schooling upon “catch per unit of effort” as an index of population density was explored through mathematical models.

Procedures were given for estimating classification errors as they might arise in assigning the individuals in a sample to their respective age groups. Other methods considered for estimating population size included those based on the change in sex ratio before and after harvest of an exploited species and those utilizing the extrapolation of repeated, visual, incomplete counts in an area to obtain an estimate of the total number in the area.

This symposium was arranged by Douglas S. Robson (Cornell University) for the Biometrics Society (ENAR). Chairmen were Kenneth D. Carlander (Iowa State University of Science and Technology) and Daniel B. DeLury (University of Toronto).

The section was also cosponsor of the symposium on managing the innovative process, arranged by Burton Dean and Ellis Johnson (Case Institute) for ORSA-TIMS.

Morris B. Ullman, Secretary

Science in General (X)

Science Courses for Baccalaureate Education Project (X4)

The Project’s session met on 30 December 1964. V. L. Parsegian (Rensselaer Polytechnic Institute) first reviewed the history and status of the project. A panel of six members then presented specific questions for discussion. Kent D. Lawson (Bennington College) commented on and led discussions on the objectives of the project, and M. Brian Bayly (Rensselaer Polytechnic Institute) on the physical sciences content and approach. William H. Johnson (Rensselaer Polytechnic Institute) and David G. Barry (State University of New York) followed with biological aspects. Edwin J. Holstein and George Goe (Rensselaer Polytechnic Institute) introduced questions from the social sciences and mathematics, respectively.

Members of the Advisory Board of the Project, in addition to the chairman, are David G. Barry, Walter H. Bauer (Rensselaer Polytechnic Institute), Loren Eiseley (University of Pennsylvania) Harry W. Jones (Columbia University School of Law), Adolph Lowe (New School for Social Research), Henry Marganeu (Yale

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This unusual session gave reports on the goals and activities of a project which aims to develop new approaches to Science Courses for Baccalaureate Education. In the process, the meeting elicited many valuable suggestions from an informed and responsive audience. The program was organized so that the audience could participate in seeking answers to specific questions related to goals and methods. Endowed by the Charles F. Kettering Foundation, the project is organized to include participation on the part of the faculty members from many colleges. The number of colleges participating, in addition to Rensselaer Polytechnic Institute where the project is centered, now exceeds 60.

The projected courses are intended for liberal arts programs and for undergraduates whose studies may lead to professions in law, government, economics, business, anthropology, psychology, theology, and so forth. The courses will contain materials selected from the physical sciences (such as astronomy, earth science, atomic, molecular, and materials sciences), biological sciences, and to some extent from the social sciences. The presentation is intended to identify the continuity, transitions, relationships, and essential differences among disciplines, as well as to emphasize the power and the limitations of scientific methodology.

The objective of the courses is to reveal to the student the essential content, significance, and beauty of selected portions of the physical and biological sciences, and to emphasize the relationship of these sciences to the social sciences and to the student’s own professional, social, and personal interests and responsibilities. Tentatively, the courses will be of three-semester duration, probably taken during the junior and senior years. Time limitations require that each topic and its presentation be severely analyzed and selected for maximum effectiveness.

Among the questions discussed were, to what extent can rigorous and quantitative analysis be compromised, in favor of a qualitative view, without losing essential insight? Apparently there is no simple solution to this problem, since one’s position can vary from topic to topic. Some natural science topics bring little meaning except as they are treated quantitatively, perhaps
through involvement in an experimental situation. For some areas, a historical approach is preferable, while for others an intellectual process is often best stimulated by introduction through "world we live in" problems or personal experiences. For some students arithmetic and inadequate appreciation for magnitudes of phenomena often pose obstacles which may also be helped by meaningful experiments. The case method is often very good, provided that the larger conceptual interrelationships can be developed effectively. Physical models may, with care, become useful for illustrating both physical and social systems. Motivation of the student is an essential consideration.

Themes, ideas, or concepts which can be clearly traced through more than one of the physical, biological, and social sciences, become especially useful, because they reveal the common aspects of science and the fact that matter and energy have many forms. "Great ideas," current theoretical or practical problems in interdisciplinary areas, and a philosophic approach to these problems all offer real values. It was felt by some that the common topical approach, or the simple listing of all the topics that the course should cover, is the least productive procedure. Topics should be included always with sense of larger purpose. To what extent should "science" be thought of as a noun, and to what extent as a verb or an intellectual process? To a significant extent science may be regarded as a language to give ability to read journals such as the Scientific American, and to relate science to political and social issues, without necessarily including ability to write on scientific topics. The cultivation of an open-ended, nondidactic habit of thought with appreciation of rigor constitutes an important task for the courses. This goal can often be approached by stressing the unknowns in science, and by the use of suitable problems and experiments which necessitate student involvement in their formulation as well as in their solution.

Because of recent developments, the courses can pass easily and continuously from the physical sciences to biological phenomena through the major bridges provided by molecular biology, polymer chemistry, and atomic science. Similarly, biological sciences may provide a necessary and useful bridge to the social sciences. A uni-
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Sigma Delta Epsilon (X5)
A tea for all women in science, sponsored by Sigma Delta Epsilon, Graduate Women's Scientific Fraternity, was held on the afternoon of 28 December 1964 and was very well attended by women scientists from the United States and Canada.

Mark down these dates:
March 15—see us in Booth F-35 at the 16th Pitts. Conference on Analytical Chemistry and Applied Spectroscopy.
Science Courses for Baccalaureate Education Project (X4)
V. L. Parsegian

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