measured mucus flow in the exposed trachea of rabbits by cinephotomicrography. Phenol aerosols and smoke from filtered and unfiltered cigarettes stop ciliary activity and mucus transport.

Paul Kotin (National Cancer Institute) described bronchogenic carcinoma induced in rats and mice by aerosolized hydrocarbons. It is not known whether hydrocarbon gains access to the cell by pinocytosis after penetrating the mucus blanket or from the backside via lymphatics after it has been cleared from airspaces. A combination of influenza virus Lee or myxovirus Sendai plus ozonized hydrocarbons produces carcinoma in certain species of mice. The cytological changes are similar to those seen in the bronchial epithelium of cigarette smokers.

The last session concerned the effects of bacteria and viruses on the respiratory epithelium. Gustave Laurenzi (New Jersey College of Medicine) described an aerosol system for exposing mice and rabbits to airborne bacteria and a method for quantitating lung clearance. Smoke inhalation and alcohol ingestion alter bacterial clearance and depress mucociliary function. Although alcohol did not interfere with mobilization of phagocytes in rabbits, it did so in mice.

The effect of viruses on nasal mucociliary function in the chick was discussed by Frederick Bang (Johns Hopkins University). Viruses, particularly Newcastle virus, produce chaotic mucus flow and death of ciliated cells. He suggested the coelomic urn cell from *Sipunculus*, which is a freely moving mucus-producing cell, as a possible model for study of the respiratory epithelial cell. C. H. Stuart-Harris (University of Sheffield, England) pointed out that rhinoviruses, respiratory enteroviruses, and influenza viruses are the active agents in causing colds and febrile illness in adults. Acute bronchitis in previously well persons should be distinguished from exacerbation of symptoms in patients with chronic chest disease. Influenza viruses and rhinoviruses produce irritation and fluid exudation and increase mucus production, but they are not associated with the persistent sputum production of patients with chronic bronchitis.

D. A. J. Tyrrell (Harvard Hospital, Salisbury, England) described an elegant organ-culture technique for observing the cytopathic effect of certain viruses in human respiratory epithelium. Common cold virus has been cultivated and serial passage has succeeded. A working culture ensures continuity of cells and permits observation of the effects of respiratory viruses on cell growth and function. Cilia of these respiratory epithelial cells may beat while the cells are hosts for large numbers of viruses. Thus, viral growth in cells may not disturb their function. Extrapolation of these findings is limited by the dissimilarity between the cells infected in tissue culture and those infected in the intact organism, and also because present techniques are inadequate for growing some of the viruses which cause respiratory disease. The cytopathologic effects of viruses, particularly those which cause influenza, on ciliated epithelium were described by J. F. Ph. Hers (University Hospital, Leiden, Netherlands). Immunofluorescent techniques make it possible to identify the site of attachment of viral subunits and to distinguish stages of synthesis. The S, or soluble, complement-fixing ribonucleic acid antigen of influenza virus appears first in the nucleus and multiplies on the nuclear border, resulting in destruction and death of the cell. The hemagglutinin or V antigen attaches and multiplies on the cell border just within the cytoplasm, and the activity of the cell continues. These techniques offer the hope that at least group-specific etiological diagnoses of diseases in humans can be made by immunofluorescence of exfoliated respiratory epithelial cells.

In summarizing the symposium, David Bates (McGill University) pointed out that studies of the long-term effects of noxious materials on biological systems are necessary for an understanding of chronic diseases in man; this type of study is difficult under present research granting policies. He cautioned against extrapolation from the effects produced on animals in minutes or hours, after large experimental doses of a substance, to diseases which appear in humans after years of exposure to much smaller quantities of the same or similar substances. Public emphasis on and expenditure for research on lung cancer should be refocused upon the more frequent and important chronic destructive lung diseases, chronic bronchitis and pulmonary emphysema.

There is a paucity of information available about the fluid in which cilia beat and the effect upon cilia of changing the properties of mucus. Little is known about the difference between mucus in small distal airways and in large bronchi and between mucus in the upper lobes and in the lower lobes of the lung. Although deficiencies of thyroid and vitamin A appear to reduce mucus transport and lung clearance, mechanisms by which they do so are unexplained. The role of macrophages in clearance of particles from the lungs and the interaction of phagocytic and mucociliary clearance require investigation. The uniformity of effects of noxious agents on widely varying preparations of ciliated cells confirms the observation that nature is economical with methods but wasteful of materials.

Anderson Hilding (Duluth), commenting from a lifetime of research on cilia, observed that there are only minor disagreements as to the harmful effects of cigarette smoke on the lung, and that these effects require no further demonstrations to provide a basis for action. Thus, what to do about cigarettes, neither a food nor a drug and the sole product of a large undiversified industry, poses a challenge to imaginative economics. Hilding's interest in cilia and mucus transport arose from the central position which the common cold and viral respiratory diseases play in the pathogenesis of serious diseases of nose, ears, throat, and lung as seen by an otolaryngologist. He recommended great care in extrapolating from ciliary behavior in protozoa, clams, and frogs to that in man.

The proceedings of the symposium will be published as a supplement to the *American Review of Respiratory Diseases*. The symposium was supported by the P. Lorillard Company.

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Forthcoming Events

June

26–3. International **Dental** Federation, 53rd, Vienna, Austria. (G. H. Leatherman, 35 Devonshire Pl., London, W.1, England)

27–29. **Smoking and Health**, 1st intern. congr., New York, N.Y. (W. A. Scharffenberg, 6830 Laurel St., NW, Washington, D.C. 20012)

27–30. **Botanical** Soc. of America, Northeastern Section, summer field meeting, Univ. of Maine, Orono. (R. K. Zuck, Dept. of Botany, Drew Univ., Madison, N.J.)

27–30. Canadian **Pediatric** Soc., annual, Ottawa, Ont. (CPS, 14 Green Ave., St. Lambert, Quebec)

27–2. American **Crystallographic** Assoc., Gatlinburg, Tenn. (W. L. Kehl, Gulf Research and Development Co., P.O. Box 2038, Pittsburgh, Pa.)

27–2. **Mineralogical** Soc. of America, Gatlinburg, Tenn. (G. Switzer, U.S. Natl. Museum, Washington, D.C.)

27–2. **New Industrial Technologies**, engineering seminar, Pennsylvania State University, University Park. (Continuing Education Conference Center, Pennsylvania State University, University Park 16802)

28–29. **Hepatology**, 4th intern. symp., Chianciano Terme, Italy. (Secretariat, via Nicolò Porpora 9, Rome)

28–30. **Genetics of Congenital Norformations**, symp., Bratislava, Czechoslovakia. (F. Hrabal, Foreign Relations Dept., Czechoslovak Acad. of Sciences, Národní tr. 3, Prague 1)

28–30. **Electromagnetic Compatibility**, 7th annual symp., New York, N.Y. (Inst. of Electrical and Electronics Engineers, Electromagnetic Compatibility Group, Box A, Lenox Hill Station, New York 10021)

28–30. **Electromagnetic Scattering**, conf., Univ. of Massachusetts, Amherst. (R. S. Stein, Polymer Research Inst., Univ. of Massachusetts, Amherst)

28–30. **Relaxation Techniques in Chemical Kinetics**, symp., State Univ. of New York, Buffalo. (Mrs. E. E. Schmidt, 193 Hayes Hall, State Univ. of New York, Buffalo 14214)

28–30. Physics of **Quantum Electronics**, conf., San Juan, P.R. (P. L. Kelley, M.I.T. Lincoln Laboratory, Lexington, Mass. 02173)

28–1. **High Temperatures**, intern. symp., Paris, France. (Prof. Flahaut, Faculté de Pharmacie, 4, avenue de l'Observatoire, Paris 6e)

28–1. American **Orthopaedic** Assoc., Hot Springs, Va. (L. R. Straub, 535 E. 70 St., New York 10021)

28–2. **Vacuum**, 3rd intern. congr., Stuttgart, Germany. (H. Adam, 5 Köln-Bayental, Postfach 195, West Germany)

28–3. **Insect Biochemistry**, U.S.–Japan Cooperative Science Program seminar, Chiba, Japan (invitation only). (Office of Intern. Science Activities, Natl. Science Foundation, Washington, D.C.)

29. National Council of **Teachers of Mathematics**, New York, N.Y. (J. D. Gates, NCTM, 1201 16th St., NW, Washington, D.C. 20036)

29–1. **Mutant Mice with Neurological Diseases**, conf., Jackson Laboratory, Bar Harbor, Maine. (J. L. Fuller, Jackson Laboratory, Bar Harbor)

29–2. **Data Processing Management** Assoc., intern. conf., Philadelphia, Pa. (Conference Registrar, Data Processing Management Assoc., P. O. Box 1079, Philadelphia 19105)

30–2. **Microwave Applications of Semiconductors**, symp., University College, London, England. (Symposium Secretary, Inst. of Electronic and Radio Engineers, 8-9 Bedford Square, London, W.C.1)

30–3. National Soc. of **Professional Engineers**, annual, Albuquerque, N.M. (NSPE, 2029 K St., NW, Washington, D.C.)

July

1–4. **Astronomical** League, Miami, Fla. (A. P. Smith, Jr., 1601 S.W. 10th St., Miami)

1–10. General **Relativity and Gravitation**, intern. conf., London, England. (H. Bondi, Dept. of Mathematics, King's College, London, W.C.2)

1–1 August. **Theoretical Biology and Theoretical Biophysics**, Colorado State Univ. colloquium, Fort Collins. (H. J. Morowitz, Dept. of Molecular Biology and Biophysics, Box 2166, Yale Station, New Haven, Conn.)

2–3. British Soc. for **Immunology**, summer meeting, Glasgow, Scotland. (I. Roitt, Courtauld Inst., Middlesex Hospital, London W.1, England)

2–4. **Astronomical League**, Milwaukee, Wis. (W. M. DuVall, 518 Emmertsen Rd., Racine, Wis. 53406)

2–5. **Meteorological Data Processing**, Uccle and Brussels, Belgium. (World Meteorological Organization, 41, avenue Giuseppe Motta, Geneva, Switzerland)

2–9. International Union of **Pure and Applied Chemistry**, 23rd conf. Paris, France. (R. Morf, c/o F. Hoffman-La Roche, Ltd., Grenzacherstr. 124, Basel, Switzerland)

4–10. American **Library** Assoc., annual, Detroit, Mich. (D. H. Clift, American Library Assoc., 50 E. Huron St., Chicago, Ill.)

5–6. Low-Level **Radioactivity Measurements**, symp., London, England. (N. G. Trott, Physics Dept., Royal Marsden Hospital, Surrey Branch, Downs Rd., Sutton, Surrey, England)

5–7. **Astrophysical**, intern. symp., Liege, Belgium. (P. Swings, Inst. D'Astrophysique, Cointe-Sclessin, Belgium)

5–7. American Soc. of **Heating, Refrigerating, and Air-Conditioning Engineers**, Portland, Ore. (R. C. Cross, 345 E. 47 St., New York 10017)

5–10. French Soc. for the **Advancement of Science**, 84th annual congr., Tours. (The Association, 28 rue Serpente, Paris 6^{e}, France)

5–6. Aug. American **Mathematical** Soc., summer inst. on algebraic groups and discontinuous subgroups, Boulder, Colo. (G. L. Walker, 190 Hope St., Providence, R.I. 02906)

6–8. **Water Resources Research**, western conf., Colorado State University, Fort Collins. (Office of Conference Services, 204 Administration Bldg., Colorado State Univ., Fort Collins 80521)

6–9. American **Dental** Soc. of Europe, annual, Florence, Italy. (A. Sturridge, 35 Harley St., London W.1, England)

6–9. **Miscroscopy**, 12th intern. symp., Sheffield, England. (MICRO-65, McCrone Research Inst., 451 E. 31 St., Chicago, Ill.)

6–10. **Plant Viruses,** 5th intern. conf., Wageningen, Netherlands. (State Agricultural Univ. of Wageningen, Laboratory of Virology, Salverdaplein 10, Wageningen)

7–9. **Molecular Relaxation Processes**, symp., Aberystwyth, Wales. (General Secretary, Chemical Soc., Burlington House, London W.1, England)

7–11. Society for the Study of **Fertility**, annual, Edinburgh, Scotland. (C. A. Simmons, 129 Harley St., London, W.1)

8–16. British **Medical** Assoc., annual, Swansea, England. (D. Gullick, BMA, Tavistock Sq., London, W.C.1)

9–11. **Heat Flow below 100°K**, and Its Technological Applications, Grenoble, France. (J. Wilks, Commission 1, Intern. Inst. of Refrigeration, c/o Clarendon Laboratory, Parks Rd., Oxford, England)

10–17. **Education and Health**, intern. conf., Madrid, Spain. (L. P. Aujoulat, 1 rue de Tilsit, Paris 8e)

11–15. **Psychoanalysis**, 2nd intern. forum, Zurich, Switzerland. (G. Chrzanowski, 4 E. 95 St., New York 10028)

11–15. American **Veterinary Medical** Assoc., annual, Portland, Ore. (AVMA, Dept. of Public Information, 600 S. Michigan Ave., Chicago 5, Ill.)

12–14. **Biological Sciences** Symp., 16th annual, Univ. of Michigan, Ann Arbor. (L. B. Mellett, Dept. of Pharmacology, Univ. of Michigan Medical School, Ann Arbor)

12–14. Physiology and Biochemistry of **Muscle as a Food**, symp., University of Wisconsin, Madison. (E. J. Briskey, College of Agriculture, Univ. of Wisconsin, Madison 53706)

12–15. Japan Soc. of **Constitutional and Diathetic Medicine**, congr., Kyoto, Japan. (The Society, Dept. of Pathology, Kyoto Univ., Kyoto)

12–15. **Nuclear and Space Radiation Effects**, annual conf., Univ. of Michigan, Ann Arbor. (S. C. Rogers, Radiation Effects Dept., 5312, Sandia Corp., Albuquerque, N.M.)

12–17. **Spectroscopy**, 12th intern. colloquium, University of Exeter, Exeter, England. (C. E. Arregger, 1 Lowther Gardens, Prince Consort Rd., London, S.W.7, England)

12–18. **Pure and Applied Chemistry**, 20th intern. congr., Moscow, U.S.S.R. (N. A. Kleimenov, Inst. of Chemical Physics, Acad. of Sciences, Vorobyevskoye chaussee 2-b, Moscow)

13–15. **Aerospace Vehicle Flight Control**, Soc. of Automotive Engineers/NASA conf., Los Angeles, Calif. (SAE, 485 Lexington Ave., New York 10017)

13–16. Royal **Medico-Psychological** Assoc., annual, Glasgow, Scotland. (RMPA, 11 Chandos St., London W.1, England)

14–15. **Reinforced Plastics**, regional conf., Soc. of Plastics Engineers, Seattle, Wash. (J. B. Meyer, RETEC Registration, c/o J. B. Meyer Co., P.O. Box 6664, Seattle)

15–16. **Water Quality Management** in River and Reservoir Systems, seminar, Vanderbilt Univ., Nashville, Tenn. (W. H. Wisely, American Soc. of Civil Engineers, 345 East 47 St., New York 17)

15–18. Properties and Applications of **Low Temperature Plasma**, symp., Moscow, U.S.S.R. (E. S. Starkman, College of Engineering, Univ. of California, Berkeley)

15–21. **Education of Professional Physicists**, intern. conf., London, England. (Miss P. N. Boston, Inst. of Physics and the Physical Soc., 47 Belgrave Sq., London, S.W.1)

18–24. **Dental**, 2nd intern. congr., Rio de Janeiro, Brazil. (P. F. Reis Filho, Associacao Brasileira de Odontologia, Rua da Baia 570, 5.º Andar, C. Postal 2357, Minas Gerais, Brazil)

18–24. International **Ophthalmic-Optical** Congr., Dublin, Ireland. [E. Pemberton, Assoc. of Ophthalmic Opticians (Ireland), 11 Harrington St., Dublin]

19–21. **Surgery of the Hand,** 1st intern. congr., Rio de Janeiro, Brazil. (Sociedade Brazileira de Mão, Rio de Janeiro)

19–21. **Swine in Biomedical Research**, intern. symp., Richland, Wash. (L. K. Bustad, Biology Dept., Battelle-Northwest, P.O. Box 999, Richland 99352)

19–22. Association of **Food and Drug Officials** of the U.S., 69th annual, New York, N.Y. (The Association, P.O. Box 9095, Austin, Tex.)

19–22. **Space**, 5th European symp., Munich, Germany. (Executive Secretary, British Interplanetary Soc., 12, Bessborough Gardens, London, S.W.1, England)

19–23. Study of **Nuclear Structure** with Neutrons, intern. conf., Antwerp, Belgium. (M. Neve de Mevergnies, Neutron Physics Dept., CEN-CSK, Mol, Belgium)

19–23. Society for **Analytical Chemistry**, conf., Nottingham, England. (C. A. Johnson, 14 Belgrave Sq., London, S.W.1, England)

20–23. American **Malacological** Union, Wagner College, New York, N.Y. (J. J. Parodiz, Carnegie Museum, Pittsburgh, Pa.)

21–31. **Mental Health**, 5th Caribbean conf., Fort-de-France, Martinique, French West Indies. (Caribbean Federation for Mental Health, Mme. Charles Saint-Cyr, Ravine Vilaine, Fort-de-France)

22–24. International Assoc. for **Dental Research**, 43rd general meeting, Toronto, Ont., Canada. (G. H. Rovelstad, U.S. Navy Dental School, Natl. Naval Medical Center, Bethesda, Md.)

22–26. **Rorschach and Projective Methods**, 6th intern. congr., Paris, France. (A. Morali-Daninos, 7 avenue Trudaine, Paris 9e)

22–27. Thermodynamics of **Nuclear Materials and Atomic Transport in Solids**, Vienna, Austria. (C. E. Holley, Jr., Div. of Research and Laboratories, Intern. Atomic Energy Agency, Kärntnerring 11, Vienna 1)

24–4. Sept. **Organism-Sediment Interrelationship**, NSF seminar, Bermuda Biological Station. (K. E. Chave, Marine Science Center, Lehigh Univ., Bethlehem, Pa. 18015)

25–28. American Assoc. of **Dental Schools**, Toronto, Canada. (C. V. Rault, Georgetown Univ., Washington, D.C.)

25–29. Pacific **Dermatologic** Assoc., Portland, Ore. (G. MacDonald, 4294 Orange St., Riverside, Calif.)

25–30. **Neurochemical**, intern. conf., Oxford, England. (J. N. Cummings, Dept. of Chemical Pathology, Natl. Hospital, Queen Sq., London, W.C.1, England)

25–30. International **Psycho-Analytical** Assoc., 24th congr., Amsterdam, Netherlands. (R. P. McKnight, Austin Riggs Center, Stockbridge, Mass.)

26–29. American Inst. of **Aeronautics and Astronautics**, 2nd annual, San Francisco, Calif. (D. L. Raymond, 1290 Sixth Ave., New York 10019)

26–30. Interpretation and Therapy of **Cardiac Arrhythmias**, conf., Hahnemann Medical College and Hospital, Philadelphia 2, Pa. (L. S. Dreifus, Dept. of Med-

icine, Hahnemann Medical College and Hospital, 230 North Broad St., Philadelphia)

27–29. **Positron Annihilation**, conf., Wayne State Univ., Detroit, Mich. (A. T. Stewart, Physics Dept., Univ. of North Carolina, Chapel Hill)

27–29. **Research Program Effectiveness**, Washington, D.C. (Secretary, Research Conf. Committee, Room 808, Old Post Office Bldg., 12th St. and Pennsylvania Ave., NW, Washington, D.C. 20368)

28–30. **Library Science**, symp., Syracuse Univ., Syracuse, N.Y. (D. Bergen, School of Library Science, Syracuse Univ., Syracuse 13210)

28–30. **Reactor Operating Experience**, Jackson Lake Lodge, Wyo. (F. Schroeder, Phillips Petroleum, Idaho Falls, Idaho)

28–30. **Reliability and Maintainability**, 4th annual conf., Los Angeles, Calif. (J. de S. Coutinho, 32 Dartmouth St., Garden City, N.Y.)

28–31. Spanish **Biochemists**, 3rd meeting, Oviedo, Spain. (J. R. Villanueva, Centro de Investigaciones Biológicas, Velázquez 138, Madrid 6, Spain)

29–2. **Microcalorimetry**, intern. symp., Marseille, France. [E. Calvert, Institut de Microcalorimétrie et de Thermogénèse, 26, rue du 1414 RIA (3e), Marseille]

29–5. **Protozoology**, 2nd intern. conf., London, England. (R. S. Bray, London School of Hygiene and Tropical Medicine, Keppel St., London, W.C.1)

30–31. **Animal Reproduction**, 7th biennial symp., Michigan State Univ., East Lansing. (W. Hansel, Dept. of Animal Husbandry, Cornell Univ., Ithaca, N.Y.)

August

1–5. American Soc. of **Animal Science**, Michigan State Univ., East Lansing. (J. E. Oldfield, Dept. of Animal Science, Oregon State Univ., Corvallis)

1–8. **Chemistry**, 9th Latin American congr., San Juan, P.R. (Secretary, 9th Latin American Chemical Congr., Box 2647, Rio Piedras, P.R.)

2–4. Society for **Cryobiology**, 2nd annual, Madison, Wis. (G. Rapatz, American Foundation of Biological Research, RFD 1, Madison 53716)

2–5. **Comparative Endocrinologists**, 3rd European conf., Copenhagen, Denmark. (C. Barker-Jørgensen, Universitets Zoofysiologiske Laboratorium Juliane Maries Vej 32, Copenhagen Ø)

2–6. **High Pressure**, intern. conf., Saône et Loire, France. (B. Vodar, Centre National de la Recherche Scientifique, B.P. 30, Bellevue, Seine et Oise, France)

2–6. **Instrumentation Science**, 2nd research conf., Instrument Soc. of America, Geneva, N.Y. (K. B. Schnelle, Jr., ISA, 539 William Penn Pl., Pittsburgh, Pa.)

3–7. **Acta Endocrinologica**, 5th congr., Hamburg, Germany. (A. Jores, 2 Medizinische Klinik, Eppendorfer Krankenhaus, Hamburg 20)

3–7. **Poultry Science** Assoc., Univ. of Georgia, Athens. (C. B. Ryan, Texas A&M Univ., College Station 77843)

4–6. **Space and Ballistic Missile Technology**, 10th symp., U.S. Naval Training Center, San Diego, Calif. (C. T. Morrow, Aerospace Corp., Box 95085, Los Angeles, Calif. 90045)