

Meetings and Societies

Calder Hall Nuclear Power Station

As is well known, the first regular supply of electric power from nuclear energy was fed to the supply mains of Great Britain when Her Majesty the Queen opened the Calder Hall Station on 17 Oct. 1956. This was a great occasion for the United Kingdom Atomic Energy Authority; indeed it can almost be regarded as a historic occasion. However, from a scientific point of view another occasion of outstanding importance was the meeting of the British Nuclear Energy Conference in London on 22-23 Nov., when the whole detailed story of the design and construction of the Calder Hall plant was placed on record.

The interest shown in this meeting is well indicated by the size of the audience, more than 2000 members being present, and by the fact that large contingents from overseas countries journeyed to London to take part in the meeting. These overseas visitors included parties from the United States, from Sweden, France, Italy, Belgium, and many other European countries, and from other parts of the world. It was particularly gratifying to receive the good wishes and congratulations of the American visitors and to know that the work done so far in England has stimulated interest in gas-cooled reactors in the United States. The studies which are being made of the advantages of gas-cooled reactors as compared with the pressurized-water reactors will be of outstanding interest when they are available for publication.

The symposium itself was divided into five sessions, with the chairman of the conference, Sir John Cockcroft, presiding over the opening session, the second session on technical research problems, and the final discussions summarizing the proceedings and considering future developments. W. L. Owen, engineering director of the industrial group which was responsible for building Calder Hall, was chairman of the session on engineering design. The session on light engineering and electrical engineering was presided over by J. Eccles (Central Electricity Authority). Although this session included very little material related to

the electric supply industry, it seemed appropriate that the Central Electricity Authority should provide the chairman for one session in view of the very close association between that authority and the Atomic Energy Authority in the development of nuclear power in Great Britain.

In a meeting of this size, with some 20 papers presented, some in rather general form and some more detailed, obviously a few papers will attract the most public interest. The unique feature of the conference was undoubtedly its comprehensiveness, but in presenting the meeting to a wider audience some selectivity must be shown. The student of nuclear energy will find it profitable to study the papers as a whole.

Of all the papers presented, the opening address by Sir Christopher Hinton was perhaps the most stimulating. Hinton's unique position as head of the industrial group of the United Kingdom Atomic Energy Authority, and the subject of his address, "The place of the Calder Hall-type of reactor in nuclear power generation," combined to give this paper an interest which could not be equaled by those which followed. Some of his conclusions will be regarded as debatable by some experts, but the standing that he enjoys within atomic energy circles will undoubtedly result in his views being the subject of very close scrutiny.

Hinton dealt with the early history of the British atomic energy organization and the considerations which led to the rejection of the Hanford-type of pile as a plutonium producer for the British defense project. Even in the earliest days the advantages of a reactor basically similar to the Calder Hall-type were understood and given detailed consideration. A number of factors combined, however, to lead to this type of reactor being rejected in favor of the air-cooled piles which were eventually built at Windscale and which have now been operating for 5 or 6 years.

The Calder Hall-type was not abandoned when the decision to build the air-cooled piles at Windscale was taken but was continued as the subject of a research project at Harwell. This stage of the

work was described fully in later papers of the symposium. The increased requirement for plutonium for military purposes which arose later provided a suitable occasion for reexamining the Calder Hall-type of pile, primarily from the standpoint of its function as a plutonium producer, with electricity as a by-product. This made it possible to begin major engineering studies and construction at an earlier date than would otherwise have been the case and led to a detailed study of the future use of piles of this type in a long-term program for nuclear power production. The British program was the first in the world to show, comprehensively and over a long term, how nuclear energy could meet the growing need for power, and the Calder Hall-type reactors form the basis of the program.

The second half of Hinton's paper was speculative in that it forecast the trends in capital costs and weight per horsepower of nuclear power plants in the future. Although, no doubt, arguments may be raised about details, the broad conclusions can hardly be questioned. As an example, the accompanying graph shows the curve given for capital cost in pounds sterling per horsepower extrapolated to the year 2000. With arguments based on curves such as this, and indications of possible future development of this type of reactor, Hinton drew the conclusion that such reactors will find a place in nuclear power generation, at least during the next 25 years. In the second half of that period, and for particular applications perhaps even earlier, the need for reduction in total weight per horsepower will lead to the development of liquid-cooled systems.

The details of the design study and the later engineering design and construction of the Calder Hall reactors were presented, in the next two papers, by R. V. Moore, who participated in the earlier work at Harwell and was able to carry the work through to completion when he transferred to the industrial group of the UKAEA.

The four groups of industrial firms which have submitted designs to the Central Electricity Authority were represented by their leading executives, and all offered tributes to the success of the work, with perhaps at times a slight indication that industry would be glad to be given a little more initiative and freedom. The most forthright commentary came from Sir Claude Gibb, who expressed his pride in the achievement to date, to which his own group has contributed extensively, and his confidence in the future. He called emphatically for an immediate decision to augment the published program for nuclear energy utilization in the United Kingdom.

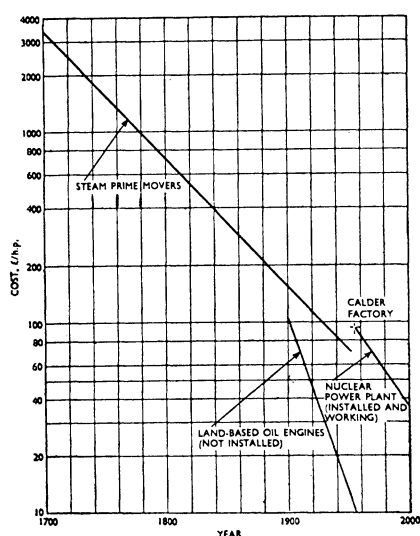
Some of the features of the newer designs of industrial reactors were outlined.

Generally speaking, economies can be achieved over the Calder Hall design by an increase in size and rating of the reactor. This leads to a reduction in capital costs, while lower operating costs are achieved by charge and discharge arrangements which can be operated on full power, thus giving a better load factor. However, development is limited by the shortage of scientists and engineers and depends, also, on the availability of suitable steel, the size pressure vessel which can be fabricated, and production of a sufficient number of materials-testing reactors.

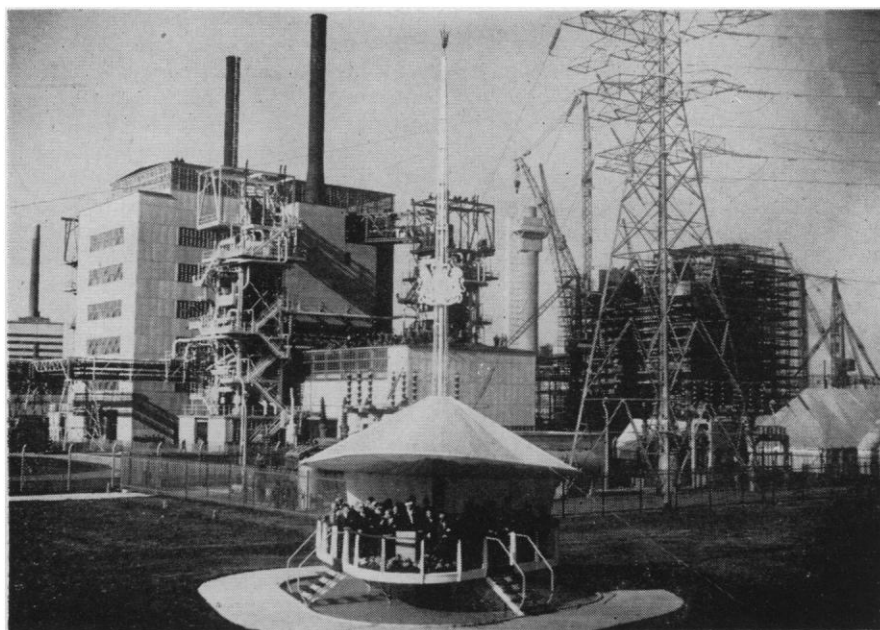
An interesting point made by Brown (Central Electricity Authority) was that, with the increasing size of units, conventional stations can produce electricity in future years at less than present-day costs. This was questioned by W. L. Owen, who pointed out that the capital cost of conventional stations was not the most important part of the cost of generation. He felt that the rising cost of the fossil fuels, coal and oil, which had persisted for half a century, would preclude further economies, and that the balance would increasingly swing toward nuclear energy.

Owen also gave the meeting detailed information on the building of materials-testing reactors which would come into service in 1957-58. He emphasized the need for smaller power reactors for export and transport purposes and felt that these might be gas-cooled types. In an interesting account of the relationship between the various engineering and development groups, he emphasized the need for a correct decision on the most suitable reactor for particular applications and then for ruthless adherence to a suitable construction program.

The question of safety was raised by



Comparison of 1954 equivalent capital cost of steam prime movers, land-based oil engines, and the Calder factory.



Ceremonies at Great Britain's Calder Hall Station, 17 Oct. 1956, where Queen Elizabeth opened the world's first full-sized atomic power station by pulling a switch that sent the first atomic-made electricity into the national grid.

one member from overseas and was answered at length by Hinton, who outlined the siting policy followed. He felt that a very conservative attitude had been adopted. In the Calder Hall-type of reactor, none of the possible forms of failure could lead to an uncontrolled rise in reactivity, giving runaway conditions. Indeed, no two unrelated major fault conditions occurring simultaneously could give a serious district hazard. In his opinion, this type of reactor introduced an industrial hazard considerably less than many, such as chlorine storage and transport, which were readily accepted by the community.

In the second session, on "Technical research problems," interest was again concentrated on a few papers. That by Fortescue and Hall, which outlined the experimental work leading to the choice of shape of the Calder Hall fuel element, aroused a good discussion, notably from Saunders (Imperial College). The paper does not purport to be complete, but it is nevertheless an extensive account of the reasons for the high efficiency of the transverse finning adopted in place of the longitudinal fins of the Windscale piles. Photographs illustrating the formation of geared vortices between the fins are particularly interesting in this connection. Both the paper and the resulting discussion indicated that interest in the subject of heat transfer is by no means exhausted, in spite of the large amount of work which has been done, and this conclusion is reinforced by later work on gases, water, and liquid metals.

Schonland (deputy director of the Atomic Energy Research Establishment),

although he probably knew the answer, raised the interesting question, in discussion of the physics papers, of whether the expensive experimental work in applied physics could be replaced by theoretical work. There is little doubt that some economy might be effected by simplification of experiment, but this could well lead to additional complication in the mathematics. Mummery felt that a judicious use of experimental techniques was necessary but that this must be combined with adequate development of the academic basis of the work.

Although only two papers were presented on the metallurgical work associated with the Calder Hall development, these were particularly complete, and there is a growing realization of the limitation in reactor design imposed by the materials of construction. In the case of uranium itself, the reactors do not impose severe irradiation levels, since the primary objective is the production of plutonium. The ultimate objective of power production has been kept well in mind, and uranium has been produced by casting and heat treatment by a continuous high-frequency induction method. Great care is taken to give freedom from internal strains and a fine random grain size, which is expected to give a good performance in later reactors. Questions were asked on the creep of uranium and its effects on the suitability of the vertical stacking arrangement used. It was pointed out that this had been extensively studied to eliminate danger on this score. It is well known that, between the opening of Calder Hall and the conference, some cartridges had been dis-

charged from the piles, giving good reason to believe that the work on uranium had led to correct conclusions.

The use of magnesium alloys in high-temperature gas streams had, in the early days, seemed a brave decision. This is clear from the outline of the development work on these materials. The manufacture of the highest quality metal and its forming and welding required much work; a most persistent problem was the low ductility of the alloys in some ranges of temperature. Similarly, magnesium alloys show varying tendencies to form voids at grain boundaries under certain conditions of temperature and stress. The continued use of magnesium alloys in reactors of this type demands confidence in the development work and in experience to date.

The choice of steel for the pressure vessel was referred to in the metallurgical papers, and the construction was described in the first paper of the next session. Both in the papers and in the resulting discussion, it was interesting to note the importance attached to avoidance of the possibility of brittle failure of the vessel. This led to the choice of a steel with a low transition temperature and to a complete x-ray inspection of all welds. Finally the vessel was stress-relieved *in situ* by electric heaters placed inside the vessel and then subjected to both pressure and vacuum tests.

Details are given, in the relevant papers, of the uranium-handling equipment and of the design of important equipment, such as the electric equipment, blowers, and ducting. The optimization of the piles for plutonium production lead to a low gas temperature, and for good thermal efficiency a dual pressure cycle was adopted for the turbines. Improved efficiency will no doubt result from raising the gas temperature in future reactors.

Interesting comments on the session dealing with reactor control and instrumentation came from the manager of the Calder Hall plant, Stretch. Equipment for the detection of faulty fuel elements appears complicated in photographs, although it is found to be simple in operation. The instrument was designed to have greater flexibility than may be found necessary in future reactors. Elsewhere the designers have attempted to limit instruments to an absolute minimum. Stretch felt that later it would be possible to reduce the instrumentation without reducing the flexibility which he had already found in operating the reactors.

The final session of the conference was devoted to a further paper by R. V. Moore on the possibility of developing better reactors of the basic Calder Hall-type. The important point is that steps will be taken to raise the gas tempera-

ture. This will mean that the fuel elements must be clad in higher melting-point metals than magnesium or aluminum, with possibly a higher surface-to-mass ratio. This might lead to a need for enriched uranium, with a continuing feed of natural uranium, so that the demand for diffusion plant effort would be small. Alternative coolants and gas-turbine cycles are other possible future steps.

These matters are essentially speculative, but the British effort appears to be firmly based on natural uranium fuel reactors of the gas-cooled, graphite-moderated type typified by Calder Hall. The tone of the conference was undoubtedly one of optimism tempered by a realization of the effort which will be necessary to meet the increasing demand for power. It was generally felt that the release of so much detailed information would help to provide a stimulus to British industry to meet the challenge before it.

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IUPAC Commission on Proteins

A symposium on protein chemistry will be held in Paris, 25–29 July, under the auspices of the Commission on Proteins of the Section of Biological Chemistry, International Union of Pure and Applied Chemistry. The invited speakers and participants in the discussions include A. Tiselius, L. Pauling, C. H. W. Hirs, C. B. Anfinsen, H. Fraenkel-Conrat, G. Schramm, R. R. Porter, C. H. Li, F. Sanger, E. L. Smith, H. Tuppy, L. C. Craig, J. C. Kendrew, C. Tanford, F. Turba, F. Sorm, P. Desnuelle, C. Fromageot, J. L. Oncley, P. Edman, H. Neurath, K. Bailey, K. Linderstrom-Lang, and K. Pedersen.

The program will be devoted to a survey of present knowledge of the structure and biological function of protein molecules. The papers will be published in monograph form. The symposium will be open to about 150 biochemists, who must register *before 1 Apr.* with the chairman of the symposium, Prof. Jean Roche, Collège de France, Place Marcelin-Berthelot, Paris 5, France.

The concept behind this special symposium on the present state of knowledge of protein structure stems in part from the objectives which led to the creation of the IUPAC Commission on Proteins in 1951, namely, the question of whether internationally available standard samples of proteins might be helpful in chemical and other studies. As an exploratory step toward determining the demand for such samples, the commis-

sion is announcing the present availability of a special sample of a single lot of beef insulin.

Designated as crystalline beef insulin, Batch No. 2189, the protein has been tested by Craig's countercurrent distribution method and Porter's chromatographic procedure. Copies of the curves thus obtained are supplied with each sample. The insulin may be obtained by writing to the British Drug Houses Limited, Graham Street, City Road, London, N.1, England. It is packed in 1-gram ampules at £6 (\$18) each to cover the cost of manufacture and distribution.

The purpose in making this sample available is to provide a single lot of insulin that different laboratories can use in experiments in which it may be of value to be working with the same protein preparation. If reference samples of this type prove useful to protein chemists, the Commission on Proteins of IUPAC wishes to help to make available other single batches of proteins prepared in as pure a state as is practicable with current methods of commercial processing.

Comments on this program will be welcomed and may be addressed either to the president of the commission, Prof. A. Neuberger, Department of Chemical Pathology, St. Mary's Hospital Medical School, London, W.2, England, or to the secretary, Dr. Stanford Moore, Rockefeller Institute for Medical Research, 66 St. and York Ave., New York 21, N.Y., U.S.A.

International Crop Protection

The fourth International Congress of Crop Protection will be held in Hamburg, Germany, 8–15 Sept. The subjects to be considered include fundamental research, phytotherapy, protection of stored products, crop-protection techniques, plant quarantine, and organization of crop-protection and legal regulations. One-page abstracts of proposed 20-minute papers should be submitted *before 1 Apr.* to the congress office: Biologische Bundesanstalt für Land- und Forstwirtschaft, Messeweg 11/12, Braunschweig, Federal Union of Germany.

National Health Forum

Names of 80 participants appear on the advance program of the 1957 National Health Forum on "Better mental health—challenge to all health services" that is to take place 20–22 Mar. at the Netherland Hilton Hotel in Cincinnati, Ohio. This is the first year that the forum has been held away from New York. The program, which is an invitation to at-

tend the meeting and includes registration blanks, may be obtained from the National Health Council, 1790 Broadway, New York 19, N.Y. The council sponsors the forum each year on behalf of its national organization members, now 52 in number.

Keynote speakers at the opening session will be Harold D. Lasswell, professor of law and political science at Yale University, and Francis J. Braceland, psychiatrist-in-chief at the Institute of Living, Hartford, Conn., and president of the American Psychiatric Association. Braceland is chairman of the 23-member committee that is planning the forum program.

Curricula in the Biological Sciences

The Committee on Educational Policies and its Subcommittee on College Education, units of the Biology Council, Division of Biology and Agriculture, National Academy of Sciences-National Research Council, are sponsoring a Conference on Undergraduate Curricula in the Biological Sciences. The conference, which is supported by a grant from the National Science Foundation, held a first meeting in Washington, D.C., last December, and will finish its deliberations in a session at the University of North Carolina, Chapel Hill, 1-4 Apr. Willis H. Johnson, a member of the subcommittee, is chairman of the conference.

Recognition of the need for a major conference on biological curricula arose, in part, from correspondence and discussion between the Subcommittee on College Education and some 500 American biologists concerning problems confronting undergraduate education as they relate to the biological sciences. Many correspondents emphasized the need for an intensive, critical reexamination of courses and curricula.

The purpose of the conference is to develop a set of principles for guidance in planning biological courses and curricula for future biologists, keeping in view the range of the biological sciences, the knowledge and abilities teachers must help students to develop, and the functional and technical requirements of different disciplines and lines of work which biologists enter. Discussion is being centered around three questions, corresponding to the main levels with which undergraduate education is concerned: (i) What biological knowledge should form part of the experience of all or most college students, regardless of their course of study? (ii) What additional knowledge and experience, in both biological and related fields, is essential, useful, or desirable for all biologists, irrespective of later specialization? (iii) What is the role of the undergraduate

college in providing specialized training, and what additional elements are basic in each of the major areas of specialization in biology?

A summary report will be published shortly after the April meeting and distributed widely. A detailed account of the discussions will also be issued later during the year.

The committee has invited the following 17 biologists, representing diverse fields, to participate in the conference: Marston Bates, Julius H. Comroe, Jr., Lincoln Constance, Harriet B. Creighton, Donald R. Griffin, I. C. Gunsalus, James H. Hilton, George H. Kidder, Chester A. Lawson, John A. Moore, Henry J. Oosting, Robert B. Platt, Alfred S. Romer, I. W. Sizer, Carl P. Swanson, S. L. Washburn, and Frits W. Went.

Others attending the conference include L. A. Maynard, chairman, and Frank L. Campbell, executive secretary, of the Division of Biology and Agriculture; Paul A. Weiss, chairman, and Russell B. Stevens, executive secretary, of the Biology Council; Donald B. Anderson of the National Science Foundation; the Committee on Educational Policies, Howard M. Phillips, chairman, H. R. Albrecht, C. H. Bailey, John A. Behnke, Claude S. Chadwick, Thomas S. Hall, Carlyle Jacobsen, Milton O. Lee, and T. S. Painter, members, R. E. Paulson, executive secretary; and the Subcommittee on College Education, Benson E. Ginsburg, Victor A. Greulich, Willis H. Johnson. Because of the importance of their fields for biology, a chemist, a physicist, and a mathematician have also been invited to the second meeting.

ONR Decennial Symposium

The Office of Naval Research symposium on "A decade of basic and applied science in the Navy" that was to take place 26-27 Mar. [*Science* 125, 203 (1 Feb. 1957)] has now been scheduled for 19-20 Mar.

Nutrition Conference

The Third Annual Nutrition Conference, sponsored by Wayne State University College of Medicine, will be held on 4-5 Apr. Speakers on the general subject "Fats—helpful or harmful" will include John B. Brown, Ohio State University; Fredrick J. Stare, Harvard University; Grace A. Goldsmith, Tulane University; and Ancel Keys, University of Minnesota. Further information may be obtained by writing the Department of Physiological Chemistry, Wayne State University College of Medicine, Detroit 7, Mich.

International Atomic Agency

Vienna has been selected as the site for the first general conference of the International Atomic Energy Agency in a decision taken at the ninth meeting of the 18-nation Preparatory Commission that has been in session at United Nations Headquarters. Although detailed negotiations with the Austrian Government are still under way, the commission has already expressed its appreciation of the Austrian Government's offer to make the necessary facilities available.

The agency's general conference will be made up of all members. It will meet annually, and together with the Board of Governors, it will determine agency policies and the extent of its operations.

The precise date of the first general conference has not yet been set. It cannot be held until a sufficient number of countries ratify the statute of the agency. Eighty nations have signed the statute and are eligible to become initial members of the agency. At its recent meeting, the Preparatory Commission expressed the hope that enough ratifications will be forthcoming in the near future to make it possible to hold the first general conference in 1957.

Teachers Association Meets

"New frontiers for science teachers" is the theme of the fifth national convention of the National Science Teachers Association (National Education Association) that will meet from 20-23 Mar., in Cleveland, Ohio. Headquarters for the sessions will be the Hotel Cleveland.

The opening address will be given by Arthur S. Flemming, director, Office of Defense Mobilization, who will discuss "Elements of National Security." The evening session the same day will feature a talk on "National Security and science teaching" by John H. Fischer of Baltimore, Md., superintendent of schools.

Five leaders in the science and education fields will be the panelists on the Wednesday evening program. They are Leslie W. Knott of the U.S. Public Health Service; M. H. Trytten, director, Office of Scientific Personnel, National Academy of Sciences; Harold Barnett, director of Economic Growth Studies, Resources for the Future, Inc.; T. Keith Glennon, president, Case Institute of Technology; and Charles C. Cole, assistant dean, Columbia College, Columbia University.

The chief speaker at the Thursday (21 Mar.) general session will be I. Bernard Cohen, professor of the history of science, Harvard University, who will consider "The impact of science upon society." Following his talk, there will be three symposia, one on the elementary-

school level, a second on the junior-high-school level, and the third on the senior-high-school and junior-college level.

Friday's (22 Mar.) general session will deal with "New scientific ideas of greatest consequence to science education." The main speakers will be Dennis Flanagan, editor of *Scientific American*, and former AAAS president Paul B. Sears of Yale University.

The annual banquet will be held Friday evening, with Laurence H. Snyder as the speaker. Snyder, who is dean of the Graduate College, University of Oklahoma, and president of the AAAS, will discuss "Science and human values."

A special program has been developed for the convention's final day. It will feature 11 sections dealing with "Classroom instructional materials and demonstrations for science." Including both discussions and demonstrations, these sessions will go into the various science subject-matter fields in both elementary and high schools. Interested teachers who want copies of the convention program or answers to specific queries should write to the National Science Teachers Association, 1201 16 St., NW, Washington 6, D.C.

Apparatus Makers

The 39th annual meeting of the Scientific Apparatus Makers Association is scheduled to take place at the Greenbrier, White Sulphur Springs, W.Va., 27 Apr.-2 May. The list of special speakers includes George W. Crowe, public relations manager, East Coast division, Esso Standard Oil Company; Dexter M. Keezer, vice president of the McGraw-Hill Publishing Company, Inc.; Howard A. Meyerhoff, executive director, Scientific Manpower Commission; and Ross Nichols, vice president of the Weston Electrical Instrument Corporation. Some 300 company representatives will hear these men discuss such topics as, "public and human relations," "the business outlook," "education of professional manpower," and "government contract problems."

SAMA president Henry F. Dever will preside over the 5-day meeting. Dever is president, Brown Instruments Division, Minneapolis-Honeywell Regulator Company.

UNESCO Conference on Radioisotopes

An international scientific conference on the use of radioisotopes in research will be convened by the United Nations Educational, Scientific and Cultural Organization next September in Paris. Preliminary discussions on the scope and organization of the conference took place at a meeting of scientists from eight countries at UNESCO House, Paris, in January. The scientists were Francisco Magalhaes Gomes of Brazil, Charles D. Coryell of the United States, Charles Fisher of France, Tatsuji Hamada of Japan, A. S. Rao of India, Henry Seligman of the United Kingdom, Cestmir Jech of Czechoslovakia, and Victor Vavilov and Ivan Rojansky of the USSR. Observers present from the World Health Organization, the World Meteorological Organization, the Food and Agriculture Organization, and the European Organization for Nuclear Research promised the support of their organizations for the conference.

More than 1000 scientists are expected to attend the conference. The purpose will not be to adopt resolutions or recommendations but to provide a broad exchange of information on newest developments in the use of radioisotopes as instruments of research, as tracers, or as sources of radiation. The conference will work in two main sections, one dealing with radioisotopes in the physical sciences and the second with the biological sciences.

The first section will cover such fields as geology and geophysics (including meteorology and oceanography) and metallurgical and industrial research. The second will take up the use of radioisotopes in biochemistry (including plant biochemistry and photosynthesis), human and animal physiological research, nutrition research, basic medical research, and certain branches of agricultural research, including soil fertility, plant and animal pathology, and the use of insecticides.

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Technical Writers' Institute

The fifth annual Technical Writers' Institute will be held at Rensselaer Polytechnic Institute, Troy, N.Y., 10-14 June, under the direction of Jay R. Gould. In the past 4 years 300 representatives of 150 national and international companies have attended the institute, which is designed for those who supervise technical writing in business, industry, and the professions.

The institute includes sessions on manuals and instruction books, reports, technical promotion, training programs, industrial films, and graphic and illustrative aids. Writing sessions will put into practice the more general principles learned through lectures and discussion. Additional information may be obtained by writing to Jay R. Gould, Technical Writers' Institute, Rensselaer Polytechnic Institute, Troy, N.Y.

Society Elections

■ Association for Computing Machinery: pres., John W. Carr III, University of Michigan; v. pres., Richard W. Hamming, Bell Telephone Laboratories; sec., Jack Moshman, Council for Economic and Industry Research, 734 15 St., NW, Washington 5, D.C.; treas., Charles Concordia, General Electric Company. Representative to the AAAS Council is Alston S. Householder.

■ American Meteorological Society: pres., Robert D. Fletcher, Air Weather Service; v. pres., Frederic A. Berry, Advisory Committee on Weather Control; sec., Thomas F. Malone, Travelers Insurance Companies, 700 Main St., Hartford, Conn.; treas., Henry DeC. Ward, Eaton and Howard, Inc. Representative to the AAAS Council is Kenneth C. Spengler.

■ Society for Experimental Stress Analysis: pres., M. M. Leven, Westinghouse Electric Corporation; v. pres., E. Wenk, Jr., Southwest Research Institute; v. pres., W. R. Campbell, General Electric Company; sec.-treas., W. M. Murray, Massachusetts Institute of Technology. Representative to the AAAS Council is Miklos Hetenyi.

Forthcoming Events

April

4-6. Society for Research in Child Development, biennial, Iowa City, Iowa. (L. L. Lovell, Iowa Child Welfare Research Sta., State Univ. of Iowa, Iowa City.)

7-10. Pan American Assoc. of Ophthalmology, 4th interim cong., New York, N.Y. (B. F. Payne, 17 E. 72 St., New York 21.)

7-12. American Chemical Soc., Miami, Fla. (A. H. Emery, ACS, 1155 16 St., NW, Washington 6.)

8. Phi Lambda Upsilon, Miami, Fla. (T. B. Cameron, Dept. of Chemistry, Univ. of Cincinnati, Cincinnati 21, Ohio.)

8-10. American Soc. of Mechanical Engineers, spring, Birmingham, Ala. (C. E. Davies, ASME, 29 W. 39 St., New York 18.)

8-12. Food Bacteriology, internatl. symp., Cambridge, England. (Dr. Mossel, Central Inst. for Nutrition Research T.N.O., Catharijnesingel 61, Utrecht, Netherlands.)

8-12. Surface Activity, 2nd world cong., London, England. (Congress Secy., 14 Belgrave Sq., London, S.W. 1.)

9-10. Industrial Electronics Education Conf., annual, Chicago, Ill. (E. A. Roberts, Armour Research Foundation, Illinois Inst. of Technology, Chicago 16.)

10-12. Nuclear Instrumentation Conf., natl., Atlanta, Ga. (H. Kindler, Instrument Soc. of America, 313 Sixth Ave., Pittsburgh, Pa.)

10-13. Conference on Embryology and Experimental Morphology, Cambridge, England. (D. R. Newth, Dept. of Zoology, University College London, Gower St., London W.C. 1.)

11-13. American Assoc. of Pathologists and Bacteriologists, annual, Washington D.C. (E. A. Gall, Cincinnati General Hospital, Cincinnati 29, Ohio.)

11-13. Southwestern Inst. of Radio Engineers Conf. and Electronics Show, 9th annual, with 2nd National Simulation Conf., Houston, Tex. (F. C. Smith, Jr., Box 13058, Houston 19.)

12-13. Colorado-Wyoming Acad. of Science, annual, Fort Collins, Colo. (O. W. Olsen, Colorado A.&M. College, Fort Collins.)

12-13. Eastern Psychological Assoc., annual, New York, N.Y. (G. G. Lane, Dept. of Psychology, Univ. of Delaware, Newark.)

12-13. New Orleans Acad. of Sciences, New Orleans, La. (A. Welden, Dept. of Biology, Newcomb College, New Orleans.)

12-14. American Assoc. for Cancer Research, Chicago, Ill. (H. J. Creech, Inst. for Cancer Research, Fox Chase, Philadelphia 11, Pa.)

12-14. American Assoc. of Physical Anthropologists, annual, Ann Arbor, Mich. (J. H. Spuhler, Dept. of Human Genetics, Univ. of Michigan Medical School, Ann Arbor.)

12-14. American Soc. of Human Genetics, annual, Ann Arbor, Mich. (E. J. Gardner, Dept. of Zoology, Utah State College, Logan.)

12-14. National Speleological Soc., Natural Bridge, Va. (Mrs. M. McKenzie, 1407 Hickory Ct., Broyhill Park, Falls Church, Va.)

13. Society for the Scientific Study of Religion, spring, New York, N.Y. (W. C. Clark, Hartford School of Religious Education, Hartford 5, Conn.)

13. South Carolina Academy of Science, annual, Columbia (Miss M. Hess, Box 114, Winthrop College, Rock Hill, S.C.)

14-16. Telemetering Symposium, natl., Philadelphia, Pa. (A. S. Westneat, Jr., Applied Science Corp., Box 44, Princeton, N.J.)

14-20. American Physiological Soc., Chicago, Ill. (M. O. Lee, APS, 9650 Wisconsin Ave., NW, Washington 14.)

15-17. American Soc. of Lubrication Engineers, annual, Detroit, Mich. (W. P. Youngclaus, Jr., ASLE, 84 E. Randolph St., Chicago 1, Ill.)

15-17. Molecular Mechanism of Rate Processes in Solids, Faraday Soc. discussion, Amsterdam, Netherlands. (Faraday Soc., 6 Gray's Inn Sq., London, W.C.1.)

15-17. Systems for Information Retrieval, symp., Cleveland, Ohio. (J. H. Shera, School of Library Science, Western Reserve Univ., Cleveland 6.)

15-18. American Personnel and Guidance Assoc. and constituent divisions: American College Personnel Assoc., American School Counselor Assoc., National Assoc. of Guidance Supervisors and Counselor Trainers, National Vocational Guidance Assoc., Student Personnel Assoc. for Teacher Education; Detroit, Mich.

(A. A. Hitchcock, APGA, 1534 O St., NW, Washington 5.)

15-18. Host-Specificity and Parallel Evolution among Parasitic Insects and Worms, symp., Neuchatel, Switzerland. (J. G. Baer, C.P. 2, Neuchatel 7.)

15-18. International Inst. of Differing Civilizations, 30th session, Lisbon, Portugal. (11, Blvd. de Waterloo, Brussels, Belgium.)

15-19. American Assoc. of Immunologists, annual, Chicago, Ill. (F. S. Cheever, Graduate School of Public Health, Univ. of Pittsburgh, Pittsburgh 13, Pa.)

15-19. American Soc. for Experimental Pathology, annual, Chicago, Ill. (C. G. Erickson, Inst. of Pathology, Univ. of Tennessee, 858 Madison Ave., Memphis.)

15-19. American Soc. for Pharmacology and Experimental Therapeutics, Chicago, Ill. (H. Hodge, Dept. of Pharmacology, Univ. of Rochester, Rochester, N.Y.)

15-19. Federation of American Societies for Experimental Biology, annual, Chicago, Ill. (M. O. Lee, FASEB, 9650 Wisconsin Ave., Washington 14.)

15-19. High Energy Nuclear Physics Conf., 7th annual, Rochester, N.Y. (R. Marshak, Univ. of Rochester, Rochester.)

15-20. American Inst. of Nutrition, annual, Chicago, Ill. (R. W. Engel, Dept. of Biochemistry and Nutrition, Virginia Polytechnic Inst., Blacksburg 13, Va.)

16-18. Nuclear Tests for Nondestructive Testing Applications, symp., Chicago, Ill. (American Soc. for Testing Materials, 1916 Race St., Philadelphia 3, Pa.)

17-19. American Assoc. of Anatomists, annual, Baltimore, Md. (L. B. Flexner, School of Medicine, Univ. of Pennsylvania, Philadelphia 4.)

18-20. Assoc. of Southeastern Biologists, annual, Athens, Ga. (J. C. Dickinson, Jr., Univ. of Florida, Gainesville.)

18-20. Ohio Acad. of Science, annual, Bowling Green. (R. W. Dexter, Dept. of Biology, Kent State Univ., Kent, Ohio.)

18-20. Southern Soc. for Philosophy and Psychology, annual, Gatlinburg, Tenn. (W. B. Webb, U.S. Navy School of Aviation Medicine, Pensacola, Fla.)

18-20. Venereal Disease Postgrad. Conf., 26th, Memphis, Tenn. (H. Packer, Dept. of Preventive Medicine, Univ. of Tennessee College of Medicine, Memphis 3.)

18-21. American Soc. of Ichthyologists and Herpetologists, 37th annual, New Orleans, La. (F. R. Cagle, Dept. of Zoology, Tulane Univ., New Orleans 18.)

19-20. Arkansas Acad. of Science, annual, Fayetteville. (L. F. Bailey, University of Arkansas, Fayetteville.)

19-20. Seismological Soc. of America, annual, Los Angeles, Calif. (P. Byerly, Bacon Hall, Univ. of California, Berkeley 4.)

20-26. Industrial Health Conf., 12th natl., St. Louis, Mo. (E. C. Holmblad, Industrial Medical Assoc., 28 E. Jackson Blvd., Chicago 4, Ill.)

22-24. National Acad. of Sciences, annual, Washington, D.C. (H. L. Dryden, NAS, 2101 Constitution Ave., NW, Washington 25.)

(See issue of 15 February for comprehensive list)

LETTERS

The editors take no responsibility for the content of the letters published in this section. Anonymous letters will not be considered. Letters intended for publication should be typewritten double-spaced and submitted in duplicate. A letter writer should indicate clearly whether or not his letter is submitted for publication. For additional information, see *Science* 124, 249 (1956) and 125, 16 (4 Jan. 1957).

Diffraction Patterns

A recent news note in *Science* [125, 109 (18 Jan. 1957)] reported a new method of investigating diffraction patterns as a function of time. The method had been described in an article by R. Thun [*Umschau* 56, 660 (1 Nov. 1956); 56, 688 (15 Nov. 1956)]. It may be of interest that just recently a still better method serving a similar purpose has been disclosed.

H. Nielsen, in *Photographie und Wissenschaft* 5, 3 (1956), shows x-ray diffraction patterns taken continuously from tantalite crystals when subjected to heat. Different photographs are printed separately, using colored light and color-sensitive photographic paper, in a manner similar to Land's color-translation process [*Science* 109, 371 (15 Apr. 1949)]. On the final x-ray diffraction photographs, it can easily be seen that changes occurring during the photographic exposure yield different colors. Unlike the results with Boettcher and Thun's method, these x-ray diffraction patterns retain a three-dimensional shape.

J. B. MEYER-ARENDT
Ohio State University, Columbus

Biology of Schizophrenia

M. K. Horwitt [*Science* 124, 429 (1956)] apparently finds little fact and much artifact in many current reports concerning differences between schizophrenic and nonschizophrenic individuals. Certainly uncontrolled studies that neglect the variables cited shed little light on the problem.

However, some of the remedies suggested for converting artifact to fact appear to be of doubtful significance. This arises mainly from a common misinterpretation or delusion shared by many psychiatrists which may have induced in the author a bit of *folie à deux*. He states: "Much of this conflict is due to a lack of understanding by some workers that the term *schizophrenia* is a general classification with many subdivisions, which are often only slightly related, and that the manner in which the patient chooses to