

Meetings

Friends of the Pleistocene

On the evening of 8 May 1959, the Midwestern Friends of the Pleistocene assembled at Hotel Eau Claire, Eau Claire, Wis., for their tenth annual field conference. Under the leadership of Robert F. Black (University of Wisconsin), about 90 participants from the Midwest, Washington, D.C., and Denver, Colo., spent a day and a half examining the glacial geology of west-central Wisconsin. On the first day the group traveled in private cars from the prominent St. Croix moraine of Cary age, near Hudson, southeastward across pre-Cary deposits to the vicinity of the Chippewa River. The next day, glacial deposits of pre-Cary age were examined in the vicinity of Eau Claire.

Research that led to the field conference was started in the fall of 1956, with the financial assistance of the Wisconsin Alumni Research Foundation. Studies were conducted during the school year by Robert F. Black, assisted by L. A. Bayrock, Thomas E. Berg, and Elizabeth H. Kissling. Some data were gathered under the auspices of the Wisconsin State Highway Commission.

It is still too soon to draw definite conclusions from many of the various studies being carried on. Many tentative conclusions were presented for the benefit of participants of the conference. Most important is the conclusion that no surficial glacial deposits in west-central Wisconsin are older than early Wisconsin, the previous correlations of deposits in concentric belts with Illinoian, Kansan, and Nebraskan notwithstanding.

In northwest St. Croix County the Cary front in places is a pronounced terminal moraine of clay-silt-sand till; generally, only thin ice-stagnation features of relatively clean, gravelly sand may be found for several miles beyond what normally would be considered the main terminal moraine. The small size of the stagnation features, the paucity of outwash deposits, the slight reworking of older outwash deposits, the obvious inability of the ice to cover low uplands and to erode, and the obvious topographic control and gravity flow of ice in diverse directions within lowlands suggest a warm and very thin advance of ice at a late stage of the Cary. Where poorly sorted till is found back of the outermost limits of the Cary advance, leaching to depths of many feet, considerable alteration of minerals in the finer fraction, and oxidation through tens of feet of material suggest that older, weathered till constitutes the bulk of the material transported and deposited by the Cary ice. The Cary advance blocked established drainage lines,

of which few became reestablished; drainage is poorly integrated—undrained depressions are characteristic. Primary depositional features are essentially unmodified. Ice flow was southeastward near Hudson in the St. Croix lobe and southwestward near Chippewa Falls in the Chippewa lobe; ice from both lobes came through the Lake Superior lowland. The Kinnickinnic, Rush, Red Cedar, and Chippewa river valleys carried outwash from the Cary ice, the last two being by far the most important. An extensive system of terraces in the Chippewa, St. Croix, and Mississippi river valleys and their immediate tributaries has not been studied.

Deposits left by an advance slightly older than the Cary and tentatively assigned to Tazewell age are identified in west-central St. Croix County, north of highway 12 and outside the Cary front. For lack of time they were not examined during the field conference.

Deposits left by an older advance are of several lithologies and textures, the main types being: (i) a basal dark-gray clayey till restricted to areas underlain with dolomite; (ii) a reddish-brown sandy till in areas underlain with sandstone and generally on top of, but also mixed with, the dark-gray clayey till in areas underlain with dolomite; and (iii) stratified glacial-fluvial deposits of many kinds. All gradations of these units may be found. Patches of unleached till are not common. Leaching penetrates from a few inches to more than 15 feet, depending on the original carbonate content and texture. Most till accumulations are only a few feet thick, but maximum thickness of drift exceeds 100 feet, as at Woodville. Till is absent over large parts of the area, and glacial deposits are limited commonly to a few scattered erratics or to a few inches of colluviated materials in part derived from glacial drift.

Kames are a conspicuous feature of the deposits and are found almost everywhere northwest of the Chippewa River. Moulin kames are most abundant; kame terraces and irregular kames also attest to ice stagnation. The wide range of lithology and texture of kame materials in adjacent deposits demonstrates the complexity of the situation—dolomite gravels may be adjacent to noncalcareous iron-stained gravels or to partly calcareous gravels with thick clay-ironstone concretionary shells. Cemented and uncemented, unoxidized and oxidized, fresh and disintegrated materials may lie side by side in perplexing array. However, the degree of surface modification of the kames is similar throughout.

The dark-gray clayey till seems to be typical lodgment till; the sandy till is partly ablation debris. Patches of thick drift cannot be aligned into simple moraines or ice fronts, nor can the kames or concentrations of large erratics dis-

tributed so widely in the area. The irregularity of drift deposition seems to reflect merely the fact that the drift was concentrated irregularly in the ice when it stagnated. Movement of early Wisconsin ice throughout the area from Eau Claire westward to Hudson is believed to have been from the north to the northwest, and distinct lobes, such as occurred in the late Wisconsin advances, did not exist.

Considerable postglacial erosion of bedrock, particularly sandstone, has occurred. Solifluction lobes, involutions, terracettes, stone stripes, ice-wedge casts, mass-wasted scallops, and sapped cliffs point to former cold climates and to dominance of gravity movements and frost processes over stream action at some time after deglaciation. Geomorphic analysis of the older landscape reveals no areas of distinctly different ages. The incomplete weathering and relatively minor dissection of thick deposits indicate an early Wisconsin age; this has been confirmed with two carbon-14 dates which give approximately 30,000 years for the advance of early Wisconsin ice across a residual soil with much chert and a forest cover on dolomite. [Sample W-747 (U.S. Geological Survey) is spruce, dated at $29,000 \pm 1,000$ years before the present, from dark-gray clayey till at a depth of 14 feet about 3 miles southwest of Hammond, in the NW $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 6, T 28N, R 17W; sample Y-572 (Lamont Laboratory) is spruce, dated at $30,650 \pm 1,640$ years before the present, from dark-gray clayey till at a depth of 50 feet in the Chicago, St. Paul, Minneapolis, and Omaha railroad cut in Woodville]. The similarity of the upper parts of thick drift, with thin drift occurring patchily over the area, indicates that no great difference in age or source can exist.

Lapping of the early Wisconsin ice onto the "driftless area" brought the clean upper portions of the ice sheet onto the higher ridges so that little erratic material was available for deposition. Hence, the limits of the early Wisconsin advance must be determined by vague criteria such as thickness of residual materials, loess accumulations, drainage changes, and erosional features. None is particularly diagnostic. Early Wisconsin ice is believed to have extended farther into the "driftless area" than is shown on most published maps, but positive proof is lacking.

The presence of materials of diverse lithology and great range of alteration in adjacent deposits suggests that the early Wisconsin ice reworked older glacial deposits. Glacial deposits buried tens of feet below the surface and beneath a buried soil that is older than 45,000 years were found by Francis Hole (written communication, 13 Sept.

1958) in Wood County. It is likely that west-central Wisconsin also was glaciated sometime prior to the advance dated about 30,000 years ago, but it is not known whether this was pre- or post-Sangamon.

ROBERT F. BLACK

Department of Geology,
University of Wisconsin, Madison

Forthcoming Events

August

16-19. Botanical Nomenclature, discussions (Intern. Bureau for Plant Taxonomy and Nomenclature), Montreal, Canada. (J. Rousseau, Natl. Museum, Ottawa, Canada.)

16-21. American Pharmaceutical Assoc., Cincinnati, Ohio. (R. P. Fischelis, APA, 2215 Constitution Ave., NW, Washington 7.)

17. Ultrasonics, natl. symp., San Francisco, Calif. (L. G. Cumming, Inst. of Radio Engineers, 1 E. 79 St., New York 21.)

17-21. Pacific Southwest Assoc. of Chemistry Teachers, Pacific Grove, Calif. (W. A. Craig, 416 N. Citrus Ave., Los Angeles 36, Calif.)

17-22. Logopedics and Phoniatrics, 11th intern. cong., London, England. (Miss P. Carter, 46 Canonbury Square, London N.1, England.)

19-26. Refrigeration, 10th intern. cong., Copenhagen, Denmark. (M. Kondrup, Danish Natl. Committee, Intern. Congress of Refrigeration, P.O. Box 57, Roskilde, Denmark.)

19-29. Botanical Cong., 9th intern., Montreal, Canada. (C. Frankton, Secretary-General, 9th Intern. Botanical Cong., Science Service Bldg., Ottawa, Ontario, Canada.)

19-29. International Assoc. of Wood Anatomists, Montreal, Canada. (IAWA, Laboratorium für Holzforschung E.T.H. Universitatstrasse 2, Zurich, Switzerland.)

19-29. Mycological Soc. of America, Montreal, Canada. (E. S. Beneke, Dept. of Botany and Plant Pathology, Michigan State Univ., E. Lansing.)

19-29. Phycological Soc. of America, Montreal, Canada. (W. A. Daily, Dept. of Botany, Butler Univ., Indianapolis 7, Ind.)

20-22. Rocky Mountain Radiological Soc., Denver, Colo. (J. H. Freed, 4200 E. Ninth Ave., Denver 20.)

20-25. Chemical Thermodynamics, symp., Wattens, Austria. (F. Vorländer, Deutsche Bunsen-Gesellschaft, Carl-Bosh-Haus, Varrentrappstrasse, 40-42, Frankfurt a.M., Germany.)

20-27. Therapeutics, symp., Gardone, Italy. (R. Morf, c/o Sandoz S.A., Basel 13, Switzerland.)

20-2. Limnological Cong., 14th intern., Vienna and Salzburg, Austria. (Secretary, 14th Intern. Limnological Congress, Biologische Station, Lunz am See, Austria.)

23-26. American Farm Economic Assoc., Ithaca, N.Y. (C. D. Kearl, Dept. of Agricultural Economics, Warren Hall, Cornell Univ., Ithaca.)

23-26. Electromotion, 6th electrical conf. of petroleum industry, Long Beach,

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23-27. Veterinary Medicine, 3rd Pan-American Cong., Kansas City, Mo. (B. D. Blood, Pan-American Congresses of Veterinary Medicine, P.O. Box 99, Azuk, Buenos Aires Province, Argentina.)

24-26. American Accounting Assoc., Boulder, Colo. (C. Cox, 437 Hagerty Hall, Ohio State Univ., Columbus 10.)

24-26. Anti-Submarine Warfare (classified), symp., San Diego, Calif. (R. R. Dexter, Inst. of the Aeronautical Sciences, 2 E. 64 St., New York 21.)

24-26. Dynamics of Conducting Fluids,

symp. (American Rocket Soc., and Northwestern Univ.), Evanston, Ill. (J. J. Harford, ARS, 500 Fifth Ave., New York 36.)

24-27. American Hospital Assoc., New York, N.Y. (E. L. Crosby, 18 E. Division St., Chicago, Ill.)

24-28. Australian and New Zealand Assoc. for the Advancement of Science, 34th cong., Perth, Western Australia. (J. R. A. McMillan, Science House, 157 Gloucester St., Sydney, Australia.)

24-29. Infrared Spectroscopy Inst., 10th annual, Nashville, Tenn. (N. Fuson, Director, Infrared Spectroscopy, Fisk Univ., Nashville 8.)

24-29. International Assoc. for Hydraulic Research, cong., Montreal, Canada. (IAHR, c/o Laboratoire Hydraulique, Raam 61, Delft, Netherlands.)

24-29. Ionization Phenomena in Gases, 4th intern. conf., Upsala, Sweden. (A. Nilsson, Secretary-General, Inst. of Physics, Upsala, Sweden.)

24-29. Polarography, 2nd intern. cong., Cambridge, England. (Mrs. B. Lamb, Chemistry Lab., Evershed & Vignoles, Corner of Iveagh Ave., N. Circular Rd., London, N.W.10, England.)

24-30. Modern Systems for Detecting and Evaluating Optical Radiation (Intern. Optical Commission), symp., Stockholm, Sweden. (S. S. Ballard, Dept. of Physics, Univ. of Florida, Gainesville.)

25-27. Petroleum Industry Conf., AIEE, Long Beach, Calif. (N. S. Hibshman, AIEE, 33 W. 39 St., New York 18.)

25-28. Alaskan Science Conf., Alaskan Div., AAAS, 10th, Juneau. (N. J. Wilimovsky, Bur. of Commercial Fisheries, Box 2021, Juneau.)

25-28. American Dietetic Assoc., 42nd annual, Los Angeles, Calif. (Miss R. M. Yakel, ADA, 620 N. Michigan Ave., Chicago 11, Ill.)

25-30. American Ornithologists' Union, Regina, Saskatchewan, Canada. (H. G. Deignan, Div. of Birds, U.S. National Museum, Washington 25.)

26-29. International Assoc. of Milk and Food Sanitarians, Glenwood Springs, Colo. (V. T. Foley, Health Dept., Kansas City, Mo.)

26-29. International Union of Pure and Applied Chemistry, 20th conf., Munich, Germany. (Div. of Chemistry and Chemical Technology, Natl. Research Council, Washington 25.)

27-29. American Assoc. of Clinical Chemists, 11th annual, Cleveland, Ohio. (A. Hainline, Jr., AACC, Cleveland Clinic Foundation, 2020 E. 93 St., Cleveland 6, Ohio.)

27-29. American Physical Soc., Hawaii. (K. K. Darrow, APS, Columbia Univ., New York 27.)

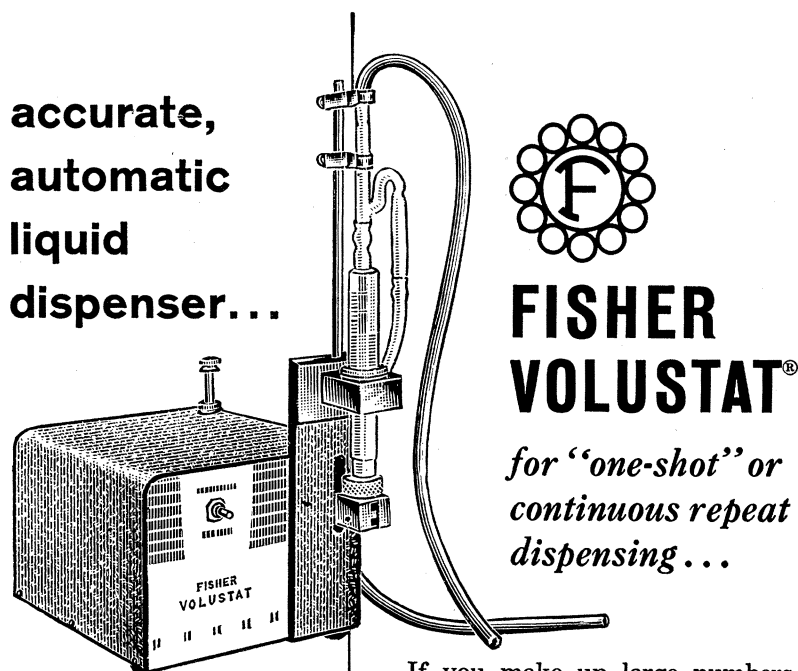
28-29. Weather Modification (with American Soc. of Civil Engineers), conf., Denver, Colo. (H. G. Houghton, AMS, Dept. of Meteorology, Massachusetts Inst. of Technology, Cambridge 39, Mass.)

28-30. American Folklore Soc., annual, Albany and Cooperstown, N.Y. (MacE. Leach, 110 Bennett Hall, Univ. of Pennsylvania, Philadelphia 4.)

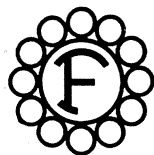
28-31. Astronomical League, Denver, Colo. (R. Dakin, 720 Pittsford-Victor Rd., Pittsford, N.Y.)

28-4. International Union for Scientific Study of Population, cong., Vienna, Austria. (F. Lorimer, Dept. of Sociology, American Univ., Washington, D.C.)

30-3. American Inst. of Biological Sciences, annual, University Park, Pa. (H. T. Cox, AIBS, 2000 P St., NW, Washington 6.)



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The following 17 meetings are being held in conjunction with the AIBS meeting at University Park, Pa.

American Microscopical Soc. (T. H. Cheng, Dept. of Zoology and Entomology, Pennsylvania State Univ., University Park.)

American Phytopathology Soc. (J. E. Livingston, Dept. of Botany and Plant

Pathology, Pennsylvania State Univ., University Park.)

American Soc. for Horticultural Science. (R. E. Larson, Dept. of Horticulture, Pennsylvania State Univ., University Park.)

American Soc. of Human Genetics. (C. C. Li, Graduate School of Public Health, Univ. of Pittsburgh, Pa.)

American Soc. of Limnology and Oceanography. (E. L. Cooper, Dept. of Zoology, Pennsylvania State Univ., University Park.)

American Soc. of Parasitologists. (T. H. Cheng, Dept. of Zoology and Entomology, Pennsylvania State Univ., University Park.)

American Soc. of Plant Physiologists. (A. A. Benson, Agriculture and Biological Chemistry, Pennsylvania State Univ., University Park.)

American Soc. of Zoologists. (A. Anthony, Dept. of Zoology, Pennsylvania State Univ., University Park.)

Biometric Soc. (ENAR). (Miss C. S. Weil, Mellon Inst., 4400 Fifth Ave., Pittsburgh, Pa.)

Ecological Soc. of America. (M. W. Schein, Dept. of Poultry Husbandry, Pennsylvania State Univ., University Park.)

Genetics Soc. of America. (J. E. Wright, Dept. of Genetics, Pennsylvania State Univ., University Park.)

National Assoc. of Biology Teachers. (H. S. Fowler, Science Education, Pennsylvania State Univ., University Park.)

Nature Conservancy. (W. Sharp, Pennsylvania Cooperative Wildlife Reserve, 206 Forestry Bldg., Pennsylvania State Univ., University Park.)

Society for Industrial Microbiology. (Miss M. B. O'Hara, Applied Sciences Labs., Inc., State College, Pa.; or A. Rose, 525 S. Gill St., State College.)

Society of Protozoologists. (H. Frings, Dept. of Zoology, Pennsylvania State Univ., University Park.)

Society for the Study of Development and Growth. (J. E. Livingston, Dept. of Botany and Plant Pathology, Pennsylvania State University, University Park.)

Tomato Genetics Cooperative. (B. L. Pollack, Dept. of Horticulture, Pennsylvania State Univ., University Park.)

30-4. American Cong. of Physical Medicine and Rehabilitation, Minneapolis, Minn. (Miss D. C. Augustin, 30 N. Michigan Ave., Chicago 2, Ill.)

30-4. Laurentian Hormone Conf., Mont Tremblant, Quebec, Canada. (G. Pincus, 222 Maple Ave., Shrewsbury, Mass.)

30-4. Medical Education, 2nd world conf., Chicago, Ill. (World Medical Assoc., 10 Columbus Circle, New York 19.)

30-5. World Federation for Mental Health, 12th annual, Barcelona, Spain. (Miss E. M. Thornton, Secretary-General, WFMH, 19, Manchester St., London W.1, England.)

30-6. History of Science, 9th intern. cong., Barcelona and Madrid, Spain. (J. Vernet, via Layetona 141, Barcelona.)

30-6. Residues on Crops and/or the Problem of Insect Resistance to Insecticides, symp., Munich, Germany. (R.

Morf, Secretary-General, IUPAC, c/o Sandoz S. A., Basel, Switzerland.)

30-6. Thermodynamics and Experimental Thermochemistry, 17th intern. cong. (Internat. Union of Pure and Applied Chemistry), Munich, Germany. (Div. of Chemistry and Chemical Technology, Natl. Research Council, Washington 25.)

30-12. International Oceanographic Cong. (AAAS, UNESCO, ICSU), New York, N.Y. (Miss M. Sears, chairman, Woods Hole Oceanographic Institution, Woods Hole, Mass.)

31-2. Free Radical Stabilization, 4th intern. symp., Washington, D.C. (A. M.

Bass, Natl. Bureau of Standards, Washington 25.)

31-2. Stratospheric Meteorology, conf., Minneapolis, Minn. (H. G. Houghton, AMS, Dept. of Meteorology, Massachusetts Inst. of Technology, Cambridge 39, Mass.)

31-3. Biological Photographic Assoc., Montreal, Canada. (Miss J. H. Waters, P.O. Box 1668, Grand Central Station, New York 17.)

31-3. Mathematical Assoc. of America, 40th summer meeting, Salt Lake City, Utah. (H. M. Gehman, MAA, Univ. of Buffalo, Buffalo 14, N.Y.)

31-4. Haematin Enzymes, symp. (by

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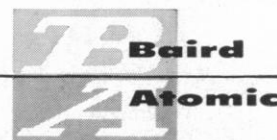
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invitation), Canberra, Australia. (A. H. Ennar, John Curtin School of Medical Research, Australian National Univ., Canberra.)

September

1-3. Association for Computing Machinery, natl., Cambridge, Mass. (J. Moshman, Council for Economic and Industry Research, Inc., 1200 Jefferson Davis Highway, Arlington 2, Va.)

1-6. College of American Pathologists, Chicago, Ill. (A. H. Dearing, Suite 2115 Prudential Plaza, Chicago 1.)

1-7. History and Philosophy of Science (General Assembly, History Div., Intern. Union of the History and Philosophy of Science), Barcelona, Spain. (R. Taton, IUHPS, 64, rue Gay-Lussac, Paris 5^e, France.)

1-8. Acoustics, 3rd intern. cong., Stuttgart, Germany. (E. Zwicker, Breitscheidstrasse 3, Stuttgart N.)

1-7 Oct. International Civil Aviation Organization (Meteorological Div.), Montreal, Canada. (ICAO, Maison de l'Aviation Internationale, Montreal, Canada.)

2-4. Allergy, 4th European cong., London, England. (British Assoc. of Allergists, Wright-Fleming Inst., St. Mary's Hospital, London, W.2.)

2-4. Cryogenic Engineering Conf., Berkeley, Calif. (K. D. Timmerhaus, CEC, Chemical Engineering Dept., Univ. of Colorado, Boulder.)

2-4. Crystal Imperfections and the Chemical Reactivity of Solids (Faraday discussion), Kingston, Ontario, Canada. (Faraday Soc., 6 Gray's Inn Sq., London, W.C.1, England.)

2-5. American Mathematical Soc. and Mathematical Assoc. of America (joint summer), Salt Lake City, Utah. (E. Pitcher, AMS, Lehigh Univ., Bethlehem, Pa.)

2-8. Foundations of Mathematics: In-finitistic Methods, symp., Warsaw, Poland. (A. Mostowski, Dept. of Mathematics, Univ. of California, Berkeley 4.)

2-9. British Assoc. for the Advancement of Science, 121st annual, York, England. (Secretary, BAAS, 18 Adam St., Adelphi, London, W.C.2, England.)

3-6. American Sociological Soc., natl., Chicago, Ill. (D. Young, Russell Sage Foundation, New York 22.)

3-5. Nephrology, 1st intern. cong., Geneva, Switzerland, and Evian, France. (G. Richet, Hospital Necker, 149, rue de Sevres, Paris 7^e, France.)

3-9. American Psychological Assoc., annual conv., Cincinnati, Ohio. (R. W. Russell, APA, 1333 16 St., NW, Washington 6.)

4-7. International Federation of Surveyors, annual (by invitation), Gracow, Australia. (IFS, 4, Kanaalweg, Delft, Netherlands.)

5-11. Application of Radiation Sources in Industry, intern. conf., Warsaw, Poland. (P. Fent, IAEA, Vienna, Austria.)

6-12. Standards on a Common Language for Machine Searching and Translation, intern. conf., Cleveland, Ohio. (Secretariat, Center for Documentation and Communication Research, Western Reserve Univ., Cleveland 6.)

New Products

The information reported here is obtained from manufacturers and from other sources considered to be reliable, and it reflects the claims of the manufacturer or other source. Neither Science nor the writer assumes responsibility for the accuracy of the information. A coupon for use in making inquiries concerning the items listed appears on page 182.

■ **VACUUM-TUBE VOLTMETER** displays on two separate meters the r.m.s. values of both in-phase and quadrature components of input signal voltage with respect to a given sine wave reference voltage of the frequency. Frequency range is 20 cy to 20 kcy/sec. Voltage ranges are 15 mv to 20 v for the reference and 15 mv to 15 v for the signal. Input impedance is greater than 50 megohm in parallel with 13 pf. Accuracy of ± 2 percent of full scale is claimed. (Solartron, Inc., Dept. 922)

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