

11 OCTOBER 1985 VOL. 230 NO. 4722

\$2.50

SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



Now There's a Choice of Three 6000-rpm Floor-Model Centrifuges

Meet the new J-6M/E large-capacity refrigerated centrifuge!

It offers some of the best features of our other two 6000-rpm models — the microprocessor controls of the top-of-the-line induction drive J-6M and the economy of the dc-drive J-6B analog model.

With these features, the J-6M/E is ideal for those who want virtually automatic operation. You can store up to ten programs in the micro-

processor memory, with touch recall for time-saving, error-free repeat runs.

The J-6M/E offers a choice of three acceleration/deceleration rates to preserve the gentlest separations without compromising time.

Just like the other 6000-rpm models, the J-6M/E can spin a total of 20 Beckman rotors, including the unique JS-2.9 which holds up to 12 blood bags. There are elutriator

rotor capabilities too for living cell separations.

The Model J-6M/E — the perfect intermediary!

For details write: Beckman Instruments, Inc., Spinco Division, 1050 Page Mill Road, Palo Alto, CA 94304, or Beckman Instruments International, S.A., P.O. Box 76, 1211 Geneva 6, Switzerland.



JE-6B Elutriator Rotor.

BECKMAN

Circle No. 85 on Readers' Service Card

Cut your serum needs in half with SerXtend.TM

SerXtend* serum extender is a totally defined combination of cell growth factors that makes ordinary fetal bovine serum go twice as far or more.

It's a consistent, quality-controlled supplement for your cell culture growth media—tested for endotoxin, mycoplasma, adventitious bovine viruses, hepatitis B antigen, *and* cell growth.

With SerXtend, there's less need for lot-to-lot serum testing, fewer endogenous interfering factors, and lower total protein concentration (to simplify purification).



DuPont/Hana Biologics: Serving you together

SerXtend is manufactured for DuPont and its quality is guaranteed by Hana Media, Inc., the leaders in cell culture technology.

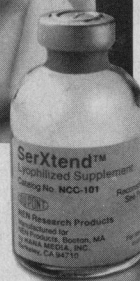
*SerXtend is a trademark of Hana Biologics, Inc., Berkeley, CA 94710.

Circle No. 139 on Readers' Service Card

**Call 1-800-237-8400
Ext. 305 (In Florida
1-800-282-1469)**

Find out how SerXtend can save you time, trouble, and money in preparing your cell culture growth media. Call today toll free, or write Du Pont-NEN, Room 5000A, 595 Colonial Park Drive, Roswell, GA 30075.

For immediate technical information or to place your order, call 1-800-225-1572 (in Mass. and international, 617-482-9595).



NEN Research Products



SCIENCE

	This Week in <i>Science</i>	115
LETTERS	Africanized Honeybees: <i>F. H. Fields</i> ; Computer Science Funding: <i>D. Gries, R. Miller, R. Ritchie, P. Young</i>	120
EDITORIAL	Arms Control and Intricacy: <i>W. D. Carey</i>	125
ARTICLES	Strained-Layer Epitaxy of Germanium-Silicon Alloys: <i>J. C. Bean</i>	127
	Life at High Temperatures: <i>T. D. Brock</i>	132
	What Makes a Good Computer Device?: <i>R. W. Keyes</i>	138
	Production of 2-Keto-L-Gulonate, an Intermediate in L-Ascorbate Synthesis, by a Genetically Modified <i>Erwinia herbicola</i> : <i>S. Anderson et al.</i>	144
NEWS AND COMMENT	DOE, States Reheat Nuclear Waste Debate	150
	<i>Briefing</i> : White House Issues Secrecy Guideline; Star Wars Boycott Gains Strength; EPA Moves Tentatively on Two Air Pollutants; China to Permit Inspection of Some Nuclear Facilities; Comings and Goings	152
	Britain's Oil Bubble About to Deflate	154
	IOM Presents More Nuclear War Data	156
RESEARCH NEWS	How Rhizobia and Legumes Get It Together	157
	The Core of the Milky Way	158
	The 23-Million-Dollar Quest Pays Off	161
ANNUAL MEETING	Call for Contributed Papers	162

BOARD OF DIRECTORS

DAVID A. HAMBURG
Retiring President, Chairman

GERARD PIEL
President

LAWRENCE BOGORAD
President-Elect

ROBERT McC. ADAMS
ROBERT W. BERLINER

MILDRED DRESSELHAUS
DONALD N. LANGENBERG

CHAIRMEN AND SECRETARIES OF AAAS SECTIONS

MATHEMATICS (A)
Daniel Zelinsky
Lynn Arthur Steen

PHYSICS (B)
Ralph O. Simmons
Rolf M. Sinclair

CHEMISTRY (C)
Rustum Roy
Jean'ne M. Shreeve

ASTRONOMY (D)
David Morrison
John E. Gaustad

PSYCHOLOGY (J)
John I. Lacey
William N. Dember

SOCIAL, ECONOMIC, AND POLITICAL SCIENCES (K)
David Mechanic
David L. Sills

HISTORY AND PHILOSOPHY OF SCIENCE (L)
Edward Grant
Arthur L. Norberg

ENGINEERING (M)
Henry McGee
W. Edward Lear

EDUCATION (Q)
John F. Schall
Joseph D. Novak

DENTISTRY (R)
Gordon H. Rovelstad
Harold M. Fullmer

PHARMACEUTICAL SCIENCES (S)
Edward G. Ripple
Betty-ann Hoerner

INFORMATION, COMPUTING, AND COMMUNICATION (T)
Karen B. Levitan
Elliot R. Siegel

DIVISIONS

ARCTIC DIVISION

Richard Bushey
President

Gunter E. Weller
Executive Secretary

CARIBBEAN DIVISION

Juan A. Bonnet, Jr.
President

Lucy Gaspar
Secretary-Treasurer

PACIFIC DIVISION

Geoffrey G. E. Scudder
President

Alan E. Leviton
Executive Director

SCIENCE is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1333 H Street, NW, Washington, D.C. 20005. Second-class postage (publication No. 484460) paid at Washington, D.C., and at an additional entry. Now combined with *The Scientific Monthly*. Copyright © 1985 by the American Association for the Advancement of Science. Domestic individual membership and subscription (51 issues): \$60. Domestic institutional subscription (51 issues): \$98. Foreign postage extra: Canada \$24, other (surface mail) 27, air-surface via Amsterdam \$65. First class, airmail, school-year, and student rates on request. Single copies \$2.50 (\$3 by mail); back issues \$3 (\$3.50 by mail); Biotechnology Issue, \$5 (\$5.50 by mail); classroom rates on request. Change of address: allow 6 weeks, giving old and new addresses and seven-digit account number. Authorization to photocopy material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act is granted by AAAS to libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee of \$1 per copy plus \$0.10 per page is paid directly to CCC, 21 Congress Street, Salem, Massachusetts 01970. The identification code for *Science* is 0036-8075/85 \$1 + .10. Postmaster: Send Form 3579 to *Science*, 1333 H Street, NW, Washington, D.C. 20005. *Science* is indexed in the *Reader's Guide to Periodical Literature* and in several specialized indexes.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

BOOK REVIEWS	The Cosmological Distance Ladder, <i>reviewed by M. Harwit</i> ; The Carbon Cycle and Atmospheric CO ₂ , <i>J. C. G. Walker</i> ; A Calculus of Suffering, <i>V. G. Drachman</i> ; Uneasy Genius, <i>M. J. Nye</i> ; Some Other Books of Interest: Books Received	163
REPORTS	Cretaceous Extinctions: Evidence for Wildfires and Search for Meteoritic Material: <i>W. S. Wolbach, R. S. Lewis, E. Anders</i>	167
	Halite Particles Injected into the Stratosphere by the 1982 El Chichón Eruption: <i>D. C. Woods, R. L. Chuan, W. I. Rose</i>	170
	Oroclinal Bending of the Southern Sierra Nevada Batholith: <i>M. McWilliams</i> and <i>Y. Li</i>	172
	Dust Devils on Mars: <i>P. Thomas</i> and <i>P. J. Gierasch</i>	175
	A Potent Nonpeptide Cholecystokinin Antagonist Selective for Peripheral Tissues Isolated from <i>Aspergillus alliaceus</i> : <i>R. S. L. Chang et al.</i>	177
	Cloning of Shiga-Like Toxin Structural Genes from a Toxin Converting Phage of <i>Escherichia coli</i> : <i>J. W. Newland, N. A. Strockbine, S. F. Miller, A. D. O'Brien, R. K. Holmes</i>	179
	Distinct Monoamine Oxidase A and B Populations in Primate Brain: <i>K. N. Westlund, R. M. Denney, L. M. Kochersperger, R. M. Rose, C. W. Abell</i>	181
	Externalization of β -Adrenergic Receptors Promoted by Myocardial Ischemia: <i>A. S. Maisel, H. J. Motulsky, P. A. Insel</i>	183
	Acquisition by Innervated Cardiac Myocytes of a Pertussis Toxin-Specific Regulatory Protein Linked to the α_1 -Receptor: <i>S. F. Steinberg, E. D. Drugge, J. P. Bilezikian, R. B. Robinson</i>	186
MEETING	Gordon Research Conferences: 1986 Winter Schedule: <i>A. M. Cruickshank</i>	189
PRODUCTS AND MATERIALS	Electrophoresis Apparatus; Laboratory Jack; DNA/RNA Labeling Reagent; Ultrafiltration; Immunocytochemistry Labels; Plasma Emission Spectrometer; Chemical Structure Software; Literature	198

DOROTHY NELKIN JOHN E. SAWYER	SHEILA E. WIDNALL LINDA S. WILSON	WILLIAM T. GOLDEN Treasurer	WILLIAM D. CAREY Executive Officer
----------------------------------	--------------------------------------	--------------------------------	---------------------------------------

GEOLOGY AND GEOGRAPHY (E) William H. Matthews III Helen M. McCammon	BIOLOGICAL SCIENCES (G) Betty M. Twarog Judith P. Grassie	ANTHROPOLOGY (H) Albert C. Spaulding Priscilla Reining
MEDICAL SCIENCES (N) Alfred P. Fishman Jonathan E. Rhoads	AGRICULTURE (O) Roy G. Creech Ralph J. McCracken	INDUSTRIAL SCIENCE (P) Robert H. Pry Robert L. Stern
STATISTICS (U) J. Stuart Hunter Edward J. Wegman	ATMOSPHERIC AND HYDROSPHERIC (W) F. Kenneth Hare Bernice Ackerman	GENERAL (X) Harold P. Green Rodney W. Nichols

SOUTHWESTERN AND ROCKY MOUNTAIN DIVISION

Donald J. Nash President	M. Michelle Balcomb Executive Director
-----------------------------	---

The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to foster scientific freedom and responsibility, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

COVER

Landsat false-color image of southern Sierra Nevada Batholith, California. The San Andreas Fault strikes across the frame from left to right; the Garlock Fault joins the San Andreas in the left-center of the image. The deflected "tail" of the Sierra Nevada is bounded to the right by the Garlock Fault. The large tan triangular area in the right-center is the Mojave Desert. The blue-green areas to the south denote the San Fernando Valley and metropolitan Los Angeles. See page 172. [EROS Data Center, Sioux Falls, South Dakota]

ONE YEAR AND STILL GOING STRONG!



Continuous production from an anchorage dependent human cell line started on August 28, 1984. 6893 liters of product-rich media collected so far.

BIO-RESPONSE, INC.

1978 West Winton Ave., Hayward, CA 94545 USA
Telephone: 415-786-9744 Telex: 5101005247

Circle No. 46 on Readers' Service Card

Engineered bacteria for making vitamin C

Approximately 30 million kilograms of vitamin C are used worldwide each year, and now a genetically engineered bacterium has been constructed that greatly streamlines the process by which the vitamin can be made (page 144). Most vitamin C (ascorbic acid) is made by multistep chemical synthesis coupled with microbial fermentation. It has also been made by a co-fermentation process in which two dissimilar species of bacteria carry out in tandem the requisite synthetic steps. Anderson *et al.* describe the construction of the "metabolically engineered" organism *Erwinia herbicola*, which carries genes cloned from a member of the *Corynebacterium* genus. The recombinant organism can convert the starting material (glucose) into the penultimate product in vitamin C synthesis; then, by a simple reaction catalyzed by an acid or a base this product can be converted into ascorbic acid.

Cretaceous "winter"

Discoveries in Denmark, New Zealand, and Spain of abundant soot and charcoal in clay samples dating back 65 million years suggest that wildfires may have contributed to the global extinction of species (thought to have been triggered by the impact of an asteroid or a meteorite) at the end of the Cretaceous period (page 167). The copious amounts of carbon found at three disparate sites suggest that a worldwide carbon layer was deposited. Wolbach, Lewis, and Anders explain how a meteorite could have ignited wildfires on distant continents, burning vegetation and fossil carbons. As much of the terrestrial biomass was consumed by fire, massive amounts of carbon and dust in the atmosphere would have blocked sunlight and inhibited photosynthesis, noxious chemicals would have harmed living creatures, and the earth could have been cooled as envisioned also in nuclear winter scenarios. These data from ancient events may be applicable to predictions about effects of a nuclear winter.

Martian dust devils

Viking Orbiter photographs show that there are dust devils on Mars (page 175). Columnar, conical, or funnel-shaped vortices of dust apparently rise into the thin Martian atmosphere as the surface is heated during summer afternoons. Dust devils were typically 1 to 2.5 kilometers high, although the tallest reached 7 km. Most were found where the terrain was smooth, and analysis of their color showed that they were composed of surface dust. Thomas and Gierasch estimate that a typical dust devil 2 km high and 200 m in diameter would contain 3×10^3 kilograms of dust. Further investigation will help determine whether this dust load plays a part in initiating major dust storms on the planet.

Toxic *Escherichia coli*

The common gut bacterium *Escherichia coli* can become a dangerous pathogen when infected by a phage (a bacterial virus) that carries a toxin gene (page 179). The phage converts normal *E. coli* to toxin-producing organisms that cause infantile diarrhea and hemorrhagic colitis. The pathogenic form produces 10,000 times as much toxin (called Shiga-like toxin or SLT) as does normal *E. coli*. Newland *et al.* found that phage strains insert a structural gene into the host *E. coli* chromosome; this gene specifies production of SLT. The gene for SLT and the toxin produced are structurally similar to the gene and toxin found in shigellae that cause dysentery.

Enzymes in the brain

The A and B monoamine oxidases—degradative enzymes that affect neurotransmitter concentrations and functioning by removing amine groups from neurotransmitters—are found in discrete regions of the primate brain (page 181). The A form was found (with highly specific monoclonal antibodies) in cells that use catecholamine as a neurotransmitter; B was found in cells that use serotonin. Because A, not B, deaminates serotonin, Westlund *et al.* suggest that the normal role of these enzymes is a protective one, deaminating extraneous amines that encounter the neuronal cells. A different destructive role may be played by the B form in some drug abusers; brain damage and parkinsonism have been associated with use of synthetic opiates contaminated with MPTP which, upon activation by the B enzyme, produces toxic cellular effects. Aberrant enzyme activities are also thought to accompany certain psychiatric and neurologic disorders for which enzyme inhibitors have been used clinically.

Biochemistry of heart throbs

A transmembrane signal protein N_f or a related molecule in a family of proteins thought to mediate a number of hormonal actions is associated with functional changes in the developing heart (page 186). The automatic beating of heart cells changes during development: it is at first stimulated by α -adrenergic catecholamines and later inhibited by them. This change is brought about by neurologic influence—innervation by sympathetic nerves in the heart—and has been observed in culture. Steinberg *et al.* found that the N_f -like protein increases as responsiveness changes and that it is involved in biochemical and pharmacologic regulation of responsiveness. The results are pertinent to normal cardiac ontogeny and perhaps to unusual circumstances—myocardial infarction and heart transplantation—in which the heart may revert to an earlier developmental state and respond differently to α -adrenergic stimulation.

AffiPure™ Antibodies.

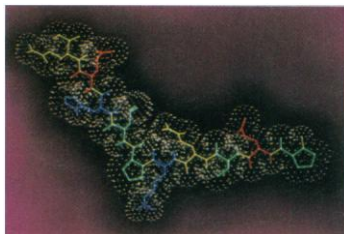


A continuing source of biological reagents from Triton Biosciences Inc.

AffiPure™ Antibodies to a transforming growth factor and oncogene proteins are produced in sheep against synthetic peptides. Use of affinity-purified chromatography yields antibodies which are monospecific and greatly reduces non-specific reactions.

Triton Biosciences Inc. now offers:

- ☐ **Ras^{Ha} p21 AffiPure™ Antibody**
- ☐ **α TGF AffiPure™ Antibody**
- ☐ **Ras^{Ki}/Ha p21 AffiPure™ Antibody**
- ☐ **Fes p85 AffiPure™ Antibody**

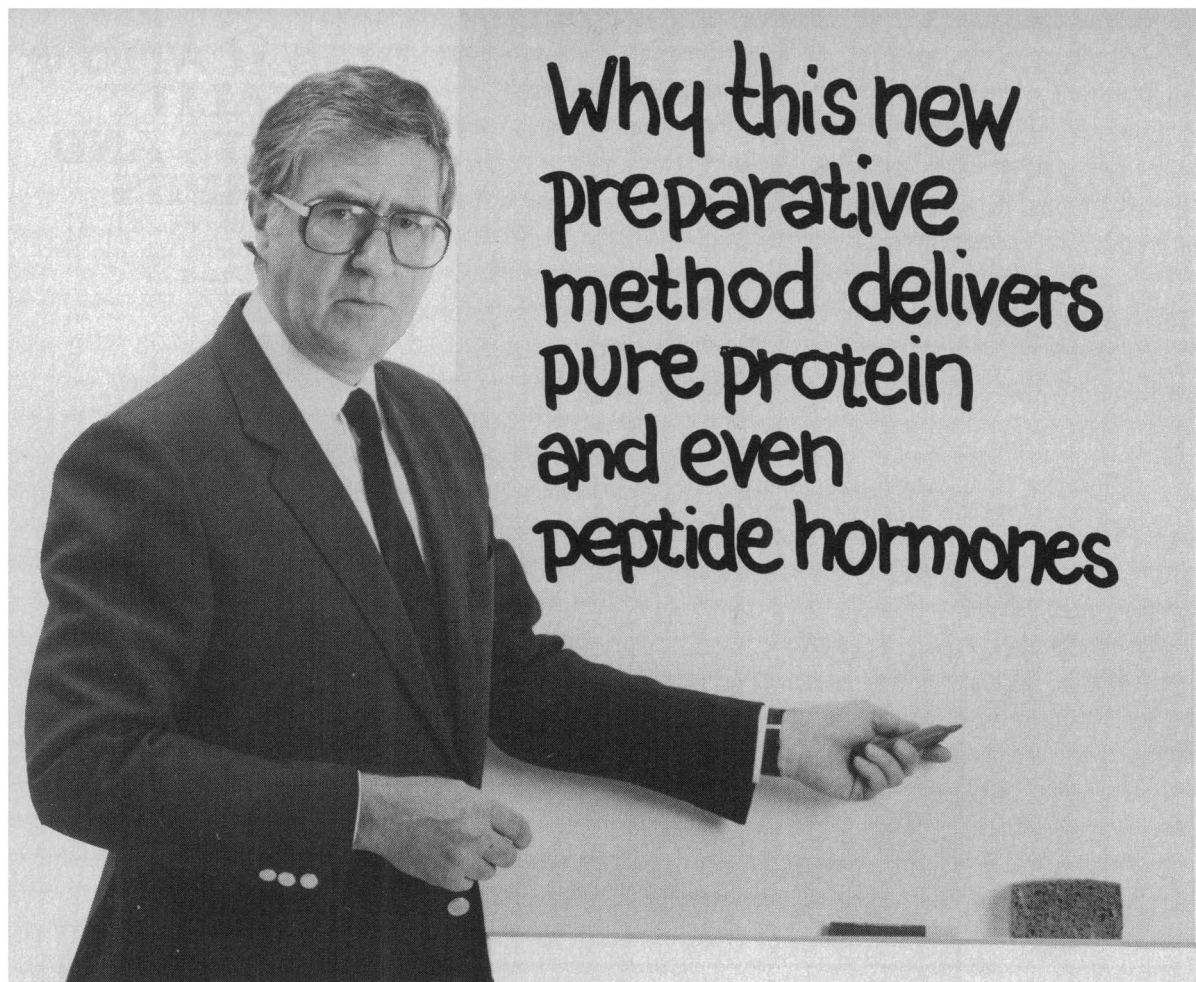


AffiPure™ Antibodies are valuable research tools for scientists working in the fields of TGF's and oncogenes. Triton Biosciences' commitment to providing a continuous source of biological reagents to the cancer-related research community is strengthened by our expanded facilities, increased human resources and our encouragement of working communications with institutions and independent researchers.

For additional information, contact Triton Biosciences Inc., 1501 Harbor Bay Parkway, Alameda, Calif. 94501, Tel. (415) 769-5200. Customer Services: 1-800-TRITONS. In California call: 1-800-682-6200.



Triton Biosciences Inc.™
A Subsidiary of Shell Oil Company



Well to begin with, you won't compromise high sample load with poor resolution. In fact, our way gives you 10 times greater load and also 10 times better resolution – at the same time!

Sounds too good? Just try advanced electrofocusing by using Immobiline. It's the only system available that lets you immobilize the pH gradient within the gel, puts an end to drift, cuts out conductivity gaps and gives you infinite stability.

Look up J. Biochem. Biophys Methods 8 (1983) 157–172, and find out how preparative electrofocusing separates proteins in quantities of up to 1 gram – completely free from low molecular weight contaminants. Better still, just fill in the coupon and get all the facts. Or try it

straight away, and I'll see that we give you an attractive discount on your first order.

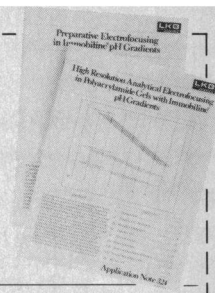
- ☐ Please send me your new brochure on The Immobiline System for analytical and preparative electrofocusing.
- ☐ Please send me your latest catalogue on Quality Chemicals for electrophoresis and electrofocusing.
- ☐ Please call me.

Name _____

Company/Institution _____

Department _____

Address _____



LKB

THE INCENTIVE GROUP

LKB-Produkter AB, Box 305, S-161 26 Bromma, Sweden. Tel. +46(8)98 00 40, telex 10492
 Antwerp (03) 218 93 35 · Athens-Middle East +30(1)894 73 96 · Copenhagen (01) 29 50 44 · Hongkong (852) 5-555555
 London (01) 657 88 22 · Lucerne (041) 57 44 57 · Madras (044) 45 28 74 · Moscow (095) 256-9002 · Munich (089) 85 830
 Paris (06) 928 65 07 · Rome (06) 39 90 33 · Stockholm (08) 98 00 40 · Tokyo (03) 293-5141 · Turku (021) 678 111
 Vienna +43(222)92 16 07 · Washington (301) 963 3200 · Zoetermeer (079) 31 92 01
 Over 60 qualified representatives throughout the world.

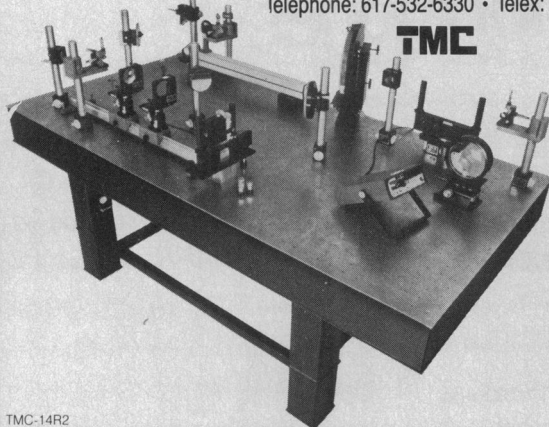
Circle No. 34 on Readers' Service Card

New standards of vibration isolation **MICRO-g[®]** systems

- Standard Post-Mount Isolators combined with Series 76 Honeycomb Tops achieve exceptional levels of attenuation and damping.
- Gimbal Piston isolators attenuate both vertical and horizontal vibration in a single compact module. Wide range of load ratings.
- New Series 76 honeycomb core tops offer superior damping, rigidity and structural integrity.
- Standard sizes to 4' x 12'; top thickness 2", 4", 8" and 12".

Technical Manufacturing Corporation

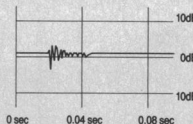
15 Centennial Drive, Peabody, Massachusetts 01960
Telephone: 617-532-6330 • Telex: 951408



TMC-14R2

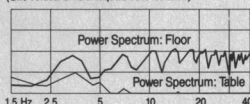
DAMPING

(Decay rate of on-board input)



ISOLATION

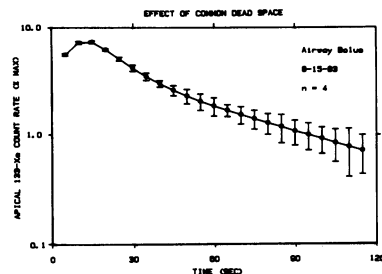
(One vertical division equals 90% isolation)



Circle No. 88 on Readers' Service Card

PUBLICATION ^{NEW} **QUALITY** **CHARTS AND** **GRAPHS**

from your IBM PC, XT, AT
and HP or compatible plotter



- Error Bars • Smooth lines,
Clean diagonals • Movable
Labels • Log and Semi-log scales
• and more . . .

Load data from Keyboard or disk,
any ASCII or DIF file (including
LOTUS 123)

This and other new microcomputer
tools for the scientist. Call or write
for our FREE catalog.

JANDEL SCIENTIFIC

2656 Bridgeway, Sausalito, CA 94965
800-874-1888 (outside CA)
415-331-3022 (inside CA)

Circle No. 83 on Readers' Service Card

BURN YOUR REFERENCE CARDS!

REF-11TM

Computerizes your REFERENCES
and prepares your BIBLIOGRAPHIES

- ☐ Maintains a data base of references
- ☐ Searches for any combination of authors, years of publication, reference title (or any words in the title), and topics covered by the reference
- ☐ Formats bibliographies exactly as you want them
- ☐ Alphabetizes references
- ☐ Abbreviates journal titles
- ☐ Runs on any video terminal and printer
- ☐ Menu driven dialogue
- ☐ Compact storage format
- ☐ 20 lines of comments for each reference

IBM PC/XT/AT, MS-DOS, CP/M 80 . . . **\$195⁰⁰**

RT-11, TSX-Plus, RSX-11, P/OS **\$250⁰⁰**

VAX/VMS (native mode) **\$350⁰⁰**



ANY
MANUAL **\$15⁰⁰**

ANY
MANUAL
& DEMO **\$20⁰⁰**

322 Prospect Ave., Hartford, CT 06106
(203) 247-8500

Connecticut residents add 7½% sales tax.

Circle No. 17 on Readers' Service Card

Science, Arms Control & National Security

This pressing issue for all scientists is the
focal point of these new titles from AAAS:

THE VERIFICATION CHALLENGE: Problems and Promise of Strategic Nuclear Arms Control Verification, by Richard A. Scribner, Theodore J. Ralston, and William D. Metz. Available November 1985, ca. 200pp., \$15*.

STRATEGIC NUCLEAR ARMS CONTROL VERIFICATION TERMS AND CONCEPTS: A Glossary, by Richard A. Scribner and Kenneth N. Luongo. AAAS (1985) 48pp., \$2.50*.

STRATEGIC NUCLEAR ARMS CONTROL VERIFICATION: An Annotated Bibliography, 1977-1984, by Richard A. Scribner and Robert Travis Scott. AAAS (1985) ca. 108pp., \$7.50*.

THE STRATEGIC DEFENSE INITIATIVE: Some Arms Control Implications, by Jeffrey Boutwell and Richard A. Scribner. AAAS (1985) 48pp., \$2.50*.

To order, write to: Committee on Science, Arms Control, and National Security, AAAS, 1333 H Street, NW, Washington, DC 20005.

(* Please add \$1.50 postage and handling per order. Allow 4-6 weeks for delivery. AAAS members receive a 20 percent discount on listed prices.)

**THE FIFTH ANNUAL CONGRESS FOR
HYBRIDOMA RESEARCH
JANUARY 26 - 29, 1986
BALTIMORE CONVENTION CENTER, BALTIMORE, MARYLAND**

Co-Chairmen:

Zenon Steplewski, The Wistar Institute, Philadelphia, PA • Hilary Koprowski, The Wistar Institute, Philadelphia, PA • Joseph Davie, Washington University, St. Louis, MO

Keynote Speaker: Mark Davis, Stanford University, Stanford, CA **Title:** T-cell Receptor Gene Structure and Function.

We are planning six Working Group Meetings on "Murine Monoclonal Antibodies Available for Clinical Application". These Group Meetings will be restricted to 20 participants each in the following fields:

Group A: Immunohistological Diagnosis

Leader: J. Schlom, NCI, Bethesda, MD

Reporteur: M. Nuti, Laboratorio Di Immunologia, Rome, Italy

Group B: Radioimmunosclntigraphy

Leader: J.-F. Chatal, Center Rene Gauducheau, Nantes, France

Reporteur: J. Powe, Victoria Hospital, Ontario, Canada

Group C: Antigens Shed by Tumor Cells

Leader: R. Bast, Duke University, Durham, NC

Reporteur: J.-Y. Douillard, Center Rene Gauducheau, Nantes, France

Group D: Immunotherapy of Solid Tumors

Leader: A. Houghton, Sloan Kettering Cancer Center, New York, NY

Reporteur: S. Ferrone, New York Medical College, Valhalla, NY

Group E: Immunotherapy of Leukemia and Lymphoma

Leader: J. Ritz, Dana Farber Cancer Institute, Boston, MA

Reporteur: K. Foon, University of Michigan, Ann Arbor, MI

Group F: Immunoconjugates

Leader: K. Krolick, University of Texas, San Antonio, TX

Reporteur: J. Fulton, Southwestern Medical School, Dallas, TX

It is our intent to select participants *actively* involved in the above listed research for in-depth discussion of progress made recently.

The entire day of Monday, January 27, 1986 will be available for these group discussions. The consensus reached by the groups will be presented by the Reporteurs to the whole Congress and results of these discussions will be published in Hybridoma.

Investigators interested in participating in Group Meetings should send a short summary to Dr. Ralph Reisfeld, Scripps Clinic and Research Foundation, 10666 North Torrey Pines Road, La Jolla, California 92037 by November 30, 1985.

Workshop Topics & Chairmen:

HUMAN REPERTOIRE and AUTOIMMUNE DISEASE

A. Notkins, NIH, Bethesda, MD.

GENETIC PROBES

J.D. Capra, University of Texas, Dallas, TX.

MONOCLONAL ANTIBODIES in DISSECTING NORMAL and MALIGNANT STEM CELLS

I. Bernstein, Fred Hutchinson Cancer Center, Seattle, WA.

ISOTYPE SWITCH VARIANTS IN ANALYSIS of ANTIBODY FUNCTION

M. Scharff, Albert Einstein College of Medicine, New York, NY.

Poster Sessions: TECHNOLOGICAL ADVANCES IN HYBRIDOMA RESEARCH

Participants are invited to submit abstracts for the poster sessions. These abstracts will be reviewed up until the time of the meeting; however, only those accepted by Nov. 15 will be published in the journal, Hybridoma. Contact Dr. Zenon Steplewski (215) 898-3924.

Organized by Scherago Associates, Inc., in conjunction with the journal Hybridoma.

REGISTRATION FEES:

\$400 On-site registration — includes a one year subscription or renewal to the journal, Hybridoma.

\$350 ADVANCE REGISTRATION — (Received by Nov. 15) — Includes a one year subscription or renewal to the journal, Hybridoma.

\$ 75 STUDENT REGISTRATION — Student status must be confirmed in writing by department chairman.

4-7 registrations received together from same organization \$300 each. Includes 4 journal subscriptions only.

8-10 registrations received together from same organization \$200 each. Includes 4 journal subscriptions only.

Larger group rates available upon request.

Cancellations must be received in writing by December 19, 1985.

Attendance will be limited. Make checks payable to: **Scherago Associates, Inc., DNA/HYBRIDOMA**

S-10-11

☐ Please reserve _____ space(s): Registration Fee of \$ _____ enclosed.

☐ Please send abstract form.

Name _____

Dept. _____ Organization _____

Street _____

City _____ State _____ Zip _____

Telephone: () _____

Return to: **Hybridoma; c/o Scherago Associates, Inc.**

Dept. S-10-11, 1515 Broadway, New York, NY 10036 • (212) 730-1050

The CRAY

ATTENTION!

We interrupt this ad to announce a breakthrough in supercomputing services.

X-MPower from Boeing.

We've combined a Cray X-MP Supercomputer with a Solid-State Storage Device (SSD) that packs a whopping 128 million words.

And it's available now via our international teleprocessing network.

This isn't just a better mousetrap. It's a total revolution in computing power.

Not only are we solving current research and design problems at amazing speeds, we're changing the way scientists and engineers think about solving problems. Here's why.

LIGHTNING FAST JOB TURN-AROUNDS. The X-MP is 30 percent faster on scalar jobs than the Cray 1S, the old efficiency champ. For vectorized jobs, it runs from 2 to 3 up to 10 times faster. Best of all, the SSD is 100 to 250 times faster than disks. The result? I/O problems become a thing of the past. And CPU time will almost equal turnaround time.

Recently, one group of researchers took only 3.6 hours to solve a seismic, 3-D migration problem that would have taken 23.8 hours! And for the structural analysis of an offshore platform, the X-MP turned a 28-hour CYBER 760 job into a 26-minute snap.

ACCELERATES RESEARCH AND DESIGN. The X-MP lets you do more computer runs in the time you've got for the same price or less. That squeezes more results out of your R&D dollar. And brings them in on time.

OPENS UP NEW WAYS TO SOLVE PROBLEMS. Because you have so much more calculating power, you can not only run current problems faster, but you can develop totally new algorithms as well. Totally new approaches to old problems!

These are big claims.

That's why we want a chance to tell you more. We've got more data than we can cram into one ad. Such as the X-MP's incredible versatility. In manufacturing. Oil and gas extractions. Telecommunications. Pharmaceuticals. Nuclear power. And more. Plus, you'll have full access to our MAINSTREAM® time-sharing services and our engineering and scientific software library.

To get the whole story, call Bob Nicholson today at (206) 763-5097. Or write Boeing Computer Services, P.O. Box 24346, M/S 7A-33, Seattle, WA 98124.

Scholar/Teach both.
For four years, we can't touch mainframes unsurpassed.

1. The ease of learning... even computer background.
2. The most analysis capabilities.
3. Mainframe alternative capabilities other CBT systems.
4. With more flexibility, Scholar/Teach cost CBT systems or compatible.

Now it's even better reasons the company not think about.

We've kept it simple. But it's flexible enough to grow with you as your

BOEING

CRAY and CRAY X-MP are trademarks of CRAY Research, Inc. MAINSTREAM® is a registered service mark and Boeing is a trademark of The Boeing Company.

We Make Only One Product. And We Make It Better Than Anyone Else.



Introducing cellgro™ cell culture media, now available through major scientific distributors.

We understand that the last thing you need to worry about is another variable—especially in the cell culture media you use. That's why Mediatech developed cellgro.™

To make cellgro™ the best, we go beyond required standards. We start with water for injection—even our steam is pure. In production, we use sophisticated monitoring systems, a highly-automated Class 100 dispensing room, and 316L stainless-steel lined ovens, tanks and piping. All these measures optimize sterile conditions and make low endotoxin levels the norm—not the exception.

Extensive product testing and stringent release standards assure consistently high quality. Functional tests on all media

Cellgro.™

extend for three passages on three cell lines—a diploid and two heteroploids. Plus, selected media are hybridoma-tested, at no extra cost.

We also test for endotoxins by the LAL chromogenic assay. Our release standard for liquid media is ≤ 0.25 EU/ml (.025 ng/ml, reference FDA standard EC-5). Anything else is not acceptable for release. Final biological tests include in-house membrane filtration for sterility and mycoplasma testing performed outside the facility.

For special formulations, test results by lot, and technical assistance, call 1-800-CELLGRO. Contact your local scientific distributor for price and order information.

Cellgro™ will change the way you think about media. Get the right solution to work for you.

MEDIATECH/DIVISION OF SYBRON CORPORATION 13884 Park Center Road, Herndon, Virginia 22071 1-800-CELLGRO
Cellgro.™ Quality, Consistency, Availability.



The Sorvall® RC-5C. For versatility, it runs rings around any other superspeed centrifuge!

Now, get utmost flexibility from microcomputer control—with g-force display, rate and temperature control and ω^2dt integrator, all automatically!

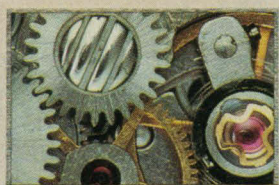
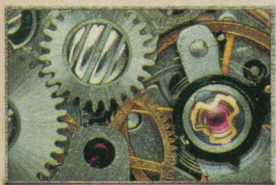
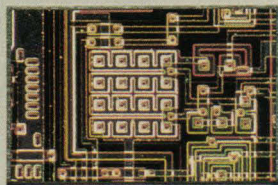
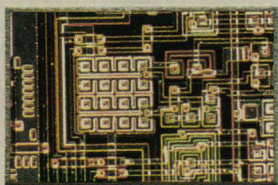
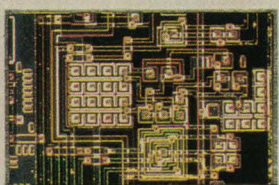
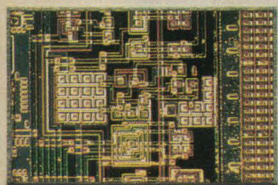
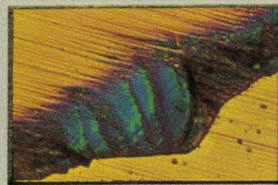
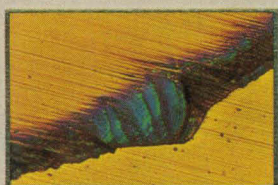
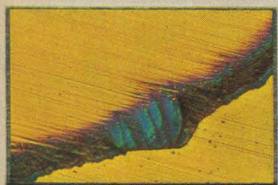
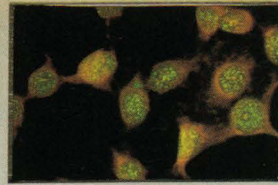
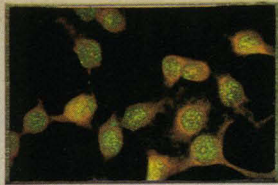
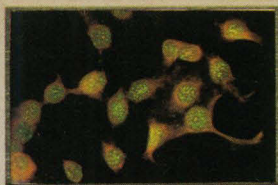
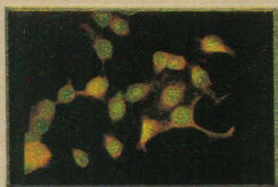
The microcomputer makes entering a run simpler than ever. Both "set" and "run" conditions are simultaneously visible. The RCF Mode instantly displays g-force for speeds you select. Duplication of critical runs is convenient, thanks to a built-in ω^2dt integrator that calculates the total centrifugal effect.

The proven reliability of the workhorse SORVALL® RC-5B has been carried forward in designing the 5C. You'll find the same efficient direct-drive motor system and reliable refrigeration, warranted for five years. No vacuum is required to achieve rotor speeds or maintain operating temperatures.

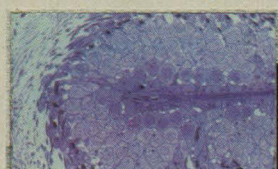
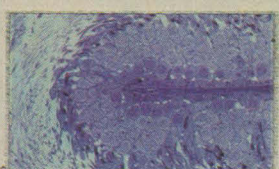
Find out more about the most versatile superspeed a lab can own. **Call (800) 345-8600 Ext. 500** and ask for 12-page product brochure. Or, write Du Pont Company, BRML #162210, Wilmington, DE 19898. In Canada call **(416) 745-9870**

Sorvall® Centrifuges
We've got a centrifuge that's just your speed





PICTURE PERFECT



There's a breakthrough in photomicrography that's the image of perfection, the new Nikon UFX photomicrographic system.

An exclusive Direct Projection System transmits 100% of the available light to the film. The result is drastically shorter exposures, greatly enhanced low

light sensitivity and a striking improvement in contrast. Computer control assures automatic exposure accuracy in either 1% spot or integrated average metering modes. Yet, this system is astonishingly simple to operate.

For the total picture of Nikon's new FX systems for

35mm, Polaroid® and large format photomicrography, write: Nikon Inc., Instrument Division, 623 Stewart Avenue, Garden City, NY 11530. (516) 222-0200.

Nikon
Extending Man's Vision



© 1982 Nikon Inc.

For more information circle reader service number 79
For demonstration circle reader service number 80

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Science serves its readers as a forum for the presentation and discussion of important issues related to the advancement of science, including the presentation of minority or conflicting points of view, rather than by publishing only material on which a consensus has been reached. Accordingly, all articles published in *Science*—including editorials, news and comment, and book reviews—are signed and reflect the individual views of the authors and not official points of view adopted by the AAAS or the institutions with which the authors are affiliated.

Publisher: WILLIAM D. CAREY

Editor: DANIEL E. KOSHLAND, JR.

Deputy Editors

PHILIP H. ABELSON (*Engineering and Applied Sciences*), JOHN I. BRAUMAN (*Physical Sciences*), GARDNER LINDZEY (*Social Sciences*)

Editorial Board

PHILIP W. ANDERSON, DAVID BALTIMORE, ANSLEY J. COALE, JOSEPH L. GOLDSTEIN, LEON KNOPOFF, SEYMOUR LIPSET, WALTER MASSEY, OLIVER E. NELSON, ALLEN NEWELL, RUTH PATRICK, VERA C. RUBIN, HOWARD E. SIMMONS, SOLOMON H. SNYDER, ROBERT M. SOLOW

Board of Reviewing Editors

JAMES P. ALLISON, QAIS AL-AWQATI, LUIS W. ALVAREZ, DON L. ANDERSON, KENNETH J. ARROW, C. PAUL BIANCHI, ELIZABETH H. BLACKBURN, FLOYD E. BLOOM, MICHAEL S. BROWN, JAMES H. CLARK, STANLEY FALKOW, NINA V. FEDOROFF, GARY FELSENFELD, DOUGLAS J. FUTUYMA, THEODORE H. GEBALLE, STEPHEN P. GOFF, PATRICIA S. GOLDMAN-RAKIC, RICHARD M. HELD, GLORIA HEPPNER, JOHN IMBRIE, ERIC F. JOHNSON, KONRAD B. KRAUSKOPF, PAUL E. LACY, JOSEPH B. MARTIN, JOHN C. MCGIFF, MORTIMER MISHKIN, JOHN S. PEARSE, YESHAYAU POCKER, FREDERIC M. RICHARDS, JAMES E. ROTHMAN, RONALD H. SCHWARTZ, OTTO T. SOLBRIG, ROBERT T. N. TJIAN, VIRGINIA TRIMBLE, GEERAT J. VERMEIJ, MARTIN G. WEIGERT, GEORGE M. WHITESIDES, WILLIAM B. WOOD, HARRIET ZUCKERMAN

Editorial Staff

Managing Editor: PATRICIA A. MORGAN
Assistant Managing Editors: NANCY J. HARTNAGEL, JOHN E. RINGLE
Production Editor: ELLEN E. MURPHY
News Editor: BARBARA J. CULLITON
News and Comment: COLIN NORMAN (deputy editor), MARK H. CRAWFORD, CONSTANCE HOLDEN, ELIOT MARSHALL, R. JEFFREY SMITH, MARJORIE SUN, JOHN WALSH
European Correspondent: DAVID DICKSON
Research News: ROGER LEWIN (deputy editor), RICHARD A. KERR, GINA KOLATA, JEAN L. MARX, ARTHUR L. ROBINSON, M. MITCHELL WALDROP
Administrative Assistant, News: SCHERRAINE MACK; **Editorial Assistant, News:** FANNIE GROOM
Senior Editors: ELEANORE BUTZ, RUTH KULSTAD
Associate Editors: MARTHA COLLINS, SYLVIA EBERHART, CAITILIN GORDON, WILLIAM GREAVES, BARBARA JASNY, STEPHEN KEPPEL, EDITH MEYERS, LOIS SCHMITT
Assistant Editor: LISA MCCULLOUGH
Book Reviews: KATHERINE LIVINGSTON, **Editor:** LINDA HEISERMAN, JANET KEGG
Letters Editor: CHRISTINE GILBERT
Contributing Editor: RUTH L. GUYER
Production: JOHN BAKER, HOLLY BISHOP, KATHLEEN COSIMANO, ELEANOR WARNER, ISABELLA BOULDIN, SHARON RYAN, BEVERLY SHIELDS
Covers, Reprints, and Permissions: GRAYCE FINGER, **Editor:** GERALDINE CRUMP, CORRINE HARRIS
Guide to Scientific Instruments: RICHARD G. SOMMER
Manuscript System Analyst: WILLIAM CARTER
EDITORIAL CORRESPONDENCE: 1333 H Street, NW, Washington, D.C. 20005. Telephone: 202-326-6500. For "Information for Contributors" see page xi, *Science*, 27 September 1985.

Business Staff

Chief Business Officer: WILLIAM M. MILLER III
Business Manager: HANS NUSSBAUM
Assistant to Chief Business Officer: ROSE LOWERY
Business Staff Supervisor: DEBORAH JEAN RIVERA
Membership Recruitment: GWENDOLYN HUDDLE
Member and Subscription Records: ANN RAGLAND

Advertising Representatives

Director: EARL J. SCHERAGO
Production Manager: DONNA RIVERA
Advertising Sales Manager: RICHARD L. CHARLES
Marketing Manager: HERBERT L. BURKLUND
Sales: New York, N.Y. 10036: J. Kevin Henebry, 1515 Broadway (212-730-1050); SCOTCH PLAINS, N.J. 07076: C. Richard Callis, 12 Unami Lane (201-889-4873); CHICAGO, ILL. 60611: Jack Ryan, Room 2107, 919 N. Michigan Ave. (312-337-4973); BEVERLY HILLS, CALIF. 90211: Winn Nance, 111 N. La Cienega Blvd. (213-657-2772); SAN JOSE, CALIF. 95112: Bob Brindley, 310 S. 16 St. (408-998-4690); DORSET, VT. 05251: Fred W. Dieffenbach, Kent Hill Rd. (802-867-5581).
ADVERTISING CORRESPONDENCE: Tenth floor, 1515 Broadway, New York 10036 (212-730-1050).

Arms Control and Intricacy

This meditation is prompted by the recent passing of Herbert Scoville. His career, in and out of government, in pursuit of balanced national security tempered by arms control went a very long way in defining and exemplifying the idea of scientific responsibility. The best years of his life, and all of his dwindling time, went into building the case for the arms control process and elucidating the differential impacts of weapons systems on the fragile texture of what we term stability.

Much that assails the eye and the ear, relative to reining in the risk of nuclear conflict, is at the level of rhetorical jousting. Our adversary calls for a mutual moratorium on tests. We invite the adversary to observe a weapons test. Deadlock follows. But below the surface rhetoric is an intricacy that grows more complex with time and with weapons innovations, and it is here that the specialists have so critical a role.

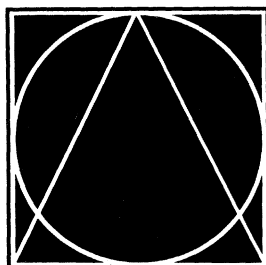
The likelihood that nuclear weapons will disappear is small. We read in Shevchenko's confessional autobiography* that Soviet policy-makers dismiss true nuclear disarmament because, in that event, the Soviet Union would cease to be a superpower. If that is to be taken on its face, the puzzle of Soviet intransigence is given a new twist, since it seems to say that in their case nuclear overkill has evolved into a nonnegotiable geopolitical asset. The burden on arms control efforts thus becomes staggering, and the focus has to be on measures for conflict avoidance and negotiations to put a cap on weapons systems competition. But with trust on both sides near the zero point, the course is all uphill.

The quality of public opinion in matters of arms control and the requirements of national security are very important to a society based upon the principles of representative government. Nowhere is this problem more troublesome than where controversy arises regarding new starts on weapons systems and confidence levels in the verifiability of arms agreements. The parade of disputes over weapons systems in the past decade alone says much about the confusion that afflicts public opinion. Each new weapons initiative has generated arguments as to need, efficacy, cost, reliability, survivability, and consistency with ratified or unratified arms control treaties. Not everyone can follow these trails without a guide, and Scoville's legacy to his fellow citizens will long survive in the educational work of the Arms Control Association.

Because intricacy besets this whole area, great oversimplifications are of no help. Thus, the AAAS thought it timely to publish this year a glossary of terms and concepts that bear on problems of verification in nuclear arms control matters. It runs to 38 pages, without counting even more pages listing key official documents, treaties in force, and "suspended arms control negotiations." It is a mouthful. "SLAR" stands for Side-Looking Airborne Radar. "Pave Paws Radar" is a phased array radar to warn of submarine-launched missiles. "Molniya" are Soviet satellites for military communication. "Exoatmospheric" refers to antiballistic missiles that operate outside the atmosphere. Thus we begin to glimpse a patch of the intricacy that suffuses the nuclear weapons culture and hampers public opinion in staying in step with the arms control debate.

Now a summit meeting is in prospect. It ought to be more than a spectacle of personalities on a world stage. It ought to bring into focus the full dimensions of the terror that holds us hostage. Whatever may be its outcomes, the genuine work of pursuing arms control will be done, as always, offstage. It will be done in the quiet zone of the cold war, and those who work honestly at it are unlikely to be singled out for peace prizes. The unfinished work of Scoville challenges us profoundly.—WILLIAM D. CAREY

*A. N. Shevchenko, *Breaking with Moscow* (Knopf, New York, 1985), p. 163.



Smith Kline & French Laboratories

Announces

the Fourth in Its Series of Annual Research Symposia

Co-Organizers:

George Poste and Stanley T. Crooke

New Frontiers in the Study of Gene Functions

April 8-10, 1986

Sheraton Valley Forge Hotel
Valley Forge, Pennsylvania

Tentative Program

J. Alwine	G. Fink	A. Johnson	P. Sharp
R. Axel	M. Gellert	G. Khoury	M. Shulman
S. Benkovic	C. Gross	P. Leder	S. Tilghman
M. Birnstein	D. Hogness	R. Palmiter	R. Tjian
R. Brinster	L. Hood	G. Rubin	R. Weinman
G. Felsenfeld	R. Jaenisch	R. Sauer	H. Weintraub

For Additional Information and Registration Forms, Contact:

Ms. Buff Biddle
Symposium Coordinator
Post Office Box 7929
Philadelphia, Pa. 19101

○ = continuity of life

△ = quest for knowledge

□ = resolution

(NW60)M

AAAS 1986 AAAS ANNUAL MEETING Philadelphia, 25-30 May

Call for Contributed Papers

Deadline 17 January 1986

The next Annual Meeting of the AAAS will be in Philadelphia, PA, 25-30 May 1986, at the Franklin Plaza, Bellevue Stratford, and Hershey Philadelphia hotels; plan to attend. Information about program activities, as well as housing and registration forms, will appear biweekly in *Science*, beginning with the 31 January 1986 issue.

Although it is too late to submit suggestions for symposia for the 1986 Annual Meeting, contributed papers can be sent in up to 17 January 1986. The contributed paper sessions will be either of the POSTER or SLIDE type; see below for instructions and abstract sample.

POSTER SESSION: Each contributor will have a bulletin board on which to place text and graphics (oversized for easy reading)

for an extended period of time so that the work can be discussed with interested parties.

SLIDE SESSION: Each contributor will have 10 minutes to present his or her work and show 2"x2" (35 mm) slides or overhead transparencies.

Please indicate on your abstract which type of presentation you prefer to give.

The privilege of contributing a paper is extended only to AAAS members, although the member need not be one of the authors but merely the endorser of the contribution. All presenters (member and non-member) must register at the meeting.

Instructions for Contributors

Type abstracts, using a clean (new) ribbon, on ordinary white bond paper (8.5 by 11 inches; 21.5 by 28 cm) according to the format shown on the right (the example is reduced to about one-half of the linear dimension; your abstract will be printed *directly from your copy* at about two-thirds of its linear dimensions). Indicate at the top of the page the letter of the AAAS Section which comes closest to your subject matter (a full list will be found at the bottom of the contents page of any issue of *Science*), two or three words which give the subspecialty involved, and whether you prefer a POSTER or SLIDE session.

It is very important to keep your abstract within the limits of a 5-inch (12.7-cm) square. If it is too wide, it will be returned; if it is too long, it may be arbitrarily cut. **Note that your original will be our camera-ready copy, so type and letter as neatly as possible.**

At the bottom of the page, left side, type the name and address of the person who should be contacted regarding the abstract (that is, the person we should notify of where and when the presentation should be made). On the right side, type the name and affiliation of the AAAS member or fellow who is submitting the abstract and have this person sign the abstract. *The privilege of submitting a contributed-paper abstract for the Annual Meeting is limited to AAAS members or fellows, but this person need not be one of the authors.*

Send the *original* together with 3 copies of your abstract to:

Contributed Papers
AAAS Meetings Office
1333 H Street, N.W.
Washington, D.C. 20005

Not later than 17 January 1986

Abstract submitted for a contributed paper session at the AAAS Annual Meeting in Philadelphia, PA (25-30 May 1986)

AAAS Section nearest subject matter of paper _____

Subspecialty of this AAAS Section _____

Type of Session (indicate one): _____ POSTER or _____ SLIDE

5 inches (12.7 cm)

Indent Five Spaces and Type Title in Upper and Lower Case Letters and Underline. AUTHOR'S NAME (Institution in Parentheses), SECOND AUTHOR (Institution).*

Skip a space and type abstract. The full width of the column of typed material should be 5 inches (12.7 cm) and must not extend beyond that. Abstracts which are wider than this will not be printed (only the title and authors will be printed). The total length of the material, from top of title to bottom of footnotes, should not exceed 5 inches (12.7 cm); material which takes up more than this space is subject to arbitrary cutting. All special symbols and signs which must be hand lettered (e.g., π) should be rendered in reproducible black ink as clearly and carefully as possible. The entire submission should be of camera-ready quality so that it can be photographed, turned into a plate, and printed. The printed abstract will be about 2/3 the size of the typed version. Avoid paragraphing as this wastes space. However, you may use your allotted space to neatly letter in equations and diagrams, as you deem necessary,

$$-\frac{\hbar^2}{2m} \nabla^2 \psi + V \psi = i\hbar \frac{\partial \psi}{\partial t}$$

as indicated in this example.

*Skip a space and type footnotes. Author's names should be in all upper case letters; institutions in upper and lower case letters.

Person to be contacted
about abstract:

Full Name
Complete Address

Submitted by AAAS member:

Type name of member
Type affiliation of member

(signature of member)