with special training in the teaching of modern science and mathematics, works closely with a committee of Turkish scientists. The teaching materials for science and mathematics consist of special adaptations of new U.S. materials. These adaptations have been made on the campus by Turkish and American scientists and science teachers working together. Summer training courses for groups of Turkish high school science and mathematics teachers are also conducted at the school, and plans are being made to extend the influence of the school in a number of ways with the ultimate aim being to help improve the teaching of science and mathematics in the country in general.

Jack S. Goldstein (Brandeis University) discussed the progress being made in the African elementary school science project administered by Educational Services Incorporated, with support from a number of sources including the United States Agency for International Development (AID), the Ford Foundation, and the Louis and Pauline Cowan Foundation. In particular, Goldstein described the summer workshop which he directed in Entebbe, Uganda, in 1965, attended by selected representatives of the primary schools of the Tropical African Countries. The three objectives of the workshop were: (i) to develop primary school science units, (ii) to exchange information about primary school science activities from the countries represented, and (iii) to develop a corps of people from each country who would be equipped to staff school science resource centers in each of the countries. Goldstein noted the eagerness and ability of the African students and teachers and the tremendous problems which must be overcome in each of the countries.

Claude A. Welch (Michigan State University) related observations on science education made during a visit to Japan in the summer of 1965 in connection with the U.S.-Japan Cooperative Science Program. Welch described Japanese progress in translating and adapting biology teaching materials developed in the United States by the Biological Sciences Study Committee. He also discussed the network of science teaching centers which have been established in Japan where a wide range of activities, from the preparation of science teaching materials to the supplemental training of science teachers,

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Piaget’s Research and Its Implications for Science Education

This symposium was a joint session of Section Q and the National Association for Research in Science Teaching (27 December 1965).

"A preliminary report on the performance of 5th and 6th graders on a directed learning task: the pendulum," was presented by Maurice Belanger. Another paper, "Interrelations of the acquisition of some Piaget-type tasks requiring proportional thinking," was presented by Ronald Raven. The paper by Belanger is just a section of a monograph which he is in the process of writing. Therefore some of his conclusions were still tentative. However, it was interesting to learn there is such a thing as "boy physics" as well as "girl physics"; that girls seem to have greater rigidity to change than boys; that boys, rather than girls, are much more receptive to data collected by experimentation. These represent just a few of the inferences which Belanger has been able to make from his studies. Raven found from his research that maturation plays an important role in the ability to use proportional thinking.

Interrelations of the acquisition of some Piaget-type tasks requiring proportional thinking in primary school children was one of the subjects covered during this symposium on Piaget research. Inhelder and Piaget have shown that there is a gradual evolu-
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Resolution in the process of proportional thinking. His paper reports the results of an investigation of children's thinking within the first and second proportion schema. In the first stage, the child is able to see the relationship between the changes of one variable and the proportionate changes of the final results. Thus, he can predict that an increase in the height of an inclined plane will produce an increase in the speed of an object moving down the plane. During the second stage, the child comprehends that an increase in one variable can be compensated for by reducing or increasing another variable. For example, we can hold the speed of a car constant by increasing the angle of an inclined plane even though we have placed the car lower on the plane.

The purpose of this experiment was to determine what the effects of two different rules were on the ability of the child to manipulate the variables governing the speed of objects down the inclined plane. In the first experiment, six-, seven-, and eight-year-old children used the rule that the speed of an object down the plane was directly proportional to the height of the object on the plane and the angle of the plane. Weight was not a factor in determining the speed of the object. In the second part of the experiment, children of the same age group were using the rule that the speed of the object down the inclined plane was directly proportional to the weight, height of the object on the plane, and the angle of the plane. The car was adjusted so that an increase in weight would make it go faster contrary to "accepted" laws of physics.

Six- and seven-year-old children had more difficulty excluding the weight as a variable than did the eight-year-old children. Even though the first rule involved only two variables, the children scored consistently higher on problems dealing with the rule involving three variables. It is to be noted that all the children had previously been operating by a rule that lighter things go faster. The second experiment made them operate by an opposite rule that heavier things go faster. In spite of the unusual nature of the latter rule, the children still preferred to operate by it rather than exclude weight as a factor determining the speed of objects down the plane. It would appear that children have formed a strong relationship between weight and speed. The results of the experiment show

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that the rules governing the relationship are not altogether perceptual in that the children were able to successfully use a rule that contradicted their perceptual experiences, that is, heavier things go faster. However, the weight-speed relationship was not easily distinguished until the third grade although the rules governing this relationship were easily changed at the first and second grade levels.

Measurement of Quality in Education

During this symposium (29 December), all participants generally accepted Allan M. Cartter's opening comments that "quality" is an elusive term and that we are living in an age of public accountability. Using chemistry as an example, Cartter described a "subjective opinion study" of graduate departments of 106 major universities, involving ratings of graduate programs in 30 subject fields. The judgments of department chairmen, senior scholars, and junior scholars were tabulated independently and collectively for these groups. Judgments and subsequent rankings were made on the scholastic stature of the faculty of each graduate department and the general effectiveness of each doctoral program.

William Firman reported on a study conducted in New York state which involved ability and basic skills achievement measures of 70,000 pupils in 100 school systems. Analysis of the results of students tested at these grade levels (4, 7, and 10), with type of system, general ability level as indicated by I.Q., and socio-economic levels has led to a "mosaic of strengths and weaknesses" for each system and sets of achievement expectancy norms. Two general conclusions reported were that "good" schools tend to recruit teachers on a nationwide basis and have more faculty members with masters degrees; and, second, that holding power is positively related to the availability of special services.

Henry S. Dyer reported on pilot work which has led to the development of a plan to evaluate educational programs in Pennsylvania. Citing the act of the Pennsylvania legislature which calls for the development of this type of program, Dyer pointed out that the pilot work demonstrated that dialogue between laymen and school people on educational matters is possible. The plan calls for the involvement

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of the public right down to the tests ultimately devised for use. It would yield expected outputs for schools of different types based on predictor variables over which the school system has control. The five salient features of the plan are (i) direct public involvement, (ii) continuous review, (iii) breadth of purposes, (iv) a cumulative program of research, and (v) encouragement of vital diversity.

Ralph W. Tyler discussed the work of the Exploratory Committee on Assessing the Progress of Education. He pointed to the value of descriptive type information provided during the depression by the reports of the National Youth Commission, and national measures in the fields of health and business; he noted that we do not have such information about the progress of education. He said a national assessment would differ from a national testing program in many ways. Each student would complete only a portion of the exercises and only a sample of students would be involved. There would be no scores or reports on individual students, teachers, or school systems. Rather, descriptive reports would be made on 192 populations based on four age levels (9, 13, 17, adult), four regions, two socio-economic levels, three types of communities (large city, suburban, rural-small town, and sex. Tyler cited the involvement of scholars, teachers, and public-spirited laymen in the deliberations of the committee and in initial steps toward instrument development.

Curriculum Development for Elementary School Science

This symposium was a joint session of Section Q, the National Association for Research in Science Teaching, and the American Educational Research Association (30 December 1965).

Joseph Lipson reported how the Learning Research and Development Center of the University of Pittsburgh has for the past two years been engaged in the preparation of individualized science lessons for the elementary school. The individualized program depends on diagnostic pre-testing and achievement post-testing of the abilities of the students so that no student is asked to learn objectives which he has already mastered and so that each student is assured of mastery of the objectives of the lessons he has had. In order to have an effective co-

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ordinated program of lesson writing, materials development, test development, and program evaluation, the entire sequence is keyed to statements of what the student is expected to be able to do after each lesson or group of lessons. Lessons in which the student is asked to transfer his knowledge to new problems, discuss a problem with other students, or explore a new environment are built into the lesson stream.

Turning from the technical and pedagogic problems of lesson preparation for individualized instruction, we have concerned ourselves with forming a basis for deciding what should be taught in the elementary school science program, how the objectives should be taught, and the criteria of performance which the children should be expected to meet.

The lessons currently in use are based upon the AAAS process lessons and the lessons of the Science Curriculum Improvement Study of the University of California at Berkeley. It is proposed that the next step in curriculum development might go beyond the process objectives which enable the student to organize information and events over broad areas of science and general experience. The lessons of the SCIS (Science Curriculum Improvement Study) are in the domain which we have in mind. These lessons teach highly general basic concepts using experiences which are familiar to the student and which can be brought into the elementary school laboratory. Our proposal is that this program, integrating process goals and developing concepts of wide application and generality, be extended and at each point in the program we select those concepts which will most contribute to future learning and comprehension in science.

Concept learning in the elementary school has a special meaning in our lesson plan. By concept formation is meant that the student can identify a class of objects or events when shown a sample of objects or events (for example, when shown three triangles the student should be able to say that they are all triangles), and that the student can distinguish instances and non-instances of the concept (for example, which of the following figures are not triangles). This type of learning is emphasized because it is evident that children can gain command over many hundreds of concepts and that these concepts are resistant to forgetting.
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Laboratory experiences are used as the basis for concept formation because of the observed persistence which children show in manipulative exercises; because we avoid many of the learning problems which arise when we attempt to teach scientific ideas with purely graphic or verbal means; because of the opportunity for self-initiated exploration which the laboratory materials provide; and because the properties to be observed cannot be fully displayed except in the laboratory setting.

Vocabulary plays an important role in the curriculum in order that the students can use a verbal sequence in applying the concepts to future problems; so that the instructor or the instructional materials can call forth the concept by the appropriate word; and so that at some point new principles can be taught by verbally indicating the relationship between previously mastered concepts. By building concepts upon verifiable, repeatable experiences we can ensure that the individual citizen can make a reasonable interpretation of events which have a scientific context. If properly chosen, the concepts will show a minimum interference of early learning with future learning.

In order to illustrate the steps which must be taken to implement the suggested program, a scheme of course design will be suggested; current experimental work in individualized education will be described insofar as it pertains to the theme of the talk. In particular, a comparison of grade school children and college freshmen will be reported.

Lawrence Lowery tested the reliability of a unit prepared by the Elementary School Science Project, and measured children's attitudes toward science, the nature of science, and the scientist. The tests consist of three parts which use the projective technique—Word Association Test, an Apperception Test, and a Sentence Completion Test. Reliability of the test was determined in two ways: (i) scoring between types, and (ii) the ranking of the same individuals 8 weeks later with no science being taught in the interim.

The reliability is greater than .90. The validity was established through an interface showing where students scored consistently through the three projective tests. Note the validity was never lower than .80 for the sub-tests. The weakness presented is that, al-
though these tests proved out, they are not to be used separately since all three are necessary before one may draw conclusions.

The final session of Section Q's program consisted of contributed papers (30 December). Paul Wittey (Northwestern University) summarized 15 annual studies of television-viewing habits of children and youth. Favorite programs and total viewing time were reported. Gains in vocabulary, changes in reading habits, relation to succession in school, and undesirable outcomes were among conclusions discussed. Philip H. DuBois reported on the statistical procedures by which statistical controls may be substituted for experimental controls in educational situations. The method involves (i) development of a hypothesis relating gain in proficiency to measurable traits; (ii) measurement of pertinent variables, including initial and final level of proficiency; and (iii) estimation of the relation between the primary variable and gain. Melvin P. Robbins (University of British Columbia) reported on a study which tested the Delacato conception for certain cognitive abilities in children. His study fails to support the Delacato hypothesis. R. J. Tritschler (IBM) reviewed the many problems faced by librarians in cataloging and retrieving printed materials. The potential solution through the use of computers was presented.

**Frederic B. Dutton, Secretary**

**National Association of Biology Teachers (Q8)**

Four sessions comprised the core of the NABT program. In the session, "Specific techniques in biology," Nicholas Eigsti (Ball State University) used yellow-green soybeans to show how genetic ratios can be taught as an open-ended experiment. Darwin Thorpe (Compton, California, College) showed how he used 35-mm slides to make vertebrate dissections more efficient. To show evolution, Marion S. Baran (Riverside-Brookfield High School, Illinois) explained how he innovated with plastic refrigeration containers to raise *Drosophila*. One of the problems with electrophoresis is its high cost. Sister Mary Ivo (Chicago Archdiocese) showed how she utilized simple and inexpensive equipment.

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search participation program," had Paul Geisert (Oak Park and River Forest, Illinois, High School) demonstrating his "think box," a skull into which students are encouraged to place questions. M. Cassandra Hickey (Medford, Massachusetts, High School) talked about her guide sheets which she used to help her students understand better the BSCS Yellow Version. In Oregon at Twality Junior High School, Arthur Biederman used his students as part of a NSF research participation ground squirrel study. And Gladys Kleinman (Rutgers University) explained her inquiry-oriented methods course to train non-science oriented elementary teachers.

In a session, "Teacher training and resource use in biology," Tom Mertins and Jerry Nisbet (Ball State University) explained that their NSF summer institute stressed cytology, genetics, and biochemistry to fill the void of most secondary teachers. Kenneth Bandelier (New Haven, Indiana, High School) reported on his research which showed that teachers seldom made use of community resources. The necessity of keeping records of an organization, which can be made available for research, was stressed by Myrl Lichtenwalter (Wells High School, Chicago.)

In the last session, Alfred Novak (Stephens College) proposed a model college program for training future biology teachers, and Charles Ostrander (Merced, California, College) showed his device for obtaining immediate evaluation of student response to prepared questions. And finally, John Cunningham (Florida State University) explained how biological examples can be used to build science concepts in elementary students.

One of the most interesting and well-attended sessions was an "how-to-do-it" session where 20 teachers simultaneously demonstrated their pet ideas.

The highlight of the sessions was the NABT luncheon; Ralph Gerard (University of California, Irvine) talked on brains and learning.

Harry K. Wong, Program Chairman

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Relatively planned sessions that were concerned with the rapidly changing patterns of science education at all levels, from the primary grades through college.

Sessions on science in the elementary school emphasized the great need for involving individual students in the process of science to achieve effective learning and for more open-ended experiments to help children understand the nature of science. One lecture presented methods for using closed circuit TV for observing and evaluating teaching techniques.

We should give more attention to the preparation of teachers and helping them keep up to date in science. The most important thing that a teacher should develop in college is a sound philosophy—of science, of science teaching, and of life in general. This philosophy is not usually what is taught in formal classes, but what is learned in the many classroom and life situations on the campus.

The session on science in the junior high school dealt specifically with achieving balance in teaching the physical sciences. One speaker showed how the earth and space sciences can serve as a unifying theme for teaching science. There is a lack of adequate emphasis on the laboratory in junior high school and a need for providing more adequate facilities and equipment.

Problems of teaching science in the junior college were also discussed. There is a need for more interplay between administrators and professors in 4-year colleges and their counterparts in the junior colleges. In some colleges an alarming trend away from emphasizing scientific literacy for general education is indicated through the decreased emphasis on science for general education and the increased emphasis on the separate disciplines.

There is an encouraging improvement in the academic quality of junior college teachers, often placing them on equal intellectual footing with the professors in the 4-year college. The junior college science staff is making commendable efforts to solve the problems of the wide range of ability levels among students and relieving the pressures of rapidly increasing enrollments. Although professors in junior colleges are giving an increasing amount of attention to research, teaching is their primary function and interest. This, together with the fact that the best teachers are teaching introductory as well as more advanced courses, creates a fa-
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favorable situation for providing students with a sound introduction to science.

Several groups met to discuss specific topics related to science teaching in junior college. A report of these discussion groups is available on request from NSTA, 1201 Sixteenth Street, NW, Washington, D.C. 20036.

One of the problems facing teachers and administrators is that of effecting changes in teaching techniques and content in the classroom. In-service education and new techniques for evaluation provide excellent opportunity for accelerating these changes. One speaker discussed the role of education in our society and the potential assistance for change available at all levels of instruction through federal funds. In the future it is probable that increasing attention will be given to implementing changes and encouraging schools at every level to improve their instructional programs.

ALBERT F. EISS,
Associate Executive Secretary

Information and Communication (T)

Current Issues in Communication of Science II: The Scientific Meeting and Related Publications

The panel on Scientific Meetings (27 December 1965) observed that there are many purposes for scientific meetings; among the most constructive uses by scientists are: Reporting and learning about new research developments; surveying the state of the art of an area; personal contact, both professional and social; and building interdisciplinary bridges. These purposes are accomplished to varying degrees by the many types of meetings now offered.

However a great deal of both direct financial outlay and valuable time is now consumed by meetings. This has reached the point where the value of present meeting activities is being questioned with increasing seriousness. There is not any good method of evaluation and it is rather widely assumed or estimated that the return on total expenditure is small. The planning and sponsorship of meetings is moving from the scientific and professional societies toward the federal government and trade associations.

More clarity of objectives is needed in planning most meetings as is more care in setting structure in accordance

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State of the Art and the Prospects for Data Gathering, Storage, Transformation, and Retrieval

The field of information transfer is in a phase of transition. In the session, 29 December 1965, on "Data gathering, storage, transformation, and retrieval," Walter M. Carlson (Department of Defense) presented recent findings that show local and informal transfer (face-to-face and telephone communication, personal and office files, and others) predominate markedly in frequency of use over formal transfer involving national or regional libraries, bibliographic services, document-retrieval systems, and journals. Carl F. J. Overhage (M.I.T.) then outlined the program of research (Information Transfer Experiments) recommended by last summer's Planning Conference to improve informal transfer and introduce into formal transfer some of the convenience and quick responsiveness that have heretofore characterized informal but not formal transfer. The Intrex program calls for a melding of the concepts of library and multiple-access (for example "time-sharing") computer and, in accordance with Carlson's philosophy, an emphasis on the needs and points of view of the users of information. In the final talk, J. C. R. Licklider (IBM) focused attention upon the prospects for "on-line information networks" in which systems similar to Intrex in various parts of the country (or of the world) may be interconnected through telecommunication channels. He added support for the ideas that the technological bases (storage, transmission, processing, display, and so forth) for such systems are rapidly coming into being and that much of the research and development during the next few years aimed at a "national information system" should be directed toward on-line networks in which "content" as well as document-retrieval (that

with objectives. In addition, the structure of systems of meetings sponsored by major societies and other organizations ought to be examined with objectives in mind. More carefully documented study of meetings with these matters in mind should prove valuable and the cost of such studies certainly should be returned manifoldly by the reduced expenditures and increased yield of value from meetings.

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is, "bibliographic-control") information exists, and is used, in computer-processible form. Discussion ranged over a broad field—browsing in a semi-automated information system, "negotiating" retrieval specifications through conversational man-computer interaction; cost of storing the contents of the Berkeley library in computer-processible form; an experimental on-line information network for universities.

J. C. R. LICKlider,
Program Arranger

Society of Technical Writers
and Publishers (T2)

During a panel discussion, "Strengthening the scientist's communicative skills" (30 December 1965), H. C. McDaniel (Westinghouse Electric Corporation, Pittsburgh) noted that the course this country will pursue for the next few years will be determined largely by the rate of technological advancement, and that the private citizen must be kept informed so that he can make intelligent decisions. Scientists possess at least two vocabularies—the common English vocabulary, and the specialized technical and scientific vocabulary. In communicating research results, the audience determines word choice. It is not enough to use only words the reader can understand; these must also be words he cannot misunderstand. Manuscripts should be free of bias, particularly if this relates to conclusions. The more objective the analysis, the more useful the results.

In examining the "valued decision" within the framework of today's complex society, Harold Hornby (Ames Laboratory, National Aeronautics and Space Administrations, Sunnyvale) analyzed factors such as criteria for value judgments, evaluation of alternative approaches, mechanisms for assuring objectivity, and today's planning vis-a-vis tomorrow's anticipated requirements. It was shown how these criteria relate to the universality of science and to the strengthening of the concept of total education.

Improved methods of scientific reporting were considered by Carl M. Johnson (U.S. Navy Electronics Laboratory, San Diego). Noting that much time, effort, and money have gone into the retrieval of scientific literature, Johnson suggested that at least equally important should be improvement of the material being retrieved, so that it can be quickly comprehended by the read-

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er and readily found in the document center. The QRC (quick reader comprehension) reporting technique was cited as an example of an effective information retrieval method now being used successfully at the Navy Electronics Laboratory and elsewhere.

Supervision as the key to effective communication was discussed by James W. Souther (University of Washington, Seattle). It was pointed out that the supervisor—the university professor guiding the work of graduate students, or the scientist-supervisor in industry or government directing the work of scientists—exerts a powerful influence on scientific writing. No longer can we afford supervisors who do not meet their responsibilities with respect to strengthening the communicative skills of those who work for them. If science supervisors are to exert a positive influence, they must understand the kinds of problems science writers must solve, must identify the informational needs and the reading habits of the anticipated audience, and must establish procedures for effectively directing the writing of scientists.

The panel was cosponsored by AAAS (Section T) and the Society of Technical Writers and Publishers. Gunther Marx (IIT Research Institute, Chicago) arranged the session and presided at the meeting.

GUNThER MARX, Program Chairman

**Statistics (U)**

Section U sponsored or cosponsored 28 sessions at the 1965 AAAS meetings in Berkeley. The largest group of meetings (18) were the December sessions of the Fifth Berkeley Symposium on Mathematical Statistics and Probability.

The address at the vice-presidential session was given by Oscar Kempthorne on "The classical problem of inference—goodness of fit." Arrangements for this address were made after it was learned that Dr. Fry would not be able to attend. Neyman, first chairman of Section U and organizer of the Berkeley Symposium, presided.

The 18 sessions of the Berkeley symposium included 65 papers on subjects such as weather modification, information processing and cognition, medical diagnosis by computer, astronomy, demography, genetics, and other topics. The earlier meetings of the Berkeley Symposium were held in June and additional sessions were held in January.
1966. The papers will be published by the University of California; papers on weather modification and discussions will form a separate volume.

A major problem in the epidemiology of mental disorder is that no single set of statistics can be taken as truly representing either incidence or prevalence. At a session arranged for the Population Association by Everett Lee (University of Pennsylvania) results obtained from various sources were critically examined. Enough agreement as to some of the most important differentials appears to establish important elements in this area.

A session, "Experiments on operating information systems," arranged by Ezra Glaser (National Institute of Health) discussed the actual problems encountered at the Patent Office and elsewhere in developing search systems and other information procedures.

Other sessions cosponsored by Section U included the symposium on Measuring Quality in Education (with Section Q and others), Computers and Universities (with Section P and others), a session on Statistical Methods of Bioassay arranged for the Biometric Society (ENAR) by Douglas Robson (Cornell) and two sessions arranged by the Biometric Society (WNAR). The Section also cosponsored the two sessions arranged by the Society of Systematic Zoology on "Biological data retrieval and computer analysis."

MORRIS ULLMAN, Secretary

**Biometric Society, Eastern North American Region (U3)**

The session on bioassay placed emphasis on the use of prior information in the statistical design and analysis of routine assays. Variances among previous slope and intercept estimates for the Standard Preparation provided the basis for deciding the number of doses of Standard and Test Preparations to include in a parallel-line assay. A numerical illustration comparing variances of potency estimates based on a single dose of Test Preparation and 0, 1, or 2 doses of a Standard antibiotic showed that for a fixed total number of observations the 1-point assay, using prior estimates of both slope and intercept for the Standard, was less accurate than the 2- and 3-point assays. The problem of nonparallelism between Standard and Test dosage-response curves was examined and formulas were presented for confidence interval estimates of dose-specific potency values. In quantal response assays where the probit slope (1/α) is known a priori, the LD_{50} can be estimated homoscedastically by an "up and down method" in which animals are tested singly in sequence at dose levels which change by c/2 units in each trial. If an animal does not respond then the dose is increased for the next animal—otherwise the dose is decreased. The experiment is terminated after a fixed number of trials following the first change in direction of dosage increment. The LD_{50} is then estimated by the maximum likelihood method. For c = 1, errors of ± 2α/3 in setting the dose increment value were shown to have a negligible effect with respect to variance and bias of the LD_{50} estimate.

D. S. ROBSON, Program Chairman
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Science in General (X)

Sigma Delta Epsilon (X3)

A luncheon for all women in science was held in the Women's Faculty Club of the University of California in Berkeley on 28 December 1965. Mary L. Willard (Pennsylvania State University; past president and national honorary member of Sigma Delta Epsilon) was the speaker. She gave a very interesting talk on criminalistics and called on members of the audience to act as visual aids to illustrate her stories.

The annual dinner and Grand Chapter meeting was held on 29 December 1965. National honorary membership was conferred on four members of the Fraternity: Helen Dyer and Mary E. Maver, in absentia; Mary Rogick, posthumously; and Anna Rachel Whiting, in person. Whiting, at present a consultant to the Oak Ridge National Laboratories, Biology Division, gave a brief talk on her studies on the genetics of Habrobracon wasps through the use of x-ray irradiation at various stages of the wasps' development. She plans now to study the effect of weightlessness on the genetics of this species by sending wasps into space on a Gemini flight.

Eleanor Alexander Jackson, one of the recipients of the 1965 grants-in-aid, reported on her attempts to cultivate M. leprae on media used for the growth of M. tuberculosis. She has been able to grow the organism from freshly excised leproma nodules sent to her from Brazil and to produce lepromalike lesions with them in newborn rats.

At the business meeting money was appropriated for three additional grants-in-aid for 1966, a check for $200 was contributed to UNESCO to help finance science education in Nigeria, and the Miles College project was extended for the new fiscal year. Amendments to the constitution and bylaws were adopted to implement the change in fiscal year. The possibility of creating a new office, that of business manager for the fraternity was discussed and the present treasurer appointed to fill the office until it can be properly established at the next meeting of the Grand Chapter. Finally, national officers were elected and installed to take office 1 July 1966, the beginning of the new fiscal year, present officers will function until 30 June 1966.

HARRIET M. BOYD, National Secretary
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8–3. World Meteorological Organization, commission for synoptic meteorology, 4th session, Wiesbaden, Germany. (WMO, 41, avenue Giuseppe Motta, Geneva, Switzerland)


10–11. Heat Transfer to Non-Newtonian Fluids, 12th annual heat transfer conf., Oklahoma State Univ., Stillwater. (J. D. Parker, Dept. of Mechanical Engineering, Oklahoma State Univ., Stillwater 74075)


17–19. Isotopic Spin in Nuclear Physics, intern. conf., Florida State Univ., Tallahassee. (D. Robson, Dept. of Physics, Florida State Univ., Tallahassee)


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22-23. Modern Concepts of Cardiovascular Diseases, conf. and workshop, Reno, Nev. (D. T. Smith, Laboratory of Pathophysiology, Univ. of Nevada. Reno 89507)


24-26. Biomathematics and Computer Science in the Life Sciences, symp., Houston, Tex. (Dean, Div. of Continuing Education, Univ. of Texas Graduate School of Biomedical Sciences, Texas Medical Center, Houston 77025)


24-26. Pollution and Marine Ecology, conf., Galveston, Texas. (S. M. Ray, Texas A&M Univ. Marine Laboratory, Galveston 77550)

24-27. International Assoc. for Dental Research, 44th general mtg., Miami, Fla. (G. H. Rovelstad, U.S. Navy Dental School, Natl. Naval Medical Center, Bethesda, Md. 20014)

25-26. National Assoc. of Biology Teachers, western regional conv., Los Angeles, Calif. (The Association, Professional Building, Great Falls, Mont.)

26-27. Arizona Chest Disease Symp., Tucson. (E. A. Oppenheimer, P.O. Box 6067, Tucson 85716)

27-30. American Assoc. of Dental Schools, Miami Beach, Fla. (R. Sullens, 844 N. Lake Shore Dr., Chicago, Ill.)


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1–2. Arkansas Acad. of Science, Little Rock. (G. E. Templeton, Univ. of Arkansas, Fayetteville)


1–7. American Acad. of General Practice, Boston, Mass. (M. F. Cahal, Volker Blvd. at Brookside, Kansas City 12, Mo.)


4–6. Exobiology, conf., Ames Research Center, Moffett Field, Calif. (Letters and Science Extension, Univ. of California, Berkeley 94720)

4–6. American Assoc. of Physical Anthropologists, Berkeley, Calif. (F. E. Johnston, Dept. of Anthropology, Univ. of Pennsylvania, Philadelphia 19104)


4–7. Advances in Water Quality Improvement, conf., Univ. of Texas, Austin. (Special Lecture Series, Engineering Laboratories Bldg. 305, Univ. of Texas, Austin 78712)


4–10. Psychology, 10th inter-American congr., Lima, Peru. (Intern. Soc. of Psychology, 2104 Meadowbrook Dr., Austin, Tex.)

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(Continued from page 814)


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NEWS AND COMMENT

(Continued from page 808)

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Meeting Notes

The 2nd international biophysics congress will be held in Vienna, 5-9 September, sponsored by the International Organization for Pure and Applied Biophysics. Contributed papers on all areas of biophysics will be considered for presentation. Abstracts deadline: 15 May. (Secretariat, Mrs. E. Weidenhaus, Vienna Akademie of Medicine, Alserstrasse 4, Vienna 9)

The American Meteorological Society will sponsor a conference on marine meteorology, 7-10 September, in Virginia Beach, Virginia. Papers are invited on exchange processes between atmosphere and oceans, weather systems over the oceans, oceanic physical influences, and applications of meteorology to operations in ocean areas. Abstracts: 200 words; deadline: 15 March. (J. R. Stinson, U.S. Navy Weather Research Facility, Naval Air Station, Norfolk, Virginia 23511)

A conference on coherence and quantum optics is scheduled at the University of Rochester, New York, 22-24 June. Emphasis will be on statistical properties of electromagnetic fields and the interactions of fields under conditions where coherence effects play a role. The sponsors are the University, the Air Force Office of Scientific Research, and the Air Force Cambridge Research Laboratory. Abstracts: 1000 words; deadline: 10 March. (E. Wolf, Department of Physics and Astronomy, University of Rochester, Rochester, New York 14627)

Papers are invited on fundamental and practical applications of x-ray analysis for a conference scheduled for 10-12 August in Denver. The sponsor is the metallurgy division of Denver Research Institute. Abstracts: 200 to 400 words, in duplicate; deadline: 11 April. Final manuscripts, in duplicate, and the author's consent to publish in the copyrighted proceedings of the conference, are required by 11 July. (Metallurgy Division, Denver Research Institute University of Denver, Colorado)

The Air Force Systems Command aerospace medical division and research technology division will sponsor a symposium on bionics 3-5 May in Dayton, Ohio. Main emphasis will be on areas related to cybernetics; topics to be discussed include biological control and information-processing systems, artificial intelligence, pattern recognition, self-organizing and learning systems, and automata theory. (H. L. Oestreicher, Aerospace Medical Research Laboratories, Wright-Patterson Air Force Base, Ohio 45433)

A symposium on underwater physiology will be presented 23-25 March in Washington. The program includes reports on studies of man, animals, tissues, cells, and the effects of gases under conditions encountered at depths of more than 250 feet. (K. W. Hannah, National Academy of Sciences, 2101 Constitution Avenue, NW, Washington, D.C. 20418)

An international conference on lens design with large computers will be held 5-8 July in Rochester, New York. The meeting will provide opportunity to evaluate and compare the performances of various programs for large computers and to synthesize information offered by these programs concerning the physics of optical systems. Although emphasis will be on optical design with large computers, papers about work done with small machines and simple programs will also be welcome. (Institute of Optics, University of Rochester, Rochester, New York 14627)

The 1966 Laurentian Hormone conference is scheduled for 28 August to 2 September in Mont Tremblant, Quebec. The program will include sessions on thyroid physiology, steroid hormones, peptide hormones, insulin and the pancreas, and hormones and metabolism. Participation will be limited. Deadline for applications: 20 April. (J. Sanford, 222 Maple Avenue, Shrewsbury, Massachusetts 01545)

North Dakota State University, Fargo, will present a research conference on the biological sciences, 31 March to 1 April. The meeting will be cosponsored by AIBS. Topics to be covered will include the probability of life in outer space, protein nutrition, environmental research problems, radiation biology, and bionics. (K. L. Larson, Department of Agronomy, North Dakota State University, Fargo)
The Engineering Manpower Commission has published the results of a survey of engineering students who graduated from college in 1965. The information was gleaned from questionnaires, completed by the placement directors of 186 engineering schools, regarding some 20,000 graduates. The survey indicates that the demand for new engineering graduates is 'high; some 87 percent had definite educational, job, or military commitments by graduation. About one of every four for whom information was available is going to graduate school; and salaries for those who accepted jobs averages $634 a month, 3½ percent higher than for 1964 graduates. (The Placement of Engineering Graduates 1965. Engineering Manpower Commission of Engineers Joint Council, Department P, 345 East 47th Street, New York 10017. $1)

A base map of the Atlantic Continental Shelf and Slope has been published by the U.S. Geological Survey to help geologists record data from submerged lands. It incorporates more than 1.8 million soundings showing the topography of the ocean floor from Nova Scotia to Florida at a scale of 1 inch to 16 miles. The map was compiled from U.S. and Canadian data, supplemented with data collected by a team aboard the research vessel Gosnold during several cruises. The map is divided into three sheets which can be joined to form a single map. (Map Showing Relation of Land and Submarine Topography; miscellaneous map J-451. U.S.G.S., Washington, D.C. 20242; $1.50 set)

A recent NSF publication discusses the numbers of scientists and engineers who immigrated to the United States during fiscal years 1962 and 1963. The report says that the majority came from the United Kingdom, Canada, and Germany, and that 7000 of 10,000 were engineers. The report also includes information on the migration of scientists and engineers prior to their immigration to the U.S. Data are based on special tabulations prepared for NSF by the Immigration and Naturalization Service. (Scientists and Engineers from Abroad, Fiscal Years 1962 and 1963, Reviews of Data on Science Resources, Vol. 1, Number 5. Superintendent of Documents, Government Printing Office, Washington, D.C. 20402; 5 cents)

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Scientists in the News

Atomic Energy Commission chairman Glenn T. Seaborg has been awarded the 1966 Gibbs medal of the Chicago section of the American Chemical Society. The award was given to Seaborg for his outstanding contributions to pure and applied chemistry and for contributions to scientific and academic administration and to government service.

The new Home Secretary of the National Academy of Sciences is Merle A. Tuve, director of the Department of Terrestrial Magnetism of the Carnegie Institution of Washington.

South Dakota State University appointed Duane Acker dean of the college of agriculture and biological sciences, effective 1 February. He was associate dean of agriculture at Kansas State University.

Edmund S. Nasset, professor emeritus of physiology at the University of Rochester, has become visiting professor of physiology at George Washington University medical school, Washington. The appointment will last through August.

Ralph E. Knutti, who retired last July as director of the National Heart Institute, has been appointed executive officer of Universities Associated for Research and Education in Pathology, an organization formed recently to encourage cooperation in that field among universities and other scientific institutions. The association's headquarters is 9650 Rockville Pike, Bethesda, Maryland.

Peyton Rous of New York City, a pioneer American researcher in the field of cancer, was named the main recipient of Germany's highest medical award—the Paul Ehrlich and Ludwig Darmstaedter prize. Rous, 86, a member emeritus of The Rockefeller University in New York, will receive the award in ceremonies in Frankfurt in March.

John A. Saxton, director of the United Kingdom Scientific Mission and scientific counsellor at the British Embassy in Washington, will return to England this spring to become director of the Radio and Space Research Station of the Science Research Council, in Slough.
Piet C. Gugelot, director of the Institute for Nuclear Physics, Amsterdam, Netherlands, has been named scientific director of NASA’s Space Radiation Effects Laboratory, Newport News, Virginia, effective 1 January. Virginia Associated Research Center operates the laboratory under contract with NASA Langley Research Center.

Victor H. Weisskopf has returned to his position as Institute professor of physics at MIT, after a 5 years' leave of absence during which he was director general and scientific director of the European Organization for Nuclear Research (CERN), Geneva, Switzerland. He will be succeeded at CERN by Bernard Gregory of France, who has been a directorate member for research.

Robert C. Seamans, Jr. has been appointed as deputy administrator of NASA. He will retain his position as associate administrator for an indefinite period.

Recent Deaths

Saul Adler, 71; head of the parasitology department of Hebrew University, Jerusalem; 25 January.

Dirk Brouwer, 63; Munson professor of natural philosophy and astronomy at Yale University and director of the Yale Observatory; 31 January.

Harold C. M. Case, 75; retired professor and head of the department of agricultural economics at the University of Illinois; 3 January.

Israel L. Chaitoff, 63; professor of physiology and formerly co-chairman of the department, University of California, Berkeley; 25 January.

Ellsworth C. Dougherty, 44; lecturer in comparative nutrition and a specialist at the agricultural experiment station at the University of California, Berkeley; 21 December.

George Wicker Elderkin, 86; professor emeritus of art and archeology at Princeton University; 19 December.

Clarence B. Hilberry, president emeritus of Wayne State University; 10 January.

G. Albert Hill, 73; former professor of chemistry at Wesleyan University; 28 December.

Robert Hodes, 51; professor of physiology at Mount Sinai medical school; 27 January.

Albert W. Hull, 85; retired assistant director of the General Electric Research Laboratory; 22 January.
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Randolph Lovelace II, 58; director of space medicine for the National Aeronautics and Space Administration; 12 December.

E. Kennerly Marshall, Jr., 76; professor emeritus of pharmacology and experimental therapeutics at Johns Hopkins medical school; 10 January.

Benjamin Y. Morrison, 74; retired head of the division of plant exploration and introduction in the Agriculture Department’s bureau of plant industry; 25 January.

René Perrin, 72; retired president and board chairman of Electro-Chimie D’Ugine, a leading French chemicals and metals concern; 15 January.

Hans Pettersson, 77; professor emeritus and former director of the Oceanographic Institute in Goteborg, Sweden; 25 January.

Charles Schank, 55; senior representative of the U.S. Atomic Energy Commission in Brussels, Belgium; 23 January.

Walter H. Schoewe, 74; emeritus associate professor of geology at the University of Kansas and editor of Transactions of the Kansas Academy of Science; 11 January.

Hervey Woodburn Shimer, 93; professor emeritus of paleontology at Massachusetts Institute of Technology; 13 December.

Anton N. Volsky, 68; Soviet nuclear scientist and member of the USSR Academy of Sciences; 7 January.

Frank Wilcoxon, 73; lecturer in statistics at Florida State University and chemistry research scientist at American Cyanamid Co.; 18 November.

Summer Institutes

Botanical Sciences, 6th, 20 June to 15 July, for college botany teachers; University of Massachusetts, Amherst; NSF grant to Botanical Society of America. Deadline: 1 March. (E. L. Davis, Dept. of Botany, University of Massachusetts, Amherst)

Cross Cultural Research, 3rd: 5 July to 26 August, University of Pittsburgh; NSF grant. Stipends: predoctoral, $600–$1000; postdoctoral, $1200–$1700. Deadline: 15 March. (H. Barry, III; Department of Anthropology, University of Pittsburgh, Pittsburgh, Pa. 15213)

Erratum: On page 870, column 3, of this issue, the paragraph beginning “The three-and-one-half day symposium of Section O . . .” and the material that follows in column 1 and the top of column 2 of page 871 should be inserted on page 875 as part of Section O reports.

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