tioned aversive temporal stimuli play an important role in such behavior. The aversiveness of these stimuli fall to a minimum directly after an avoidance response and then rise as the occasion for the next shock approaches.

John Nevin (Columbia University) described experiments conducted in collaboration with Robert Berryman and William Cumming on matching-to-sample behavior in the pigeon. Several procedural variations were described, and some data on the effects of pentobarbital on delayed matching behavior were presented.

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Manpower Problems: Training of Mathematicians

A conference on "Manpower Problems in the Training of Mathematicians" was held in Washington on 16–17 April under the auspices of the Conference Board of the Mathematical Sciences (CBMS) with support from the National Science Foundation. It was held in response to a report on *Graduate Training in Engineering, Mathematics, and Physical Sciences* (EMP) prepared by the Gilliland Panel of the President's Science Advisory Committee and issued by the White House, 12 December 1962. The panel summarized the national requirements for EMP scientists at the Ph.D. level and considered various factors affecting the supply. The report concluded that the supply of graduate students could result in the production of 7500 doctorates in 1970, as compared with 3000 in 1960. In mathematics the report presented two alternative goals for 1970: 2200 or 1320, which are increases by factors 7 and 4, respectively, over the output of 303 Ph.D.'s in 1960.

The conference received detailed information on the supply of graduate students, the existing means for their support, and the currently available supply of mathematicians for their training from representatives of government agencies, the constituent organizations of CBMS, and the National Research Council. The effects of industry and of the proposed increase in the training program in engineering and physical

sciences on the supply and demand for mathematicians was discussed by representatives of the Bell Telephone Laboratories, RIAS, American Chemical Society, American Institute of Physics, and the American Society for Engineering Education. About 70 people participated.

The conference report will include the following recommendations:

1) Young Ph.D.'s should be used earlier and more effectively as thesis advisers.

2) NSF support of summer institutes for intensive research training of advanced graduate students should be extended and strengthened.

3) A program of training grants to departments of mathematics should be established which will facilitate the matching of competent graduate students with qualified thesis advisers.

4) Pre- and post-doctoral fellows should be encouraged to do a moderate amount of teaching.

5) Existing national policy which provides funds for the construction and equipment of scientific laboratories should be broadened to provide for the construction and equipment of buildings for offices, seminar rooms, libraries, and computing facilities, which serve the same purpose in the production of Ph.D's in mathematics as experimental laboratories do in engineering and the physical sciences.

6) Promising secondary centers of Ph.D. production should be given support to increase their output of doctorates while maintaining and even increasing their level of excellence.

7) Due consideration should be given to the high level of demand for Ph.D.'s in applied fields: statistics, computer science, applied mathematics.

8) Steps should be taken to provide undergraduate departments of mathematics with competent staffs in order to raise the level as well as the quantity of students entering graduate study.

9) Suitable arrangements should be made so that the substantial number of mathematicians in industry and government who are qualified to direct thesis preparation may serve the universities in Ph.D. production.

10) New centers of excellence for Ph.D. production should be created where suitable pools of students and a nucleus of qualified mathematicians exist.

The constituent organizations of CBMS are: American Mathematical Society, Association for Computing Machinery, Association for Symbolic

Logic, Institute of Mathematical Statistics, Mathematical Association of America, National Council of Teachers of Mathematics, and Society for Industrial and Applied Mathematics. Dr. J. Barkley Rosser, chairman of the CBMS council presided at the conference.

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International Congress of Zoology, 20–27 August 1963

The 16th International Congress of Zoology will be held in Washington on 20–27 August 1963. In contrast to many congresses, which consist mainly of individually contributed papers plus a number of specialized symposia, a high degree of organization is planned for this meeting. Individual papers have been, to be sure, welcomed, and a large number of "special" symposia have been organized. Many of these symposia are designed to cut across the lines between two or more subdisciplines. Individual papers and special symposia will occupy the afternoons. The unique feature of the congress is that the morning sessions will be devoted exclusively to a series of plenary symposia, in which our current knowledge of some six broad areas of animal biology will be presented to the participants as a whole by experts in each field.

The reasons for this planning lie in the present state of the science of zoology. Half a century or so ago, like every other major scientific discipline, zoology was essentially a discrete unit structure, well-demarcated for the most part from other sciences, and with a considerable degree of mutual intelligibility between workers in its subfields. Today this is no longer the case. Happily, the boundaries between animal biology and the physical sciences have been in great measure broken down. Less happily, with increase in breadth and depth of research interests, there has been a strong trend toward fragmentation—a disintegration of the field into a number of minor disciplines, between which communication is often poor. The major aim of zoology should be an understanding of the animal as a whole. Currently we are rapidly advancing our knowledge of various fractions of the field; but our concept of the total organism has all but vanished.