The recent revolution in mathematics education has raised many fundamental questions and given rebirth to others. What are the objectives of mathematics education—and, how can they be used as a basis for curriculum development? What is really learned when mathematics is discovered? What does the master teacher do which makes him a master teacher—can others be taught to do these things? How does one measure mathematical knowledge and ability? To what extent can mathematical creativity be taught? These are just some of the questions about which we have only partial answers and about which more complete answers must be attained if mathematical education is to reach its potential. Unfortunately, with the immediate and pressing needs for more and better instructional materials, in-service teacher training, and the like, few con-
temporary mathematics educators have had the time to acquire the specialized training needed to conduct definitive research on such questions. They generally have too much to do already.

In recognition of the need for more research specialists in mathematics education and with support from the U. S. Office of Education, the Graduate School of Education, University of Pennsylvania has instituted a new doctoral program in mathematics education research leading to the Ed.D. and Ph.D. degrees.

This program has been especially designed for recent graduates with distinguished undergraduate records in mathematics or mathematics education. Advanced students with a master's degree in mathematics, mathematics education, statistics, or any area of behavioral science research with a strong undergraduate preparation in mathematics may be admitted into the program with advanced standing. The program is primarily intended to prepare students for positions of leadership in mathematics education research in universities, research laboratories and organizations, and federal, state, and local research agencies.

This program is interdisciplinary in nature and involves study in four core areas: mathematics, recent mathematical curricula (including elementary, secondary, and college levels), psychology and educational psychology, and research methodology (including measurement, statistics, experimental design, computer programming, operations research, etc.). In addition to minimal requirements in these areas, each student is expected to specialize in one or more of the core areas. Trainees will also be encouraged to elect appropriate courses in logic, operations research, statistics, psycho-linguistics, and the sciences. Independent study and research is encouraged and extensive opportunities are provided for participation in research seminars and a variety of research activities in mathematics education.

Programs may be tailored to the needs and objectives of individual students but most students will select one of two general options. The first option (Mathematics Emphasis) is weighted heavily towards mathematics whereas the second, an option which might appropriately be called Psycho-Mathematics, or the Psychology of Mathematics Learning, requires more intensive study in psychology and educational psychology along with supporting work in such areas as logic, operations research, statistics, and linguistics. The minimal mathematics requirement in the second option (Psycho-Mathematics) is the equivalent of a (steeply graded) University of Pennsylvania undergraduate major and in the first (Mathematics Emphasis) is the equivalent of a Pennsylvania master's degree. Participation in advanced seminars in mathematics education and independent study devoted to research in mathematics education is required of all candidates. For this purpose, four new courses have been instituted, the last three being devoted exclusively to research: Research in Mathematics Education, Seminar on Innovation in Mathematics Curriculum and Instruction, Research Seminar on the Psychology of Mathematics Learning.

Stipends, for qualified candidates, vary from tuition scholarships to approxi-
mately $4,000 per year plus full tuition for those with three dependents. In addition to fellowships, for full-time study, a number of research assistantships and summer research assistantships are available for \( \frac{3}{4} \) time students.

Qualified college seniors and recent graduates, with an undergraduate major or master's degree in mathematics or mathematics education, are especially urged to apply. Those interested in the Ph.D. program should apply for admission to the Graduate School of Arts and Sciences; Ed.D. applicants should apply to the Graduate School of Education.

Further information on the program may be obtained by consulting the University of Pennsylvania Graduate Studies Bulletin and Undergraduate Catalogue for course descriptions and by writing Dr. Joseph M. Scandura, Associate Professor of Mathematics Education, Graduate School of Education, University of Pennsylvania, Philadelphia, Pennsylvania 19104.