MATHEMATICS

Chairman: KERMITT H. CARLSON, Valparaiso University

MERRELL E. SHANKS, Purdue University, was elected chairman for 1961

ABSTRACTS

Mathematics and the Younger Generation. HANS J. ZASSENHAUS, University of Notre Dame.—Teaching techniques are suggested which will enable the teacher to maintain his own standards of performance while allowing the student freedom in pursuing his own goals which include passing examinations, acquiring knowledge, learning how to learn, getting a degree, discovering himself and developing a fitness to serve the community. Emphasis is on freedom of self-expression for the student and acknowledging that each student is unique and must be treated accordingly. The axiomatic method, especially, does not really work except with perhaps ⅓ of all students. Mathematics is more than just a set of rules. It is not merely a formal system. It makes itself felt by confronting us with reasonable problems. We succeed with the student insofar as we arouse his interest in these problems.

The Mathematics Program at Rose Polytechnic Institute. T. P. PALMER, Rose Polytechnic Institute.—All students at Rose are required to take 18 hours of mathematics through differential equations. The freshman year is the same for all. A mathematics major in his sophomore year may take modern geometry and matrix theory in a 3 hour elective spot. In his junior year he takes 6 hours of advanced calculus, 6 hours of vector analysis and theory of functions of a complex variable along with modern physics, a language, a technical elective and a course in the humanities. In the 1st semester of his senior year he takes advanced differential equations, statistics, modern algebra, engineering analysis, a technical elective and a humanities elective, while in the 2nd semester he takes numerical analysis, hydrodynamics, mathematics seminar, two technical electives and a humanities elective. The total program consists of 51 hours of mathematics, including 33 hours beyond the required differential equations. The mathematics seminar is of unspecified content. Topics which have attracted interested students are stability theory, probability theory, topology and finite dimensional vector spaces. One non-required course offered by the department is Mathematical Methods for Digital Computers, which centers around the Bendix G 15d computer now installed at the Institute.

Crises Past and Present (invited hour address). R. CREIGHTON BUCK, University of Wisconsin, Chairman of the Committee for the Undergraduate Program in Mathematics.—A review of the development of mathematics in the U. S. from 1900 and a prospectus for future growth based upon recommendations of the Committee for the Undergraduate Program, with special emphasis on the activity of the Panel on Pre-graduate Training. Of first importance to the student of mathematics is that he develop his ability to read and enjoy the appropriate literature. Mathe-

matics is full of idiom which he must learn to interpret. He must become aware of the traditions and history of mathematics. Too many textbooks today seem to have been written by machines, there is so little humanism in them. Furthermore, our emphasis on rigor has served only to remove the excitement from mathematics. Techniques are important. The methodology of proof is learned best through the experience of reading proofs. It is also important that the student develop the proper attitude of looking beyond his immediate objective; too many stop developing with the Ph.D. Finally, there is the question of whether teaching must always be right the first time. Do we prove everything, or must some things be unlearned? The fact is that mathematics develops from hazy ideas and unformed conjectures, and the "Satz-Beweis" tradition must yield to a tolerance for laxity. There are actually fewer Ph.D.'s teaching mathematics in the U. S. than there were 10 years ago. What is required to meet the increased demand is not known, but a relaxation of the requirement of a Ph.D. seems called for. The Committee for the Undergraduate Program recommends a Doctor of Arts degree in which the thesis is expository or critical.

The State of Mathematics in the State of California. HARLEY FLANDERS, Purdue University.—The phenomenal growth of California marks it as special. In 7 years it will be the largest state. In 1959 the University of California at Berkeley had 19,000 students and a permanent mathematics staff of 45. Enrollment for 1965 is estimated at 26,000-35,000, mathematics staff a very conservative 80, possibly 100. A major factor in the growth of mathematics there is the opportunities for mathematicians in industry and government. The state college system is coming into competition with the university system by offering Ph.D.'s. There is a danger that the state college system will adopt the Doctor of Arts degree and distort it to something not intended by its originators. The training of secondary teachers is done in the state college system. Another unique feature of California is its system of 40 junior colleges. In the future these will carry the sole responsibility for offering the first two college years. There are no small schools among California's 300 high schools. Once a California teacher has a secondary credential he may teach any subject. Twenty-five per cent of California's high school math teachers had no math in college. The credential situation is currently under review.

Comments on the Liaison Between High School and College Mathematicians. ARTHUR E. HALLERBERG, Valparaiso University.—The problem of articulation between school and college mathematics will almost certainly become more complicated before generally accepted procedures evolve. Furthermore it will not be solved by committee reports, by particular superior experimental programs, by the general adoption of a single pattern of high school mathematics courses or by adoption of a uniform set of college admission requirements. Rather, some satisfactory state of affairs in the transition will be obtained only after full and free conversation and interaction between secondary school and college teachers and between the teachers of mathematics at all levels and those who are doing, inventing and applying math. The changes, when they come, must come at all levels of teaching. Factors contributing to the problem, but which may also contribute to its solution, are: (1) the watertight com-

partments of mathematics have been broken, (2) the lines of demarcation between junior high school, high school and college math are being erased, (3) modern mathematics is making an impact on the curriculum, (4) physicists, chemists and engineers still want traditional mathematics, notably the calculus, as early as possible. Suggested action: Teachers and administrators should become informed of recent actions of the National Council's Secondary School Committee and of CUPM. We should work through some of the new materials such as those of SMSG or Ball State. Read about new proposals in "Math Teacher," "School Science Math" and "Math Monthly." Encourage institute participation and local participation in activities of ISCCM, Continental Classroom, etc. Experiment with new ideas even in traditional classes. Finally, communicate through periodicals and meetings.

Interdepartmental Seminar: A New Mathematics Course at DePauw. ROBERT J. THOMAS, DePauw University.—Interdepartmental Seminar was introduced at DePauw in 1958. It is a small class for senior students in chemistry, mathematics or physics which treats mathematical topics from any of the three fields. The student's work is largely independent study.