Access to Grant Applications: S. M. Schwartz; Nuclear Power Potential: J. J. Taylor; Dutch or Deutsch?: I. M. Kolthoff; J. C. Kraft

Electronic Data Bases

Eastern Geothermal Resources: Should We Pursue Them?: J. E. Tillman
From Dylys to Ylides to My Idyll: G. Wittig
DNA Methylation and Gene Function: A. Razin and A. D. Riggs

Upstart Television: Postponing a Threat
Briefing: OMB Offers Option on A-21: Doctors Must Put Patients First, Says Editor; Turkic Tribe Seeks Alaskan Peaks as Home
Trouble in Science and Engineering Education
Institute of Medicine Gets New President
IOM Elects New Members
Making Interferon: Gains Come Slowly

1980 Nobel Prize in Physics to Cronin and Fitch
1980 Nobel Prize in Physiology or Medicine
Natural Killer Cells Help Defend the Body

Fossils in the Making, reviewed by P. Dodson; The Sky Explored, V. Rubin; Coherence and Correlation in Atomic Collisions, E. Merzbacher; The Genetics of Altruism, M. Slatkin; Books Received
### REPORTS

- **Bacterial Resistance to Ultraviolet Irradiation Under Anaerobiosis: Implications for Pre-Phanerozoic Evolution**: M. B. Rambler and L. Margulis  
  ... 638
- **Subcellular Origin of Cholinergic Transmitter Release from Mouse Brain**: P. T. Carroll and J. M. Aspry  
  ... 641
- **Oral Contraceptives, Lanosterol, and Platelet Hyperactivity in Rat**: M. Ciavatti et al.  
  ... 642
- **Somatostatin: Occurrence in Urinary Bladder Epithelium and Renal Tubules of the Toad, Bufo marinus**: J. L. Bolaffi et al.  
  ... 644
- **Liquid-Phase Dehydration of Aqueous Ethanol-Gasoline Mixtures**: G. F. Fant a et al.  
  ... 646
- **Subs justic Nicotine Receptors on Rat Brain Membranes**: C. Romano and A. Goldstein  
  ... 647
- **Carbon-13 Nuclear Magnetic Resonance Study of Osmoregulation in a Blue-Green Alga**: L. J. Borowitzka et al.  
  ... 650
- **Environmental Influences on Serotonin and Cyclic Nucleotides in Rat Cerebral Cortex**: M. C. Diamond et al.  
  ... 652
- **Nigral Dopamine Neurons: Intracellular Recording and Identification with l-Dopa Injection and Histofluorescence**: A. A. Grace and B. S. Bunney  
  ... 654
- **Bioactive Conformation of Luteinizing Hormone—Releasing Hormone: Evidence from a Conformationally Constrained Analog**: R. M. Freidinger et al.  
  ... 656
- **Infectious Diseases and Population Cycles of Forest Insects**: R. M. Anderson and R. M. May  
  ... 658
  ... 661
  ... 663
- **Kin Selection: Its Components**: M. J. Wade  
  ... 665
- **Adaptive Topography in Family-Structured Models of Kin Selection**: R. E. Michod and R. Abugov  
  ... 667
- **Male Photuris Fireflies Mimic Sexual Signals of Their Females’ Prey**: J. E. Lloyd  
  ... 669
- **Nonolfactory Sensory Pathway to the Telencephalon in a Teleost Fish**: T. E. Finger  
  ... 671
- **Attentional Factors in the Inhibition of a Reflex by a Visual Stimulus**: E. M. DelPezzo and H. S. Hoffman  
  ... 673

---

**C O V E R**

Firefly habitat in northwestern penin- sular Florida in March. Pulsing Pho turis males descend from tall pines to fly, flicker, and glow, like males of un- related species. Males are probably in quest of their females which are, in turn, hunting the foreign males by ag- gressive signal mimicry. See page 669.  
[Dan Otte, Academy of Natural Sci- ences, Philadelphia, Pennsylvania]
Electronic Data Bases

Profound changes are occurring in the creation, processing, storage, retrieval, and transmission of scientific numerical data. The power and convenience of electronic instrumentation has led to its widespread use in laboratories. Digitized data from such equipment can readily be stored and processed. They can be retrieved and transmitted to other equipment both here and abroad through telecommunication networks. In many areas of science and technology large electronic data bases are being created that can also be tapped through the networks. Improvements in very large scale integrated circuits and memory devices, together with development of additional software, guarantee a great expansion of the role of electronic data.

New electronic devices have made possible experiments and observations not previously attainable and the accumulation of data at unprecedented rates. This is true throughout the natural sciences. The exploration of Jupiter by the Voyager spacecraft was completely dependent on electronic sensing devices, communication of signals to the earth, storage of the data in memories, and subsequent machine processing. The Geosynchronous Environmental Operational Satellite measures visible and infrared spectra of the earth's disk every 30 minutes and produces $2 \times 10^6$ bits of data every day.

Many processes in nature occur in very short times. An important research frontier today is picosecond chemistry. Through the use of lasers and electronic sensing devices, much information is now being gathered about excited states of atoms and molecules. Details of the mechanisms of photo-synthesis are being studied. When light falls on a plant, excited states are produced, electrons are transferred, spectral changes take place. These phenomena occur in time spans of microseconds or less.

New instrumentation has had profound effects on analytical chemistry. The most striking one has been to create the capability of identifying and measuring very tiny amounts of substances. By employing a combination of gas-liquid chromatography and mass spectrometry, biochemists have been able to isolate and measure 0.1 picogram of a hormone. With other equipment, analyses can be made much more rapidly than heretofore. A new spectrophotometer produces an entire spectrum from 200 to 800 micrometers in only 1 second.

A major hazard in hospitals is errors of transcription, which sometimes run as high as 5 percent or more. Modern hospitals try to avoid such errors in clinical laboratories by using electronic devices and storing results in a computer. A similar situation exists in pharmaceutical laboratories, which must maintain records of exemplary quality. Every measurement possible, such as weighing, is conducted with equipment that ties into the computer.

Electronic storage of digital data is the only feasible means of dealing with information in areas of science where it is produced at such a great rate that placing it on paper would be impractical. In addition, once the massive amounts of data are in machine-retrievable form, they can be processed and analyzed quickly and with a thoroughness beyond human capability.

Computers can communicate with each other, and this is being facilitated by public and private networks. Traffic is increasing rapidly. In large part this is due to the establishment of commercially available data bases, which are expanding in scope and numbers. The data bases will be helpful in pure science; they are already proving very valuable in applied research, and industrial organizations are willing to pay well for tapping them. In fields such as chemistry, solid state physics, and metallurgy, international competition is arising among compilers and vendors. We are in the early phase of important changes in electronic data handling. The federal government has been moderately helpful in furthering these developments, but expansion of its support is in order.—PHILIP H. ABEELSON

Adapted from a talk given at the CODATA Conference in Kyoto, Japan, 8 October 1980. Proceedings of the conference are to be published by Pergamon Press.