American Association for the Advancement of Science

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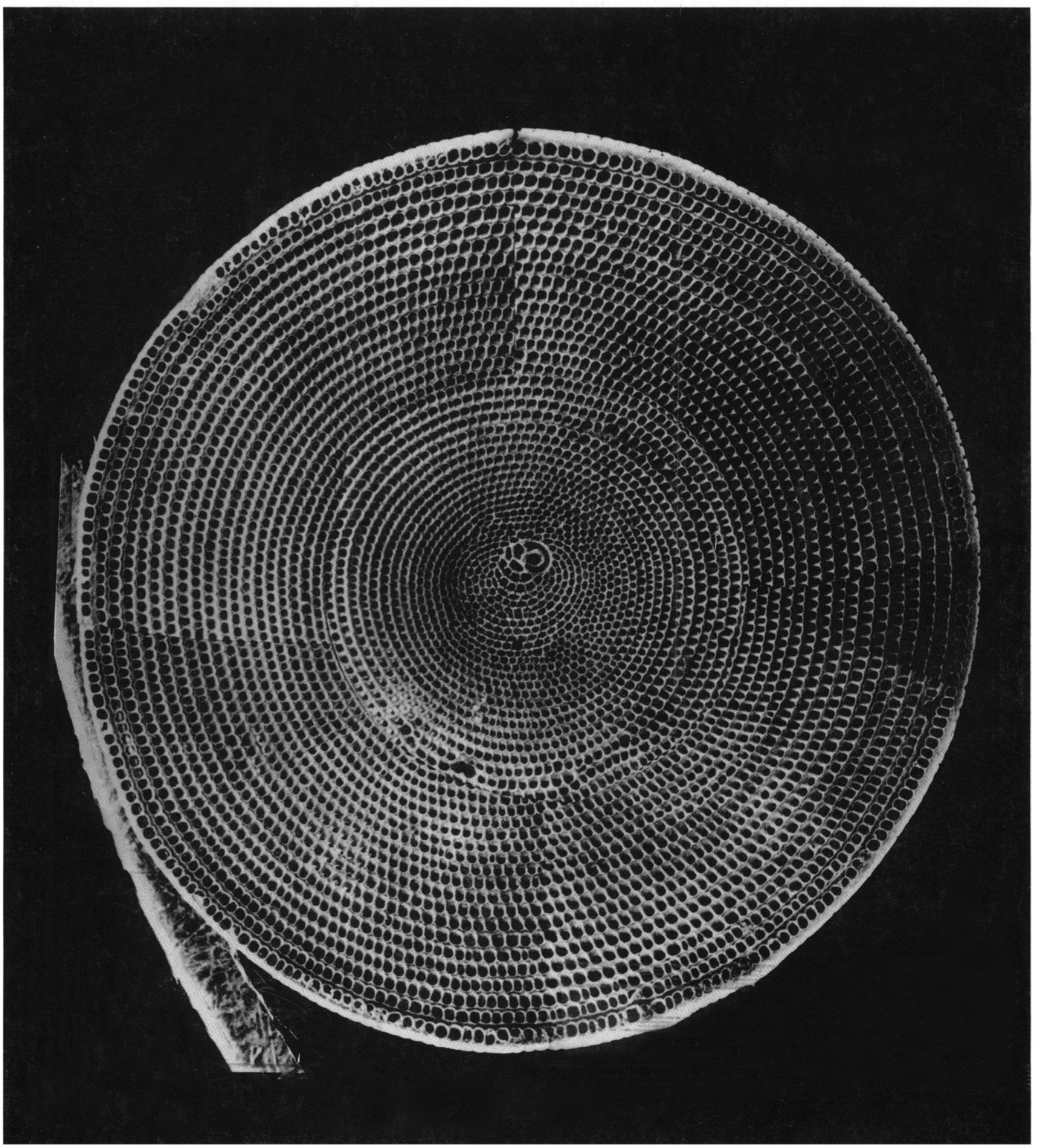

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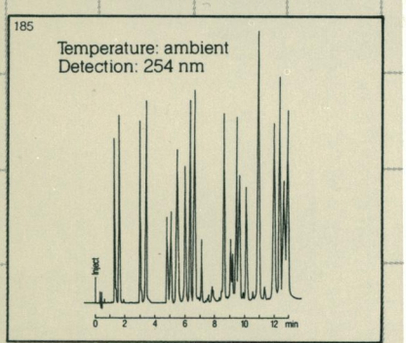

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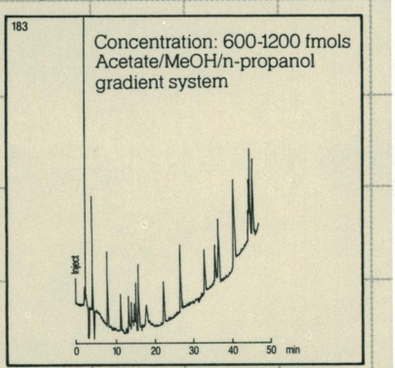

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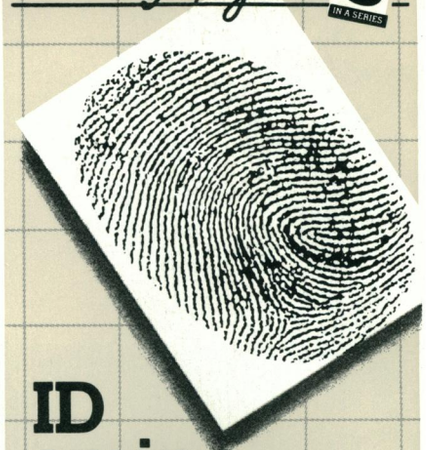

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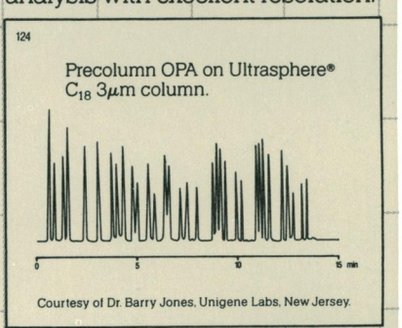

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SCIENCE

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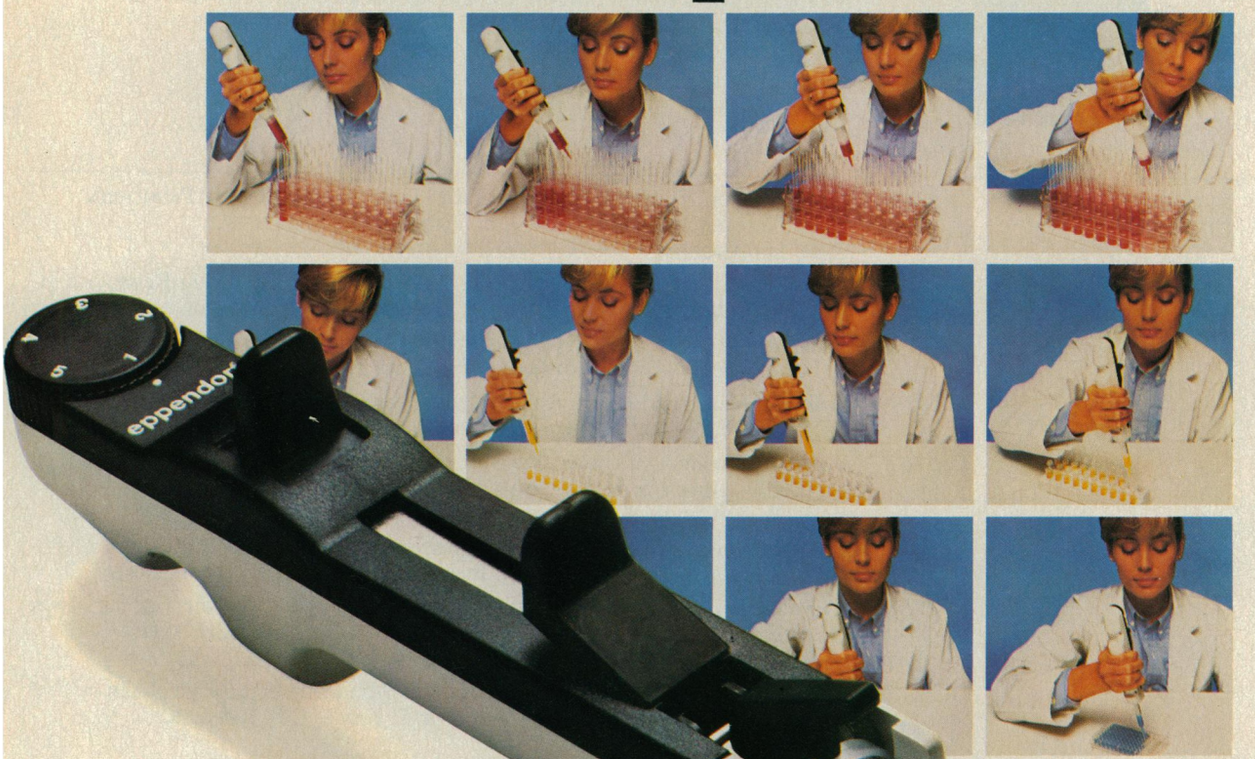
COVER The benthic foraminiferan *Sorites marginalis* (Lamarck) was first described in 1816. The initial chambers are in the center of the test, and succeeding ones are added in an annular series. This species occurs only in shallow tropical seas, and is distributed worldwide. See page 775 [SEM photograph by Kenneth Severin, Department of Geology, University of California, Davis 95616]

The repeater.



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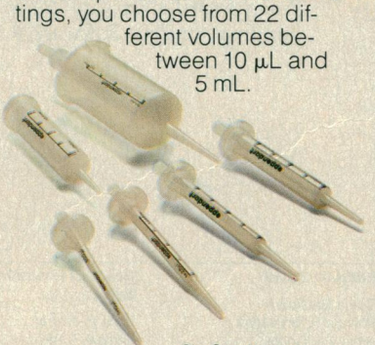

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This Week in
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Interleukin-2 receptor

BOTH interleukin-2 (IL-2) and IL-2 receptors are crucial for immune regulation (page 727). After antigens (foreign materials) stimulate T cells, IL-2 receptors appear on T-cell surfaces, and IL-2 production is induced. Although any immune response depends on the antigen's interaction with antigen-specific cells, a response's magnitude and duration are directly affected by a concurrent interaction of IL-2 with its receptor. Cells of patients with adult T-cell leukemia (ATL) always carry many IL-2 surface receptors, unlike normal T cells on which such receptors must be induced. Because of this feature, monoclonal antibodies that react specifically with IL-2 receptors and can eliminate receptor-bearing cells are being evaluated for ATL therapy. They are also of potential use in therapy for autoimmune disorders and in the suppression of organ rejection after grafting. Waldmann's review discusses the IL-2 receptor and documents how versatile and useful monoclonal antibodies can be: they have helped in characterizing IL-2 receptors, in cloning receptor genes, in determining how IL-2 and its receptors affect immune regulation, and in defining receptor distributions and disorders in receptor expression.

Experimental economics

ECONOMICS has become a laboratory science (page 732). In economic experiments people come together in a "laboratory" to participate in actual market situations in which they can earn a profit. Such experiments add to models the important but unpredictable human factor. Plott describes experiments for "posted-price" institutions, those in which sellers publicly post the price at which they wish to sell commodities, and buyers compete as they attempt to acquire units at the posted prices. After a time the market closes and then reopens with new prices, and the experiment continues for a number of cycles. Although, in general, the law of supply and demand works reasonably well in such markets, the posted-price markets were found to force prices up and market efficiency down. The results, like those of other economic laboratory experiments, have helped provide insights into models describing existing markets; they have been applied to policy-making and the design of markets in recently deregulated industries and have also been used in legal cases.

Update on Yukon artifacts

YOU can't judge a bone by its color (page 749). In 1966, a caribou tibia carved into a skinning tool (known as the Old Crow Basin "flesher") was found among bones of extinct Pleistocene animals in the Yukon. Dating of the inorganic carbon in the flesher indicated that it was 27,000 years old; the discovery implied that human hunters had lived in this region of the New World at that time. Three other tools carved from caribou antlers and found nearby had dark staining that resembled that of the flesher; they appeared to have been mineralized, and their association with the bones suggested that they too might be Pleistocene in age. Nelson *et al.* reevaluated the bones and artifacts, dating the organic carbon fraction. For 32 bones from the region (25,000 to 47,000 years old), early dates were confirmed. The flesher and the three other tools dated back only 1200 to 1500 years, to a time when such tools were common. Thus, the scenario for man's arrival in that region of the New World, based on data and inferences from the flesher, will need revamping.

Salla disease

TRANSPORT of the sugar sialic acid across the membranes of lysosomes (enzyme-laden sacs within cells) is defective in Salla disease (page 759). In this disorder, large amounts (10 to 30 times normal) of sialic acid are stored in lysosomes and are detected in urine. Lysosomes appear swollen with sialic acid when observed in the electron microscope; enzymes involved in the sugar's metabolism seem to function normally. Renlund *et al.* evaluated the egress of sialic acid from lysosome-rich fractions from cells of patients and normal individuals. Transport of the sugar (but not all small molecules) was defective in patient preparations. Salla disease is heritable and most patients diagnosed to date live in Finland. The disease may result from a single gene mutation that affects the carrier that mediates sialic acid transport. Disease onset usually occurs early in life, patients have slightly shortened life spans, and progressive neurologic dysfunctioning and mental and psychomotor retardation are typical.

Evolution of marine protozoa

THE theory that species evolve and then disperse from centers in the tropics to higher latitudes does not apply to benthic foraminifera, the bottom-living marine protozoa (cover) whose secreted shells are well preserved in fossil records (page 775). Buzas and Culver studied biogeographic and evolutionary patterns of fossil and modern organisms, analyzing the large collections in museums in the United States (some 500,000 slides), Germany, England, Holland, and Austria. Species typically survive about 20 million years; first appearances were recorded simultaneously for many species in widely separated areas, suggesting rapid dispersal of new species. In the recent geologic record (beginning 12,000 years ago), appearances of some species were first recorded far north of the tropics in Maine and Alaska. For the benthic foraminifera, the record indicates that evolution has occurred and continues to occur at all latitudes throughout the world and that dispersal can be either to higher or lower latitudes.

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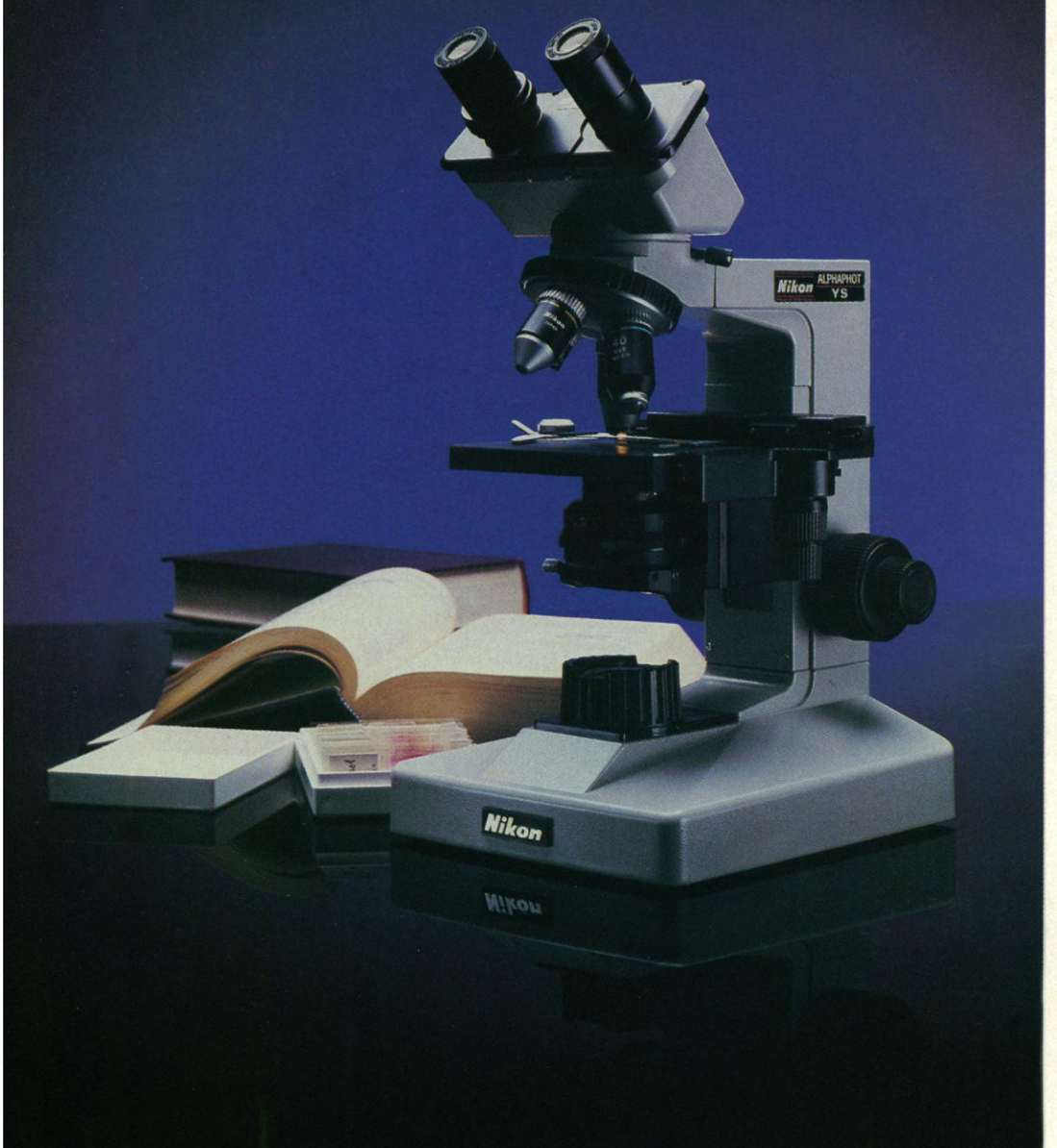

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Physics Through the 1990's

More than a thousand scientists participated in the preparation of the recently released *Physics Through the 1990's*.* Theirs was a labor of love and devotion that may or may not have much impact on federal support in the days of Gramm-Rudman. Their efforts resulted in a collection of eight volumes containing about 1900 pages that treats in great detail past accomplishments, future opportunities, and needs for federal support of the various branches of physics. Parts of the report are at a level designed for policy-makers. Much of it is at a level comprehensible mainly by physicists. However, there are portions of interest to scientists in other disciplines. One major theme of the publication is a multiplicity of examples of how past discoveries in physics have had important sequelae in the advancement of other branches of science and in a host of practical applications. Another facet of the report is the air of excitement that physicists are bringing to the study of the various branches of their science. Examples are especially observable in the volume devoted to atomic, molecular, and optical physics (AMO). This area of physics is highly likely to develop information, techniques, and equipment that affect other disciplines.

Physicists engaged in AMO research have much to be enthusiastic about. Their work has both fundamental significance and important practical applications. Developments in equipment and instrumentation have opened rich frontiers for study. As many as two score of different kinds of measuring equipment have been invented and produced. Perhaps most important are various types of lasers, synchrotrons, vacuum equipment capable of maintaining pressure less than 10^{-11} torr, and molecular beam techniques.

With a combination of these equipments and techniques it is possible to prepare virtually any simple molecule in any desired quantum state to study its structure, the physics that underlies this structure, and the dynamics of electrons moving in molecular fields.

Picosecond and femtosecond laser experiments can reveal how energy flows from one part of the molecule to another, the transition to chaotic vibrational motion, and the rates and mechanisms that determine the system's choice of a particular decay mode. Lasers provide highly selective excitation and interrogation schemes.

By using lasers sharply tuned to a frequency just below a particular vibrational mode of an atom or molecule, it is possible to cool the atom or molecule to millikelvin temperatures. In the very high vacuum it is possible to trap either individual atoms or ions and to make observations on them for hours at a time.

Another interesting topic for study are Rydberg atoms or molecules. These are neutral entities with an outer electron in a high quantum state, for example, $n = 100$. Such an atom has a very large diameter. It interacts with electromagnetic fields to an extent 10^8 greater than that for ordinary atoms and can be used to detect infrared, submillimeter, and microwave radiation.

Some synchrotrons produce intensities at least 10^6 greater than those of conventional sources, and even greater levels of radiation are on the way. Use of this source in crystallography will be especially helpful to biologists and chemists. Already, the structures of zeolite crystals ranging in size from 1 to 10 micrometers have been determined. Synchrotrons have also made accessible the complete spectrum between the ultraviolet and x-rays, much of which had been inaccessible.

One of the goals of AMO physicists is to determine physical properties with ever higher precision. An impressive result is the determination that space is isotropic to the speed of light. Laser interferometry has shown that space is isotropic to a few parts in 10^{15}. Of all the quantities in physics, time is by far the most accurately measured. The primary time standard in the United States is basically an atomic beam magnetic resonance apparatus. It has an accuracy of 1 part in 10^{13}, approximately 3 seconds in 1 million years.

These are only a few examples from the AMO volume, but they should convey a glimpse of the opportunities. If it is a good sample of the other volumes of *Physics Through the 1990's*, physicists have much to be enthusiastic about.—PHILIP H. ABELSON

**Physics Through the 1990's* (National Academy Press, Washington, DC, 1986).

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(1981); I. Renberg and T. Hellberg, *Ambio* **11**, 30 (1982); K. Tolonen and T. Jaakkola, *Ann. Bot. Fenn.* **20**, 57 (1983); D. F. Charles, *Verh. Internat. Verein. Limnol.* **22**, 559 (1984).
3. G. Nygaard, *Folia Limnol. Scand.* **8** 32 (1956); J. Meriläinen, *Ann. Bot. Fenn.* **4**, 51 (1967); N. Foged, *Bull. Geol. S. Denm.* **18**, 161 (1968); G. Digerfeldt, *Folia Limnol. Scand.* **16**, 1 (1972); U. Miller, *SNV Publ. (Stockholm)* 7, 42 (1973); F. Berge, *SNSF Intern Rap. 11* (1975); *ibid. 42* (1979); I. Renberg, *Early Norrland (Stockholm)* **9**, 113 (1976).
4. F. Hustedt, *Arch. Hydrobiol. Suppl.* **16**, 274 (1939).
5. J. Imbrie and N. G. Kipp, in *The Late Coenozoic Glacial Ages*, K. Turekian, Ed. (Yale Univ. Press, New Haven, CT, 1971), pp. 71–181.
6. T. Webb III and R. A. Bryson, *Quat. Res.* **2**, 70 (1972); T. Webb III, *J. Interdisc. Hist.* **4**, 749 (1980).
7. R. B. Davis, S. A. Norton, C. T. Hess, D. F. Brakke, *Hydrobiologia* **103**, 113 (1983); R. W. Batterbee, *Philos. Trans. R. Soc. London* **B305**, 451 (1984); R. B. Davis and D. S. Anderson, *Hydrobiologia* **120**, 69 (1985); D. F. Charles, *Ecology* **66**, 994 (1985).
8. R. B. Davis, D. S. Anderson, F. Berge, *Nature (London)* **316**, 436 (1985).
9. J. P. Smol, R. W. Batterbee, R. B. Davis, J. Meriläinen, Eds., *Diatoms and Lake Acidity* (Developments in Hydrobiology 29, Nijhoff/Junk, Dordrecht, The Netherlands, 1986).

Sly Statistics

Gina Kolata, in her article "Shakespeare's new poem: An ode to statistics" (Research News, 24 Jan., p. 335) presents statistical evidence that a newly discovered poem may reasonably be attributed to Shakespeare. The excerpt quoted in the article is strikingly similar to the following 17th-century poem on statistics by Speaker Ashe.

Shall I try not to lie,
Not to cheat with deceits,
mistruths breeding?
Shall I fend off the tend-
Ency to woo with biased views
so misleading?
Then sly statistics mean tricks
Must I renounce forever.
From unmarked scales I quail,
Unfair compare employing never.

DAVID BIRKES
Statistics Department,
Oregon State University,
Corvallis OR 97331

Cells, Patients' Rights, and Researchers' Responsibilities

The briefing by Marjorie Sun "Who should have rights to a patient's cells?" (News and Comment, 7 Feb., p. 543) leads off with a sentence referring to "the rights of patients and the responsibilities of researchers." A passing reference is made later to "informed consent."

I am a lawyer and I am constantly being shamed by my so-called brethren at the Bar, who have distorted litigation into a form of shakedown. Of course, if the cells in question are to be separated from the "patient" in a manner posing any danger to the patient or inhibiting the use of the best state-of-the-art therapy, the patient's (or his lawful representative's) consent is properly required. But suppose the cells are to be thrown away unless salvaged by the researcher. Then, since the cells are abandoned material, the salvager and not the former possessor has "ownership" of them. To suggest that such a former possessor of cells is "participating in the research" is silly. A perfect example of such abandoned cells is found in the cuttings on the floor of a barbershop.

W. BROWN MORTON, JR.
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Erratum: The caption for the photograph accompanying the review of *Neurobiology of Arachnids* (28 Mar., p. 1610) should have read, "*Peocilotheria regalis*, an Indian bird-spider. Beneath it is a spike train recorded from a sensory neuron responding to mechanical stimuli in the spider *Cupiennius salei*."

New England Biolabs' Summer Workshop in

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Faculty:

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Bromdiphen-hydramine	1.17	Diperodone	1.47	Methorphan	2.54	Phenoxy-benzamine	1.37
Brompheniramine	1.50	Disopyramide	2.70	Methylatropine	1.27	Promethazine	1.25
Bupivacaine	1.41	Doxylamine	1.37	Methylhom-atropine	4.2	Pronethalol	1.26
Butorphanol	1.99	Ephedrine	1.83	Methylphenidate	1.70	Propoxyphene	2.3
Carbinoxamine	1.33	Ephedrine, pseudo-	1.34	Metoprolol	1.64	Propranolol	1.13
Chlorpheniramine	2.26	Homatropine	1.63	Nadolol A	3.98	Terbutaline	1.22
Clidinium	1.21	Labetalol A	2.10	Nadolol B	3.03	Tocainide	1.44
Cocaine	1.46	Labetalol B	1.36	Oxyphencyclimine	1.42	Tridihexethyl	1.64
Cyclopentolate	3.86	Mepensolate	1.32	Oxprenolol	1.25	Trimeprazine	1.11
		Mepivicaine	1.25				

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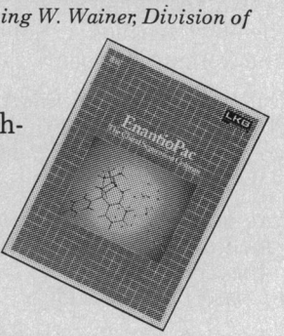

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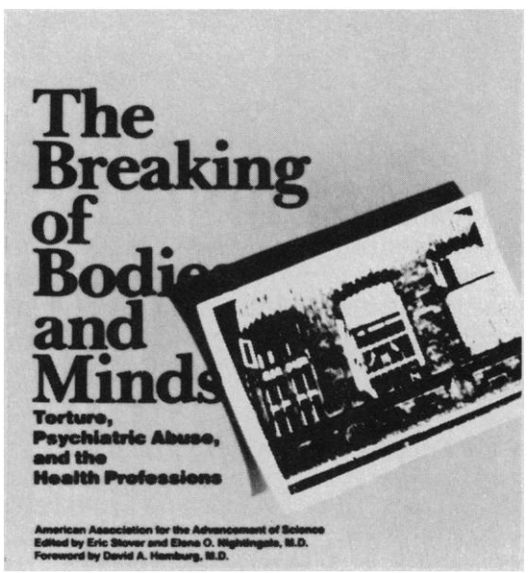
Torture, Psychiatric Abuse, and the Health Professions

A documentation of systematic use and effects of physical and mental torture throughout the world

Edited by Eric Stover
and Elena O. Nightingale
With a Foreword by
David A. Hamburg



This eye-opening book brings together for the first time writings on the role of medical personnel in cases of torture and psychiatric abuse. Through analyses and case histories, psychiatrists and other health care professionals, political scientists, ethicists, and other writers discuss the systematic use and effects of physical and mental torture in the Soviet Union, Latin America, and other parts of the world.

The book also details the complicity of an alarming number of medical personnel in torture and psychiatric abuse and examines the ways in which governments use a medical rationale to seek legitimacy for human destruction. Finally, it describes efforts by medical and other associations both to combat offensive practices and treat victims.

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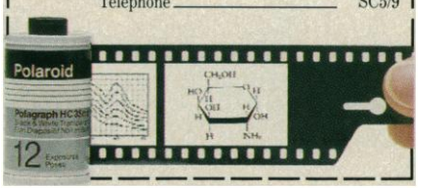

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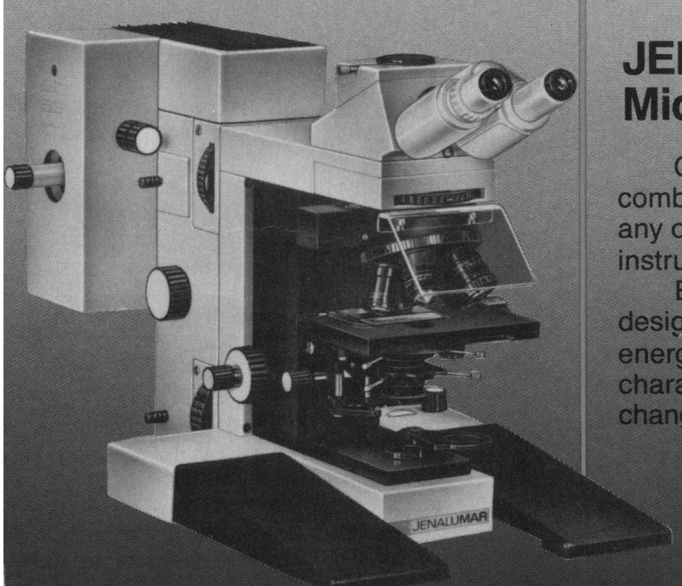

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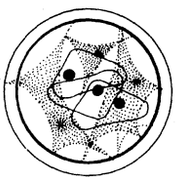

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PROGRAM AND WORKSHOPS (FINAL)

September 22, 1986 (Monday)/Day 1

OPENING ADDRESS: **DR. KEITH R. PORTER**

September 23, 1986 (Tuesday)/Day 2

	SESSION A TRACK	*SESSION B TRACK*
AM-1	CELL CYCLE AND MITOSIS, I. *Conveners:* DR. JOANNA OLMSTEAD and DR. DAVID PRESCOTT	CELLULAR IMMUNOLOGY, I *Conveners:* DR. SUSAN ROSENBERG and DR. DAVID SCOTT
AM-2	CELL CYCLE AND MITOSIS, II, *(continued . . .)*	CELLULAR IMMUNOLOGY, II *(continued . . .)*
PM	GROWTH FACTORS/ONCOGENES, I. (PHYSIOLOGY) *Conveners:* DR. RENATO BASERGA and DR. GORDON SATO	CYTOSKELETON/CYTOMATRIX, I. *Conveners:* DR. J.S. CLEGG, DR. KEITH R. PORTER, and DR. RICHARD VALLEE

September 24, 1986 (Wednesday)/Day 3

AM-1	GROWTH FACTORS/ONCOGENES, II. (MEMBRANE EFFECTS) *Conveners:* DR. GRAHAM CARPENTER and DR. PETER BLUMBERG	CYTOSKELETON/CYTOMATRIX, II. *(continued . . .)*
AM-2	GROWTH FACTORS/ONCOGENES, III. (MOLECULAR GENETICS) *Conveners:* DR. CHARLES STILES and DR. GEORGE TODARO	TRANSPORT AND SECRETION *Conveners:* DR. JAMES JAMIESON and DR. DAVID SABATINI
PM	GROWTH FACTORS/ONCOGENES, IV. (MOLECULAR GENETICS) *Conveners:* DR. CARLO CROCE and DR. GEORGE VANDE WOUDE	MEMBRANE RECYCLING *Conveners:* DR. RICHARD ANDERSON and DR. THOMAS ROTH

September 25, 1986 (Thursday)/Day 4

AM-1	ANTIBODY AND T-CELL RECEPTORS, I. *Conveners:* DR. FREDERICK ALT and DR. MARK DAVIS	REGULATION OF GENE EXPRESSION, I *Conveners:* DR. CHARLES EMERSON and DR. STEVEN MCKNIGHT
AM-2	ANTIBODY AND T-CELL RECEPTORS, II. *(continued . . .)*	REGULATION OF GENE EXPRESSION, II *(continued . . .)*
PM	*WORKSHOPS* *HYBRIDOMAS:* DR. WALTER GERHARD *CELL SENESCENCE:* DR. VINCENT J. CRISTOFALO and DR. GEORGE M. MARTIN *MYCOPLASMA:* DR. MICHAEL F. BARILE and DR. GERARD J. MCGARRITY *PRODUCTION OF BIOLOGICALS, INCLUDING HORMONES:* DR. ARTHUR LEVINSON *VACCINE PRODUCTION AND TISSUE CULTURE:* DR. JOHN C. PETRICCIANI and DR. WILLIAM R. TOLBERT	*WORKSHOPS* *CARCINOGENESIS:* DR. LEILA DIAMOND and DR. JAMES TROSKO *DIFFERENTIATED CELLS:* DR. JOSEPH LEIGHTON *SERUM-FREE MEDIA:* DR. RICHARD G. HAM *PLANT GENETICS:* DR. KAREN W. HUGHES *INVERTEBRATE HORMONES:* DR. EDWARD M. BERGER

September 26, 1986 (Friday)/Day 5

AM-1	GENE TRANSFER *Conveners:* DR. W. FRENCH ANDERSON and DR. FRANK CONSTANTINI	DIFFERENTIATION *Conveners:* DR. PETER ALBERSHEIM and DR. DAVOR SOLTER
AM-2	GENE TRANSFER *(continued . . .)*	DIFFERENTIATION *(continued . . .)*

Poster abstract submissions *must* be received by **Dr. Vincent J. Cristofalo,** *Chair,* **Program Committee** no later than June 20, 1986. For details and deadlines on poster abstract submissions and forms, meeting preregistration and hotel reservations, please contact the *Executive Director,* TCA business office. Commercial exhibitors should contact the *TCA Executive Director* for rates.