to show that there are large diurnal shifts in the thermal status of lions, as much as 8° or 9°C between resting and active states. Baldwin described studies on the green turtle in the South Atlantic; the turtle regularly migrates to Ascension Island and appears to be sensitive to certain olfactory gradients. Other studies using radiotelemetry with water buffalo have shown ways in which the dominant male in a group preserves his territorial rights. The territorial movement of water buffalo has been successfully followed at distances as far as 20 miles from the radio receiver.

The discussion of corresponding codes and languages in which larger systems of organisms carry out their communication and control processes was initiated by William J. Horvath (University of Michigan). He described studies of war models which were based on a Markov process. Using such a model to study 315 wars, it was found that the ending of a war is related to the number of deaths; the model predicts size of the war rather than duration. Similar models have also been applied to the chronicles of the Department of Labor on the duration of industrial strikes. There are approximately 3300 recorded strikes in the United States each year. They show the same slow falloff as in the case of wars. The decrement resembles the failure rate in vacuum tubes, in that the longer they perform, the longer will be the time to failure. There is a similar finding in characteristics of marriage and divorce. The longer one remains with a spouse, the longer one is likely to remain.

The final session of the conference dealt with the feasibility of machine codes, structures, components, and languages designed for compatibility with biological systems and the features of a mathematics deliberately developed for such systems. Horst Mittelstaedt (Max-Planck Institut, Seewiesen, Germany) discussed gravity orientation in fish and the philosophic questions of causality versus information flow. He defined information as a causal relation between input and output variables. A "transferer" can be described just by input-output characteristics. Thus, for example, in the orienting to light by the drone fly, the turning moment in the legs relates to the angle between the fly and the light source. In this case no changes can occur within the central nervous system by feedback to the source of the stimulus. Mittelstaedt then went on to describe the intercausal nets composed of transferers that simultaneously receive and transfer different sets of inputs. Fractional approaches to understanding the behavior of a multicausal net can be made by looking at the effects of the input from different receptors. He suggested a disjunction and division of the net into many classes so that one can proceed until a complete understanding of the behavior of the net is fully specified. In this way it should be possible to determine if the organism acts as a transferer or as a simple cybernetic system.

Leon D. Harmon (Bell Telephone Laboratories, Murray Hill, New Jersey) discussed the types of codes that could elicit patterned output in the nervous system. He noted that codes could be classified into two generic coding categories: spike trains and continuous slow transactions. He cited three levels of coding: (i) codings that arise in sensory transducers, (ii) codings that arise in the central processor, at which point memory storage may be involved, and (iii) codings involved in motor outputs. In all of these, parallel or serial processing may be involved.

Rosenberg discussed cell-to-cell interaction, pointing out that transmitter substances may be bidirectional and that their effects would then be reciprocal. In this case there would be a limited degree of transmitter mobility and a range in its specificity. There probably is a hysteresis loop in the time course of typical transmitter substances. During differentiation of cells, one cell may exercise an inductive influence on another cell until there is ultimately a condition of irreversibility. Lettvin considered that the effects of individual elements may be parochial rather than global. He noted that if one removes half the retina of a frog, the remaining fibers spread over the whole of the colliculus. It is very difficult to explain the further finding that, if one removes a square of the colliculus, rotates it 180 degrees, and reinserts it, no changes in visual performance can be detected after 90 days.

Jerome R. Cox, Jr. (Washington University School of Medicine, St. Louis, Missouri) described a method for computer recognition of electrocardiographic patterns by the use of a string of cascaded processors employing successive data reduction.

Y. V. L. Rao (United Nations Educational, Scientific & Cultural Organization, Paris, France) discussed some of the problems of mass communication. In their projects they have studied the dynamics of small and large group interaction. Their conclusion is that since there are many variables involved, it is impossible to predict the characteristic reaction of an individual without knowing those elements of his behavior which he contributes to the group interaction. He cited several examples of propaganda films that had either the opposite of the effect intended or no effect at all on audiences. The most persuasive films encouraging dental hygiene were those that employed fear.

The conference, chaired by Otto H. Schmitt (University of Minnesota), was organized under the auspices of the Interdisciplinary Communications Program of the New York Academy of Sciences (Dr. Frank Fremont-Smith, director) and was supported by the National Aeronautics and Space Administration and the Smithsonian Institution. An edited transcript of the proceedings is scheduled for publication. Ensemble dynamics within and between living organisms is planned as the subject of next year's conference.

DIANE M. RAMSEY
Reiss-Davis Child Study Center,
Los Angeles, California

Calendar of Events

October

1–4. American **Roentgen Ray** Soc., New Orleans, La. (Secretary, The Society, c/o Mayo Clinic, Rochester, Minn. 55902)

2–3. **Health Quackery**, 4th natl. congr., Chicago, Ill. (American Medical Assoc., Dept. of Investigation, 535 N. Dearborn St., Chicago 60610)

2–4. Symposium on **Materials for Radioisotope Heat Sources**, Gatlinburg, Tenn. (Chairman, Metallurgical Soc. of AIME, 345 E. 47 St., New York 10017)

3–4. **Fiber** Soc., Washington, D.C. (L. Rebenfeld, Box 625, Princeton, N.J.)

3–5. Canadian Soc. of **Immunology**, Toronto, Ont., Canada. (H. Z. Movat, Dept. of Pathology, Univ. of Toronto, 100 College St., Toronto 2)

4. **Industrial Pharmaceutical Technology**, Philadelphia, Pa. (R. S. Joslin, William H. Rorer, Inc., Fort Washington, Pa. 19034)

4–5. American **Physical** Soc., Hanover, N.H. (The Society, Executive Secretary, 528 W. 120 St., New York 10027)

4–6. National Conf. on **Marine Sciences in Education**, Catalina Island, Calif. (R. B. Linsky, Coordinator, Marine Sciences and Director, Floating Lab Program, 1104 W. 8 St., Santa Ana, Calif. 92701)

4–8. American College of **Chest Physicians**, 10th, Washington, D.C. (M. Kornfield, 112 E. Chestnut St., Chicago, Ill. 60611)

5–6. National Congr. on **Medical Ethics**,

2nd, Chicago, Ill. (Dept. of Medical Ethics, American Medical Assoc., 535 N. Dearborn St., Chicago 60610)

6–10. **Prestressed Concrete** Inst., 14th Seattle, Wash. (R. J. Lyman, 205 W. Wacker Drive, Chicago, Ill. 60606)

7. **Industrial Pharmaceutical Technology**, 7th mtg., Chicago, Ill. (J. Ellis, Abbott Labs., North Chicago, Ill. 60064)

7–10. **Thermal Conductivity**, 8th, Lafayette, Ind. (W. H. Shafer, Thermophysical Properties Research Center, 2595 Yeager Rd., West Lafayette, Ind. 47906)

7–11. **Activation Analysis** Conf., 3rd, Gaithersburg, Md. (National Bureau of Standards, Office of Technical Information and Publications, Room A500/101, Washington, D.C. 20234)

7–11. **Instrument Symp.** and Resarch Equipment Exhibit, 18th, Bethesda, Md. (J. B. Davis, National Institutes of Health, Bethesda 20014)

7–11. Armed Forces Inst. of **Pathology**, Washington, D.C. (Director, MEDEM-PG, Armed Forces Inst. of Pathology, Washington, D.C. 20305)

8–10. Conference on **Analytical Chemistry in Nuclear Technology**, 12th, Gatlinburg, Tenn. (L. J. Brady, Oak Ridge Natl. Lab., P.O. Box X, Oak Ridge, Tenn. 37830)

8–13. American Soc. of **Clinical Hypnosis**, Chicago, Ill., (F. D. Nowlin, 800 Washington Ave., SE, Minneapolis, Minn. 55414)

9–11. American **Ceramic** Soc., Bedford, Pa. (C. R. Kurkjian, Bell Telephone Labs., Murray Hill, N.J. 07974)

9–11. **Meteoritical** Soc., 31st., Cambridge, Mass. (U. B. Marvin, Smithsonian Astrophysical Observatory, 60 Garden St., Cambridge 02138)

9–11. American **Physical** Soc., Athens, Ga. (L. W. Seagondollar, Dept. of Physics, North Carolina State Univ., Raleigh 27607)

9–12. **Optical** Soc. of America, Pittsburgh, Pa. (M. E. Warga, Optical Soc. of America, 2100 Pennsylvania Ave., NW, Washington, D.C. 20037)

10–11. Symposium on **Applications of Ferroelectrics Company**, Washington, D.C. (H. L. Stadler, Ford Motor Co., Dearborn, Mich.)

10–12. American **Thyroid** Assoc., Washington, D.C. (W. McConahey, 200 First St., SW, Rochester, Minn. 55901)

11–13. Midwest Forum on **Allergy**, Chicago, Ill. (D. B. Frankel, 111 N. Wabash Ave., Chicago 60602)

11–13. **Philosophy of Science** Assoc., Pittsburgh, Pa. (G. J. Massey, Michigan State Univ., East Lansing)

11–18. American Soc. of **Clinical Pathologists**, New York, N.Y. (Administrative Secretary, 445 N. Lake Shore Dr., Chicago, Ill. 60611)

13–16. **Rare Earth Research,** 7th conf., San Diego, Calif. (J. F. Nachman, Applied Science Dept., Solar, San Diego 92112)

14–17. Association of Official **Analytical Chemists**, Washington, D.C. (L. G. Ensminger, P.O. Box 540, Benjamin Franklin Sta., Washington, D.C. 20014)

14–17. **Clay Minerals** Soc., Bloomington, Ind. (J. B. Droste, Dept. of Geology, Indiana Univ., Bloomington 47401)

14–17. Conference on **Plasma Instabilities in Astrophysics**, Pacific Grove, Calif. (P. A. Sturrock, Inst. for Plasma Research, Via Crespi, Stanford Univ., Stanford, Calif. 94305)

14–17. **Metallurgical** Soc., Detroit, Mich. (C. K. Carlson, American Inst. of Mining, Metallurgical and Petroleum Engineers, 345 E. 47 St., New York 10017)

14–18. American Soc. of **Civil Engineers**, Pittsburgh, Pa. (W. H. Wisely, American Soc. of Civil Engineers, 345 E. 47 St., New York 10017)

14–18. American College of **Surgeons**, Atlantic City, N.J. (Director, 55 E. Erie St., Chicago, Ill.)

15–16. **Industrial Hygiene** Foundation, 33rd, Pittsburgh, Pa. (R. T. P. deTreville, Industrial Hygiene Foundation, 4400 Fifth Ave., Pittsburgh 15213)

15–18. American **Dietetic** Assoc., 51st, San Francisco, Calif. (The Association, 620 N. Michigan Ave., Chicago, Ill., 60611)

17. Animal **Nutrition** Research Council, Washington, D.C. (L. Michaud, Merck Sharp & Dohme Research Labs., Rahway, N.J. 07065)

17–18. National **Fluid Power** Assoc., Chicago, Ill. (W. R. Smith, 3300 S. Federal St., Chicago 60616)