be: Make mathematics really and obviously worth while to students and encourage students rather than eliminate them.

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