

Meetings

Tsunami Runup: United States— Japan Cooperative Science Program

A symposium on tsunami runup and local effects, held 16–24 April 1965 in Sapporo (Hokkaido) and Tokyo, Japan, resulted from a resolution adopted during a seminar on tsunamis and storm surges, held in May 1963 under the auspices of the U.S.–Japan Cooperative Science Program. No formal papers were presented at the symposium, but a dozen invited participants informally presented the results of current research by themselves or their associates. Because the world's specialists in this field participated, and because the discussions covered most aspects of the tsunami problem (from generation to eventual decay), it is felt that this symposium was one of the most productive ever held on this particular subject. The high technical level of the discussions was aided by the exchange of presentation summaries among participants some weeks before the meeting.

The final session was devoted to summarization and resolution, as follows:

1) The wave pattern near the origin of a tsunami can be computed with some confidence if the spatial extent and time history of the bottom motion are known. Some information on bottom motion can be obtained from seismic and barometric evidence (there is evidence that tsunamis are also generated in the atmosphere by large earthquakes).

2) The propagation of tsunami energy and tsunami waves outward from a known source over a spherical ocean with arbitrary depth contours appears to be a difficult but not mysterious problem. Present efforts are underway to develop, with high-speed computers, rapid analysis techniques for such calculations. Computer tapes containing the ocean bathymetry as a function of position are already available for all oceans.

3) Present theory and experiments indicate that wave behavior in shallow water in the nearshore region can probably be computed within an acceptable degree of accuracy by linear hydrodynamic theory. Such computation can be achieved almost to the point of wave breaking, although the calculations become increasingly complex in shallow water. It is still an open question as to whether it is easier to study nearshore problems by numerical methods or by hydraulic models. It appears that fairly rough numerical models would give average effects to an acceptable degree of accuracy.

4) The fine details of water motion at and above the shoreline seem to be beyond the scope of computation methods because of the influence of nonlinear effects such as friction, turbulence, and Mach-stem reflection. Therefore water motion is more appropriately studied by hydraulic-model experiments.

5) In order to minimize scale effects, tsunami models of the nearshore region must necessarily be very large. No facility of sufficient size presently exists anywhere in the world.

6) The advantage of an international tsunami research center and model facility was unanimously stressed as the best means of providing solutions of particular engineering problems and for the general study of coastal effects.

The Japanese delegation, headed by Tsutomu Kishi (Hokkaido University) did an excellent job in planning the sessions, which included visits to hydraulics laboratories at the University of Hokkaido and to the Kashima Institute of Civil Engineering Research. This meeting provided a comprehensive, up-to-date picture of the general phenomenology of tsunamis, and suggestions for future work on still unsolved problems.

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Forthcoming Events

August

14–6. **Digital Computers** for College Teachers of Science, Mathematics, and Engineering, Univ. of Southwestern Louisiana, Lafayette. (J. R. Oliver, Box 133, USL Station, Lafayette 70506)

14–19 Sept. International Assoc. for **Quaternary Research**, 7th Congr., Boulder and Denver, Colo. Field conf., 14–29 Aug. and 5–19 Sept.; general assembly, 30 Aug.–5 Sept. (G. M. Richmond, Room 2462, Bldg. 25, Denver Federal Center, Denver 80225)

15–20. American Inst. of **Biological Sciences**, Urbana, Ill. (AIBS, 3900 Wisconsin Ave., NW, Washington, D.C.)

The following societies will meet in conjunction with the AIBS. Unless otherwise indicated, the local chairmen are at the University of Illinois, Urbana.

American **Bryological** Soc. (G. N. Jones, Dept. of Botany)

American **Fern** Soc. (G. N. Jones, Dept. of Botany)

American **Fisheries** Soc. (G. Bennett, Aquatic Biology Section)

American **Genetic** Assoc. (S. Price, Room 210 S. Bldg., Plant Industry Station, Beltsville, Md.)

American **Microscopical** Soc. (L. J. Thomas, Dept. of Zoology)

American Soc. for **Horticultural Science**. (C. J. Birkeland, Dept. of Horticulture)

American Soc. of **Limnology and Oceanography**. (W. Larrimore, Illinois Natural History Survey, Urbana)

American Soc. of **Plant Physiologists** (J. B. Hanson, Dept. of Agronomy)

American Soc. of **Plant Taxonomists**. (W. Payne, Dept. of Botany)

American Soc. of **Zoologists**. (L. Ingle, Dept. of Zoology)

Animal Behavior Soc. (G. P. Waldbauer, Dept. of Entomology)

Botanical Soc. of America. (D. J. Paolillo, Dept. of Botany, 302 Natural History Bldg.)

Ecological Soc. of America. (L. C. Bliss, Dept. of Botany)

Mycological Soc. of America. (D. P. Rogers, Dept. of Botany)

National Assoc. of **Biology Teachers**. (H. Weaver, Dept. of Recreation and Municipal Park Administration)

Nature Conservancy. (L. J. Stannard, Illinois Natural History Survey, Urbana)

Phycological Soc. of America. (L. Hoffman, Dept. of Botany)

Society for **Industrial Microbiology**. (L. D. Witter, Food Science Dept.)

Society for the Study of **Development and Growth**. (D. L. Nanney, Dept. of Zoology)

Society for the Study of **Evolution**. (L. J. Stannard, Illinois Natural History Survey, Urbana)

Society of **Nematologists**. (D. P. Taylor, 106 Horticulture Field Laboratory)

Tomato Genetics Cooperative. (A. Thompson, Dept. of Horticulture)

15–20. **Energetics**, American Soc. of Mechanical Engineers, conf., Rochester, N.Y. (ASME, 345 E. 47 St., New York)

15–21. **Ophthalmology**, 8th Pan Ameri-

can Congr., Rio de Janeiro, Brazil. (W. D. Estrada, Praca Cardea, Arcoverde 25, Copacabana, Rio de Janeiro)

16-18. **Guidance and Control**, conf., Minneapolis, Minn. (D. L. Mellen, Mail Station 677, Military Products Group, Aeronautical Div., Honeywell, Inc., Minneapolis 55440)

16-20. Australian-New Zealand Assoc. for the **Advancement of Science**, Univ. of Tasmania, Hobart, Tasmania, Australia. (K. D. Nicolls, Div. of Soils, CSIRO, Stowell Ave., Hobart)

16-20. **Liquid Crystals**, conf., Kent State Univ., Kent, Ohio. (G. H. Brown, Dept. of Chemistry, Kent State Univ., Kent)

16-20. American Soc. for **Pharmacology and Experimental Therapeutics**, fall meeting, Univ. of Pennsylvania, Philadelphia. (E. B. Cook, 9650 Wisconsin Ave., Washington, D.C. 20014)

16-21. **Electron Diffraction and the Nature of Defects in Crystals**, intern. conf., Melbourne, Australia. (R. I. Garrod, Astronautical Research Laboratories, Box 4331, G.P.O., Melbourne)

16-3. **Kinematical and Chemical History of the Galaxy**, NATO inst., Sussex, England. (R. Wooley, Herstmonceux Castle, Sussex)

16-3. **Radiation Trapped in the Earth's Magnetic Field**, NATO institute, Bergen, Norway. (B. M. McCormac, Geophysics Div., IIT Research Inst., 10 W. 35 St., Chicago, Ill. 60515)

17-20. **Anesthesiology**, symp., Czechoslovak Medical Soc., Prague. (J. Hoder, Unemocnice 2, Prague 2)

17-20. **Atmospheric Pollution**, 2nd Clean Air Conf., Sydney, Australia. (J. L. Sullivan, New South Wales Dept. of Health, P.O. Box 31, George St. North Post Office, Sydney)

17-27. **Infrared Spectroscopy**, 16th annual inst., Fisk Univ., Nashville, Tenn. (Director, Fisk Infrared Inst., Fisk Univ., Nashville 8)

18-20. American **Astronautical Soc.**, natl. meeting, San Francisco, Calif. (J. N. Nielsen, P.O. Box 642, Los Altos, Calif.)

18-25. **Upper Atmosphere Chemistry** Circulation and Aerosols, symp., Intern. Assoc. of Meteorology and Atmospheric Physics, Visby, Sweden. (The Association, Commission of Atmospheric Chemistry and Radioactivity, c/o Natl. Center for Atmospheric Research, Boulder, Colo.)

20-21. American Inst. of **Ultrasonics in Medicine**, 1st Pan American meeting, Lima, Peru. (C. Bustamante Ruiz, Dept. of Physical Medicine and Rehabilitation, Hospital Obrero, Lima)

21. American Assoc. of **Electromyography and Electrodiagnosis**, annual, Philadelphia, Pa. (M. K. Newmarf, 16861 Wyoming Ave., Detroit, Mich. 48221)

21. **Spectroscopy**, 5th, Intern. Union of Pure and Applied Physics commission, Copenhagen, Denmark. (W. Price, Dept. of Physics, Kings College, Univ. of London, London, W.C.2, England)

21-25. **Insect Endocrinology**, symp., Prague, Czechoslovakia. (F. Hrabal, Foreign Relations Dept., Czechoslovak Acad. of Sciences, Narodni tr. 3, Prague 1)

22-25. **Soil Conservation Soc. of America**, Philadelphia, Pa. (H. W. Pritchard, 7515 Ankeny Rd., Ankeny, Iowa)

22-27. **Medical Electronics and Biomedical Engineering**, Tokyo, Japan. (K.

Suhara, Japan Soc. of Medical Electronics and Biological Engineering, Old Toden Bldg., 1-1 Shiba-tamura-cho, Minato-ku, Tokyo)

22-27. **Microchemical Techniques**, intern. symp., Pennsylvania State Univ., University Park. (H. Francis, Jr., Pennsalt Chemicals Corp., 900 First Ave., King of Prussia, Pa.)

22-27. American Acad. of **Physical Medicine and Rehabilitation**, Philadelphia, Pa. (M. K. Newman, 16861 Wyoming Ave., Detroit, Mich. 48221)

22-28. **Physiology of Giant Algal Cell**, conf., Australian Acad. of Science, Canberra, Australia. (The Academy, Gordon St., Canberra)

22-28. **Industrial Research**, 16th annual conf., Tuxedo, N.Y. (R. T. Livingston, School of Engineering and Applied Science, Columbia Univ., New York, N.Y.)

22-28. **Lunar Geology**, intern. field conf., Bend, Ore. (L. Staples, Dept. of Geology, Univ. of Oregon, Eugene)

23-25. **Cryogenic Engineering**, conf., Houston, Tex. (K. D. Timmerhaus, Engineering Research Center, Univ. of Colorado, Boulder 80304)

23-25. American Soc. of **Human Genetics**, Seattle, Wash. (J. B. Graham, Dept. of Pathology, Univ. of North Carolina, Chapel Hill)

23-25. **Plant Phenolics** Group of North America, annual, Albany, Calif. (V. C. Runeckles, Imperial Tobacco Co. of Canada, P.O. Box 6500, Montreal, Quebec)

23-26. **Clay Minerals Soc.**, 2nd annual, Univ. of California, Berkeley. (J. A. Pask, Dept. of Mineral Technology, Univ. of California, Berkeley 94720)

23-26. **Quantum Chemistry**, Physical Chemistry Div., Chemical Inst. of Canada, Edmonton, Alta. (The Institute, 48 Rideau St., Ottawa 2, Ont.)

23-27. **Control Procedures in Drug Production**, seminar, Univ. of Wisconsin, Madison. (W. Blockstein, Extension Services in Pharmacy, Univ. of Wisconsin, Madison)

23-27. **Neurological Surgery**, 3rd intern. Congr., Copenhagen, Denmark. (DIS Congress Service, Sankt Peders Straide 19, Copenhagen K)

23-27. American **Ornithologists Union**, Ohio State Univ., Columbus. (R. Mewaldt, San Jose State Teachers College, San Jose, Calif.)

23-27. **Space**, 5th annual conf., Virginia Polytechnic Inst., Blacksburg. (M. L. Collier, Jr., Virginia Polytechnic Inst., Blacksburg)

23-28. American **Physiological Soc.**, Univ. of California, Los Angeles. (R. G. Daggs, 9650 Wisconsin Ave., Washington, D.C. 20014)

23-29. European Soc. of **Haematology**, 10th Congr., Strasbourg, France. (R. Waitz, Faculté de Médecine, Inst. d'Hématologie, 1, Pl. de l'Hôpital, Strasbourg, Bas-Rhin, France)

23-29. **Logopaedics and Phoniatrics**, 13th intern. Congr., Vienna, Austria. (Mrs. A. M. Jorg, Vienna Acad. of Medicine, Alserstr. 4, Vienna 9)

23-30. **Limnology**, 16th intern. Congr., Warsaw, Poland. (G. E. Hutchinson, Yale Univ., New Haven, Conn.)

24-26. Association for **Computing Machinery**, 20th natl. conf., Cleveland, Ohio. (G. J. Moshos, P.O. Box 4741, Cleveland)

24-26/28-29. **History of Science**, 11th intern. Congr., Warsaw and Krakow, Poland. (W. Voisé, Inst. of the History of Science and Technology, Polish Acad. of Sciences, Nowy Swiat 72, Room 19, Warsaw 1)

24-27. Western **Electronic Conv.** (WESCON), San Francisco, Calif. (E. L. Rogers, Wescon, Suite 203, 780 Welch Rd., Palo Alto, Calif.)

24-27. **Pharmaceutical Sciences**, 25th intern. Congr., Prague, Czechoslovakia. (Pharmaceutical Section, Czechoslovak Medical Soc., J. E. Purkny, U Elektry 8, Prague)

24-28. **Electron Microscope Soc.**, 23rd annual, New York, N.Y. (L. Ross, Anatomy Dept., Cornell Univ. Medical College, 1300 York Ave., New York)

25-27. **Gas Dynamics**, 6th biennial conf., Evanston, Ill. (A. B. Cambel, Gas Dynamics Symp., Northwestern Univ., Evanston 60201)

25-27. **Thymus**, Ciba Foundation symp., Melbourne, Australia. (Ciba, 41, Portland Place, London, W.1, England)

25-27. **X-Ray Analysis**, 14th annual conf., Denver, Colo. (Metallurgy Div., Denver Research Inst., Univ. of Denver, Denver 80210)

25-28. **Systems Engineering for Control System Design**, Tokyo, Japan. (H. M. Paynter, Mechanical Engineering Dept., Massachusetts Inst. of Technology, Cambridge 39)

25-28. **Photochemistry**, intern. conf., Tokyo, Japan. (I. Tanada, Laboratory of Physical Chemistry, Tokyo Inst. of Technology, Ookayama, Meguro-ku, Tokyo)

25-28. International **Phycological Soc.**, Halifax, N.S., Canada. (E. G. Young, Natl. Research Council of Canada, Halifax)

25-28. **Seaweed**, 5th intern. symp., Halifax, N.S., Canada. (E. G. Young, Natl. Research Council of Canada, Halifax)

26-28. **Helium Superfluidity**, symp., St. Andrews, Scotland. (J. F. Allen, St. Andrews Univ., St. Andrews)

26-28. **Neurovirulence**, symp., Munich, Germany. (Permanent Section of Microbiological Standardization, Intern. Assoc. of Microbiological Societies, Inst. d'Hygiène, Geneva, Switzerland)

26-28. National Council of **Teachers of Mathematics**, Vancouver, B.C., Canada. (J. D. Gates, 1201 16th St., NW, Washington, D.C. 20036)

29-2. American Assoc. of **Clinical Chemists**, 17th natl., Chicago, Ill. (M. E. Hanke, 8424 Rhodes Ave., Chicago)

29-2. **Illuminating Engineering Soc.**, New York, N.Y. (A. D. Hinckley, 345 East 47 St., New York 10017)

29-3. AAAS, Laurentian **Hormone** Conf., Mont Tremblant, Quebec, Canada. (J. C. Foss, Laurentian Hormone Conf., 222 Maple Ave., Shrewsbury, Mass.)

29-10. **Forest Hydrology**, intern. symp., Pennsylvania State Univ., University Park. (W. E. Sopper, School of Forestry, Pennsylvania State Univ., University Park)

30-31. **Past and Future of Science**, symp., Krakow, Poland. (B. Suchodolski, Polish Acad. of Sciences, Palace of Culture and Sciences, Warsaw)

30-1. **Antennas and Propagation**, intern. symp., Washington, D.C. (R. J. Adams, Code 5330, U.S. Naval Research Laboratory, Washington 20390)