Meetings and Societies

Theoretical Geophysics

A conference on theoretical geophysics was held at the National Science Foundation in Washington, D.C., 1–3 Feb., jointly sponsored by the National Science Foundation and the Carnegie Institution of Washington. The steering committee of the conference appointed by the National Science Foundation included John von Neumann, chairman, E. H. Vestine, deputy chairman, L. V. Berkner, J. Kaplan, H. K. Stephenson, NSF liaison representative, and J. Charney, secretary. More than 100 participants were invited because of their interest in the use of theoretical and mathematical approaches in the solution of geophysical problems, mainly in meteorology, oceanography, hydromagnetism, geomagnetism, aurora, cosmic rays, ionospheric physics, atmospheric electricity, geochemistry, seismology, gravity and geodesy, tectonophysics, and origin of the earth.

H. Stommel began first session with a discussion of the general circulation of the oceans. The importance of wind in driving the ocean is clear, but many effects are not well understood. J. Charney remarked that in recent years widespread observing stations and large computing machines have provided at least a crude cross section of the general circulation of the atmosphere. Fultz spoke on model experiments, illustrating hydrodynamics for bodies in rotation, when the primary driving forces are thermal, and discussed these in relation to upper air waves and cyclones. V. P. Starr noted that the nonzonal motions of the westerly trade winds are now known to provide a primary mechanism for energy transfer spatially.

W. M. Elsasser observed that progress in other fields has opened up new vistas in geophysics. Convection in the earth's core, together with the Coriolis force, Elsasser and Parker have shown, can yield a dynamo producing the geomagnetic field. Chandrasekhar discussed time constants of the geomagnetic field in relation to the dynamo theory of its origin and to a possible periodic reversal in field at intervals of about 250,000 years. Gallet gave a paper in which he discussed the estimation of the temperatures near 300 kilometers, using radio astronomy techniques and the steady background of galactic radio noise as well as temperature-dependent estimates of the collision rate between ions and electrons.

During the second session, Chapman considered that heat from the solar corona at a temperature of 10^6 to 2×10^{6}°K would fall off as the two-seventh power of the distance from the sun. Near the earth this would give a temperature of about 225,000°K, providing a downward flux of energy into the earth's atmosphere. Chapman also indicated the need for rocket observations in determining heights of electric currents in the ionosphere, and whether currents are in the space beyond. N. C. Gerson discussed the forces that affect winds in the upper atmosphere, and in particular effects of gravity, pressure differences, Coriolis force, forces from crossed electric and magnetic fields, and transients.

W. Bennett showed beautiful motion pictures of streams flowing in Störmer orbits, around a magnetized sphere. A most interesting feature was the evidence for large numbers of particles crossing into a low-latitude closed or trapped region, by escape across a small forbidden region. Gunn and Byers showed that the sizes of raindrops and their formation depend upon nuclei and the electric charges they acquire. S. E. Forbush reviewed results obtained by application of statistical theory to cosmic-ray time series. There was derived a pronounced inverse year to year dependence of cosmic-ray intensity, and its variability, upon sunspot number. During magnetic storms there are often periodic decreases in cosmic-ray intensity.

J. A. Simpson described variations in neutron counts with latitude and longitude in equatorial regions. The terrestrial dipole as seen from several earth radii above the earth's surface does not seem to agree with that obtained from magnetic measurements at the earth's surface. E. H. Vestine stated that dynamical theory served to explain fluctuations in the length of the day in terms of changes in the rate of rotation of the central core measured from geomagnetism. A theoretical project designed to provide new estimates of electric conductivity of the upper mantle was proposed.

A. G. McNish reported on changes in F-region height associated with geomagnetic variations at the equator. He also discussed the importance of understanding the formation of the ionospheric layers for purposes of predicting radio propagation conditions. Oliver Wulf described results found by S. Nicholson and himself showing the presence of a universal wave in geomagnetic activity. J. Balsley discussed geologic and geomagnetic interpretations of rock magnetism. Magnetic reversals in rocks in adjacent strata might not mean reversals of the geomagnetic field in times past but sometimes seem to be associated with chemical make-up.

The morning period of the second day was devoted mainly to the theoretical aspects of problems of the earth's interior. F. Press demonstrated a phase-velocity method of estimating the average depth to the Mohorovičić discontinuity at the base of the earth's crust. Under the coastal mountains the depth to this discontinuity is about 35 kilometers, whereas under the high Sierras the depth is about 50 kilometers. He gave inferences from the phase velocities of seismic waves traveling between the Mohorovičić discontinuity and the earth's surface that suggested depths of the continental caps at about 35 kilometers or so. In ocean areas this discontinuity is at a considerably smaller depth.

Maurice Ewing discussed transverse or G-waves of very long periods which circumnagivate the upper levels of the earth. The absence of high-frequency S or shear waves might be explained if there are molten "bubbles" 10 to 50 kilometers in diameter reducing the amplitude of high-frequency shear waves. John Verhoogen said that, from surface measurements of the earth, one cannot tell whether it is heating or cooling, but the mantle down to about 2900-kilometer depth is usually below its melting point. Heiskanen discussed the size and shape of the earth. He mentioned the use of gravitational methods, the geoid and its shape, and inferences from gravitational anomalies.

Yoder introduced the subject of the thermodynamics of rock-forming processes. Discrepancies between predicted chemical activity and observation may be as great as by a factor 2. In fact, the important changes in composition with pressure and temperature cannot be predicted with present theory. Birch and Gutenberg have tried to identify the Mohorovičić discontinuity near 30 kilometers with a chemical phase transition, and MacDonald suggested that feldspar would be likely to undergo such a change at this depth. The change is from feldspar to a garnet.

During the afternoon session of 2 Feb., experimental papers on dating earth materials were given by Aldrich and by Suess. Aldrich said that many materials can now be dated with considerable confidence using isotope ratios Sr^{87}/Rb^{87}

and A^{40}/K^{40} for micas. Suess dated the various Ice Age deposits using C^{14} techniques. Dated examples were 8500, 12,000, 15,000, or 23,000 years ago.

Joseph Kaplan then described the International Geophysical Year program. He stated that the idea for an institute of theoretical geophysics arose naturally in early discussions of the IGY venture. Chapman and Berkner noted that the new and rich observational material of the IGY would afford opportunities for theoretical study in many countries for a long time. Helmut Landsberg staggered almost everybody by reporting that there are 300 million punch cards covering recent Weather Bureau data, and that these are added to at the rate of 60,000 or so a day. Pekeris and Slichter emphasized the need for improved theories of earth and atmospheric tides and oscillations and theoretical seismology, using advantages gained from electronic computers in this work.

A number of actions were taken by the conference unanimously. Each institution with a program in scientific geophysics was urged to intensify its activities in theoretical geophysics. It was agreed that there is now a need for at least one major institute that may devote its primary attention to the theoretical and mathematical aspects of geophysics, the coverage of which should be broad and not restricted to certain branches. The institute should be associated with, or be an integral part of, a university. Several universities indicated that they would plan to provide their own theoretical groups whether or not they were invited to provide a home for a new institute.

The conference recommended that substantial grants be made during the next 3 to 5 years to institutions that have outstanding records of accomplishment in training advanced students in experimental and theoretical research in geophysics, with the specific aim of a substantial intensification of their activity in scientific geophysics over a period long enough for them to develop strength in their permanent program of research and training in this field. The conference also recommended that nonproject grants be made to productive institutions for the training and support of students and laboratory and field operations without restriction as to problem or project.

The conference completed its heavy load of scientific study and work in a spirit of friendly and effective cooperation unusual for so large and assorted a gathering.

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Meeting Notes

■ The University of Michigan's ninth annual conference on aging, which took place in July, was attended by more than 700 persons from this country and Canada. Participants included Edward L. Bortz of Philadelphia; Johan Bjorksten, the Bjorksten Research Foundation, Madison, Wis.; William B. Lountz, Washington University; Gordon Aldridge, Michigan State University; and L. E. Burney, assistant surgeon general.

■ The National Council of Phi Tau Sigma, the honor society for food science, has granted a charter for a chapter at the University of Georgia in Athens. Other chapters are at the University of Massachusetts, Massachusetts Institute of Technology, and Rutgers University.

■ The third Western Area Development Conference will be held at Phoenix, Ariz., 31 Oct.–1 Nov., with "Resources for industrial expansion" as its theme. Arranged by Stanford Research Institute and cosponsored by the Confederacion de Camaras Industriales de los Estados Unidos Mexicanos, the conference is expected to attract more than 500 business and industrial executives from the United States, Mexico, and Canada.

Executive secretary of the conference is Carleton Green, manager of the Mountain States Office of Stanford Research Institute at Phoenix.

■ The German engineering societies, VDI and VDE, are sponsoring an automatic control conference to be held at the University of Heidelberg 25–29 Sept. This will be an international meeting with the Soviet Union actively participating. There will be more than 80 papers by automatic control experts from the United States, Japan, Yugoslavia, and several other countries.

Society Elections

■ National Association of Science Writers: pres., Roland H. Berg, *Look Magazine*; sec., John Troan, *Pittsburgh Press*. Representative to the AAAS Council is Herbert B. Nichols.

■ Phi Tau Sigma, the honor society for food science: pres., Carl S. Pederson, Cornell University; v. pres., Emil N. Mrak, University of California; sec.-treas., Edward E. Anderson, University of Massachusetts; exec.-sec., F. J. Francis, University of Massachusetts.

■ American Association of Neuropathologists: pres., Ben Lichtenstein, Chicago, Ill.; v. pres., K. Scharenberg, Ann Arbor, Mich.; sec.-treas., Leon Roizin, New York, N.Y.

■ American Society of Ichthyologists and and Herpetologists: pres., Edward H. Taylor, University of Kansas; sec., Arnold B. Grobman, Florida State Museum, University of Florida, Gainesville; treas., Coleman J. Goin, University of Florida. The vice presidents are John C. Marr, U.S. Fish and Wildlife Service; L. P. Woods, Chicago Natural History Museum; A. P. Blair, University of Tulsa.

■ American Neurological Association: pres., H. Houston Merritt; pres.-elect, Israel S. Wechsler; 1st v. pres., Richard B. Richter; 2nd v. pres., Augustus Rose; sec.-treas., Charles Rupp.

■ American Board of Oral Medicine: chairman, Samuel C. Miller, New York University College of Dentistry; sec., Lester W. Burket, University of Pennsylvania School of Dentistry; treas., Harold R. Gelhaar, Upper Montclair, N.J.

■ American Home Economics Association: pres., Beulah V. Gillaspie, Purdue University; sec., Nellie Buckey, Department of Education, Baltimore, Md.

Forthcoming Events

August

27–31. Colloquium on Statistical Mechanics of Transport Processes, IUPAP, Brussels, Belgium. (I. Prigogine, 40 Avenue F. D. Roosevelt, Brussels.)

September

3–10. History of Science, 8th intern. cong., and International Union for the History of Science, 4th general assembly, Florence and Milan, Italy. (Vasco Ronchi, Instituto Nazionale di Ottica, via San Leonardo 79, Florence, Italy.)

4–5. Meteoritical Soc., 19th meeting, Bloomington, Ind. (C. W. Beck, Dept. of Geology, Indiana Univ., Bloomington.)

4–6. International Assoc. of Milk and Food Sanitarians, annual, Seattle, Wash. (H. L. Thomasson, IAMFS, Box 437, Shelbyville, Ind.)

4–7. American Physiological Soc., Rochester, N.Y. (M. O. Lee, APS, 9650 Wisconsin Ave., Washington 14.)

4–9. American Ornithologists' Union, annual, Denver, Colo. (H. F. Mayfield, 2557 Portsmouth Ave., Toledo 13, Ohio.)

4–11. International Geological Cong., 20th, Mexico, D.F. (Congreso Geológico Internacional, Calle Balderas 36, Despacho 302-A, Mexico, D.F.)

4–11. International Paleontological Union, Mexico, D.F. (H. E. Vokes, Johns Hopkins Univ., Baltimore 18, Md.)

5–7. Atmospheric Optics Symposium, Petersborough, N.H. (F. D. Smith, Boston Univ. Physical Research Labs., 700 Commonwealth Ave., Boston 15, Mass.)

5–7. Cryogenic Engineering Conf., Boulder, Colo. (P. L. Barrick, National Bureau of Standards Cryogenic Engineering Laboratory, Boulder.

5–7. Wyoming Geological Field Conf., 11th annual, Moran, Wyo. (K. W. Frielinghausen, Box 1571, Casper, Wyo.)

5–13. International Cong. of Applied Mechanics, 9th, Brussels, Belgium. (H. L. Dryden, Director, National Advisory Committee for Aeronautics, Washington 25.)

6–8. American Political Science Assoc., annual, Washington, D.C. (E. M. Kirkpatrick, APSA, 1726 Massachusetts Ave., NW, Washington 6.)

6–8. Phi Sigma Soc., Ann Arbor, Mich. (K. F. Lagler, Dept. of Fisheries, School of Natural Resources, Univ. of Michigan, Ann Arbor.)

6–12. International Genetics Symposium, Tokyo and Kyoto, Japan. (Secretary, IGS 1956 (Science Council of Japan, Ueno Park, Tokyo.)

7–9. American Sociological Soc., annual, Detroit, Mich. (Mrs. M. W. Riley, ASS, New York Univ., Washington Square, New York 3.)

7–10. American Statistical Assoc., annual, Detroit, Mich. (D. C. Riley, ASA, 1757 K St., NW, Washington 6.)

7–10. Biometric Soc., ENAR, Detroit, Mich. (A. M. Dutton, Univ. of Rochester, Box 287, Station 3, Rochester 20, N.Y.)

7–10. Econometric Soc., Detroit, Mich. (R. Ruggles, Dept. of Economics, Yale Univ., New Haven, Conn.)

9–12. American Inst. of Chemical Engineers, Pittsburgh, Pa. (F. J. Van Antwerpen, AIChE, 25 W. 45 St., New York 36.)

9–13. International College of Surgeons, 21st annual, Chicago, Ill. (K. A. Meyer, 1516 Lake Shore Drive, Chicago 10.)

9–14. International Cong. of Clinical Chemistry, New York, N.Y. (J. G. Reinhold, 711 Maloney Bldg., Univ. of Pennsylvania, Philadelphia 4.)

9–16. Cong. on Analytical Chemistry, Lisbon, Portugal. (P. A. Laurent, Instituto Superior Tecnico, Av. Rovisco Pais, Lisbon.)

10–12. American Soc. of Mechanical Engineers, fall, Denver, Colo. (C. E. Davies, ASME, 29 W. 39 St., New York 18.)

10–12. Electron Microscope Soc. of America, annual, Madison, Wis. (Miss J. R. Cooper, Nela Park 130, Cleveland 12, Ohio.)

10–14. Electron Transport in Metals and Solids, colloq., Intern. Union of Pure and Applied Physics, Ottawa, Canada. (K. C. MacDonald, National Research Council, Ottawa.)

10–14. European Soc. of Cardiology, 2nd cong., Stockholm, Sweden. (K. E. Grewin, Sodersjukhuset, Stockholm.)

10–14. Immunomicrobiological Standardization Symposium, 2nd, Rome, Italy. (G. Penso, Instituto Superiore di Sanita, Viale Regina Elena, 299, Rome.)

10–14. International Conf. on Fatigue of Metals, London, England. (Secretary, Institution of Mechanical Engineers, 1, Birdcage Walk, Westminster, London, S.W.1.)

10–14. International Cong. on Catalysis, Philadelphia, Pa. (H. Heinemann, ICC, c/o Houdry Process Corp., P.O. Box 427, Marcus Hook, Pa.)

10–14. International Cong. of Dietetics, 2nd, Rome, Italy. (American Dietetic Assoc., 620 N. Michigan Ave., Chicago 11, Ill.)

(See issue of 20 July for comprehensive list)