metabolism of chlorpromazine certain analgesics did significantly increase the concentration of unmetabolized chlorpromazine in the blood. Erica Spurdle (Bureau of Research in Neurology and Psychiatry, Princeton, New Jersey) reported that adrenochrome semicarbazone protected mice against shock from colon bacillus toxin, and treatment with the compound also prolonged the onset of symptoms of anaphylaxis.

Bernard B. Brodie (National Heart Institute) presented Section Np's distinguished lecture entitled “Biochemical aspects of mental disease.” He discussed the possible role of neurotransmitter, storage of catecholamines in nerves and nerve endings, and the importance of cyclic AMP.

The officers and representatives of the sponsoring societies met to elect new officers and to formulate the program for next year's meeting. Andre Archambault (University of Montreal) is the new vice president and chairman of Section Np for 1966, and Lee H. MacDonald (Upjohn Company) was elected committee-man-at-large.

Lunch, reception, and dinner were sponsored by E. R. Squibb & Sons, Wyeth Laboratories, and McKesson and Robbins, respectively.

JOSEPH P. BUCKLEY, Secretary

Agriculture (O)

The attendance at the seven sessions of the Section O program totaled almost 600. Six of the seven sessions were made up of invited papers designed to cover the salient features of ground-level climatology. One session consisted of contributed papers, in this same field, but limited to forestry aspects.

The retiring chairman of Section O, Robert H. Shaw, has been designated as a committee-man-at-large for a 4-year term. The 1966 chairman for the Section is N. C. Brady (Cornell University). The program for the 1966 meeting in Washington, D.C. is "The Agricultural Aspects of Pollution"; Brady will develop this program. It will encompass soil, water, plants, animals, foods, and feeds. H. B. Sprague has completed two 4-year terms as secretary of Section O; and his successor is Ned D. Bayley (U.S. Department of Agriculture).

H. B. SPRAGUE, Secretary

Industrial Science (P)

Section P conducted two meetings on 29 December 1965. In the morning session, chaired by Ralph W. Gerard, the present and potential roles of computers in universities were presented. Gerard indicated some of the experiments that are being conducted at the University of California, Irvine, to determine the potential use of computers in aiding instruction.

Fred M. Tonge presented some potentials of computer-assisted instruction and implications of computer technology in both instruction and administration. George E. Forsythe described the research, educational, and professional problems associated with the establishment of computer science departments in universities. Martin Cumnings described the opportunities which exist to computerize libraries to serve research and educational needs of universities. Robert D. Tschirgi recommended the use of technology in the establishment of communication networks to interconnect universities, industry, government, and libraries.

At the section's luncheon meeting, the Industrial Science Achievement Award was presented by Burton V. Dean to Stanford University in recognition of the university's contribution to industrial science through its educational and research programs.

In the afternoon, J. C. R. Licklider described the interaction of man and the computer in the gathering and use of information. Walter M. Carlson described how information is used to assist individuals in the Department of Defense. Carl F. J. Overhage described plans for conducting experiments on the transfer of information.

BURTON V. DEAN, Secretary

Education (Q)

The first session of Section Q was a program of contributed papers (26 December). Morris Goran discussed the similarities of science and art. He emphasized, particularly, the similarities in harmony and order. Scientific theory displays the cohesiveness and logical beauty that one finds in the masterful whole of a work of art. The two aspects of science—analysis and experience of discovery—must both be taught so that the student experiences an emotional impact from the beautifully put-together theory. For the experience of discovery it seems that curiosity has been overstressed and in its place the emphasis should be on imagination and speculation. The ability to look at data in a new way exemplifies this imaginative skill.

A research study by Steven Ross, a medical doctor, supports Goran's philosophical point of view. He stresses that the college medical doctor must practice medicine, must do research, and must teach. This is probably correct for most of the academic disciplines. Teaching tends to be based on tradition rather than on research or ingenuity and imagination. One cannot avoid the emotional problem connected with the teaching process. Ross's study seemed to show that the learning of just the basic anatomical parts of the area that the average doctor needed achieved better results than a control section in which the anatomy was taught in greater detail. Is there a workable minimum knowledge that can be attained in any given field, and which will allow additional time for imagination and speculation?

If research is to supplant tradition in teaching practice, perhaps William Ternent is correct in his analysis of the writings of scientists and engineers. He would suggest that their writings are verbose, turgid, and unimaginative. Ternent would suggest that one should write to sell the product—the research. Therefore, more imagination should be exercised in thinking through the strategy of inviting to sell and the organization of the article to achieve the strategy.

FREDERICK B. DUTTON, Secretary

International Science Teaching

In the first symposium on International Science Teaching, eight papers were presented which reflected a wide range of activity in science education reform throughout the world. The most significant facts that emerged were: clear recognition of the need for keeping science teaching up-to-date in both the "developed" and the "developing" countries, and understanding of the many complex factors which are involved.

The symposium, arranged by Arthur H. Livermore (AAAS), was chaired by Arthur Roe (National Science Foundation).

Isaias Raw (Instituto Brasileiro de
Educacao, Ciencia e Cultura, Sao Paulo, Brazil) discussed the rapid progress of science education in Brazil during the past 15 years. He emphasized the fact that the reform had been initiated by scientists but could not have been successful without the cooperation of the Ministry of Education, and the direct assistance of such organizations as UNESCO and AID.

The first goal was the secondary school where science teaching had been frozen into a traditional pattern, and teaching of science and mathematics reflected an era which had passed. Raw, himself, has led the reform which has centered on providing the means for students to participate in their own science education. This has been accomplished through many approaches—science clubs, Science Fairs, the supplemental training of teachers in modern science and science teaching, but, most important of all, through the development and manufacture of simple and inexpensive science teaching equipment, including individual kits, which can be made available to most schools and to most students. The activities of IBEEC, now well known throughout the world, have broadened to include translation and adaptation of modern science textbooks, films, and other teaching aids. The measure of success was reflected in the establishment, by the Government in 1965, of five regional centers for science education.

In addition to attention to science education at the university level, IBEEC now sees its major responsibility as improving science teaching at the elementary school level not only for its importance in preparation for future academic study but also for the betterment of life for the millions of Brazilian children who will terminate their formal education at an early age.

Raw emphasized the importance of cooperation with scientists and science teachers from other countries in the Brazilian enterprise and expressed the hope that such international cooperation can be greatly expanded.

Harold Behrens (University of Chile), one of the early leaders of science education reform in Latin America, presented impressive figures on population growth and its implications for science and technology, which depend, in the long run, on the effectiveness of science education. Behrens emphasized the handicaps under which developing countries work in their efforts toward technological development. Important among these is the small number of motivated scholars who can lead the reform to provide the rapidly growing number of teachers needed to teach in the burgeoning schools.

Behrens described an academic-year course which he will direct at the University of Chile, under NSF and AID auspices, for a group of carefully selected leader-teachers of chemistry from Chile and other countries. The group will study modern chemistry, participate in on-going research projects in the chemistry department, and prepare model units of study for use in high school chemistry teaching. The course will begin in March 1966.

Jesse Perkinson (Pan American Union) reported on "Foreign assistance to science education in Latin America." Perkinson emphasized the growth of interest in the reform of science education in most of the Latin American countries and the rapid progress which has been made during the past few years. Factors which have made this progress possible include the development of strong leadership among the professors of science and mathematics in the universities through participation in related activities in the United States and, more recently, through participation in national and regional activities in Latin America. Perkinson stressed the relatively large amount of financial assistance for science development in Latin America from a number of outside sources, including such international organizations as the Pan American Union and UNESCO, private foundations, AID, international banks, and others. It has been estimated by International Scientific and Technological Affairs, Department of State, that outside support for science development through grants for the years 1960-62 amounted to approximately $78 million. An important effect of this assistance has been to influence the universities to modernize themselves and to bring them closer to the problems of science education reform at all educational levels. In this way, bonds between the scientists in the universities and officials in the Ministries of Education are being strengthened. A visible reflection of the movement for science education reform in Latin America is the rapid growth in the number of special vacation training courses for science teachers that are being initiated within the countries themselves.

Amanatollah Rowshan-Zaer (University of Tehran, Tehran, Iran) presented an interesting paper on factors influencing the rapid development of science education in Iran, some budgetary information, and the organization of education in Iran. Rowshan-Zaer pointed out that although science has been taught in an organized manner in Iran for only about 30 years, rapid progress is now being made because of the wise leadership, constant attention, and valuable moral and material support of His Majesty The King of Iran. This leadership is the more effective because of the receptivity of Iranian youths' minds owing to a highly developed background. That Iran is making a major effort can be seen in some budgetary figures. At the present time, it is estimated that the investment in education and manpower development is around 5 percent of the national income. The total annual budget of the University of Tehran is about $15 million, and the budget for secondary school and university education during the period of the third development plan (1962-67) is approximately $395 million.

Special efforts now are being made to improve the training of science teachers and to encourage secondary school students in the study of science through projects in which they make some laboratory equipment and simple machines. The effectiveness of this activity could be seen in an exhibition of some of these materials which was held during the past year.

Rowshan-Zaer pointed out that at the present time Tehran University's College of Education in collaboration with the Colleges of Letters and Science are making a strong effort to develop and adopt the best modern methods and material for the training of future science and mathematics teachers.

(Dr. Rowshan-Zaer and three colleagues at the University of Tehran—Yahya Abdoh, chemistry; Pezeshkpour Mostachfi, biology; and Ali-Naghie Vahdati, mathematics—are making an extensive study of science education in the United States under the auspices of the Fulbright program.)

Ernest Burkman (Florida State University) discussed "The National Science High School Project of Turkey." Burkman and his colleagues, working under the direction of J. Stanley Marshall (College of Education) have provided technical support for the project, which is sponsored by the Ford Foundation and the Turkish Ministry of Education. The school, in a new, completely equipped building, is in its second year of operation. The faculty,
with special training in the teaching of modern science and mathematics, works closely with a committee of Turkish scientists. The teaching materials for science and mathematics consist of special adaptations of new U.S. materials. These adaptations have been made on the campus by Turkish and American scientists and science teachers working together. Summer training courses for groups of Turkish high school science and mathematics teachers are also conducted at the school, and plans are being made to extend the influence of the school in a number of ways with the ultimate aim being to help improve the teaching of science and mathematics in the country in general.

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

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

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

"A preliminary report on the performance of 5th and 6th graders on a directed learning task: the pendulum" was presented by Maurice Belanger.

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

Interrelations of the acquisition of some Piaget-type tasks requiring proportional thinking in primary school children was one of the subjects covered during this symposium on Piaget research. Inhelder and Piaget have shown that there is a gradual evolu-