Reports of Sections and Societies

Mathematics (A)

"What kind of world can be built out of curved empty space?," the paper presented by John Archibald Wheeler (Princeton University), epitomizes the mathematical sophistication needed for current speculations about the structure of space in the very small (10^{-33} cm) and in the very large (10^{28} cm) dimensions. Using slides effectively, Wheeler showed an oriental print of a breaking wave to point up the effect of surface tension in the consequences of the laws of hydrodynamics and a table of airline distances to illustrate the possiblity of detecting curvature in space by intrinsic measurements. Proceeding from such simple illustrations, Wheeler led his audience to a consideration of the behavior of light rays in the curved space created by the gravitational field of the sun, to geons and the possibility that light rays might travel on geodesics in a closed path, and to the need to consider nonsimply connected topologies in the space of physics. Despite the contributions of general relativity to our understanding of space-time, Clifford's question of 1870 was described as remaining unanswered so that we do not know whether space is an arena or an encompassing entity. Concluding with a direct reference to the purpose of the symposium in which he was speaking, Wheeler recommended highly the article "The mathematician," reprinted as the initial paper in John von Neumann's collected works, as a statement of the proper relationship between mathematics and physics.

The day-long symposium, arranged by R. J. Walker for the Panel on Physical Sciences and Engineering of the Committee on the Undergraduate Program in Mathematics (CUPM), was intended to provide information to CUPM on the proper mathematics to include in the curriculum of physical science students. This question was dealt with directly by H. Frederic Bohnenblust (California Institute of Technology) in his vice-presidential address on the role of mathematics in the colleges. Calling for mathematics courses to continue to be taught in the spirit of mathematics, Bohnenblust nevertheless urged that those in other disciplines need more information on what these courses actually include and suggested various reforms. He also commented on the improvement now apparent in the preparation of entering freshmen despite the greater amount of knowledge now needed over that required a generation ago.

Bernard Friedman (University of California, Berkeley) proposed to reduce the conflict between mathematicians and scientists over the type of mathematical education that should be given in our universities by (i) exposing both mathematicians and scientists to modern abstract mathematics and some of its physical applications, (ii) teaching both mathematicians and scientists in the same course and not in separate sections, (iii) considering mathematics education as a network in which there are many alternative paths leading from one course to the next, and, (iv) reformulating some of the disciplines of applied mathematics in terms of the more modern abstract concepts which are fundamental in mathematics today.

In another of the invited talks in the CUPM symposium, H. O. Pollak (Bell Telephone Laboratories) discussed explicitly the courses in mathematics needed for engineering applications and showed in some detail how the intuition of electrical engineers working in signal theory about the finiteness of a certain vector space is meaningless if casually formulated but becomes valid after a rather sophisticated reexamination and precise description. Examples of how to use and how not to use mathematics in space science were given by Harry Pollard (Purdue University). The complications of the precise determination of orbits and the mathematics used in detecting the "pear" (or, better, "avocado") shape of the earth were described.

Far-ranging speculations on such questions as "What is the chemistry of memory?" and "How do living systems abstract and generalize?" were described by Vincent P. Dole (Rockefeller Institute) in his invited paper on molecular biology and life as now being respectable subjects for study. He urged the need for biologists and mathematicians to develop common concepts. The mathematical methods most used in psychology were discussed by R. Duncan Luce (University of Pennsylvania) who, however, excluded from his considerations the use of statistics and computers.

William F. G. Swann was memorialized in a moving talk given by Heinz Wilsdorf (Franklin Institute). Wilsdorf substituted for Francis L. Jackson who was prevented by illness from being present. Recordings of parts of a lecture and interview gave a direct sense of the tremendous personality and humor which Swann brought to his scientific work.

Surveying advances in numerical methods in the past 10 years, C. B. Tompkins (University of California, Los Angeles, and the Institute for Defense Analyses) contrasted symposia in 1953 and 1962 and noted that in the former there was an intelligent groping in a new and unexplored discipline and in the latter the work of many in a mature discipline was reported. Spectacular progress during the decade included the appearance of substantial books by authors, each of whom has had more experience in computation (measured in the number of arithmetic operations carried out) than all the writers in the time prior to this decade. Quoting from a foreword (with multiple authorship) to the forthcoming proceedings of the 1962 symposium sponsored by the American Mathematical Society, Tompkins expressed satisfaction with the status of computation in algebraic problems but concern over the state of knowledge, theoretical or computational, concerning nonlinear problems in partial differential equations.

Continuing in the program celebrating the decennial of the founding of the Society for Industrial and Applied Mathematics, J. P. LaSalle described the recent world-wide development, particularly strong in Russia, of the mathematics of control theory. Man-

power problems in mathematics were discussed by F. J. Weyl (Office of Naval Research), who stated that "the professional mathematical work force employed off campus has increased by another factor of five since 1952 and now constitutes about one-half of the total." Noting the much greater number of mathematicians being trained in the Soviet Union than in this country, Weyl also commented on the great increase in undergraduate enrollment in mathematics here and observed that "a new and serious problem area in the interface of mathematics with engineering and the sciences is developing in the education of our young where increased cooperation of the two professional fraternities is urgently needed but disheartenningly slow in getting underway."

In a program on computer applications, sponsored by the Association for Computing Machinery, Glen J. Culler (Thompson Ramo Wooldridge), in a joint paper with Burton D. Fried, described their highly successful restoration of direct human control of a (small) digital computer by use of keyboard input with multiple choice of interpretation at a subroutine level of complexity. Satellite orbit calculations were described by Henry Wolf (Analytical Mechanics Associates) with the control of error growth in numerical integration given particular attention. In his paper, "What decision theory will do to the computer industry," J. R. Simpson (U. S. Department of the Navy) described the belated development of formal mathematical techniques incorporating the human expectations which are at the heart of complex decision problems. He observed that these techniques "imply an increase in the demand for computer capacity, for complex sequences of input and display and human override, and for sophisticated programming languages and approximation methods."

J. L. Walsh, vice president for Section A in 1961, gave as his address a selection of results from his extensive research on the geometry of zeros of polynomials.

WALLACE GIVENS, *Secretary*

Physics (B)

With all the current activity in improving secondary-school science courses, it is not surprising that colleges are also studying their science curriculums. The situation in physics and the program now under way were dealt with thoroughly in the symposium on "Current educational problems in physics," the morning session of Section B held on 29 December. The first talk, on trends in college physics, set the stage; Walter C. Michels (Bryn Mawr College), chairman of the Commission on College Physics, pointed out that physics has become "big physics" as a result of the ramifications of World War II instrumentation, atomic and hydrogen bombs, new space-age activities, and so forth. The role of physics in research and development, in industry and government, is now appreciated much more by the general community, and its increasing role in life in general is better understood. Perhaps the greatly shortened time between invention and practical use (for example, with the transistor) is a contributing factor. At any rate, physics is a much more vital force today than it was just a few decades ago, and the college teaching community must react to this change. There are manpower problems, publication problems, and curriculum problems both at the undergraduate and the graduate levels. The college curriculum is under pressure both from below and from above.

At first the solution attempted was to require that physics majors take more and more physics courses, somewhat as has been done in the engineering curriculum. It is now realized, however, that requirement will not provide the solution and that the college curriculum itself, starting with the general physics course, must undergo drastic changes. New courses are being developed at several universities around the country; there are various sources of support, but the main one is the National Science Foundation. Major effort in all these programs is to erase the boundaries between classical and modern topics, to place less emphasis on mathematical analysis, and to emphasize more the symmetry arguments and the conservation laws. Some of the conventional topics (for example, geometrical optics and statics) are being pruned to make room for modern physics topics.

An associated revolution is well under way with regard to the laboratory work that conventionally accompanies the general physics course. The previous tendency to reduce and de-emphasize the laboratory has been reversed. Real teaching can be done in the laboratory, for instance in geometrical optics, and longer, more demanding experiments should be introduced. In addition, good motion-picture films may partially displace some of the conventional laboratory work.

The second speaker, Vincent E. Parker (Oak Ridge Institute of Nuclear Studies), president of the American Association of Physics Teachers for 1963, listed many of the educational projects sponsored by the Commission on College Physics, the American Association of Physics Teachers, and the American Institute of Physics. The group approach is now being used instead of the individual-professor approach, and commissions or committees seem to produce results greater than what could be expected from summing the individual efforts concerned. Physics teaching on the undergraduate level has become respectable again and is now being practiced by some of our most prestigious physicists; previously, many believed that teaching simply represented time lost from research. Other matters, in addition to the curriculum, are receiving attention. Many new films are being produced, resource letters and monographs are being written, new laboratory apparatus is being developed, a demonstration equipment manual is in preparation, and institutes, symposia, and conferences are being held to assist college teachers (and high school teachers) in improving and bringing up to date their knowledge of the field.

N. H. Frank (Massachusetts Institute of Technology) spoke on the Science Teaching Center which has been in operation at M.I.T. for over 2 years. Although all sciences will be studied, physics is being attacked first. Frank's statement that the present revolution in physics is greater than the one of Newton's time caught the audience's fancy, as well as his statement that there are many things known about the physical world today that could not be described in terms understood prior to 1900. He again noted that just adding modern physics topics to the classical physics textbook has been found unworkable, and produces too long a treatise. Thus internal recasting of the whole structure is required. Entire areas of classical physics have been stripped of their value and importance in building the subject. (This is a point on which some of our more conservative colleagues are fighting hard and giving up slowly!) The modern trend should be to build on the experimental evidence upon which modern physics concepts are based; it is felt that this experimental evidence will be much more forceful in showing the student why he should believe the new concepts. Thus laboratories are being

revised, as are lecture demonstrations; corridor experiments are being developed; take-home kits are being provided so that the student can do some laboratory experiments at leisure in his dormitory room; and adequate reference is being made to the research papers that reported the data upon which the new course is based. Excerpts were shown from "The ultimate speed," one of the modern films developed at M.I.T.

Finally, William C. Kelly (American Institute of Physics) pointed out that all these fine projects call for workers, persons of intelligence, training, and enthusiasm, and that the overall program is now in a manpower-limited state. This situation has been under close study by the American Institute of Physics, and action is under way to produce statistics for the field; to produce estimates of supply and demand; to advise about the development and conservation of talent in the field, the provision of educational facilities, and the improvement of the prestige and remuneration of college teachers of physics. In a spirited discussion initiated by the chairman, Marsh W. White, vice president for physics of the AAAS for 1962, a number of the panelists' statements were questioned, amplified, or otherwise commented upon by members of the audience.

The annual Physicists' Luncheon, cosponsored by Sigma Pi Sigma, was attended by 70 persons who sat at the feet of the great Benjamin Franklin statue in the rotunda of the Franklin Institute. The after-luncheon address was a pleasantly informal talk on the program of the International Atomic Energy Agency, given by Henry D. Smyth (Princeton University). Smyth is the U.S. representative to this agency. The afternoon session included nine contributed papers, which were concerned largely with the teaching of physics, and presented mainly by members of the physics community of greater Philadelphia.

Other activities of Section B included the joint sponsoring with Section D of the interdisciplinary symposium "Dynamics of planetary atmospheres" and the cosponsoring with the American Geophysical Union of a symposium on the earth's magnetic field and its effects on cosmic radiation. Three organizations associated with Section B held programs which included invited and contributed papers; they were the American Astronautical Society, the American Meteorological Society, and the American Rocket Society.

STANLEY S. BALLARD, *Secretary*

American Astronautical Society (B1)

The special astronautics symposium, "Scientific satellites," was organized by the American Astronautical Society and cosponsored by the National Aeronautics and Space Administration. Alfred M. Mayo, president of AAS, opened the symposium with a brief welcoming address and was followed by an illustrated keynote address on various successful techniques for the design, thermal control, and stabilization of scientific satellites by Alexander Kossiakoff (Johns Hopkins University).

The morning technical session, under the chairmanship of John E. Naugle (NASA), was devoted to current scientific satellites. It included four technical papers covering aeronomy measurements in the S-6 satellite, topside sounding of the ionosphere with the Canadian S-27 and the NASA S-48 satellites, and energetic particle and other radiation measurements with the Injun series of probes. New information about the behavior of the upper ionosphere and the Van Allen radiation belts was also revealed during this session.

The afternoon session, with John W. Townsend, Jr. (Goddard Space Flight Center) as chairman, treated the general topic, "The observatory generation of satellites." Six technical papers, devoted to both the mission and design aspects of the major NASA programs of this type were presented and discussed. The Orbiting Geophysical Observatories, Advanced Orbiting Solar Observatory, and Orbiting Astronomical Observatory were thoroughly covered.

J. GREGG STEPHENSON, *General Chairman*

American Meteorological Society (B2)

A symposium on biometeorology, sponsored by the American Meteorological Society, was the first devoted to this subject at an annual AAAS meeting. Although each of the six papers dealt with a different topic, together they constituted a fascinating report of progress within this interdisciplinary science.

Claims have been made that organic and inorganic chemical systems behave differently depending upon atmospheric and geophysical conditions. Many such claims have been refuted, but there are now data supporting the reports of Piccardi that the hydrolysis of bismuth trichloride can be modified by alterations in such environmental conditions as long-wave radio-frequency radiations, state of the sun, and season of the year (J. P. Lodge). The study of the influence of weather conditions and atmospheric pollution on sickness and death is complex. Incidence of sickness (as judged by a number of clinic visits to four large hospitals) and the number of deaths increased appreciably among residents of New York City during inversions which retarded dispersion of pollutants (L. Greenburg). Asthma attacks developed in the autumn when a sudden cold wave required initiation of indoor heating; when the weather moderated and heating was no longer needed, the number of clinic visits for asthma declined. The "human barometer" was lifted from folklore and given credence (J. L. Hollander). In a climate chamber, patients with rheumatoid and osteo-arthritis reported a worsening of their disease when the barometric pressure decreased and the humidity rose. This observation marks the first time that symptoms of weather sensitivity have been experimentally reproduced. With the increasing urbanization of human populations and the tendency to spend more time in artificial environments, more research must be devoted to the cryptoclimate (I. H. Kornblueh). Successful reduction of the loss of edible plants to pathogenic organisms can be achieved by understanding the complex interactions between environment, plant host, and pathogen (R. D. Schein). Proper application of this knowledge should make it possible to reduce the quantity of insecticides applied to prevent or stop epidemics. Recent conferences sponsored by the National Academy of Sciences have served to define the goals of biometerology and related major unsolved problems (F. Sargent). It is hoped that the current plans for international research in the atmospheric sciences and in biology can be joined to effect a productive interdisciplinary attack on the biological basis of productivity and human welfare.

FREDERICK SARGENT, II, *Program Arranger*

American Rocket Society (B3)

The sessions on rocket meteorology were held on 28 and 29 December. Except for the substitution of Jessie Havard for R. S. Long, and James Giraytys (presenting "Air Force rocket network program") for G. D. Dean in the session on 28 December, all papers previously scheduled were presented.

The first session was devoted primarily to discussions of the status of and need for the meteorological rocket network in the United States, problems of rocket instrumentation, and general characteristics of the higher atmosphere (above 30 km). From the discussions it can be concluded that impressive progress in rocket meteorology has occurred in the past 5 years; examples which may be cited are the 11 operational meteorological rocket firing sites, a total firing rate of 125 rockets per month, development of sensor devices useful up to altitudes of 60 km, and a continual effort for improvement and expansion. On the other hand, problems of great concern to the atmospheric scientists, such as adequate sensors for the 60- to 100-km region and knowledge of the incidence and distribution of minor constituents (water vapor, ozone, nitric oxide, carbon dioxide, and so forth) at high altitudes, still require additional research.

By way of balance, the final paper of 28 December outlined many exciting experiments carried out with balloons in the past several years. It pointed out that the super pressure balloon with its capability for almost indefinite life at a given altitude and new techniques which give promise of supporting flights to 50 km will provide the atmospheric scientist with a much needed tool.

The second session was concerned with three principal subjects: analysis of rocket data to obtain synoptic pressure maps to altitudes of 55 km (0.4 millibar); problems and progress in the field of aeronomy; and the planned geophysical research program in the International Year of the Quiet Sun (IQSY). From the material presented, it was again evident that lack of sensors suitable for measurements in the 60- to 100-km region will seriously handicap the meteorologist and aeronomist for some time to come. On the positive side, real progress in global aeronomy has been made; The International Sodium Series, concluded in mid-December, was a joint effort in which six countries manned eight rocket stations for the purpose of making simultaneous wind measurements at altitudes above 80 km.

The final paper of the sessions reviewed the program and some results from the International Geophysical Year (1957–1958), and the planned program for the IQSY. The total effort in the latter, presently involving some 55 nations, will be particularly important in the high atmospheric and space studies by comparison with IGY activities. Hope was expressed that the sun would be as quiet in 1964 as it was active in 1958.

W. W. BERNING, *Program Chairman*

Chemistry (C)

Superlatives are needed to describe the technical programs sponsored by Section C (Chemistry) at the Warwick Hotel on 26, 27, and 29 December. The program comprised three symposia, each consisting of two sessions, and a single session for contributed papers. Approximately 600 persons attended these sessions.

Starting off the program was the session for contributed papers. While in past years the technical content of these submitted papers did not compare with those presented in the symposia, this year's session was excellent. Of particular note was a presentation describing the formation and chemistry of ground state triplet and quintet molecules. By far the best attended sessions were those of Advances in Organic Chemistry. In essence this symposium blanketed the field of organic chemistry from synthesis to mechanistic considerations. While a large portion of the symposium was devoted to a review of recent research, it also included reports on new investigations. The symposium on Nuclear and Radiochemistry was superb. It was unfortunate that the title of one of the most outstanding papers in this symposium, "Atomic clocks for earth history" by J. L. Kulp (Columbia), was not submitted in time to be included in the *General Program Directory*. Perhaps the most spirited discussions of the meeting developed during the symposium on Techniques of Structural Chemistry. While new techniques for determining structures are being developed and old ones are becoming more sophisticated, it is apparent that findings are not always subject to precise interpretations.

Symposia speakers and officers of the section were introduced at the complementary breakfasts, which preceded the symposia. Special credit should be given to R. H. Wilhelm (Princeton) and J. R. White (Socony Mobil) who planned the program. Acknowledgment is also made to the eight local sections of the American Chemical Society that comprise the Delaware Valley Region for publicizing the program.

S. L. MEISEL, *Secretary*

Astronomy (D)

The program of Section D consisted of two symposia, each offered jointly with another section, and the retiring vice-presidential address given by Robert M. Petrie (Dominion Astrophysical Observatory).

On 28 December, a joint symposium with Section B (Physics) on The Dynamics of Planetary Atmospheres was presented. This was one of the three interdisciplinary symposia scheduled on AAAS Day; it was organized by Julius London (University of Colorado).

On 29 December a joint symposium with Section U (Statistics) dealt with several astronomical problems discussed by statistical techniques. Two of the papers included stellar problems and two were concerned with galaxies. Thornton Page pointed out that a clue to the origin and evolution of galaxies may be expected in the statistical characteristics of pairs and small groups and then discussed the question of whether the orientation of one galaxy in a pair is related to that of the other. He used measurements made on Palomar Atlas prints. The sample of 63 spiral pairs does not give clear evidence that galaxies tend to be coplanar in close pairs.

In the other paper on galaxies, Jerzy Neyman and Elizabeth L. Scott discussed the diameters, magnitudes, and distances of galaxies. They investigated the space distribution of linear diameters of galaxies and the distribution of the ratio of angular diameters both in physical and in optical pairs.

In discussions of stellar problems, C. B. Stephenson spoke on the estimation of stellar masses above the well known main sequence of the color magnitude diagram, making use of long period visual binaries. Bengt Strömgren discussed the distribution of A and F stars in the Mass-Age diagram. Stars considered were those within 100 parsecs (about 326 light years) of the sun. This symposium was arranged by Sidney McCuskey and Elizabeth L. Scott.

The vice-presidential address by Robert M. Petrie was entitled "The B stars and the galaxy." Stars of spectral type B are extremely hot stars of high intrinsic luminosity. Hence, when not obscured by dust clouds, they can be seen to very great distances. This makes them particularly useful tools for studying the problem of galactic rotation. Absorption lines added to the spectra by interstellar gas are also useful. For several years a comprehensive study of

the spectra of B stars has been one of the programs of the Dominion Astrophysical Observatory in Victoria, British Columbia. Petrie's paper summarized the past work and described the results obtained.

FRANK BRADSHAW WOOD, *Secretary*

Atmospheric Dynamics—Earth, Venus, Mars, Jupiter

An interdisciplinary symposium discussing the dynamics of planetary atmospheres was held at the AAAS annual meeting on Friday morning, 28 December.

The basic parameters affecting the motions of a planetary atmosphere are those of its thermal budget and rotation. The distribution of thermal energy sources and sinks ultimately drives the atmospheric circulation, and the rotation of the planet profoundly modifies this circulation. Thus, one should find differences between the atmospheric circulation patterns of slow and fast rotating planets.

A discussion of the problem of atmospheric motions was introduced by Barry Saltzman (Travelers Research Center) who spoke on "The role of convection in the dynamics of planetary atmospheres." Saltzman pointed out that for the earth's atmosphere there exists a large radiation excess in equatorial regions and a radiation deficit in polar regions. The motions caused by this imbalance of energy are then modified by the earth's rotation so that the necessary poleward transport of heat and momentum takes place through the large-scale motions associated with atmospheric cyclones and anticyclones.

Smaller scale motions, such as those initiated by mountain barriers, were discussed by Arnt Eliassen (University of Oslo, Norway) in a paper entitled "Vertical propagation of energy in the atmosphere" and by C. O. Hines (University of Chicago) who spoke on "Turbulence in the upper atmosphere." Eliassen showed that for internal gravity waves, if the wave phase is retarded with height, the kinetic energy flux is upward while the flux of momentum is downward. The vertical propagation of such a wave can result in the development of mother-of-pearl clouds at heights of approximately 25 km.

It was also pointed out by Hines that some of the turbulent motions in the mesosphere, as determined from observations of artificial sodium clouds, could have their origin in gravity waves propagated from below. He estimated that the kinetic energy of these gravity waves that dissipated at about 80 km could heat this region by about 1 to 10°C per day.

The structure and motions of other planetary atmospheres was reviewed by Seymour Hess (Florida State University) in the final paper, "The atmospheric circulations of Venus, Mars, and Jupiter." In discussing modeling of planetary circulations and the difference in rotation rates, Hess commented that Venus would probably have a single meridional cellular circulation whereas that for Jupiter would be predominantly banded (zonal). He concluded with the suggestion that observations of other planetary circulations could help us in checking theories concerning the mechanism of transport processes as related to the earth's general circulation.

JULIUS LONDON, *Program Chairman*

Geology and Geography (E)

The symposium, Coal in the United States: Problems and Promises, attracted much attention and called to the public's attention the fact that coal will continue to play an important role in our nation's economy and, in addition, has promising prospects for future development. With imaginative planning and concerted attack on certain problems by scientists, engineers, and economists the industry can be revitalized and revolutionized. The brightest prospect lies in greatly increased use of coal for thermal electric power. Technological advances of the immediate past and future in boiler design, transmission of electricity at higher voltages, and coal transport (including pipeline and more efficient rail transport) and in mining techniques are certain to improve greatly coal's competitive position.

It seems clear that the energy resource problems of the nation need intensive study by federal agencies and that such studies would lead to recommendations which would aid the coal industry in its struggle to improve its competitive position and would also improve U.S. energy resources conservation practices.

Coal has unusual potential as a vital industrial raw material under existing economic conditions provided that current scientific principles and technology are utilized and introduced. This prospect for coal was presented and fully documented in an oustanding paper by Charles Bliss and George Mook (Arthur D. Little, Inc.). This coal symposium was organized by George F. Deasy (Pennsylvania State University).

The important progress which has been made in recent years toward a clearer understanding of coastal geomorphology and sedimentation is the result of the type of detailed and well-documented studies which were reported upon by 20 workers in this field of investigation. Fifteen papers were read during this symposium. Fluorescent dyed sand, statistical methodology, aerial photo interpretation, palynology, radio-carbon dating, effective and abundant core sampling are among the techniques used to reveal facts about the long term operation of enormously complicated and interrelated processes. Data and observations such as those presented in this symposium not only explain shoreline history, but also greatly aid the student of sedimentary rocks through the classic technique of studying the present to understand the past. The symposium on Coastal Geomorphology and Sedimentology was organized by Donn S. Gorsline (University of Southern California).

The retiring vice president of Section E, R. J. Russell, delivered his address, "Recent recession of tropical cliffy coasts" [*Science* **139**, 9 (1963)]. This talk, which was excellently illustrated, emphasized once again the thorny problem of correctly interpreting shoreline features in order to discriminate between the effects of eustatic, tectonic, biogenic, and tidal changes. Russell reported upon a disagreement which seems to be arising between Pacific Basin and Atlantic Basin workers. Data from the Pacific area reveal evidence of a higher sea level during a climatic optimum (2000–5000 years ago) while information from the Atlantic is waning in its support of a higher stand. Russell reminded workers about the great necessity of properly preparing samples for C^{14} analysis; if the sample is not meticulously cleaned of organic material from recently living creatures, the age determination is rendered completely meaningless.

Three half-day sessions (two geography, one geology) of contributed papers were held. The geography papers were arranged by Guy Parmenter and Joseph Wraight; the geology session was arranged by the section secretary. The section intends, in spite of certain problems, to continue the sessions of contributed papers. Workers wishing to read papers at the Cleveland meeting, December 1963, should write

the secretary of the section at once. Abstracts of these papers of not over 250 words should be submitted in duplicate by 15 August 1963.

The Section E committee meeting was not well attended; however, plans were discussed for Cleveland in 1963 and Montreal in 1964. The committee is pleased to announce that John C. Reed, executive director of the Arctic Institute of North America, has accepted election to the vice presidency of the section for 1963.

RICHARD H. MAHARD, *Secretary*

Association of American Geographers (E1)

Approximately 50 persons attended the morning and afternoon sessions for contributed papers in geography held at the Sylvania Hotel, Saturday, 29 December. The program proved to be of appreciable interest, and several of the papers provoked lively discussions. The four speakers at the afternoon session who presented papers describing certain aspects of the U.S. Army research and development programs were introduced by Leonard S. Wilson, chief of the Environmental Sciences Division, Army Research Office.

G. N. PARMENTER, *Program Chairman*

National Speleological Society (E4)

Biology Program. A symposium dealing with biological aspects of cave conservation constituted one session of the National Speleological Society. V. H. Schmidt emphasized the necessity of incorporating caves within nature preserves. R. H. Gurnee noted the effect of economic pressures on cave faunas in Central and South America. The effects of refuse from human visitation, disposal of dead animals, sewage, and industrial wastes on cave communities were reviewed by J. R. Holsinger. B. G. Nicholas outlined the effects of contamination in cavernicolous ecosystems which approach the status of closed ecological systems. The intimate relation of geological and biological conservation was noted by J. V. Thraikill. L. E. Conrad reported the reduction to almost the point of extinction of cave populations of *Myotis sodalis, Myotis griscens,* and *Plecotus townsendi* in the northeastern United States.

BROTHER G. NICHOLAS, *Program Arranger*

Cave Geology. Five papers dealing with the development of limestone caves and their contained features were presented at the session on cave geology sponsored by the National Speleological Society. The growing interest in experimental methods was shown by R. O. Ewers in "Applications of experimental geology to problems in cavern development," and in a paper entitled "A comparison between laboratory models and naturally occurring domepits" by M. W. Reams. Data on an important aspect of cave geology were given by E. L. White and W. B. White in "Processes of cavern breakdown." H. D. Holland explored some of the relationships which should be considered in investigations of cave excavation and speleothem development in his paper, "The chemical evolution of some cave waters." "Dolomite speleothems," by D. W. Deal, was presented by title.

JOHN V. THRAILKILL, *Program Chairman*

Zoological Sciences (F)

Significant advances in comparative endocrinology, modification and control of growth and differentiation processes, biological effects of fallout, and exobiology highlighted the many sessions presented in the zoological sciences. Increasing attention is being devoted to endocrine mechanisms in the developing insect, particularly the nature of hormonal substances. Several terpenes and alcohols have now been found to mimic the so-called juvenile hormone of insects, while sterols duplicate the action of the brain hormone (H. A. Schneiderman). Gottfried Fraenkel reported the discovery of a new hormone responsible for tanning of the cuticle of newly emerged flies. This hormone is under neurosecretory control and seems to be a product of the corpora cardiaca. Like many vertebrate hormones, it is entirely unspecific, being present in newly molted cockroaches and in the larvae and adults of beetles.

In the memorial symposium in honor of the late A. M. Schechtman, many current aspects of differentiation were touched upon: polyuridylic acid stimulation of C^{14}-phenylalanine incorporation by cell-free systems derived from sea urchin eggs (Tyler); pinocytotic uptake of blood proteins by the insect oöcyte during the process of yolk formation (Telfer); reversal of regeneration polarity in planarian flatworms by controlling protein synthesis by means of chloramphenicol or colcemide treatment (Flickinger); the presence of "interferon" in conditioned media in which chorioallantoic membranes infected by Rous sarcoma virus had been growing, and its role in inhibiting viral growth in freshly immersed membranes (Ebert).

The study of developmental processes is being augmented by new approaches and new technical developments on a wide front. The behavioristic role of male vocalization in inducing full ovarian and oviduct development and egg laying, for example, was reported for an Australian parakeet (Brockway). The investigation of early development in mammalian material is being facilitated by such elegant experimental procedures as those of Mintz who combines mouse cleavage stages and follows differentiation; eight-cell-egg pairs and unions of up to ten whole eggs can give rise to "normal" blastocysts. The technique permits the combination of genetically or biochemically labeled blastomeres with normal cells and a study of their subsequent development.

A serious note was struck by several participants in the radioecology session who again pointed out the immediate and residual effects of nuclear blasts on plants and animals. Significant, if not immediately dangerous, increased levels of Sr^{90}, I^{131}, and Cs^{137} were found in milk, whole human body, and human thyroid in fallout areas (Pendleton *et al.*). On the other hand, a more uplifting tone was sounded by Colin Pittendrigh who discussed the feasibility of ascertaining and the desire to ascertain the presence or absence of extraterrestrial life. Although vast sums and vast problems are involved in the study of exobiology, Pittenrigh feels, and probably speaks for most biologists when he notes, that not only are intriguing answers to be sought in the nature of life upon other planets, but, if it exists, its discovery will revolutionize man's concept of himself and of the universe as well.

The newly elected chairman of Section F, replacing Ernst Caspari, is Dietrich Bodenstein, professor and head of the Department of Zoology, University of Virginia. W. Frank Blair (University of Texas) was elected committeeman-at-large to replace Orlando Park, who retired at the close of his 4-year term.

DAVID W. BISHOP, *Secretary*

Society of Systematic Zoology (F3)

The 14th annual meeting of the Society of Systematic Zoology was held with the AAAS in Philadelphia. A major feature of the Society program was a panel on U.S. and international programs in biological oceanography, cosponsored by the American Society of Zoologists and the American Society of Limnology and Oceanography. Scientists representing several important oceanographic programs discussed the plans, organization, scope, and facilities of their respective programs. Due to a late scheduling change, the panel was reduced to a single session on Saturday morning to avoid conflict with the dedication of the newly converted National Science Foundation oceanographic vessel, the M/V *Anton Bruun*, which was held on Saturday afternoon.

Among the important announcements made at the meeting was the award of the Newcomb Cleveland Prize to one of our society members for a paper presented at our 13th annual meeting. Richard D. Alexander (University of Michigan) received the AAAS award for his paper on cricket behavior presented in the symposium on data of classification at the 1961 meeting.

Other features of the society program at Philadelphia included one session of contributed papers, the annual breakfast and business meeting, a coffee hour (jointly sponsored by the American Society of Zoologists), and cosponsorship of the two-session symposium of the American Society of Naturalists on the principles and methods of phylogeny. Because of the icy conditions of the highways, the book exhibit was not present at the meetings.

New elections and appointments announced at the meeting included the following: President, George Gaylord Simpson (Harvard University); president elect, Robert W. Pennak (University of Colorado); councilors, Paul L. Illg (University of Washington) and Hobart M. Smith (University of Illinois); secretary, Ellis Yochelson (U.S. Geological Survey); treasurer, Joseph Rosewater (U.S. National Museum).

CHARLES F. LYTLE, *Program Chairman*

Ecological Society of America (FG4)

The Ecological Society of America sponsored and cosponsored a large and stimulating program at its meetings with AAAS in Philadelphia. Contributed paper sessions dealt with terrestrial ecology, aquatic ecology, and conservation and human ecology. Among the more interesting programs were the special sessions on radioecology and population endocrinology.

Radioecology. The first session of this two-part program of contributed papers dealt with the use of radioisotopes as tools in ecological studies; the second session examined the ecological effects of nuclear blast, radioactive fallout, and waste disposal. Both sessions were informative in that they pointed up the extent of our knowledge in this young field of investigation and indicated areas which are in need of further investigation.

A session dealing with the use of radioisotopes as tracers in the ecosystem and a session concerned with the effect of radiation on ecosystems were well attended and received.

D. J. Nelson demonstrated the need for evaluating the biological concentration of radioisotopes in terms of specific activity. He pointed out that the equilibrium rate was a function of the biological half-life and recommended a period lapse of five such half-lives in order to assure a constant specific activity. Papers by Witherspoon, Witkamp, and Crossley dealt with movement and cycling of minerals in oak trees, leaf litter, and litter organisms.

The immediate and residual effects of the detonation of a small (approximately 100-kiloton) underground thermonuclear device at the Nevada test site were considered in three papers. Influence on resident populations of lizards was outlined by F. B. Turner, and the effect on small mammal populations was reported by C. D. Jorgensen.

Workers from the University of Utah reported on the increase in Sr^{90}, I^{131}, and Cs^{137} in the content of milk, whole human body, and human thyroid in fallout areas. They also presented information on the influence of habitat on the accumulation levels attained. Milk obtained from cows grazing on wet meadows showed the highest levels; this was reflected in the levels attained by humans who consumed the milk in this area.

S. V. Kaye evaluated the miniature glass rod dosimeter and its application to radioecology and outlined the methodology and precautions in its use. He reported that within his experience the dosimeters distributed by a Japanese firm were of superior sensitivity and reliability.

Due to the untimely and sudden death of Zola M. Fineman (U.S. Atomic Energy Commission), R. McBride withdrew their co-authored paper from the program. Because of a broken foot, Robert C. Pendleton (University of Utah) was absent; however, both of his scheduled papers were delivered by co-workers. Because of computer breakdown, F. W. Woods was unable to complete his investigations, and therefore withdrew from the program.

Stanley I. Auerbach, Oak Ridge National Laboratory, chairman of the Radioecology Committee, announced tentative plans for another contributed paper session to be held during the forthcoming AIBS meeting. He also announced that another 7-week summer institute in radiobiology, with emphasis on radiation ecology, will be held this year at Oak Ridge. Details and application information will be available in the near future.

Population Endocrinology. This session was significant because it marked the first time that sufficient research results were available for a program on the interaction of population and sociological factors on the endocrine system. Included in the session were several papers that reported on fluorometric measurement of hormones in animals of high and low social status and in crowded and uncrowded population levels.

A number of sessions were cosponsored with the American Society of Zoologists. Among these were two sessions included in a symposium on the evolution of behavior, and six other sessions of contributed papers in the field of animal behavior. An all-day session entitled "Symposium of Energetics" was co-sponsored with ASZ while a half-day symposium on statistical problems in ecology was cosponsored with Section U (Statistics). The field trip to the Pine Barrens, scheduled for Saturday, was cancelled.

F. B. TRAMA, *Program Arranger*
PAUL G. PEARSON, *Secretary*

Botanical Sciences (G)

The Philadelphia program of Section G (Botanical Sciences) consisted of one session of seven contributed papers on a variety of botanical subjects, which was well presented and well attended. December 27th was "Botany Day" with the 1962 presentation of the

symposium Plant Biology Today: Advances and Challenges. Three papers delivered in the morning and three in the afternoon brought an audience of about 150 up to date in its thinking on phytochrome and the red-far red system in plants (Bruce Bonner, Harvard), modern concepts of cell behavior (Herbert Stern, Illinois), root development in vitro (John G. Torrey, Harvard), concepts of shoot growth (Ralph O. Erickson, Pennsylvania), long distance transport in large intact plants (Martin H. Zimmermann, Harvard), and modern research in evolution in the ferns (Warren H. Wagner, Michigan). The annual luncheon for all botanists attracted over 100 persons to hear the address of the retiring chairman of the Section, John N. Couch, (Kenan professor of botany, University of North Carolina). His research on a group of organisms were presented in his talk "Are bacteria and fungi related?" All present were pleased when the director of the Cranbrook Institute of Science, Robert Hatt, awarded the Mary Soper Pope medal to Edmund Fulling, editor of *The Botanical Review;* the citation was read by Pierre Dansereau (New York Botanical Garden). The day ended with an open house in the botanical laboratories of the Academy of Natural Sciences, followed by the very successful Biologists' Smoker among the excellent exhibits of the Academy.

HARRIET B. CREIGHTON, *Secretary*

Anthropology (H)

Both Stanley Garn's talk on "Culture and the direction of human evolution" and William S. Laughlin's vice-presidential address on "Recurrent human origins and apparent extinctions" illustrated a major focus of contemporary physical anthropology, namely, the rendering of data from living populations on the problems of human evolution.

Laughlin stated that differences among fossil men are maximized because such finds are generally isolated and individual rather than parts of known populations. He stated that measurements on living populations reveal ranges of variations within groups known to be closely related that are as great as those which have been thought sufficent to identify fossil finds as different species of men. This maximization of differences has contributed to the fallacious notion of human evolution as large-scale changes in successive groups of fossil men who succeeded each other through extermination, rather than as a combination of adaptive changes of a type generally not revealed in the bony structure and absorption of earlier populations.

In the introduction to his lecture, Garn further documented this approach by pointing out that with regard to three morphological criteria considered highly significant for the grouping of fossil finds (skull thickness, tooth size, and massivity of the area of the jaw known as the mandibular symphasis), measurements of all but the earliest human fossils fall within the range of modern man.

In summing up Garn's symposium, Theodosius Dobzhansky stressed the ongoing nature of human evolution, and pointed out the weight such data place against the argument recently raised by Carleton Coon in his *Origin of Races* that modern man evolved five times. Dobzhansky expressed agreement with the symposium participant, J. Crenshaw, that even without the benefit of evidence to the contrary, the hypothesis suggested a phenomenon of extraordinary improbability, and pointed out that elsewhere in his own work, Coon contradicted this theory. Dobzhansky closed by referring to the adverse use of Coon's theory by racist propagandists. He remarked that this demonstrates that scientists can no longer remain in ivory towers, unconcerned with the impact of their pronouncements, and that, indeed, it is naive and irresponsible for them to pretend they can.

ELEANOR LEACOCK, *Secretary*

Dating Man and the Pleistocene

A joint meeting of Sections E and H centered on recent advances in the dating of anthropological material and included five papers on methodology and three on applications. It is the first time such a joint meeting was held anywhere. In retrospect, three main points stand out.

1) Radioactive techniques are giving us ever greater precision and ever increasing range in our attempts to date the events of the Pleistocene and of man's history within the epoch. It now appears that the dating of the whole of the Pleistocene from its beginning to the present is within our grasp.

J. F. Evernden and G. H. Curtis (University of California) presented latest dates on the Late Tertiary and Pleistocene, based on potassium-argon measurements, and produced dates by their methods indicating that they have refined their techniques to bring potassium-argon dating well within C^{14} dating limits.

Aaron Kaufman (Columbia University) presented a progress report on the use of the thorium-230 and uranium-234 ratio to date fresh-water carbonates.

Cesare Emiliani (University of Miami) is extending the "absolute" dates of his deep-sea-core temperature curves on the presence of protactinium and thorium adsorbed on sediments.

2) Many factors and variables in radioactive dating are receiving increasing attention as techniques are refined.

Terah L. Smiley (University of Arizona) is of the opinion that geochronology will ultimately become "a study of ecology through time" as field observations, recording of data, and so forth are improved.

Elizabeth K. Ralph (University of Pennsylvania) reported on refinements in the C^{14} method. Certain discrepancies have been found in dating Egyptian dynastic age wood materials. Measurements of samples of known positive age, as determined by dendrochronology, are providing a means of elucidating these uncertainties.

3) It was heartening to see workers in several different disciplines approach a common problem. The session demonstrated once and for all that paleontologist, zoologist, physicist, anthropologist, chemist, geologist, and archeologist can live happily together and all can benefit from valuable data in the disciplines of the others.

Dating of man in the Pleistocene in connection with his environment in the Old World was demonstrated in the papers of G. H. R. von Koenigswald (Rijks-Universiteit te Utrecht) and D.A. Hooijer (Rijksmuseum van Natuurlijke Historie, Leiden). Frederick Johnson (R. S. Peabody Foundation) showed how in recent years radioactive dating methods have compelled revisions in respect to the age of the peopling of the New World to double the once accepted time (about 12,000 to 15,000 years ago).

RALPH SOLECKI,
Program Chairman

Psychology (I)

Diversity of approach to the two major topics was the feature of the 1962 Section I program. The concept of maturity was discussed from the vantage points of biology, physiology, psychiatry, psychology, and philosophy. Memory was considered in terms of neurological mechanism, computer simulation, and various psychological formulations, with Arthur Melton's vice-presidential address an overview of the current empirical and theoretical state of affairs. A third symposium presented certain psychological implications of the problem of increasing population, and programs were cosponsored on developments in mathematical psychology, linguistic analysis and cultural problems, the structure of meaning systems, and the evolution of behavior.

For 1963 the vice president for Section I is Lloyd Humphreys (University of Illinois), and Richard L. Solomon (University of Pennsylvania) begins a 4-year term as member-at-large of the Section Committee. The Committee expects to concern itself during the year with the place of psychology in the primary and secondary school curriculum.

FRANK W. FINGER, *Secretary*

Social and Economic Sciences (K)

Some theories and concepts of economic growth were discussed at the vice-presidential address session of Section K. Simon S. Kuznets (Harvard University) was concerned with problems of measuring economic growth and discussed the several structural forms which social and economic development included; he cautioned against emphasizing growth-rate statistics which were not in a proper historical perspective and which omitted the major needs to which growth should apply. The major problems of measurement center around the meaning of: commodities and services produced, the adjective "net" in net output, the weights used to combine diverse goods and services into a total with comparably measured parts, and the long-term aspect of the increase in growth rates. The session, in an interdisciplinary context, also dealt with the relationship of economic growth to changing social institutions and values. Factors of sociocultural adaptability, for example, influence rates of growth beyond mere savings-investment functions, and these problems relate importantly to balanced economic development.

The American Economic Association held a session on the economic impacts of disarmament. The shift of productive resources at a time when less of these resources are needed for armaments requires programs for investment in peacetime goods and services. Some reinvestment into expanded peaceful space activities can be anticipated as well as into new products and services whose fuller potential has been deferred from weapons expenditures. The session treated in detail the strategy of such adjustments to disarmament in a qualitative and quantitative approach, and also related the subject to its impact on trends in research and development.

The American Political Science Association discussed the general subject of scientists in politics by reviewing the establishment of NASA, the national policy, and the President's science advisors. These papers pointed in general to the frequent confusions which nonetheless have led to the successful creation through legislation of scientific establishments within the Federal government. While conflicts in this area remain, it was inferred that the gulf between scientist and legislator and scientist and administrator is diminishing in favor of greater mutual understand-

ing of the problems and responsibilities of each.

The American Sociological Association discussed in one session matters relating science and education to the national interest. The subject matter included the conflict between science and humanism, the problems of choosing science as a career in American colleges, federal support of research, and projections to 1970 of the role of science in higher education. In a second session, cosponsored by the Population Association of America, problems of population research were reviewed to include demographic trends in Hong Kong and Africa, statistical treatment of annual birthrates in the United States back to 1855, and questions concerning the training of demographers. On the latter subject, recommendations were offered for the establishment of separate departments of demography at a few leading universities where faculty resources might be able to handle such studies.

The contributed papers session of Section K reviewed selected subjects in social science research. Political literacy in less-developed countries was noted as being commensurate with economic and social development, but maturing at a slow rate. The most politically literate paradoxically tend to display a low-level correlation with the requirements of stable personality orientation. Considerable research in this area is needed and implementation should stress "the political development of less-developed countries."

A review of problems attached to private developmental capital indicated a conflict between the equity capital principle in less-developed areas and the essential demand for new capital from external sources. In several countries a relaxation of the equity requirement is being instituted to provide for growth. A discussion of corporate decision making pointed toward urging sociologists to research corporate structures instead of concentrating on labor orientated research, and to develop the study of managerial sociology. In a treatment of the subject of the urban adjustment of immigrant workers, largely Mexican and negro, the sample study for a northern community indicated employment opportunity as the principal reason for immigration, and that the majority of the sample demonstrated satisfaction with new surroundings. A final contribution offered suggestions for a theory of social dynamics and in part was concerned with the elements of a theory of success or failure.

The Metric Association held two sessions dealing with business matters and with papers on the promotion of the metric system. Section K cosponsored the very useful symposium of Section E on coal in the United States, the session of Section H on analytic sociological methods, the program of Section U on statistics in social and economic research, and the interdisciplinary symposium on technical knowledge diffusion and economic development. A reception in honor of the vice president and chairman of the Section was thoughtfully tendered by the Wharton School of Finance and Commerce of the University of Pennsylvania and cosponsored by Sections U and K.

Kingsley Davis (University of California), a sociologist and demographer, is vice president and chairman of Section K for 1963. Henry W. Riecken (National Science Foundation), whose fields are sociology and social psychology, was elected to the new term as a member of the Section committee. Section K is fortunate to have the able services of political scientist Ithiel de Sola Pool (M.I.T.), its new secretary. The retiring secretary thanks all those who have generously assisted in the development of Section activities during the past 8 years.

DONALD P. RAY, *Retiring Secretary*

American Political Science Association (K2)

The three papers at this session all described the experiences of scientists and politicians in dealing with each other. Harry S. Hall (Temple University), in his paper on scientists and conservative legislators, reported on a study of the way in which right-wing members of Congress reacted to atomic scientists in the period before Sputnik. The data were hearings and personal interviews. There was some discussion as to whether the distrust of their patriotism and security-mindedness continues into the present period. Robert Gilpin (Princeton University) spoke about the successes of PSAC, particularly in its formative years and particularly in reference to modifying administrative and decision-making processes in the executive branch so as to allow fuller account to be taken of scientific considerations. Enid Curtis Bok and Robert C. Wood (Massachusetts Institute of Technology) discussed the establishment of NASA and the political role of advisory scientists. They noted that scientists won from Congress a number of points about which they felt strongly. But the paper showed that this was in each case the result of a coincidence of interest between the scientists and certain other groups strongly represented in Congress. The civil character of NASA and other points incorporated in the bill reflect not the political power of scientists or their reasons for advocating these measures but rather these coincidences of interest.

American Society of Criminology (K3)

Criminology includes the study of offenders, the reasons for crime, penal treatment, and the prevention of crime. All these topics were covered in the four symposia presented by the American Society of Criminology.

The first session dealt with psychiatry, psychology, and criminology. During the past decade a shift in the modal personality of offenders has occurred and has resulted in the evolution of the "new criminal." The typical prototype has changed from the "ethical professional," highly skilled offender to the reckless, unskilled, selfish, reputation-acquiring offender of today (Lewis Yablonsky, University of California, Los Angeles). An origin of delinquency was outlined by Sanford J. Fox (Boston College Law School) in his talk on delinquency and biology. Developing the science of criminology involves the utilization of the many facts of human biological individuality. Glueck's study of delinquency is evidence of the association between body type and proneness to delinquency. One important responsibility of the criminologist, who is trained in the social sciences, is to recognize the possibility that physical characteristics may relate to criminality. In a discussion on why some crimes occur, Michael Fooner (Association for Applied Psychoanalysis) cited "The Careless American." The loss of cash by theft may be induced by the victim's offering excessive temptation to the thief. Such a complementarity of roles requires assessment of the victim's responsibility. One should be alerted to and aware of the risky position into which he places himself as a potential victim of theft. One aspect in the prevention of crime was discussed by Hector Ritey (psychiatrist, New York City). We learn about the psychodynamics of criminality not so much by observing

the criminal but by concentrating our attention on the repressed criminal tendencies of those who never broke the law. A criminal act is the climax of millions of never acted-out criminal fantasies. In response to the question of what should be done with the mentally ill individual who has committed a criminal act, it is suggested by Henry Weihofen (National Law Institute), that treatment voluntarily requested under a "Psychiatric Offender Proceeding" has merit. Such a procedure involves the voluntary waiving of rights to trial by jury and to any defense of the act.

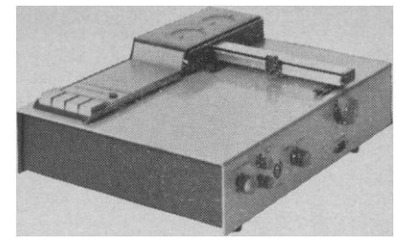
BARBARA A. KAY, *Rapporteur*

The second symposium considered the sociological approaches to problems in criminology. Marvin Wolfgang (University of Pennsylvania) emphasized the contributions of sociology to the study of crime. Peter Lejins (University of Maryland; president of the American Correctional Association) traced the development of criminological studies, and found that in the United States, in contrast to Europe, criminology is still largely treated as a branch of sociology. However, he predicted its future establishment as an independent science. In the ensuing discussion, a somewhat different opinion was expressed by Thorsten Sellin (University of Pennsylvania) who indicated that while the study of criminology might be isolated, it was still inextricably dependent on many other disciplines, and the criminologist would have to depend on other scientific experts for many of his conclusions. In a paper entitled "Criminal statistics a century ago," Sellin traced the development of statistical approaches and problems in the study of crime in the last century, and suggested that the statisticians a century ago were not only struggling with the same problems that face us today, but also managed to express the same criticisms but in a clearer and more forceful manner. Thomas G. Eynon and Walter C. Reckless (Ohio State University), in a paper read by Eynon, developed the results of research since 1948 on the delinquent population of a large state detention facility. They concluded that such institutions were not training schools for crime; the inmates themselves feel significant changes in their own points of view. The most effective contacts developed by the boys are with staff members such as the cottage parent or counselor, rather than with the social

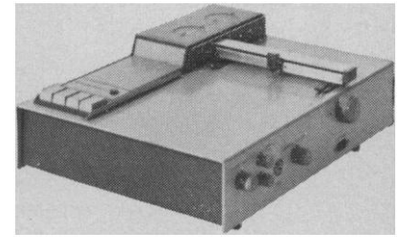
worker, psychologist, doctor, or the teacher. Charles Newman (Kent School of Social Work, University of Louisville) appraised the corrective value of the treatment of delinquents in foster homes, rather than in punitive institutions, and considered some of the difficulties of placement and adaptation, particularly of adolescents and delinquent girls. He contended that as a form of treatment foster home care deserved much greater attention than it was presently receiving. Finally, Theodore N. Ferdinand (Northeastern University) presented statistics concerning the offense patterns and family structures of delinquents from urban and rural communities. He analyzed the records of male and female juvenile offenders in rural, village, and urban communities in relation to the marital status of parents, whether mother or father was dead, and type of offenses.

CANIO L. ZARRILLI, *Rapporteur*

Problems in the administration of criminal justice were the subject of the third symposium. Bail problems of indigent defendants were discussed by Herbert Sturz (Vera Foundation). The Manhattan Bail Project is an experimental philanthropic project designed to assist indigent defendants who are unable to post even nominal bail and who are deemed unacceptable risks by the professional bail bondsmen. Certain high-risk categories of offenders are not aided (narcotic addicts and distributors, sex offenders, assaulters of police officers, and those charged with homicide). The experimental hypothesis is that selected offenders may be released without risk to the community even though they are unable to post bail. Long-term incarceration prior to trial is contraindicated by the high percentage of arrested persons found "not guilty." In some cases, individuals have spent more than a year in jail prior to trial because of their inability to post bail. In his talk on the chronic petty offender, T. Grygier (University of Toronto) described this type of offender as dependent and passive, as compared to the indictable felon. They are often immature, irresponsible, and afraid of life. Unable to compete in society, they frequently welcome confinement, which is often to them emotionally satisfying, and solves their basic needs for security, response, and recognition. One of the problems in the study of criminology, the absence of a criminal research and information center, was pointed up by John Scanlon (National Council on



a push button recorder



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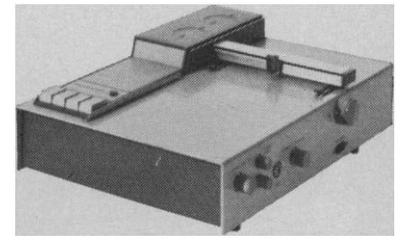
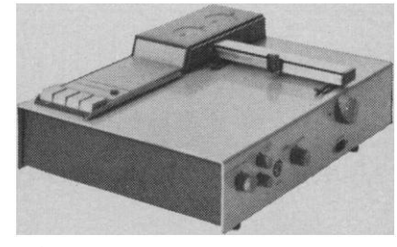
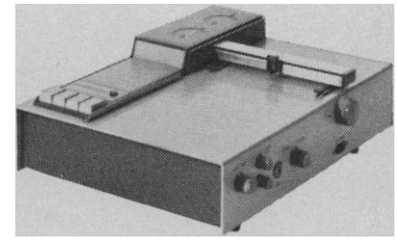


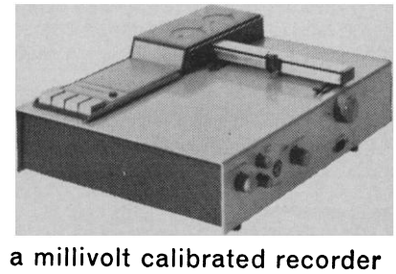
a linear recorder



a log recorder



an expanded scale recorder



a millivolt calibrated recorder

(more–)

Crime and Delinquency). While the necessity for intensified research into all phases of crime and delinquency is widely acknowledged, the absence of such a center has in the past frustrated scholars and inhibited the most economical and efficient utilization of available data, personnel, and funds. The National Council on Crime and Delinquency, working with the United Nations, U.S. government agencies, 35 foreign countries, and several state and private units has compiled (and will maintain as a current inventory) a tremendous bibliography of crime-delinquency research in progress or projected and is in the process of building a central criminal research and information center which will service the profession. Some observations on the penal system of Israel were noted by Joseph Eaton (University of Pittsburgh). The Israeli system, although much modified in the 14 years of freedom, was inherited from the English mandate authorities and bears the English stamp. Although more than 50,000 offenses are recorded annually, there are fewer than 2000 inmates in the six institutions. Probation, fines, and short sentences are stressed; the "Irish" reformatory system is preferred although it is adjusted to local conditions. Flogging has been abandoned and capital punishment has been abolished.

CLYDE VEDDER, *Rapporteur*

Problem areas in contemporary law enforcement was the theme of the fourth symposium. How industrial security programs are effective in the prevention of crime was discussed by Timothy J. Walsh (American Society for Industrial Security). Measures employed by such programs include a combination of physical security devices, loss control systems, and personnel screening. Industry does not close the gates to ex-convicts, but rather attempts to place them in positions which will neither constitute an unnecessary hazard to corporate property nor contribute to the possible recidivism of the employee. Donal E. J. MacNamara (New York Institute of Criminology) spoke about the problem of police brutality throughout the United States. One solution proposed is review boards composed of distinguished private citizens to hear complaints against police officers and units. While such boards may prove helpful, the basic answer to police brutality is a police administrator who will not tolerate it, and a systematized, objective

complaint system within the law enforcement agency dedicated to the eradication of objectionable police practices. Jacob Chwast (New York University) feels that a redefinition and reevaluation of the proper role of the police in a twentieth century democracy are vitally needed. No small part of this need is a new self-concept (or self-image), individual and group, to be developed and accepted by the police themselves. A solution to one of the major problems in law enforcement was suggested by Alvin J. T. Zumbrun (Maryland Crime Commission). The legalization of the most popular forms of gambling would reduce the multi-million dollar annual tribute to the organized crime syndicates; would eliminate much corruption of public officials; and would provide needed revenues for expanding public services. John P. Kenney (University of Southern California) expounded on the role of August Vollmer as the father of modern professional policing, specifically in California, but indirectly throughout the United States. An emphasis on research and evaluation studies of police procedures have combined to win California leadership in the march toward police professionalism.

JACOB CHWAST, *Rapporteur*

The awards and memorial session of this program was concerned with the roles played by workers in the field of criminology. Rev. Andrew Marinak (Federal Correctional Institute, Lewisburg, Penna.) noted that the role of the prison chaplain as an integral member of the rehabilitation team has neither been clearly defined nor scientifically evaluated. The problems of the practical penologist were discussed by James V. Bennett (U.S. Bureau of Prisons); in developing practical rehabilitative facilities and techniques, the penologist frequently incurs both the wrath of theoretical criminologists and the opposition of legislators.

Negley K. Teeters (Temple University) noted in his paper that the academic criminologist has all too often shirked his responsibility to inform and lead social action in correcting abuses in criminal justice administration and in righting miscarriages of justice. Also cited for being lax in its responsibility was the legal profession (Justice Haim Cohn, Supreme Court of Israel). Too frequently lawyers and jurists have neither recognized the necessity of nor taken leadership in the

campaign for the reform of the criminal law.

The following officers were chosen for 1963: president and AAAS representative, Donal E. J. MacNamara; vice presidents, Marvin Wolfgang, Lewis Yablonsky, Clyde Vedder and Jacob Chwast; secretary-treasurer, Charles Newman; executive council members, John P. Kenney and Marcel Frym.

CHARLES NEWMAN, *Rapporteur*

History and Philosophy of Science (L)

Historical testimony by actual participants in recent technological developments was the highlight of the fifth annual meeting of the Society for the History of Technology. In a symposium on the history of rocket technology, chaired by Eugene M. Emme, G. Edward Pendray spoke on Robert H. Goddard and early A.R.S. rockets; Walter E. Dornberger on the V-2 rocket; John P. Hagen on Viking and Vanguard; and Simon Ramo on Atlas, Titan, and Thor. Speaking for the historical record, these men provided valuable material on some of the most significant episodes in the recent history of rocketry.

The session on the history of the technology of atomic energy was chaired by Ralph Sanders (Industrial College of the Armed Forces). Gerald W. Johnson (Assistant to the Secretary of Defense, Atomic Energy), Richard G. Hewlett (U.S. Atomic Energy Commission), and Rear Admiral Lewis L. Strauss (USNR, Ret.; former chairman, U.S. Atomic Energy Commission) served as panelists.

Johnston talked on the historical role of military research and development in atomic energy and emphasized the development of atomic weaponry and nuclear propulsion. He expounded upon the military's role in managing the fantastic engineering feat of fashioning the first atomic bomb. He paid special attention to the fear among U.S. scientists and military personnel that Germany had been making considerable headway in building an atomic bomb of its own, a fear which later proved unfounded. Johnson then recounted the Navy's development of the atomic submarine as the pioneer vehicle in nuclear propulsion.

Hewlett's paper, "Pioneering on nuclear frontiers: two early landmarks in reactor technology," provided some historical insights. He analyzed the historical significance of the first self-sustained chain reaction produced by Enrico Fermi on 2 December 1942 in Chicago and the first generation of electric power from atomic energy by Walter H. Zinn on 20 December 1951 from the experimental breeder reactor No. 1 at Idaho Falls, Idaho. Although these events are often called landmarks, Hewlett contended that they more appropriately could be called convenient reference points. He also pointed out that subsequent history of atomic energy suggests that a depersonalizing process inevitably accompanies the rise of big science.

Strauss presented a chronology of events which led to President Eisenhower's announcement of the Atoms for Peace Program before the United Nations on 8 December 1953. He credits President Eisenhower with originating the idea during a plane flight from Denver to Washington to attend the funeral of Chief Justice Vinson.

The history of the industrial laboratory was the subject of a session chaired by Cyril S. Smith. John Beer told of European precedents of the industrial laboratory; Kendall Birr related the history of the General Electric Laboratories; and Matthew Josephson spoke on Edison and industrial research. Simon Marcson and Nathan Reingold commented on their papers.

Among the participants in a work-in-progress session was Peter F. Drucker, who spoke on the need for engineers to consider the work habits of people in the underdeveloped nations and to design for their actual needs instead of for a too-advanced technology. Carl W. Condit told of the construction features revealed by the demolition of the Garrick Theater in Chicago which illustrated advances in construction engineering pioneered by Dankmar Adler. Eugene S. Ferguson reviewed the writings and the scholarly problems involved in the study of American technology from 1788 to 1853. Other papers of this session, chaired by Thomas P. Hughes, were by W. David Lewis, Frank D. Prager, Robert M. Vogel, and Lynn White, Jr.

The annual meeting of the society was marked by the presentation for the first time of the Leonardo da Vinci medal. This was awarded to R. J. Forbes of the Netherlands "for his distinguished contributions, both monographic and bibliographical, to the history of technology." The Abbot Payson Usher prize was awarded to Silvio

A. Bedini for his article, "The compartmented cylindrical clepsydra," which appeared in the spring 1962 issue of *Technology and Culture.*

As its officers for the coming year, the society elected Cyril S. Smith as president, Peter F. Drucker as first vice president, Elmer Belt as second vice president, and Melvin Kranzberg as secretary. New members of the executive council include J. G. Brainerd, W. E. Hanford, and Thomas P. Hughes.

MELVIN KRANZBERG, *Secretary*
RALPH SANDERS, *Program Chairman*

Engineering (M)

Four speakers representing universities, industry, and government presented points of view on the very important problem of continuing education for technological personnel. Although it was agreed that the individual engineer is ultimately responsible for the furtherance of his own education, nevertheless many institutions of our society should recognize an obligation to encourage further development of each individual and to employ him at his highest skill and capability in view of the pressing demands for qualified technical personnel. Engineering societies, according to H. K. Work and C. E. Davies, can provide educational opportunities by national, state, and local technical meetings; providing teachers and arranging for courses on an in-plant or inter-industry basis; workshops; seminars; and similar activities. A plea was made for professional recognition of continuing education efforts. M. W. Kriegel outlined present company policies to encourage employees and listed programs, such as tuition refund plans, time off for course attendance, industrial leaves, professors visiting the company to teach, time and expense to attend university short courses, graduate and post-doctoral study industrial fellowships on full- or part-time, teaching machines, and others. J. W. Macy pointed out that the Bell report stressed the need for continuing education of government personnel and the government's plans for allowing attendance at courses, graduate study, visiting professors, and in-laboratory training programs. He mentioned that government employees may devote one year out of every ten years of work to further education. Discretionary funds are available in many areas for advanced study. T. P. Torda stressed the need for

educational institutions to orient their graduates to the need for continual study; he advocated a clearinghouse for information on research in education and the establishment of an institute for re-education of senior scientific and engineering personnel.

A thorough study of the needs of each company, governmental establishment, and university should be conducted and some means of informing educational institutions and engineering societies of these needs should be worked out. A plea was made for a realistic appraisal of degrees as a measure of gauging needs and abilities. Continual study of the problem is mandatory and there is an urgent need for innovation.

MERRITT A. WILLIAMSON,
Program Chairman

Medical Sciences (N)

Section N's annual symposium was organized along interdisciplinary lines, and was entitled New Concepts Regarding Biological Control Mechanisms. Cosponsored by Section F (Zoological Sciences) and the American Society of Zoologists, the symposium was arranged by DeWitt Stetten, Jr. (National Institutes of Health), and Oscar Touster (Vanderbilt University) in collaboration with the chairmen of each of the four half-day sessions. A generous grant from the National Institutes of Health permitted the inclusion of three European scientists among the speakers. Each session was followed by a roundtable discussion among the participants.

The symposium covered biological phenomena in species ranging from bacteria to mammals. Part I, on repression mechanisms, was chaired by B. Magasanik (Massachusetts Institute of Technology) and included L. Gorini (Harvard), B. Ames (National Institutes of Health), and H. L. Kornberg (University of Leicester, England) as speakers. Part II, on the feedback control of enzyme action, was chaired by H. E. Umbarger (Long Island Biological Association) and had as speakers G. N. Cohen (Centre National de la Recherche Scientifique, Gif-sur-Yvette, France), A. B. Pardee (Princeton), and H. S. Moyed (Harvard). The remaining sessions emphasized animal studies. Part III, on hormonal phenomena, was chaired by E. W. Sutherland (Western Reserve), and offered talks

by T. W. Rall (Western Reserve), O. H. Lowry (Washington University), and G. M. Tomkins (National Institute of Health). The final session, on transport across cell membranes and chaired by C. R. Park (Vanderbilt), offered talks by D. O. Rudin (Eastern Pennsylvania Psychiatric Institute), J. Skou (University of Aarhus, Denmark), and A. Leaf (Harvard).

Many thought-provoking remarks on medical education were made by DeWitt Stetten, Jr. in his vice-presidential address to the members of the section. Problems related to the supply and financial support of medical students were discussed from the standpoint of long-range needs for physicians.

Section N cosponsored several other programs, including the interdisciplinary general session on the transfer of genetic information. Francis D. Moore (Harvard) is the new vice president and chairman of Section N for 1963, and DeWitt Stetten was elected a committeman-at-large to succeed J. Murray Steele, who has completed his 4-year term of office.

With the greatly increasing number of physicians who are joining the AAAS, it is likely that the activities of Section N can be expanded in future years.

OSCAR TOUSTER, *Secretary*

Pharmaceutical Sciences (Np)

The Pharmaceutical Sciences Section held nine sessions 26 December through 29 December. A total of 33 contributed papers on various scientific studies was reported, and two symposia were held. Over 360 persons registered as having attended one or more of the meetings.

Of major interest to the group in attendance was a most interesting and stimulating vice-presidential address entitled "Pharmacy and space," presented by John A. Autian. Two symposia—one entitled Some Aspects in the Developing, Handling, and Control of Investigational Drugs, and the other entitled Rational Use of Computers in Pharmacy and Medicine—also attracted considerable interest, not only from the pharmaceutical scientists in attendance, but also from many individuals from other scientific disciplines. Over 150 persons attended each of the two sessions.

Don Francke gave introductory remarks and served as presiding officer over the symposium on investigational drugs. Ralph G. Smith (U. S. Department of Health, Education and Welfare), George Schneller (Wyeth Laboratories), Robert I. Wise (Jefferson Medical College), and Milton W. Skolant (American Society of Hospital Pharmacists) discussed the problem from the viewpoint of government, industry, clinical investigation, and the pharmacist, respectively.

John A. Autian presented introductory information on the rational use of computers and presided over the computer symposium session. Eric W. Weiss (Sun Oil Company) discussed the advantages and limitations of computers and defined many of the terms used in computer work as a basis for a clearer understanding of the subsequent papers presented. The application of computers to the storage and retrieval of information was presented by Eric W. Martin (Lederle Laboratories). John F. Pauls (Smith, Kline, and French Laboratories) presented some experiences with a small computer in pharmaceutical research and development. The applications of analog computers to problems of pharmacokinetics and drug dosage were set forth by Edward R. Garrett (University of Florida). The final paper presented before the symposium was on computer applications to neural and behavioral problems by William Ross Adey (University of California).

In addition to the above-mentioned program, the hospital pharmacy group had a most informative, well attended, full-day session of discussion and contributed papers on the scientific aspects of hospital pharmacy under the guidance of Archambault, Francke and Joseph A. Oddis. The following groups were represented: American Society of Hospital Pharmacists, American Pharmaceutical Association, American Hospital Association, and the Delaware Valley Hospital Pharmacists Association. Luncheon, entertainment, and dinner were sponsored by E. R. Squibb and Sons, Wyeth Laboratories, and McKesson and Robbins, Inc., respectively.

Wayne V. Kessler (Purdue University) and Lee H. MacDonald (Upjohn Co.), presided over the two contributed paper sessions which consisted of the presentation of the results of original investigations. The papers presented were of unusual merit. John Autian and co-workers at the University of Texas and the National Institutes of Health presented two papers describing work recently completed on

the interaction of drugs with plastics and the tissue responses noted in rabbits with plastic tubings. A series of three papers on in vivo tracer techniques in drug screening studies, the determination of the body fat of human obese subjects by whole body measurements of potassium-40 radioactivity, and the determination of potassium in solids and liquids by measurement of potassium-40 were presented by W. F. Bousquet, John E. Christian and W. V. Kessler, respectively (Purdue University). Bousquet also presented a paper on studies of the excretion and metabolism of carbon-14 labeled 2-acetamide-5-nitro thiozole in turkeys. The effect of certain drugs on perfused human placentas was discussed by H. P. Cinchta and R. F. Gautieri (Temple University). R. G. Miller and H. C. Shirkey (University of Cincinnati) presented the effects of pooled rabbit serum in alkaloidal poisoning. The synthesis and pharmacology of some basic esters of trimethoxy-benzoic acid were discussed by A. J. Vazkas and J. T. Doluisio (Temple University). Work on the identification of complex salt species of triamterene and the dynamic measurement of stress carried out at the Smith, Kline and French Laboratories, were presented by L. W. Dittert and C. Chong, respectively. A. C. Huitric (University of Washington) discussed proton magnetic resonance and the steriochemistry of cyclohexanols. Computer simulation of problems in pharmaceutical stability was presented by N. G. Lordi (Rutgers University).

The AAAS Council, the governing body of the Association, elected Don E. Francke (American Society of Hospital Pharmacists) as a vice president of the Association and elected Curtis H. Waldon (University of Colorado) to serve for a 4-year term on the committee-at-large of the Section. Francke will serve as chairman of the Section for the coming year and will preside at the Cleveland meeting in December, 1963.

The meeting was exceedingly well attended and proved to be one of the most successful in recent years.

JOHN E. CHRISTIAN, *Secretary*

Agriculture (O)

The entire program of Section O was a symposium devoted to the topic Food Quality As Affected By Production Practices and Processing. This program was arranged by George W. Irving, Jr. (U.S. Dept. of Agriculture) and covered fruits and vegetables, cereals, dairy products, poultry and eggs, and meats. Attendance was about 200.

Symposium speakers organized, analyzed, and illustrated the profound effects of production, protection, processing, and distribution practices on the quality of our major foods and predicted some predominant trends.

Among the significant conclusions reached were the following:

1) Research is steadily substituting objective for subjective measures of quality factors and is using them to refine knowledge concerning effects of genetic, environmental, management, and processing changes on product quality.

2) Better means for disease and spoilage control are emerging and further improvements are being vigorously sought.

3) Conversion of agricultural products to forms desired by consumers involves many steps. All are being examined to ascertain deleterious influences on quality and to minimize them.

4) Fruits, vegetables, and cereals, and among the animal products, poultry, are on the whole rapidly responsive to genetic modification. The genetic improvement of cattle and hogs, on the other hand, is progressing more slowly. Nevertheless, all are continually being adapted to possess the differing quality properties desired in fresh and in processed products. Basic research on flavor, color, texture, and microbiology, with more precise and sensitive tools, is providing information upon which to base practical improvements in each of the steps involved in making quality foods available to the consumer—better germ plasm, farm management practices, harvesting methods, protection during production and post harvest, processing innovations and control, and storage and distribution techniques.

In conjunction with the session on 27 December, the 1962 AAAS Campbell award was made to Robert N. Campbell and Raymond G. Grogan (University of California, Davis). These scientists were honored for their published research entitled "The big-vein virus of lettuce and its transmission by *Olpidium brassicae*."

The retiring vice president, chairman of Section O, George W. Irving, was appointed to a 4-year term as committeeman-at-large, beginning 1 January 1963. The newly designated vice president and chairman of Section O for 1963 is A. H. Moseman (director, Agricultural Sciences, Rockefeller Foundation). Moseman will develop a symposium program on agricultural sciences for new developing nations for presentation at the 1963 AAAS meetings.

GEORGE W. IRVING, JR., *Chairman*
HOWARD B. SPRAGUE, *Secretary*

Industrial Science (P)

The session on research and development management was held on 26 December 1962. All speakers were present, and the program was conducted as shown in the official program. There were about 65 persons in the audience, and a discussion period was held at the end of each paper. It was interesting to note that there were only five members of the Institute of Management Sciences in the audience, so that there was a broad appeal in the subject among AAAS attendees. The discussion centered on various main points made by the speakers: the changing nature of research and development with its large projects, the importance of doing re-

search on research and development management, the need to evaluate the gains and costs of research and development, the need to make more precise and quantitative decision-making on research and development, and the experience with analyzing actual data derived from research and development projects. There were also some sober thoughts expressed by members of the audience on the need to minimize the stress on special or unique characteristics of scientists and engineers as against other human beings, since this emphasis creates more problems than it solves.

M. A. GEISLER, *Program Chairman*

Education (Q)

One of the featured Section Q programs was the symposium on the preparation of elementary and secondary school teachers, which was cosponsored by the AAAS Cooperative Committee and Section Q. The basis of the program was a report on teacher preparation prepared by a joint study group of the AAAS and the National Association of State Directors of Teacher Education and Certification.

Cosponsored programs were scheduled with the Council for Exceptional Children and with the American Educational Research Association. The program arranged by CEC involved aspects of educational problems associated with both retarded and accelerated children. The AERA programs included one session on the scientific study of classroom behavior and another on research in the problems of education in large cities.

The teaching societies scheduled their programs independently, but had their usual diversified schedule of offerings. Section Q scheduled its vice-presidential address and four sessions for contributed papers. The papers covered a variety of subjects ranging from philosophy to research on the selection and training of graduate students.

The business session was well attended. Problems related to this section's programs were considered. A meeting of the Section committee was scheduled and preliminary program plans for the Cleveland meeting were made.

In summary, the meetings at Philadelphia were disappointing in terms of attendance. Many excellent papers were presented and deserved a better attendance. There was some indication that the programs were not sufficiently advertised in the immediate area.

HERBERT A. SMITH, *Secretary*

Council for Exceptional Children (Q3)

In a full day of meetings on 26 December, three significant topics were considered. An advance in the education of the deaf was reported by E. Ross Stuckless (University of Pittsburgh). He described a well-designed and carefully controlled study which concluded that programmed self-instruction in written language for deaf children could produce impressive gains over the typical classroom approach. Under the supervision of teachers of the deaf, programmed instruction resulted in the acquisition of certain elements of written language in half the time taken by typical classroom teaching. Stuckless described further research on the correction of language errors in adolescent deaf children through similar kinds of programmed self-instruction. That research is still in process.

John H. Hollis (Parsons Research Project, Kansas) reported on his work in eliciting differential responses from mentally retarded children in social and non-social stimulation situations. His findings may have considerable meaning for the education of retarded children. In particular, his carefully devised methods for isolating specific kinds of behavior, and measuring changes in them in response to stimulation, could have tremendous implications for the systematizing of teaching for severely retarded children.

William David Barney (University of Auckland, New Zealand) summarized work that he has done this year as visiting research professor at the University of Pittsburgh's School of Education, on formal education for mentally advanced children. Reporting on a project being conducted in the Warren, Penna., public schools, Barney indicated that the identification of highly able children at pre-kindergarten age appears to be quite feasible. An analysis of the progress of children admitted a year early to kindergarten is now underway.

National Science Teachers Association (Q5)

Experimentation and measurement was the theme for the NSTA session on 28 December at the 1962 AAAS meetings in Philadelphia. The program, whose audience consisted mainly of science teachers, was chaired by John H.

Marean (president, National Science Teachers Association, and a high school teacher in Reno, Nev.). The speaker for the session was W. J. Youden (National Bureau of Standards). Youden's address, "The parable of the fisherman," used experimental programs such as the testing of the Salk vaccine, the testing of new highway materials, and an "elegant" fish story to make his points on the characteristics of carefully designed experiments.

Following Youden's presentation, three panelists, Herbert A. Smith (Pennsylvania State University), Helen Hale (science supervisor, Baltimore County Schools, Towson, Md.), and James V. DeRose (head of the Science Department and chemistry teacher at the Marple-Newtown Senior High School, Newtown Square, Pa.) each responded to Youden's presentation with their own suggestions for improving experimentation and measurement in the science courses offered in the public school. Albert Piltz (U.S. Office of Education) initiated questions from the audience and the subsequent discussion that completed the program.

The National Science Teachers Association also participated in the joint meetings of the teaching societies.

MARJORIE GARDNER,
Program Chairman

Information and Communication (T)

At the annual business meeting members proposed and elected Chauncey D. Leake (past president of AAAS) and Joseph Kaplan (University of California) honorary members of the National Association of Science Writers. Also, recognition was noted in the minutes that as of the Christmas week of 1962, Sidney Negus (director of the public information committee for AAAS meetings) "has served the AAAS faithfully and well during the past quarter century and has extended kind and skillful help to an entire generation of science writers."

HERBERT B. NICHOLS,
Representative on AAAS Council

Statistics (U)

The first participation of Section U (Statistics) in the AAAS annual meetings covered a variety of topics and drew considerable attendance from the

statistics profession, as well as from other groups.

A highlight of the meeting was the dinner at which Jerzy Neyman, AAAS vice president and first chairman of Section U, spoke on statistics as a servant of all sciences and as an independent discipline. The essential points of this talk, and of the contributions of the discussants, involved the future pattern of the Section activity. Briefly, a consensus developed that Section U should concentrate on interdisciplinary meetings of two types. One type of session should be planned for the mutual exchange of information with scientists in other disciplines. A second type would have as its purpose the summarizing and clarifying of the results of research, particularly research involving the application of statistical techniques to various subject matter areas. A third type of meeting, designed primarily for statisticians, is also needed for those interested primarily in theory.

The sessions at this meeting, arranged largely by Neyman, indicated in practical form the ideas outlined above. Joint and cosponsored sessions covered statistical problems in probability, genetics, astronomy, psychology, social and economic research, and ecology. Attendance at these meetings varied from 25 to 150. The quality of the papers was high and the reactions of the listeners indicated intense interest.

A special session was held in appreciation of the work of the late Sir Ronald A. Fisher, the eminent British statistician who died last June in Australia. The chairman, Chester I. Bliss, gave the general background on Fisher's life. Fisher's contributions to the theory of statistics, to experimentation, and to mathematical and statistical genetics were discussed by Harold Hotelling, W. J. Youden, and Oscar Kempthorne, respectively.

The final session, Statistical Problems in Novel Domains of Science, drew a large group on the last afternoon of the meetings. In addition to the three papers listed in the program, a fourth paper entitled "Molecular-size channels and flows against the gradient," was given by George B. Dantzig (University of California, at Richmond). The application of statistics to novel problems was quite exciting in that they opened up possible new areas of development; it is likely that a similar session may be a regular feature in the future.

The quality of the first participation of Section U was due to the cooperation of the 48 persons who participated in

the sessions. In addition, Section U cosponsored a number of other sessions.

Harold Hotelling (University of North Carolina) is chairman of Section U for 1963.

MORRIS B. ULLMAN, *Secretary*

Biometric Society (U2)

At the AAAS meetings in Philadelphia, 26–30 December, the Biometric Society (ENAR) arranged five significant sessions, two jointly with the new Statistics Section (U) which met for the first time. The other three sessions were cosponsored by Section U and by the Zoology and Botany sections (F and G).

The important general contribution of statistics to science and industry is to provide an efficient methodology for acquiring new knowledge in other disciplines. It is a part of scientific methodology. However, there is another face of statistics; it is a discipline in its own right.

The first session, considered some uses of high speed computers in statistics. H. O. Hartley (Iowa State University) spoke on solutions of statistical distribution problems by Monte Carlo methods. His paper was concerned with the use of computers in Monte Carlo computations and simulations. In these procedures statistical chance variables are generated inside the computer and the physical and biological laws into which they enter are then also compounded and summarized by the computer to give the solution to the various problems. Max A. Woodbury (New York University) and Martin Lipkin (Cornell) discussed the possibility of using the computer for a high-speed evaluation of a large number of clinical symptoms of a patient to obtain a suggested diagnosis.

A second session was concerned with problems of mathematical biology, and a third considered statistical problems of genetics.

The fourth session was devoted to sampling for zoologists, and a fifth honored Sir Ronald Fisher, who has been described as the greatest statistician who ever lived. Sir Ronald died in Adelaide, Australia, on 29 July 1962. Harold Hotelling of the University of North Carolina spoke on Fisher's contributions to mathematical statistics, a subject in which investigations had barely begun when Fisher started his work. There are now many recognized national and international journals in this area, and a considerable portion of their papers still deal with the development of Fisher's ideas. W. J. Youden (National Bureau of Standards) discussed Fisher's contributions to scientific method, particularly efficient plans for obtaining and methods of interpreting data for purposes of inference. The area of knowledge and research known as the design of experiments was founded almost single-handedly by Fisher. Oscar Kempthorne (Iowa University) described Fisher's contributions to mathematical genetics.

T. A. BANCROFT, *Program Chairman*

Science in General (X)

The theme of the 1962 American Nature Study Society meetings was "Nature Study—the grassroots of Science." Papers were given on the history of the nature study movement, nature study in various parts of the world, and means by which a feeling of kinship with nature may be established in the minds of persons today. Various projects for the acquiring and use of natural

areas for schools and nature centers were described in an important session chaired by John W. Brainerd. Howard Zahniser of the Wilderness Society spoke at the annual banquet of the society on the wilderness bill pending in Congress. The joint field trip with the National Association of Biology Teachers was held on 30 December; the visit to the Brigantine National Wildlife Refuge was honored by the presence of the noted ornithologist, Roger Tory Peterson.

John W. Brainerd is the new president-elect, and thus program chairman for the 1963 meeting. S. Glidden Baldwin, retiring president, presided at all business meetings. The Society voted to affiliate with the International Union for the Conservation of Nature.

JOHN A. GUSTAFSON,
Program Chairman

Conference on Scientific Manpower (X4)

The theme of the 1962 Scientific Manpower Conference, which met in morning and afternoon sessions on 28 December, was "Community Programs for Motivation to Science and Engineering Training." The morning program was chaired by James Creese (Drexel Institute). Glenn W. Giddings (General Electric Company) discussed local industry-school cooperation in science instruction and noted that the concern of industry with education below the collegiate level is a relatively new development. However, cooperation is fast growing, and the establishment of a national clearinghouse to gather and disseminate information on such programs may now be appropriate. James G. Harlow described the statewide program sponsored by the Frontiers of Science Foundation of Oklahoma. Robert W. Neathery (The Franklin Institute) reported on the Museum's activities as examples of local motivational programs. Kenneth E. Karmel discussed the program of the Engineering and Technical Societies Council of the Delaware Valley, which includes newsletters, a speakers' bureau, student engineering clubs, and career guidance talks as exemplary of professional society activities.

The afternoon session, under the chairmanship of Samuel Schenberg, director of science of the New York City public schools, featured a panel discussion on counseling and guidance activities. Ralph Bedell (U.S. Office of Education) discussed the National Defense Education Act support for training of school counselors. Richard B. Scheetz (New Jersey Department of Education) provided specific examples of industry-local school cooperation in such areas as career conferences, laboratory visits, laboratory work experience, and summer science programs. W. Donald Vaughan, a counseling supervisor, discussed public school counseling from the standpoint of the counselor's problems and frustrations. Stewart Wood, a high school senior from Bladensburg, Md., described activities of the Washington Junior Academy of Sciences, which he felt were important in attracting and maintaining youth's interest in science. A related paper delivered by John D. Hopperton (New Mexico Institute of Mining and Technology) reported on the activities of the 37 state junior academies of science.

Papers delivered at the conference will be published by the National Science Foundation and will be available sometime after February.

THOMAS J. MILLS, *Program Chairman*