Company Research Laboratory, which made available its suite, long a rendezvous for science writers at AAAS gatherings after each day's work; and the Westinghouse Electric Corporation, which sponsored the Science Writing Awards reception and dinner.

For the tenth successive year, Thelma C. Heatwole, patent liaison officer for the Philip Morris Research Center, was associate director of the press room at the AAAS annual meeting. Her long experience as an intermediary between scientists and the press helped us greatly to supply source material quickly for the reporters covering the meeting. In addition, besides Alberta Pike, the following individuals carried out press room assignments efficiently and effectively: Foley F. Smith, of Richmond, Virginia; Mary G. Bayes, of Alberta Pike and Associates, Denver; Charlotte Trego, of Colorado Women's College; William E. Trout, III, of Indiana University; and Margaret Staley, Carol McClure, and Donna Wallace, of the Denver area. We also appreciate the cooperation of Robert M. Mellen, resident manager of the Denver Hilton, and his associates, William Elges, Janice Scogins, and others, for taking care of our innumerable requests so promptly and courteously.

The press room prize for asking the least number of questions was awarded to Walter Sullivan. His reporting of the meeting for the New York *Times* was masterful. Previous winners have been Victor Cohn of the Minneapolis *Tribune*, the late Robert Dwyer of the New York *Daily News*, and Harry A. Nelson of the Los Angeles *Times*. The science writer who traveled the farthest to cover the meeting was Lucien Barnier of Paris. He taped many addresses and news conferences for future airing in Europe. David Walker of the Canadian Broadcasting Corporation taped programs for future broadcasting in Canada.

Awareness on the part of science writers and reporters in general that news in all branches of science is available at a AAAS annual meeting was certainly evident in Denver. The Association compliments representatives of the press, radio, and television on this alertness and is extremely grateful that they assumed responsibility for accurately reporting this news throughout the world. We suspect that much of this increased cooperation on the part of the press stems from the fact that scientists appear to be more willing in these times to relate themselves and their work to the larger social environment, a trend referred to by Glenn T. Seaborg in his John Wesley Powell lecture in Denver.

Reports of Sections and Societies

Mathematics (Section A)

"Man and the computer" was the topic of a program of three papers arranged by W. F. Cahill (Goddard Space Flight Center) and sponsored by the Association for Computing Machinery. An overflow audience of nearly 100 attended this first program of Section A, on 28 December. Speaking on the intellectual implications of the computer revolution, Richard W. Hamming (Bell Telephone Laboratories) observed that the way man looks at himself and at his world is undergoing a change comparable to that of the Copernican and Darwinian revolutions. Quantitatively, computation has been increased in speed by a factor of 1 million and has been decreased in cost by a factor of 1000. Comparing this with the tenfold increase in speed that resulted from introduction of the motor car and with the social revolution it caused, Hamming warned that a philosophy for the future man-machine combination is yet to be created but that "it is time to start searching for one." Numerous examples of present uses of computers were given. These ranged from the simulation of musical instruments, the composition of music, the translation of languages, and the design of new languages to the carrying out of engineering calculations. On the latter subject Hamming remarked that in the future the 10 percent of the work of an industrial laboratory now done on a computer will become 90 percent.

The second paper was a coordinated presentation by D. Bitcer and P. Braunfeld (both of the University of Illinois) of their work on the use of a high-speed digital computer for automatic teaching. In their study the full logical power and speed of a digital computer (the Illiac) is combined with the capabilities of a slide selector to produce an electronic blackboard on the television screen provided each student. With an individual key-set for use in responding to the material presented, each student proceeds at his own speed, asking for help (by means of a "Help" button) when necessary, yet able to cut short the additional explanation at will (by pushing the "Aha" button). The questions and comments of the audience demonstrated great interest in this flexible and logically powerful approach to the concepts of programmed learning. One of the speakers estimated that a modern computer in the million-dollar class might be able to "instruct" from 5000 to 10,000 students simultaneously and stated that it was especially exciting to have the computer itself help students learn to program a computer. The possibility of having key-sets for communication with a computer over a telephone line was discussed (a comment overheard at the conclusion of this paper was: "This may be 1984 but it looks like progress").

J. H. Wegstein (National Bureau of Standards) concluded this session with a paper on the use and translation of artificial languages. He mentioned 12 languages (either obsolescent, little used, or intended for research on structure) that have been adapted or invented to provide easier yet unambiguous communication between man and machine.

Wegstein estimated that the cost of developing a fully effective language, together with a code for translating it to basic computer language, and of publishing manuals and so on, would be in the neighborhood of $1 million. This figure was considered too high by a member of the audience, but it was agreed that accurate costs are at present difficult to estimate.

"Teaching machines and mathematics programs" was the title of a general session of the AAAS under the sponsorship of its Cooperative Committee on the Teaching of Science and Mathematics and of Section A and Section I (Psychology). Joseph Hammock (Bell Telephone Laboratories) and John R. Mayor (AAAS) arranged the program, and Hammock presided. Over 100 persons attended. The speakers were John Barlow (Emory University); James L. Evans (Teaching Machines, Inc.); Jack E. Forbes (Britannica Center for Studies in Learning and Motivation); Norman A. Crowder (U.S. Industries, Inc.); and Lewis D. Eigen (Center for Programmed Instruction).

It was for the most part agreed that, after rather limited study of what is known about the technique of writing "frames," the student programming specialist must undergo the traumatic experience of beginning to write them and thus gradually gain skill in this art. It was also agreed that it is virtually impossible to find one individual with all the competencies desired. Some speakers favored a "team" approach; this led Crowder to protest that programmed texts should not be written by a committee, or at least that full account should be taken of a study which showed the optimum size of such a committee to be seven-tenths of one person!

The discussants were Max Beberman (University of Illinois), R. Creighton Buck (University of Wisconsin), and Robert M. I. Gagné (Princeton). Beberman noted that it is often necessary to spread out a mathematical argument over a whole blackboard and objected to the confining concept of tiny "frames" in the presentation of material truly mathematical in nature. He also emphasized the importance of nonverbal or symbolic devices, the need for an adviser on artistic layout, and the importance of constructive participation by the student, so that programmed materials do not degenerate into "elaborate devices for *telling* things to kids." Buck noted that the Mathematical Association of America's committee on the undergraduate program is studying both the Skinner and the Crowder approaches in connection with a text for 9th-grade algebra. He protested that answers are sometimes incorrectly expected to be unique and goals concrete, while the all-important opportunity to ask "why" is missing. Gagné commented on the other papers from the point of view of a psychologist and suggested that preparation of programmed instructional material may undergo a development similar to that which took place when mental tests were introduced.

Educational implications of the computer revolution were discussed by George Forsythe (Stanford). This was an address invited by Section A and cosponsored by the Association for Computing Machinery. After reviewing the increase in power of computers, Forsythe observed that for many reasons, including their built-in mechanism for decision-making, computers should *not* be regarded as super slide rules. He discussed a variety of present and future uses and stated that "everyone should be aware of the fact that it would be possible in Washington, with presently planned machines, to monitor almost every business transaction in the United States." He described the needed educational response, both in general terms and with specific reference to a course on computing given at Stanford in the fall of 1961, in which a fast compiler made it possible for codes handed in by 140 students to be checked on randomly generated data, and thus "graded," in the course of routine processing by the regular operating system of the computing center. Forsythe called for the formation of departments of computer science, to be placed with the humanities and sciences in the academic structure, as soon as universities "can find suitable personnel to lead and staff them."

"Biology and mathematics" was the title of the symposium arranged by D. L. Thomsen, Jr. (IBM Corporation), for the Society for Industrial and Applied Mathematics. Irwin W. Sizer (Massachusetts Institute of Technology) presided. W. J. Dixon (University of California, Los Angeles) distributed to the audience a list of 35 programs (and a chart showing input, output, and other characteristics) for the IBM 7090, developed for statistical analyses of medical data. He emphasized the importance of using rather general purpose codes and printing out results even when not all output is of interest. Graphical as well as numerical output was illustrated on the slides shown. Bertram L. Hanna (University of Indiana Medical Center) spoke on mathematical methods in human genetics in a talk which ranged from a historical survey of the interplay between genetic studies and the development of statistics to discussion of current work being done with digital computers on the genes affecting deafness, multiple sclerosis, and muscular dystrophy. Speaking on what he referred to as "experimental epistemology," Jerome Y. Lettvin (Massachusetts Institue of Technology) spoke principally on the work of his colleagues in an electrical engineering laboratory. Ranging widely over philosophy, metaphysics, and art, Lettvin described the remarkable success of Manuel Cerrillo in using concepts of dynamic range and, in particular, step functions of light intensity to identify the essential elements of the style of an artist.

On 30 December two invited papers were presented in a session arranged by Burton W. Jones (University of Colorado). Wolfgang Thron, in a paper entitled "General topology, the genesis of an abstract subject," described how the early and very practically oriented work of Fourier had grown in abstraction and power through the discoveries of Cantor, Frechet, Rielsz, and Moore. Complementing Thron's discussion, Stanislaw M. Ulam spoke on the role of set theoretical methods in the mathematical sciences. Using applications ranging from models of the atomic nucleus to the topology of the universe, Ulam demonstrated the relevance of set theoretical concepts to physical theories.

The final program of Section A was a symposium on the training of teachers of mathematics. An initially small audience grew during the 2-hour program and evinced interest by active questioning. The symposium was sponsored by the Mathematical Association of America's committee on the undergraduate program, and arranged by the committee's executive director, Robert J. Wisner (Michigan State University). G. Baley Price (Conference Board of the Mathematical Sciences) described the historical development of the current work of the committee, and Wisner gave an account of the committee's

very active and extensive program, inviting anyone interested to write him for information. Price praised the vigorous work of those who have sought to improve the teaching of mathematics in the secondary and elementary schools but expressed the opinion that the problem is growing more rapidly than the attempts to solve it. Wisner described the average educational preparation of college teachers as rapidly deteriorating, particularly in mathematics. John R. Mayor (AAAS) spoke on problems of teacher training at the elementary level. He and Wisner agreed that there is evidence of progress in dealing with state certification officials. There was a vigorous discussion period which included a debate on the merits of setting up separate sections or courses in mathematics (at least in the larger universities) for students preparing for elementary school teaching.

Section A also joined with Sections K and P in sponsoring a symposium on management science.

Several speakers noted with pleasure the presence in their audience of alert, responsive young students.

WALLACE GIVENS, *Secretary*

Biology and Mathematics (A3)

A symposium on biology and mathematics was presented on 29 December under the sponsorship of Section A and the Society for Industrial and Applied Mathematics. I. W. Sizer (Massachusetts Institute of Technology) opened the symposium by sketching the history and current status of biomathematics (as this interdisciplinary subject is sometimes called). Biomathematics, he said, is showing a growth pattern similar to that of biophysics, current developments being comparable to developments in biophysics of approximately 15 years ago.

W. J. Dixon (University of California, Los Angeles) spoke on computer-assisted data processing in biomedical research. Dixon discussed statistical procedures of interest to the biomedical worker and showed how they could be formulated for computer processing with a minimum of preliminary preparation. He then cited many biomedical studies which had been treated successfully in this manner in his laboratory.

B. L. Hanna (National Institutes of Health) discussed the current status in mathematics and modern genetics, with particular reference to human genetics. He traced many of the significant developments in the field—in particular, multiple selection processes. He sketched the processes of formulating mathematical models to study these and allied problems.

J. Y. Lettvin (Massachusetts Institute of Technology) presented many interesting and current developments in a talk entitled "Experimental epistemology." He discussed the nervous system and especially the relation of sense organs to the nervous system. He explored some very interesting recent work which relates, for example, the processes involved in the work of the artist to similar phenomena in an electrostatic field. He showed how the history of perception is becoming more closely associated with the history of esthetics. There is a strong probability that a group theoretical approach will be made to the study of perception. On the basis of some of his recent observations, Lettvin feels that it is not unlikely that new mathematics will evolve as a result of these and similar research investigations.

D. L. THOMSEN, JR.,
Program Chairman

Physics (Section B)

The two sessions of contributed papers, "Physics research in the Rocky Mountain area," held on 27 December, were most successful. There were 13 papers, with contributions from eight institutions in four states: Colorado, New Mexico, Utah, and Wyoming. Members of the press seemed especially interested in two papers from the Los Alamos Scientific Laboratory which dealt with an optical method for automatically detecting and recording nuclear explosions high in the sky.

The Physicists' Luncheon was attended by 76 persons and was the most successful such luncheon of the past several years. The announced speaker, Charles P. Sonett of the National Aeronautics and Space Administration, was unable to be present, but one of his colleagues represented him — N. W. Cunningham, head of Lunar Sciences at NASA—who described the program of his group. He captured and held the attention of all luncheon guests, including the wives, with his account of the moon shots planned for 1962: Ranger 3, 4, and 5. These shots should provide much new information about the moon and its geophysical properties, as well as vidicon pictures taken as the vehicle approaches the moon for a "hard" landing. Cunningham demonstrated a small-scale model of a Ranger vehicle which showed the various types of data-taking equipment. He went on to mention the higher-resolution pictures of the moon's surface to be obtained in 1963, and finally the soft-landing moon shots in the Surveyor series and some of the instrumentation planned for that very sophisticated program.

Section B had the basic responsibility for arranging the interdisciplinary symposium in the physical sciences, "Physics of the upper atmosphere," held on 28 December. The speakers had been selected by Alan H. Shapley of the Boulder Laboratories of the National Bureau of Standards. Shapley presided at the session and handled admirably the brisk discussion that followed presentation of each of the four papers. The first paper, "The atmosphere above 50 kilometers," was largely tutorial in nature; it was given not by the scheduled speaker (William G. Stroud) but by one of his associates, William Nordberg, of NASA's Goddard Space Flight Center. Nordberg pointed out by means of graphs and charts the extent of our knowledge of the properties of the upper atmosphere. He emphasized that whereas we may have felt until recently that conditions are pretty stable in the upper atmosphere, we now realize that this is a very dynamic region where things may be moving fast and where the situation may be changing rapidly. This point was also illustrated by the other speakers.

Edward Manring (Geophysics Corporation of America) described experiments in which a rocket ejects glowing sodium vapor to form a trail that is accurately tracked from several ground stations. The reconstructed track of the sodium trail gives information on the shear winds at high altitudes and on the rate of diffusion which is correlated with turbulence. Again, these experiments are giving us much new and unexpected information on the nature of the upper atmosphere. Franklin E. Roach (National Bureau of Standards, Boulder Laboratories) described a newly observed type of aurora which is largely invisible to the human eye but which shows high intensity in the extreme red and can be recorded with photomultiplier tubes. In fact, if these auroras were visible, they would be the subject of a great deal of discussion on

the part of persons who observed them. It appears that they may be connected with the Van Allen belts, or at least that they may give similar information regarding the magnetic field of the earth. Finally, Von R. Eshleman (Stanford) reported on experiments just getting under way in which very powerful radar is used to sound the high atmosphere by virtue of noncoherent scattering. This is one of the most recent techniques for probing the upper atmosphere, and it is one that shows a great deal of promise.

The American Astronautical Society, which is affiliated with Section B, held sessions on 28 and 29 December that were very well attended; the three-part symposium on manned lunar flight was particularly notable.

The American Meteorological Society cosponsored the symposium on physics of the upper atmosphere and also the interdisciplinary symposium in the social sciences: "Water and climate."

Sigma Pi Sigma, the national physics honor society and an affiliate of Section B, was a cosponsor of the entire Section B program and was especially active in making arrangements for the Physicists' Luncheon. It is noted with pleasure that the long-time executive secretary of Sigma Pi Sigma, Marsh W. White of Pennsylvania State University, has been elected vice president and chairman of Section B for 1962.

STANLEY S. BALLARD, *Secretary*

Chemistry (Section C)

A program of great interest not only to chemists but to scientists of all disciplines was offered by Section C. The attendance of close to 1500 attests to the wide appeal of this program. Three symposia of invited papers and two sessions for submitted papers were held in the Denver Hilton and the Petroleum Club, on 27, 28, and 29 December.

In the symposium on carbohydrates it was revealed that ordinarily nondigestible cellulose may, under proper conditions, be digested. The symposium on extraterrestrial biochemistry and biology dealt with the borders of biochemical evolution, studies of microorganisms under extraterrestrial environmental conditions, the long-term viability of organisms, the ecological profile of Mars, and the entry and survival of microorganisms in meteorites. The interdisciplinary symposium, "Geochemical evolution — the first five billion years," dealt with the origin of the chemical elements, the origin of the atmosphere of the planets, the role of the primitive environment in the origin of life, the geochemical evolution of continental crusts, the effects of some minor elements on animals and people, implications of the minor-element content of some major streams of the world, and minor elements in some major municipal water supplies in the United States.

Twenty-seven papers dealing with analytical, physical, organic, and biochemistry were presented in the two sessions for submitted papers.

The Chemists' Mixer, which was held on 27 December from 4:00 to 6:00 P.M. in the Denver Hilton, proved to be a popular event, and the informal breakfasts for symposia participants, held in the Denver Hilton and Brown Palace hotels on 27 and 28 December, were excellent "ice-breakers" and were enjoyed thoroughly. Undoubtedly this program was one of the most successful that has been sponsored by Section C.

ESSIE WHITE COHN, *Chairman*
S. L. MEISEL, *Secretary*

Astronomy (Section D)

Section D met jointly with the American Astronomical Society for four sessions of contributed papers and a symposium on magnetic fields in the solar system. The Helen Warner lecture, "Upper atmospheres of the planets," was given by Joseph W. Chamberlain (Yerkes Observatory).

The address of the retiring vice president, N. U. Mayall (Kitt Peak National Observatory), was a stimulating discussion of the history and current status of our knowledge of the Crab nebula. After the society dinner, Walter O. Roberts (National Center for Atmospheric Research and High Altitude Observatory) spoke of the research goals of the NCAR.

Section D also served as cosponsor of the interdisciplinary symposium "Physics of the upper atmosphere."

F. B. WOOD, *Secretary*

Geology and Geography (Section E)

A symposium composed of two half-day sessions and designated "Ground water problems in the Rocky Mountains and Great Plains district," at which 11 papers were presented was organized by Theodore Walker (University of Colorado). Four sessions of contributed and invited papers in geography, at which 16 papers were presented, were organized by John Loeffler (University of Colorado). One general session of seven papers in geology was organized by R. H. Mahard, secretary of the section.

Section E was cosponsor with Section C (Chemistry) of the interdisciplinary symposium entitled "Biochemical evolution—the first five billion years." This symposium, organized by T. S. Lovering (U.S. Geological Survey) and jointly chaired by him and by Essie White Cohn, vice president of Section C, was composed of two half-day sessions; nine papers were presented. This symposium attracted a capacity audience of several hundred persons.

The National Speleological Society sponsored two sessions of papers, one of them cosponsored by Section E. Certain sessions of Section O (Agriculture) having to do with the supply and utilization of water in the Rocky Mountain area and also the two sessions of the AAAS Committee on Desert and Arid Zones Research (Terah L. Smiley, University of Arizona, chairman) were cosponsored by Section E.

Howard Meyerhoff, vice president of Section E in 1959, delivered an address entitled "Changing concepts of mineral raw materials in the national economy" as one part of the Moving Frontiers of Science program. The John Wesley Powell lecture annually sponsored by the Southwest and Rocky Mountain Division of the AAAS was delivered by Glenn T. Seaborg (chairman of the Atomic Energy Commission).

A Section E dinner and a separate geography dinner sponsored by the Great Plains–Rocky Mountains Division of the Association of American Geographers immediately preceded presentation of the address of the retiring vice president, William C. Krumbein (Northwestern), entitled, "Some attributes of numerical data in geology."

The Section E Advisory Committee Meeting was poorly attended. The secretary vows to keep this group of 36 persons more adequately informed during the coming year and expects them to perform effectively in preparing for the 1962 meeting in Philadelphia.

Guy-Harold Smith (Ohio State University) has been selected chairman of Section E for 1962. Richard Joel Russell, the 1961 chairman, will present the address of the retiring vice president at the 1962 meeting.

RICHARD H. MAHARD, *Secretary*

Zoological Sciences (Section F)

The programs in zoology were conducted largely by the American Society of Zoologists, the Society of Protozoologists, and the Society of Systematic Zoology. These three societies maintained a significant series of symposia and sessions of contributed papers.

The Biologists' Smoker, planned by Sections F and G, was attended by well over 1000 biologists. The affair was arranged by Tyler Woolley and Paul Winston; local biologists were hosts.

One of the highlights of the meetings for zoologists was the dinner arranged by Section F, at which Jack Schultz (Institute of Cancer Research) gave the vice-presidential address. He discussed the relationship of the maintenance of human values to natural selection and conventional genetics.

David W. Bishop (Carnegie Institution of Washington) was named secretary of the section for the next 4 years. Norman Levine was elected committeeman-at-large for the section for a similar period. Ernest Caspari was elected vice president and chairman of Section F for 1962.

GEORGE W. WHARTON, *Secretary*

American Society of Zoologists (F1)

The American Society of Zoologists had the largest program of any society meeting with the AAAS. The program opened at the Denver Hilton Hotel, on the evening of 27 December, with a Biologists' Smoker arranged by a local committee. Then followed three full days of symposia and sessions of contributed papers. The most ambitious undertaking was the three-session symposium on neurosecretion, organized by Nancy Milburn (Tufts) for the society's divisions of comparative physiology and comparative endocrinology and chaired successively by Berta and Ernst Scharrer (Albert Einstein College of Medicine) and Aubrey Gorbman (Barnard and Columbia). Fifteen participants from the fields of anatomy, cytology, medicine, physiology, and biophysics presented papers dealing with the morphology, cytochemistry, fine structure, and electrophysiology of neurosecretory systems of both vertebrate and invertebrate animals, the physiological correlates of changes in these systems, and the effects of neurosecretory substances both on the behavior of animals and on certain isolated target cells and tissues. "Satellite sessions" followed, in hotel halls, rooms, and coffee shops.

Three other half-day symposia followed. D. Dwight Davis organized and chaired a symposium on vertebrate locomotion for the division of vertebrate morphology. William C. Young organized and chaired a symposium on evolutionary changes in the hormonal and neural bases of reproductive behavior for the division of animal behavior and sociobiology and for the section of animal behavior and sociobiology of the Ecological Society of America. Paul A. Wright organized and chaired a symposium on cellular endocrinology for the division of comparative endocrinology. The society also cosponsored a four-session symposium on physiological and biochemical aspects of human genetics organized for Section N (Medical Sciences), a three-session symposium on the data of classification, and a two-session symposium on biogeography of the Philippines, both organized for the Society of Systematic Zoology.

Fourteen sessions were devoted to contributed papers—three in animal behavior and sociobiology; three in developmental biology; three in comparative physiology; one in comparative endocrinology; one in invertebrate zoology, parasitology, and protozoology; one in vertebrate morphology; one in histology, cytology, and genetics; and one by demonstration.

The Zoologists' Dinner, organized by George Wharton, secretary of Section F, was held on 29 December and was attended by approximately 135 persons. C. Ladd Prosser, president of the American Society of Zoologists, presided, and an address was given by Jack Schultz, vice president of Section F. He considered, in a scholarly and stimulating way, "Human values and human genetics." The annual meeting of the society followed the dinner. It was announced that the executive committee had voted to meet with the AAAS at Philadelphia in December 1962.

Annual business meetings were also held by the divisions of comparative endocrinology, comparative physiology, developmental biology, and vertebrate morphology.

RAY L. WATTERSON, *Program Officer*

Hormonal and Neural Bases of Reproductive Behavior

The symposium sponsored by the Section on Animal Behavior and Sociobiology, entitled "Evolutionary Changes in the Hormonal and Neural Bases of Reproductive Behavior" was held as scheduled. Four papers were presented: L. R. Aronson, "Neural and hormonal factors in sexual behavior in lower vertebrates"; D. S. Lehrman, "Physiological regulation of reproductive behavior in birds"; R. W. Goy, "Neural and hormonal factors in sexual behavior in mammals"; K. H. Pribram, "Sex and the nervous system." As far as we know this was the first time this subject has been discussed at a AAAS meeting. The symposium was well attended and seems to have been well received.

WILLIAM C. YOUNG, *Chairman*
Department of Anatomy,
University of Kansas, Lawrence

Society of Protozoologists (F2)

The Society of Protozoologists held its 14th meeting in Denver with the AAAS. Since the 13th meeting had been held in August 1961 in Prague, Czechoslovakia, in conjunction with the 1st International Conference on Protozoology, the Denver meeting was smaller than usual, only 46 papers being given.

A main feature of the program was a round-table symposium, "Biochemical phyletic markers among the protozoa," arranged by Seymour H. Hutner (Haskins Laboratories, New York). Ellsworth C. Dougherty (University of California, Berkeley) emphasized the artificiality of the Protozoa as a natural group, while conceding the practical utility of the designation. Theodore L. Jahn (University of California, Los Angeles) deplored the artificiality of the present classification of Sarcodina and urged greater reliance on biophysical characters. John J. Lee (New York University and Haskins Laboratories) used defined media for trichomonads to fix their ancestry and relations between forms from warm- and cold-blooded hosts. Hutner noted the value of protozoa with "humanoid" biochemical features for screening anticancer compounds and mentioned that information on the thyroxin-enhanced vitamin B_{12} requirements of *Ochromonas malhamensis* pointed to the plant-animal chrysomonads as being particularly useful.

The distinction between plant-like and animal-like biochemical properties appears to break down among the Protozoa. The "humanoid" characteristics of the chlorophyll-bearing *O. malhamensis* have already been mentioned. George G. Holz, Jr. (Syracuse), J. F. Hogg (University of Michigan), and Lee all viewed ciliates (which contain no chlorophyll) as embodying both "animal" and "vegetable" biochemical features.

An unusually large proportion of the papers presented at the regular sessions were of more than routine significance. Only a sampling can be given here. John M. Burke, Jan Prager, and John J. A. McLaughlin (St. Francis College, St. John's University, and Sandy Hook Marine Laboratories and Haskins Laboratories, respectively) isolated four species of marine dinoflagellates, cultivated them axenically, and established their physiological requirements. Growing mixtures of two species, these workers were able to make either species dominant by selecting the proper nutritional and physiological conditions, and they could also produce "blooms" of different species.

Lynn Sagan and Stanley Scher (University of California, Berkeley) showed that deoxyribonucleic acid is present in the cytoplasm of *Euglena gracilis*. It occurs in both normal protozoa grown in the light and containing chloroplasts and in protozoa grown in the dark so that chloroplasts are not actually formed although the potentiality is still present, but DNA is not present in protozoa whose chloroplast-forming potentiality has been destroyed by treatment with streptomycin. The DNA is presumably in the chloroplasts, and they may well be ancient endosymbionts.

Wilhelm F. Schaeffler (University of Illinois) presented a paper describing a capillary agglutination test for *Theileria* species in which an antigen prepared from *T. cervi*, recently discovered in white-tailed deer in the United States, was used. This is the first promising serologic test to be developed for this important genus of ruminant blood parasites, which causes East Coast fever and related diseases in cattle and other ruminants in Africa and Asia.

Edmond Sergent (Institut Pasteur d'Algérie) was elected an honorary member. New officers elected included Seymour H. Hutner, president; Daniel M. Lilly (St. John's), vice president; Robert W. Hull (Northwestern), secretary; B. M. Honigberg (University of Massachusetts), executive committee member; L. Evans Roth (Iowa State University), AAAS representative; and Louis S. Diamond (National Institutes of Health), Agricultural Research Institute representative.

NORMAN D. LEVINE, *Acting Secretary*

Society of Systematic Zoology (F3)

Highlighting the 13th annual meeting of the Society of Systematic Zoology were two symposia, on the biogeography of the Philippine Islands and on the data of classification. Other features of the Denver meeting included the Zoologists' Library and Book Lounge (cosponsored by the American Society of Zoologists), the annual breakfast and business meeting, a coffee hour, and contributed papers. Unfortunately, a paper by Howard McCully (Texas Technological College), on posterior growth in the scales of serranid fishes, was omitted from the printed program.

President Richard E. Blackwelder organized and presided at a well-attended three-session symposium on the data of classification. Specialists in a variety of fields discussed the nature and application of data from their fields in animal classification. Special fields contributing data employed in the classification of animals and represented on this program ranged from molecular biology to animal behavior and ecology.

Walter C. Brown was in charge of arrangements for a two-session symposium on the biogeography of the Philippine Islands. George S. Myers chaired the first session, which included contributions on the geology and the phytogeography of this area and papers on the distribution of recent mollusks and the cephalopod mollusks. The second session, chaired by F. R. Fosberg, was devoted to the vertebrate fauna and a summary of the proceedings. Freshwater fishes, reptiles, birds, and mammals were discussed by the various speakers. An excellent summary of the symposium by Brown concluded the program. Plans are under way for publication of both these symposia, which were cosponsored by the American Society of Zoologists and AAAS Section F (Zoological Sciences).

Blackwelder, the retiring president, presided over the annual breakfast and business meeting and reported on the activities of the past year. President of the society for 1962 is Curtis W. Sabrosky.

CHARLES F. LYTLE, *Program Chairman*

Biomedical Information-Processing Organization (FG3)

On 27 December the Biomedical Information-Processing Organization held its annual meeting as a part of the 128th meeting of the AAAS, with Robert S. Ledley presiding.

Henry J. Mark delivered a paper concerning a unified theory of accurate psychological diagnosis of clinical subnormalities which enables a computer to analyze and process test information and print out clinical reports. Roger W. Sherwin described a large-scale computer program designed to assist in charting positions of inherited characteristics in human genes. Charles J. Roach described a proposed system for electronic data processing in the hospital, designed to assist in the hospital care of bed patients. Robert S. Ledley concluded the session with a discussion of computer aids for the determination of the amino acid sequences in protein.

The session admirably demonstrated the great variety and importance of computer applications in advancing the biological and medical sciences.

ROBERT S. LEDLEY, *Program Arranger*

Botanical Sciences (Section G)

About 200 people attended the three sessions held by Section G. The session for contributed papers was made up of eight talks on a variety of botanical subjects and elicited a good deal of discussion from members of the audience. The symposium, "Plant biology today: advances and challenges," was held in two parts. Each of the speakers placed his subject in its setting and then emphasized the advances which had been made in the last few years and the challenging questions which remain to be answered. It is planned to have a similar symposium next year at the annual meeting. The address of the retiring vice president, James F. Bonner, entitled "The new plant biology," followed the luncheon for all botanists, which was attended by approximately 100 people. The Biologists' Smoker, planned by Sections F and G and held in the Denver Hilton Hotel, was attended by all of the botanists present and provided the usual excellent opportunity for meeting one's colleagues.

HARRIET B. CREIGHTON, *Secretary*

Anthropology (Section H)

A compact program in anthropology began with a reception on 27 December at the Denver Museum of Natural History and ended on 30 December with a symposium on "Incest in cross-species perspective," arranged and presided over by Margaret Mead. The eight symposia, some of them held concurrently, ranged through nearly all aspects of anthropology.

A brisk opening session on "The concept of race," arranged by Jack Kelso, was followed by remarks by Th. Dobzhansky and S. L. Washburn. A program on "Civilizations in desert

lands," arranged by Richard B. Woodbury, considered such matters as levels of technical competence in dry land use, ancient systems of water control in Southeast and Southwest Asia, and social responses to problems of the distribution of irrigational water. Sessions on American archeology included the program "Early man in the western United States," arranged by Richard D. Daugherty, and a remarkable symposium of 26 short papers on "The Wetherill Mesa project" of Mesa Verde National Park, arranged by Douglas Osborne.

The symposium "The interdependence of archeology and ethnology" was arranged by Warren L. D'Azevedo, applied anthropology was treated in a session arranged by Harold L. Amoss, and Anthony Leeds arranged a program on the role of animals in human ecological adjustments.

At the Section H banquet, Jesse D. Jennings, chairman of the section, and Margaret Mead spoke of the responsibility of anthropologists to make themselves heard in the changing scientific world and of the importance of Section H as a means of bringing anthropological subjects to the attention of other scientists. Marie Wormington gave an illustrated account of her recent archeological travels through Czechoslovakia and Russia as far as Lake Baikal.

Credit for the exceptionally well attended sessions and the smoothly functioning program goes to David M. Pendergast, who, with Marie Wormington in charge of Denver arrangements, put together the entire program.

J. L. GIDDINGS, *Secretary*

Psychology (Section I)

The three major topics of this year's program were of even more than usual interdisciplinary interest. "Sensory factors in appetitive behavior and food acceptance" was the title of a 3½-hour symposium, and Carl Pfaffmann's vice-presidential address, entitled "Physiological and behavioral studies of the sense of taste," was an appropriate climax. Alvin R. Mahrer and John R. Thompson, on behalf of the Rocky Mountain Psychological Association, the Colorado Psychological Association, and the Colorado Society of Psychologists in Private Practice, arranged a two-session symposium on "Goals of psychotherapy—approaches to research and clinical application." A symposium in which several aspects of sleep were examined was arranged and chaired by W. B. Webb.

Section I served as cosponsor of several symposia and sessions for contributed papers: "Genetics and evolution in relation to human behavior" (with the American Psychiatric Association); "Teaching machines and mathematics programs" (with the Cooperative Committee on the Teaching of Science and Mathematics and Section A); "Animal behavior and sociobiology" (arranged by the American Society of Zoologists); and "Evolutionary changes in the hormonal and neural bases of reproductive behavior" (with Section F and the Ecological Society of America).

Planning for the 1962 meeting is under way. Symposia and individual contributions will be focused on the topics "memory" and "maturity." The vice president for 1962 is Arthur W. Melton (University of Michigan). Benton J. Underwood (Northwestern) and Richard L. Solomon (University of Pennsylvania) are newly elected members of the Section I committee.

FRANK W. FINGER, *Secretary*

Social and Economic Sciences (Section K)

Section K as a whole, jointly with the American Statistical Association and the National Institute of Social and Behavioral Science, presented the session that featured the vice-presidential address of Frederick F. Stephan (Princeton) on statistics and the prediction of human behavior. At the same session papers were presented by Robert K. Merton (Columbia), Henry W. Riecken (National Science Foundation), and Duncan MacRae, Jr. (University of Chicago). The latter two papers were in the general subject fields of sociology and political science, respectively.

Stimulating and well-attended sessions were also offered by the American Economic Association (arranged by Kenneth E. Boulding, University of Michigan); the American Political Science Association (arranged by Josef Korbel, University of Denver); the American Sociological Association (arranged by Ozzie G. Simmons, University of Colorado); and the American Statistical Association (arranged by the Association's Colorado-Wyoming Chapter). The Institute of Management Science presented a session on methods, econometrics, and mathematical developments in management science (arranged by Merrill M. Flood, University of Michigan). Section K served as one of the cosponsors of the general interdisciplinary symposium in the social sciences, on water and climate. A general business meeting was held by the Metric Association, and the regular 2-day meeting of the American Society of Criminology was presented within the program of Section K.

The section committee and the officers of Section K deeply appreciate the assistance and efforts of all those who contributed to the success of the programs. The general high level of the papers and the degree of audience participation provide a measure of this success.

Section K was fortunate to have had the leadership, during 1961, of Frederick F. Stephan as chairman. Simon S. Kuznets (Harvard) will serve as chairman during 1962, and Thomas H. Carroll (president, George Washington University) will begin a 4-year term of service as a member-at-large of the section committee, replacing Solomon Fabricant (National Bureau of Economic Research), whose term of distinguished service has now expired.

DONALD P. RAY, *Secretary*

American Society of Criminology (K3)

At the meeting of the American Society of Criminology, held 29 December, Isabel Gauper, speaking on women in prison, described the facilities and operation of the new Missouri Prison for Women. She noted that pleasant physical surroundings contribute to the morale of the inmates. The women are encouraged to care about their personal appearance and to contribute to the social and intellectual life of the prison community. The need for psychiatric and social case work on an individualized basis was emphasized. The recidivist rate at the Tipton institution is 12 percent, as compared to 60 percent for the men's institution.

Leslie C. Reed, speaking on the presentence investigation, emphasized the role of sentencing policy in modern penology. He noted that the presentence report, when properly prepared and used, is a great aid to the sentencing judge in the disposition of a criminal case. Sentences must be based upon case histories if we wish to take the necessary corrective measures. A good presentence report, Reed said, should cover the history of past arrests, together with institutional, educational, religious, medical, employment, and family and marital history. Close cooperation between the sentencing judge

and the probation officer is needed if the inmate is to benefit from his incarceration.

Maurice Sigler (warden of Nebraska State Penitentiary) spoke on the warden's obligation to prisoners from rural areas. He stated that a classification system is the cornerstone of a good rehabilitation program; he noted, however, that often a classification system exists without the facilities for carrying out the recommendations of the diagnostic report. He noted that there has been vast improvement in our penal system in the past 20 years. The rural offender is usually in prison for crimes of violence or theft or for passing bad checks. He is not associated with organized crime, nor is he as sophisticated as the urban offender. Because he is not a hardened criminal one would expect the rural offender to respond to rehabilitation programs. However, he is handicapped by a low level of education and by poor work habits.

Sigler noted that the convict code is a barrier in attempts to rehabilitate inmates. He also noted that there is not enough work in prison to occupy the time of the inmates. Good work habits are not instilled in inmates while they are in prison. He made a plea for a realistic work program for our prison population. He also emphasized the need for a prerelease program for men who are about to be released to the community. He recommended that a series of lectures be given these men by experts, on such topics as employment opportunities, union practices, and parole obligations.

Harry C. Tinsley (warden of Colorado State Prison), in a talk entitled "Men in prison," discussed two cases with which he had dealt within the past few days. One involved a vicious and assaultive inmate who had been in and out of several institutions during his lifetime. This man made good the last time he was released, and he is now seeking help from the warden in order to enter the armed services. Warden Tinsley used this case to illustrate the fact that we do not know when a man will reform, or why he reforms if he does. He also noted that it is unlikely that this man will be accepted into the armed services because of his criminal record. The stigma attached to a former convict who has served his time is one of the major barriers to the rehabilitation of men once they are returned to society.

The second case involved a man who had been in and out of six institutions during 20 years of his life. Tinsley asked: "What do we do for a man of this type?" He noted that our prisons are too large and are overcrowded. He recommended a maximum population of 600 inmates. The community must also assume responsibility for the rehabilitation of our criminals, since our prisons cannot do the job by themselves.

Albert Hess has recently returned from Hong Kong, where he made a survey of the narcotics problem in that city. He outlined the social characteristics of the city that help to maintain drug addiction—the influx of refugees from the Chinese mainland, unemployment, housing shortages, overcrowding, and undernourishment. He found that most addicts are from the lowest socioeconomic class, and that most of them are in the 30- to 50-year age bracket.

Hess emphasized the role of myth and tradition in the use of narcotics in the Far East. The addict regards narcotics as a treatment for physical diseases. Asiatic countries have passed antiopium legislation, and as a result heroin has largely replaced opium in Hong Kong. Hess stated that private and public agencies are attempting to deal with addiction on a medical rather than on a punitive basis.

Ruth S. Cavan, in a paper entitled "Underworld, conventional, and ideological crimes," analyzed crime in terms of a continuum, with criminal nonconformity at one end, ideological nonconformity at the other end, and conventional conformity in the middle. Three types of social norms are involved—legal norms, norms of public tolerance, and idealistic norms. Conventional behavior fluctuates between the limits set by public tolerance and idealism.

Whenever criminal activities are pushed beyond the limits of public tolerance, the community reacts with an anticrime crusade. Sometimes idealism forces the norms to the other extreme, as in the case of prohibition or antivice laws, in which cases the public reacts against such rigid idealism.

The criminal underworld and the ideological deviators are prosecuted by legal means and are rejected by society. Both groups withdraw from conventional society to form subcultural groups. The criminal syndicate has entered into a functional relationship with conventional society, whereas the idealists attempt to reform the world in terms of some ethical concept of human order.

In his discussion, C. R. Jeffery attempted to relate modern behavior theory to some of the problems raised in the papers. He indicated that many penal practices violate the principles of operant conditioning. Reinforcements are often given to inmates regardless of responses and are not used wholly to shape desired responses. An institutional setting such as a prison can be used for the retraining of inmates according to operant principles.

Jeffery raised some doubts concerning use of the presentence report. The presentence report is based upon an after-the-fact approach, from effect to cause; that is, after the crime is committed the social worker attempts to assign a cause to the behavior on the basis of a case history. On this basis one can never ascertain the causal factors involved in behavior. Since the presentence report concerns itself with past behavior, it does not focus attention upon the problem of finding out what procedures are needed to change the behavior pattern of the individual.

In the same vein, Jeffery criticized statistical analysis of success or failure on parole. He indicated that statistical controls do not reveal causal relationships. Statistical controls are based on group and not individual prediction, he said, and from statistical studies one can never predict or control the behavior of individual organisms. He recommended that more attention be paid to experimental analysis and less to statistical analysis of behavior in the study of criminality.

JAMES M. REINHARDT,
Program Chairman

American Sociological Association (K4)

The papers in the symposium on the sociology of medicine were devoted to discussion of some of the major problems that have emerged as foci of interest in the rapidly developing collaborative relationships between the social sciences and the health and medical professions. One dramatic indication of the phenomenal growth of these relationships is the fact that the recently established Section on Medical Sociology of the American Sociological Association now has over 700 registered members, of whom the great majority are engaged in research in one or another aspect of the health field.

Edmund H. Volkart (Stanford), in his paper on "Bio-social aspects of disease," identified the convergence that has emerged in conceptualization concerning changing patterns of disease, epidemiological research, and psychophysiological medicine. Odin W. Anderson (Health Information Foundation of

New York) presented a paper, "Social research methodology and the health field," in which he called for a reformulation of research questions in this field in terms that will be most useful for investigation by the techniques and methods presently available. Cecil G. Sheps (University of Pittsburgh School of Public Health) gave a paper entitled "Helping medicine fulfill its social functions." Sheps pointed out that the medical profession today is faced with a number of pressing problems that call for the help of social science research, and that the social sciences are basic to the understanding of health and disease.

Nicholas J. Demerath (Washington University, St. Louis) spoke on the place of the sciences of administration in medical care. The administrative sciences are those disciplines that are useful in planning, organizing, and facilitating the provision of health and medical services, and Demerath identified six focal points in medical-care administration where strategic applications can be made of the research findings of these disciplines.

The symposium was arranged and chaired by Ozzie G. Simmons (Institute of Behavioral Science).

OZZIE G. SIMMONS,
Program Arranger

Management Science (K6)

The symposium on management science, a joint program of the Institute of Management Sciences and of AAAS Sections P (Industrial Science) and A (Mathematics) was held on 29 December at 9:00 A.M. at the Brown Palace Hotel. The program had been arranged by Merrill M. Flood (Mental Health Research Institute, University of Michigan). Robert R. Singleton (General Electric Company, New York) presided.

The symposium was attended by about 30 people. Singleton spoke on the recent further development and application of Ansoff's quasi-analytic method as one which is native to management science. S. Sankar Sengupta (Case Institute of Technology) discussed the methodology of econometric study and its relation to management problems. George B. Dantzig (University of California, Berkeley) described the decomposition principle for linear programming and suggested its generalization as a methodological principle for use in planning complex activities. The presentations were well received and discussed freely.

ROBERT SINGLETON, *Chairman*

Medical Sciences (Section N)

Section N again sponsored a 2-day interdisciplinary symposium designed to focus attention on a research area of major current importance. Organized by Alexander G. Bearn (Rockefeller Institute) and Oscar Touster (Vanderbilt), the symposium, on "Physiological and biochemical aspects of human genetics," offered talks by investigators from a variety of biological disciplines. Each of the four sessions consisted of four formal presentations followed by a round-table discussion and question period. The very large attendance during the entire program testified to the excellence of the presentations and to the interest in the important results that are coming so rapidly from genetic investigations. The symposium was cosponsored by Section C (Chemistry), Section H (Anthropology), Section Nd (Dentistry), and the American Society of Zoologists.

The first session, presided over by G. Stent (University of California, Berkeley), dealt with the structure and specific action of deoxyribonucleic acid. J. Marmur (Brandeis) showed how the reversible denaturation of DNA has been extended to the production of "hybrid" DNA molecules by the annealing together of two different DNA samples that have been heated to dissociate their double-stranded units. Since the formation of "hybrid" double strands requires that the DNA samples be derived from genetically related microorganisms, genetic (and taxonomic) applications are in progress. R. L. Sinsheimer (California Institute of Technology) then discussed his very interesting studies on the single-stranded DNA of bacteriophage ϕX174. In susceptible cells, this DNA is converted into a "replicative form" which current studies suggest has some properties of a double strand. J. T. August (New York University) presented a report on the work of Hurwitz's group on the DNA-dependent synthesis of ribonucleic acid from ribonucleotide triphosphates incubated with a purified enzyme from *Escherichia coli*. A second RNA-synthesizing system, localized in ribosomes and ribonuclease-sensitive, but not deoxyribonuclease-sensitive, is inhibited by T2 bacteriophage infection. A. E. Mirsky's discussion of extranuclear influences on chromosomal activity raised important questions regarding cytoplasmic regulation of nuclear metabolism.

The second session, chaired by A. G. Bearn (Rockefeller Institute), emphasized gene-protein relationships. J. M. Eisenstadt (Oak Ridge) discussed his recent work with Novelli on the DNA-dependent synthesis of β-galactosidase in cell-free systems from *E. coli*. Deoxyribonucleic acid from induced cells is required, and evidence was presented that the DNA exerts its effect by promoting the formation of "messenger" RNA which contains the information required for synthesis of enzyme protein. D. M. Bonner (University of California, San Diego) reviewed the important investigations which have mapped mutational sites controlling tryptophan synthetase formation, while C. Baglioni (Massachusetts Institute of Technology) gave a comprehensive and stimulating evaluation of the genetic control of the various forms of human hemoglobin. Chemical studies on the haptoglobins were presented by O. Smithies (University of Wisconsin), who offered challenging speculations on the mutational mechanisms that might be involved in their formation.

In a continuation of the discussion of gene-protein relationships in the human being, the third session, with B. Childs (Johns Hopkins) presiding, was begun with a review by A. G. Steinberg (Western Reserve) of his own and other work on the genetic control of variations in gamma globulins. This was followed by the paper of H. N. Kirkman (University of Oklahoma) on variants of human glucose 6-phosphate dehydrogenase. The latter report included a preliminary characterization of the enzyme found in individuals with congenital nonspherocytic hemolytic anemia and studies on the TPN-induced dimerization and metastable forms of the various dehydrogenases. A. G. Motulsky (University of Washington) gave a comprehensive report on the population genetics of glucose 6-phosphate dehydrogenase deficiency, relating the condition to the occurrence of sickle-cell trait, thalassemia trait, and malaria. R. Ceppellini (University of Turin) discussed the genetic control of antibody formation, emphasizing the hypothesis that autoantibodies are responsible for certain diseases.

In the fourth and final session, with Th. Dobzhansky (Columbia) presiding, T. T. Puck (University of Colorado) reviewed the important genetic studies recently made possible with cultures of human cells, and R. D. Owens (California Institute of Technology), in a critical discussion of immunological aspects, suggested that tissue incom-

patibilities leading to graft rejection may relate particularly to white cell antigens. C. L. Markert (Johns Hopkins) then showed that each species and tissue contains its own characteristic pattern of isozymes, the patterns changing systematically during development. In his summarizing remarks on the symposium, Dobzhansky reminded the audience of the succession of primary objects of attention (for example, *Drosophila,* viruses, nucleic acids) of geneticists over the years. He emphasized the advantages offered by the use of man in genetic investigations.

It was widely agreed that the remarkable developments in the study of the nucleic acid control of protein synthesis now lead to difficult problems involving the mechanism of expression of genetic factors in more biological terms—for example, in growth and differentiation. The vice-presidential address of J. B. Youmans (American Medical Association) was highly relevant to the program in that he discussed the increasing importance of medical problems with genetic facets and recommended expansion and improvement in the teaching of genetics in medical schools.

OSCAR TOUSTER, *Secretary*

Dentistry (Section Nd)

Section Nd, in keeping with the general program scheme of recent years, again chose to organize a multidisciplinary symposium on a topic basic to oral health—namely, oral aspects of genetics.

The two-session symposium, held in the Cosmopolitan Hotel on 27 December, was organized under the direction of Albert A. Dahlberg (University of Chicago), with the cosponsorship of Section N (Medicine); the International Association for Dental Research, North American Division; the American Dental Association; and the American College of Dentists.

The morning session covered the following subjects: recent advances in dental genetics (C. J. Witkop, Jr., National Institute of Dental Research); the respective roles of twin, sibling, family, and population methods in dentomedical studies (R. H. Osborne, Sloan-Kettering Institute for Cancer Research and Cornell University Medical College); effects of heredity and environment on the development of the dentition (J. D. Niswander, University of Michigan Medical School); chromosomes, nondisjunctions, and oral anom-

alies (R. Gorlin, University of Minnesota); and the effectiveness of selection in producing laboratory stocks genetically uniform for resistance or susceptibility to dental caries (H. R. Hunt, Michigan State University, and S. Rosen, School of Dentistry, Ohio State University).

The afternoon session covered family studies of the facial complex (B. Hanna, National Institute of Dental Research); clinical aspects of genetic research in dentistry (S. L. Horowitz, Bellevue Medical Center and School of Dental and Oral Surgery, Columbia); third molar polymorphism and dental genetics (S. M. Garn and A. B. Lewis, Fels Research Institute); and the regulative changes in tooth germs grown in tissue culture (S. Glasstone Hughes, Strangeways Research Laboratories, Cambridge, England). The symposium was concluded with a general discussion by the panel and audience.

In addition, Section Nd cosponsored a meeting, on 28 December, on career opportunities in medicine and dentistry, arranged by Alpha Epsilon Delta, which attracted a large audience. After introductory remarks (Norman F. Witt, University of Colorado) two formal reports were presented, on the future needs in medicine (A. N. Taylor, American Medical Association) and in dentistry (R. F. Sognnaes, University of California, Los Angeles, Medical Center, School of Dentistry). There followed two panel discussions, on future challenges for physicians and dentists. The dental panel was moderated by H. B. G. Robinson (School of Dentistry, University of Kansas City), with discussants from several schools: W. C. Fleming (University of California, San Francisco, Medical Center), H. J. Noyes (University of Oregon Dental School), and B. C. McKinney (University of Texas).

After a group luncheon, addressed by Robert J. Glaser (University of Colorado Medical Center), arrangements were made for individual conferences with college admissions officials and for visits to local professional schools.

After these sessions Section Nd cosponsored, with Section N (Medicine), a 2-day symposium on general aspects of genetics.

Ned B. Williams (University of Pennsylvania School of Dentistry) was elected to succeed Harold J. Noyes as vice president and chairman of Section Nd (for 1962); for committeman-at-large (1962–65), S. Wah Leung (Uni-

versity of California, Los Angeles, School of Dentistry) was elected to succeed Thomas Hill, who has completed his 4-year term of office.

REIDAR F. SOGNNAES, *Secretary*

Pharmaceutical Sciences (Section Np)

Section Np held eight sessions, 27 through 29 December. There were 28 contributed papers on various studies, and one symposium was held jointly with sections on the zoological sciences, the botanical sciences, anthropology, psychology, the medical sciences, dentistry, agriculture, and education. Over 350 persons attended one or more of the pharmacy section meetings.

The AAAS Council, the governing body of the association, elected John Autian (School of Pharmacy, University of Texas) a vice president of the association and elected George F. Archambault (chief, Pharmacy Branch, Division of Hospitals, Bureau of Medical Services, U.S. Public Health Service) to serve on the committee-at-large of the section for a 4-year term. Autian will serve as chairman of the section for the coming year and will preside at the Philadelphia meeting in 1962. John E. Christian (head of the bionucleonics department, Purdue) continues to serve as secretary of the section.

Of major interest to the group in attendance was a most interesting and stimulating vice-presidential address entitled "Pharmacy and hospital pharmacy," presented by Joseph A. Oddis. An interdisciplinary symposium in the biological-medical sciences, entitled "Existing levels of radioactivity in man and his environment—measurement and significance," attracted wide attention on the part not only of the pharmaceutical scientists but of many individuals from other scientific disciplines. Over 250 persons attended this session. Christian gave introductory remarks and radioisotope demonstrations, served as presiding officer, and served as moderator of the question and discussion session. Wright H. Langham and Ernest C. Anderson of the Los Alamos Scientific Laboratory discussed, respectively, "Radioactivity levels in man and his environment" and "Application and measurement of the existing radioactivity of people and foods." James R. Arnold (University of California) discussed existing levels of cosmic-ray-produced radioactivity, and P. R. J. Burch (University of Leeds) spoke on the relationship of existing radiation levels to carcinogenesis.

The hospital pharmacy group had a most informative and well-attended full-day session of discussions and contributed papers on the scientific aspects of hospital pharmacy, under the guidance of Oddis, Don E. Francke, and Gloria Francke. The following groups were represented: the American Society of Hospital Pharmacists, the American Pharmaceutical Association, the Colorado Society of Hospital Pharmacists, the American Association of Colleges of Pharmacy, the American Hospital Association, and the American College of Apothecaries. Luncheon, entertainment, and dinner were sponsored by E. R. Squibb and Sons, Wyeth Laboratories, and McKesson and Robbins, Inc., respectively.

Autian opened the session for contributed papers which consisted of presentation of the results of original scientific investigations. Wayne V. Kessler and his coworkers at Purdue presented information on the design and operating characteristics of a large 2-pi-liquid scintillation counter for large samples, including man and animals. R. S. McCutcheon (Oregon State College) discussed antiarrhythmic actions of primaquine and amodiquin compounds with quinidine. The effects of reserpine pretreatment on drug responses were explained by R. G. Brown (University of Texas). D. B. Meyers (Butler) presented a pharmacological evaluation of six aromatic hydrazides, and D. C. Fitzgerald (Creighton) discussed estrogen levels and personality characteristics in adolescent females. G. H. Hamor described the synthesis and diuretic activity of 2-methyl-6-sulfamoylsaccharin.

Kessler presided over the remainder of the session, in which Autian presented the effect of quaternary ammonium compounds on polyvinyl chloride used in medical practice; L. A. Sciuchetti (Oregon State University) presented studies on the influence of gibberellic acid and kinetin on growth and alkaloid patterns; H. A. Lieberman (Warner-Lambert Research Institute) discussed the drying of tablet granulations in fluidized beds; T. P. Michaels (Merck Sharp and Dohme) presented an assay procedure for residual amounts of acetone in film-coated tablets; and W. W. Stiles (University of California) presented his views on preventive medi-

cine and public health in the pharmaceutical sciences curriculum.

This meeting proved to be one of the most successful of those held in recent years.

JOHN E. CHRISTIAN, *Secretary*

Agriculture (Section O)

The program for Section O, arranged by chairman Wynne Thorne, consisted of a symposium on land and water use, with special reference to the plains and mountain regions. This symposium involved four half-day sessions, for which Section O had prime responsibility. In addition, Section O cosponsored, with the AAAS, a half-day interdisciplinary program on water and climate and two half-day sessions on water improvement, in conjunction with the Committee on Desert and Arid Zones Research of the AAAS Southwestern and Rocky Mountain Division.

The first session (27 December) of the Section O program dealt with the subject of land and water resources (of the plains and mountain regions). Thorne substituted for Roland Renne (president of Montana State College) as presiding officer. There were four papers: "Population demands for land and water resources of the western hinterland," presented by S. C. Smith (University of California); "Land resources and potential use," by R. D. Hockensmith (U.S. Soil Conservation Service); "Water resources, development, and uses," by W. I. Palmer (U.S. Bureau of Reclamation); and "Public grazing lands in the economy of the West," by M. L. Upchurch (U.S. Department of Agriculture).

The second session dealt with optimum uses for resources, with E. L. Frolik (University of Nebraska) presiding. E. N. Castle (Oregon State College) discussed criteria and planning for optimum use; Nathaniel Wollman (University of New Mexico) presented a paper on economic priorities on water use in arid regions; B. D. Gardner (Brigham Young University) reviewed agriculture as a competitive segment of multiple use; and Marion Clawson (Resources for the Future) discussed recreation as a competitive segment of multiple use.

The third session (29 December) followed the AAAS half-day session on water and climate, held on 28 December, continuing the general consideration of the use of land and water resources. This third session dealt with

the impact of public policy on land and water use. W. E. Morgan (Colorado State University) presided. The first paper, on the government's responsibility for land and water, by L. B. Leopold and R. L. Nace of the U.S. Geological Survey, was presented by the associate author. The second paper, by C. R. Gutermuth (Wildlife Management Institute), presented problems associated with wilderness and other reserves of public lands. M. M. Kelso (University of Arizona) discussed problems growing out of the spaciousness of the West. The final paper, by W. E. Folz (University of Idaho), dealt with public and private investment in resource development.

The fourth session of the symposium (29 December) centered on the theme "Projecting management programs," with R. E. Hodgson (U.S. Department of Agriculture) presiding. There were four papers. Of these, the first, "Providing for multiple use in managing land and water," was presented by J. A. Hopkin. The second, "Modifying management and vegetation of watershed areas for improved water yields," was presented by F. H. Kennedy (U.S. Forest Service). The third, "Management associated with complex use for wildlife, livestock, and recreation," was presented by A. L. McComb (University of Arizona). N. K. Roberts (Utah State University) discussed management of private lands in relation to changing uses of public lands, completing the program.

On the following day the special programs on water improvement provided an important treatment of that subject, enlarging upon the themes developed in the Section O symposium. The entire series of programs, from 27 through 30 December, provided a comprehensive and well-balanced treatment of the problems associated with land and water resources and their use in the 17 western states. The information presented, and the analyses of potential programs and decisions, should be very useful to those seeking solutions to the critical problems facing these western regions.

The attendance totaled about 550 for the four half-day sessions of Section O and more than 400 for the three related half-day sessions. The audience included agricultural leaders from the federal and state agencies concerned with land and water use in the West and many leaders from private enterprises. The interdisciplinary nature of these programs was an excellent illustration of the role of science in solving basic

problems of current and long-range significance.

The following actions were taken, or announced, relative to Section O. Thorne, chairman of the section for 1961, was appointed committeeman-at-large for a 4-year term, beginning 1 January 1962. He succeeds L. P. Reitz, who has completed a 4-year term as committeeman-at-large. H. B. Sprague was reappointed secretary of Section O for a 4-year term. The symposium program of Section O for the 1962 meeting of the AAAS in Philadelphia will have as its theme, "Food quality, as influenced by production and processing." George R. Irving, Jr. (deputy administrator, Agricultural Research Service, U.S. Department of Agriculture), was elected chairman of Section O for 1962 and a vice president of the AAAS for that period.

HOWARD B. SPRAGUE, *Secretary*

Land and Water Use

Twenty papers were presented during the 3-day symposium on land and water use, one session being a general society symposium jointly sponsored and arranged with the Southwestern Division's Committee on Desert and Arid Lands Research.

Population increases of 1.6 percent per year, rising living standards, and changing interests and leisure-time activities are increasing the pressures on the nation's land and water resources (Stephen C. Smith, University of California). Higher-than-average population increases in the West, the nearly 400 million acres of public lands, and acute water limitations combine to make this an area of conflicting ideas about the use of resources.

With production on the nation's farms increasing about 2.6 percent per year, the approximately 640 million acres of land suitable for cultivation, plus anticipated developments in science and technology, will provide food and fiber needs for the foreseeable future (R. D. Hockensmith, Soil Conservation Service).

W. I. Palmer (Bureau of Reclamation) pointed out that water needs for the West could only be satisfied through a large public investment for storage, distribution, pollution control, and better measures for reducing losses. F. H. Kennedy (U.S. Forest Service) reported preliminary results of some long-term experiments which indicate that thinning or removing trees and replacing them with grass on many western watersheds could result in larger yields of water. Similar increased water supplies were foreseen from capture and use of underground and surface water (J. Harshbarger, University of Arizona) and from better knowledge of climatic events (P. R. Julian, University of Colorado).

The role of government as a guardian and developer of resources has been accepted, according to L. B. Leopold and R. Nace (U.S. Geological Survey), but they foresaw need for action to guard public interest against government encroachment. Research to determine the consequences of long-term programs is needed, with more consideration of esthetic and social values. M. K. Udall (U.S. congressman, Arizona) concluded that legislative attempts to consolidate agencies concerned with national resources had failed; legislation is being sought to establish uniform criteria among agencies for developing and managing land and water.

Several papers evaluated competitive uses of resources. N. Wollman (University of New Mexico), in an economic appraisal of alternative uses of water

in the Missouri Basin, concluded that returns in productive value of labor strongly favored use of water for manufacturing over use for agriculture. J. Hopkins (Bank of America) challenged the accepted concept of multiple use of resources and proposed the concept of optimum use, with public preference polls used as a supplement to present criteria for programs of public agencies.

M. Clawson (Resources for the Future) proposed precedures for comparing the demand curves and benefits for recreation with those for other uses of land and water. C. R. Gutermuth (Wildlife Management Institute) contended that the purpose of establishing national parks and monuments is to preserve national values rather than to provide public playgrounds. Recreation areas should be administered by the Forest Service and Bureau of Land Management. A. L. McComb (University of Arizona) concluded that multiple use is acceptable for large areas but that in practice use should be defined by a detailed site classification.

Use of public lands for livestock grazing has declined. M. L. Upchurch (U.S. Economic Research Service) estimated that only 1.2 percent of livestock feed comes from the 400 million acres of public lands and that changes in grazing fees would have little influence on the income of federal agencies. K. Roberts (Utah State University) provided data to show that the value of grazing permits on public lands has been capitalized into regular ranch operations.

WYNNE THORNE, *Program Chairman*

Education (Section Q)

The Section Q program consisted of a symposium on factors identified with the early shaping of the scientist, and two sessions of contributed papers. In addition, Section Q cosponsored two sessions with the Council for Exceptional Children, two sessions with the American Educational Research Association, and a special program with the AAAS Cooperative Committee. Section Q also cosponsored one of the AAAS interdisciplinary symposia, "Existing levels of radioactivity in man and his environment." The teaching societies had their usual array of fine programs.

William Bristow gave the vice-presidential address for the section. His subject was "Some imperatives of curriculum research and development." Two meetings were scheduled for the

section committee. Possible program improvements were considered, and greater involvement of section membership was urged. A continuing problem was seen in the relative tenuousness of the ties with various assigned affiliates of Section Q. Few of the representatives of the affiliate organizations attend the AAAS meetings. It would be mutually advantageous if affiliate societies would designate representatives who could and would attend the annual meeting.

There seemed to be general satisfaction with the quality of the programs. Some of them were really outstanding, but the attendance was relatively light. Some very deserving programs were rather poorly attended.

Kenneth E. Anderson (dean of the University of Kansas) was elected vice president and chairman of Section Q. Edgar Martin was elected committeeman-at-large for a 4-year term.

HERBERT A. SMITH, *Secretary*

The Shaping of a Scientist

In setting the focus for the symposium "The shaping of a scientist," Ralph Tyler commented on the role of the scientist in our society. He pointed out the crucial need for an ever-increasing supply of scientists who are broadly educated in terms of the values of our society, as well as highly trained in their professional field of activity. He suggested that we view the life history of a scientist and the development of his career from his preschool days through the entire educational system and on into his postgraduate work.

Patrick Suppes discussed an investigation of the way in which young children learn mathematical concepts. He commented on the incremental, as compared with the all-or-none, learning theories and described some of the experiments he had conducted in teaching mathematical logic in the elementary schools. For example, in one of these experiments, conducted at the 5th-grade level, the boys and girls are learning material usually offered at the college level.

The kinds of students who do, and the kinds who do not, achieve in science at the high school level were discussed by Victor Cline. He characterized the former as persons who are "inner-directed" or psychologically independent. They are those to whom ideas are more important than people, those who have the capacity for self-criticism and self-expression. In the work he has done, Cline sees three factors as making the critical difference between those who

do and those who do not achieve—the student's ability, his family environment, and the subculture in which he lives.

The question of differentiating between the individual who is a generally good scholar and one who excels specifically in science was raised by John Dailey. Tests of creativity offer one means of differentiating, but such tests should be used in combination with other instruments, such as aptitude inventories, to help identify science talent. Dailey reported that a recent nation-wide study of high school students showed a trend away from science careers from the 9th grade to the 12th on the basis of the students' own statements of their future plans.

Howard Gruber discussed educational goals at the university level and and their relationship to self-directed study on the part of the student. He pointed out that science education must have two facets—the assimilation of a body of scientific knowledge and the learning of a scientific way of thinking. The second objective seems to be the more difficult to attain, and to receive much less attention than the first.

There followed a general discussion, under the leadership of Tyler, in which the panel members and the visitors joined. Tyler commented on the factors in the life history and career development of a scientist about which we need more information and pointed out current research which is seeking to provide needed insights. For example, much remains to be learned about early childhood experiences which may influence the individual with regard to science. Among the factors to be studied here are the development of curiosity in the young child, his opportunities for an increasing skill in manipulating objects, the growth of his readiness for new experiences, and the effects of rewards and punishments resulting from such behavior as asking questions. Other factors enter the picture at the high school and college level in the life of the future scientist—the expectations established for the child at home, the expectations of his peer group, the general climate of the school he attends, and the environmental press of the college or university he attends. At all levels of his development an important factor is the student's opportunity to identify himself with some older person who may serve as a model for him—perhaps a doctor, lawyer, or a scientist. Tyler also commented on the education of scientists in Russia, which he

visited recently. He reported that a scientific career there carries the highest prestige. Also, during the development of the individual, much more time is devoted to educational pursuits than in the U.S., and there is therefore a correspondingly greater amount of time available for science education.

The consensus of the discussion on the shaping of a scientist in our educational system was that the mathematical foundations and the beginning of science as a way of thought as well as a body of knowledge should receive attention at the elementary school level. It was agreed that the determination of whether an individual is or is not likely to become a scientist is made well before the end of high school.

ALICE Y. SCATES, *Program Chairman*

The Exceptional Child

Section Q and the Council for Exceptional Children held two meetings in joint session on 26 and 27 December at the Shirley Savoy Hotel. The papers, with emphasis on research and theory, covered a wide range of problems concerned with exceptional children.

James Lent (University of Oregon) compared the attitudes of educable retarded children in special classses and in regular classes with respect to the level of aspiration in arithmetic-type and reading-type tasks. He noted that educable retarded children in special classes were significantly more realistic regarding their ability in arithmetic-type tasks than their counterparts in regular classes. However, no significant differences were found regarding reading-type tasks. To discover the social needs of retarded children, Barbara Edmonson and John de Jung (University of Kansas) reported on a modification of the Syracuse Scales of Social Relations. They stated that the educable retarded can recall a sufficient number of reference names to make the scale feasible for measuring social needs in an intergroup setting.

Marion Philippus (University of Colorado) and Louis Fliegler (University of Denver), in studying the personality, value, and interest patterns of elementary, secondary, and special-education student teachers, found that special educators differed significantly from the other groups on 11 out of 22 scales. Rather interestingly, all three groups rated social service interests above science and computational areas.

The problems of the gifted child were emphasized by Alice Hayden (University of Washington), Edwin Richard-

son (University of Nevada), and Calvin Taylor (University of Utah). Hayden evaluated the qualities and qualifications desired for teachers of the gifted as delineated by school administrators, gifted students, teachers of the gifted, and regular classroom teachers. She found that gifted children desired teachers who make them think, who create an interest in the subject, and who help them make good use of their time. Richardson stressed the fact that it is a mistake to overemphasize the I.Q. in determining the dynamic qualities of intellectualization demonstrated by the gifted. He further contended that the gifted appear to be more concerned with specific abilities than with general ability, are perfectionistic in their ideas, are sensitive to values, and are overcritical in their approach to problems. Taylor reiterated that current measures of intelligence are not identifying the creative individual. There is, he said, a need to define several types of giftedness and to construct adequate assessment procedures to delineate these aspects of giftedness.

Miles Zintz (University of New Mexico) discussed his 3-year research study, which was carried out to identify, define, and describe factors of cultural and environmental difference between Indians and non-Indians; to find ways to alleviate conflicts in classroom teaching-learning situations; and to provide a basis for planning appropriate classroom adjustments. Teachers' middle-class values and life style were contrasted with the values and life style of Pueblo and Navajo Indians and of the traditional Middle Rio Grande Spanish Americans. A pattern of over-age-in-grade status and increasing educational retardation as students move through the school grades was found. There was considerable evidence of a need for a systematic, sequential teaching of English as a second language for all minority ethnic groups in New Mexico.

The body image of stutterers was reported by Joseph Fitzpatrick (University of Denver). He contrasted the differences accentuated by the stutterers in drawing themselves and their ideal image in the process of speaking. Empirical indices suggested that the technique of drawing oneself is important in evaluating progress in therapy.

The way in which researchers use content words and certain causative phrases was challenged by Joseph Spradlin and Gerardeau (University of Kansas). They contended that content words should be defined in terms of ob-

servable objects or events, or of the characteristics of such objects or events. It was also suggested that the term *cause* should be defined, and utilized only where an experimental manipulation had been made.

In summary, the high quality of papers reflected the increased research interest in the exceptional child.

LOUIS A. FLIEGLER, *Program Chairman*

Science Teaching Societies (Q8)

A superb symposium arranged by the affiliated science teaching societies and covering some of the more fundamental areas within the sphere of molecular biology was held and was well attended. The history of ideas leading to the present knowledge of the architecture of cellular components was beautifully developed in a remarkably coherent sequence by Leonard Lerman, Henry Borsook, and Irwin Sizer.

Genetic architecture was treated in some detail by Lerman (University of Colorado Medical School). The empirical evidence for establishing the molecular structure of deoxyribonucleic acid was presented from the standpoint of both chemical analysis and x-ray diffraction detail. A superb metal "mobile" of a few nucleotides attracted considerable attention.

Borsook (California Institute of Technology) focused attention on the molecular structure of proteins and developed the "sentence" structure of the amino acid "alphabet." The exact sequence of some simpler proteins was illustrated by means of simple, clear slides. A description of the various chemical bonds was related to the chemical activity in terms of enzyme attack sites.

The role of enzymes in the molecular architecture of cells was well presented by Sizer (Massachusetts Institute of Technology). The chemical characterization of ribonuclease was shown, and the method for determining the active enzyme site was followed through. Only a very short section of the long chain was pointed up as the active center.

ALFRED NOVAK, *Program Chairman*

Creativity in Science

In the research symposium on creativity in science, arranged by the National Association for Research in Science Teaching and held on 29 December, Calvin Taylor presented a paper which described research techniques, the characteristics of creative scientists, and some of the implications of the research results for the process of educating

science personnel. The results of the research activities to date indicate that the thinking processes involved in acquiring basic knowledge and those involved in producing new ideas and devising new research procedures differ. For full utilization of the creative talents of a scientist, an understanding of the nature of creativity is imperative. School grades and I.Q. scores are inadequate measures of creativity. Characteristics which exemplify creativity are intellectual persistence, a capacity for manipulating ideas, the ability to make intuitive decisions, resourcefulness, and emotional identification with a research problem.

Edward U. Condon (Washington University) was unable to attend the Denver meeting. Instead, Dr. Love (Sacramento State College) presented procedures for selecting the content of a proposed liberal arts biology course for college students.

EDITH M. SELBERG, *Program Arranger*

American Nature Study Society (X3)

The American Nature Study Society, an affiliate of the AAAS since its founding, held its 53rd annual meeting in Denver from 26 to 30 December. The program included seven sessions, a banquet, and an all-day field trip and was unique in its emphasis on interpreting the natural world from viewpoints ranging from local to international.

The society cosponsored, with other teaching societies, the symposium on molecular biology.

In the first session of the society's program, the theme "Nature study around the world" was developed. The papers included one on Iran, by John Wanamaker (Principia College, Elsah, Illinois); one on science teaching in Brazil, by Paul Klinge (Editor, *American Biology Teacher*); one on general science in Pakistan, by Richard L. Weaver (University of Michigan); and one on worldwide interest in nature and conservation, by Mrs. S. Glidden Baldwin (Illinois Nature Conservancy).

Olaus J. Murie, director of the Wilderness Society, presided over the session on outdoor nature interpretation. An appeal was made for more interpretive programs and for more efficient use of the natural areas still to be set aside. Papers on these subjects were presented, by W. H. Woodin (Arizona-Sonora Desert Museum), Ted F. Andrews (Kansas State Teachers College), and Edwin C. Alberts and Wayne W.

Bryant (National Park Service). The symposium on conservation and international resource development, sponsored jointly with the National Association of Biology Teachers, attracted over 100 persons. Walter P. Taylor, Richard L. Weaver, Frank O'Leary, and Robert C. Leestman presented papers.

The Kodachrome Showing by society members and their guests attracted an audience of over 150. Each series of slides presented excellent photography and a natural history story.

At the annual banquet, which was well attended, Ruth E. Hopson (Portland, Oregon), the outgoing president, handed over the gavel and scroll of presidents to the incoming president, S. Glidden Baldwin (Danville, Illinois). Baldwin presented a movie record of "Nature adventures around the world," the highlights of his family's 8-month trip in 1960. Sounds recorded by Mrs. Baldwin accompanied the film.

The all-day field trip by bus to the Garden of the Gods was a pleasant, informative affair arranged by David O. Davis and Sam S. Blanc. The excellent interpretation of the area, by the leaders and particularly by Paul W. Nesbit of Colorado Springs, greatly added to the day's pleasure.

Ruth Hopson presided at a symposium on the natural history of the Rocky Mountains. This included a review of the physical evolution of the Rockies, by S. H. Knight, a panorama of wildlife of the area, by Richard G. Beidleman, a talk on nature in the mountains, by Nesbit, and a study of animals in the Rockies, by Murie. All papers in this and other sessions were interestingly illustrated.

The final session involved a trip to the Denver Museum of Natural History, where director Alfred M. Bailey and his staff reviewed their major activities and the process of preparing new displays.

STANLEY MULAIK, *Program Chairman*

Conference on Scientific Communication (X5)

Chauncey Leake, chairman of the AAAS Board of Directors, announced at a luncheon following the annual meeting of the AAAS Council its formal approval of the new Section on Information and Communication. Recognition was tendered to members of the Conference on Scientific Communication (originally designated the Conference on Scientific Editorial Problems),

both to those who have been members of the steering committee since 1952 and to those who have participated in the conference programs at the annual AAAS meetings.

In opening the program of the Conference on Scientific Communication (the first session of the new section), Leake said, "We know too much and yet we can't find out what we know." He pointed out that a new type of scientist will emerge, one who will be able to synthesize the data other scientists generate.

The new section (see page 535) will deal with problems of communication between scientists and between scientists and the public. The section may play a leading part in correlating information in those fields where scientific boundaries are crossed and in disseminating information on new techniques of publishing and data processing and on abstracting and information storage and retrieval.

Several related papers were presented during the first program. Published information is doubling every 10 years, according to Phyllis Parkins (*Biological Abstracts*) and Ralph Shaw (Rutgers), who discussed the problems of collecting, storing, and retrieving scientific information. Isaac Welt (Institute for the Advancement of Medical Communication) described the techniques and advantages of indexing in depth, and Foster E. Mohrhardt (U.S. Department of Agriculture) presented a paper on solving the problems of interdisciplinary communication in science.

There were two panel discussions, one on interdisciplinary science communication, under the chairmanship of Dale Baker (*Chemical Abstracts*), the other on communicating science to the people, under the chairmanship of Victor Cohn (Minneapolis *Tribune*). Members of the first panel were Miles Conrad (*Biological Abstracts*), Graham DuShane (AAAS), Eugene Garfield (Institute for Scientific Information), Richard Orr (Institute for the Advancement of Medical Communication), George L. Seielstad (Johns Hopkins Laboratory of Applied Physics), and Charles Shilling (AIBS Communication Project).

Members of the second panel were Watson Davis (Science Service), Hillier Krieghbaum (New York University), Edward G. Sherburne, Jr. (AAAS), and John Sherrod (Library of Congress).

GEORGE L. SEIELSTAD,
Program Chairman

Conference on Scientific Manpower (X6)

The program of the conference on scientific manpower featured a paper by Truman H. Kuhn (Colorado School of Mines) on the topic "Engineering and science—a struggle for survival." The session was held on 27 December.

Howard Meyerhoff (Scientific Manpower Commission) served as chairman of the session. In his introductory remarks he noted that recent studies indicate an increasing demand for scientific and engineering personnel, while current enrollments, in engineering schools at least, are declining.

Kuhn noted the close relationship between science and engineering and stated that students in these fields are drawn from a common pool of talent; science's share of this talent is now growing at the expense of engineering's. The solution, according to Kuhn, is to increase the size of this pool of talent rather than struggle to divide the present inadequate pool. Furthermore, well-rounded graduates who can specialize are needed, rather than individuals who are already narrowly specialized.

The conference on scientific manpower was sponsored this year by the Engineering Manpower Commission, the Scientific Manpower Commission, the National Research Council, the National Science Foundation, and AAAS Sections E (Geology and Geography) and M (Engineering).

THOMAS J. MILLS, *Program Chairman*

Scientific Research Society of America (X11)

The 13th annual convention of the Scientific Research Society of America (RESA) was held in the Hilton Hotel on 29 December. The board of governors, at its October meeting, had reelected W. J. Coppoc and D. B. Prentice chairman and director-treasurer, respectively, for 1-year terms, to begin 1 July 1962. The convention elected Donald L. Benedict and John W. Copenhaver members of the board of governors for 3-year terms, to begin 1 July 1962. At the RESA-Sigma Xi Luncheon, which followed the meeting, the annual RESA address was given by Edward R. Weidlein, former director of the Mellon Institute. The 1961 Procter prize of $1000 for scientific research was presented to Weidlein by W. J. Coppoc, chairman of RESA.

DONALD B. PRENTICE, *Director*