American Association for the Advancement of Science

SCIENCE

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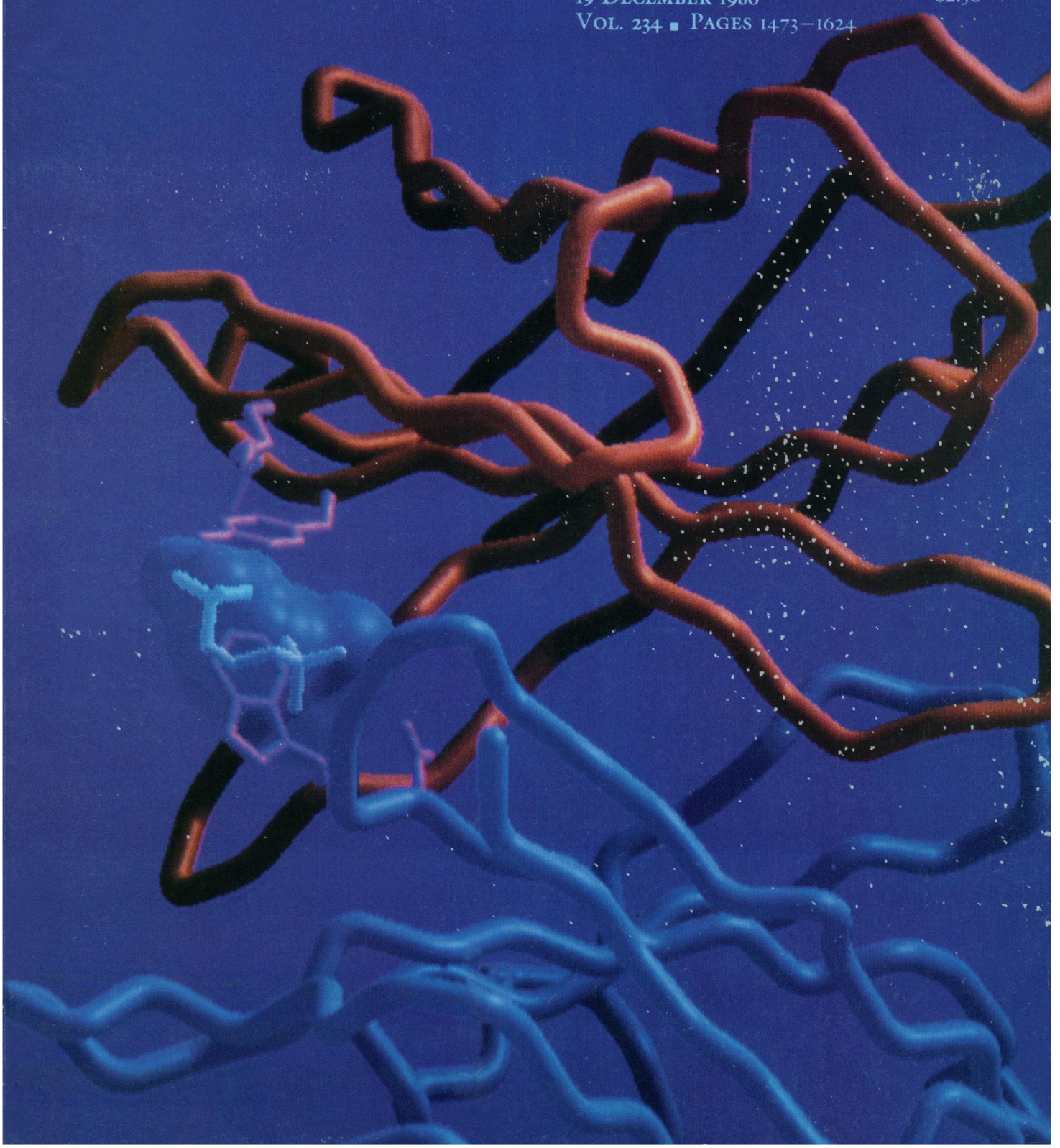
$2.50



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The Model L8M has proven to be the most reliable and efficient ultracentrifuge ever designed. The Beckman Ultra-Smooth Induction Drive makes the difference.

The drive system represents a major technological advance—it is completely enclosed *inside* a vacuum envelope, eliminating the need for a high-speed seal between the drive motor and rotor chamber. There is no bushing to wear, no friction, no messy oil drain or reservoir, no chance for a vacuum loss during a critical run. You get greatly reduced maintenance, less heat and noise in your lab, long-term reliability.

For high throughput, the L8M provides the fastest acceleration and deceleration of any ultracentrifuge for all rotors. For example, the Model L8-80M can get a Type 80 Ti Rotor to top speed in 7 min, 38 sec and decelerates from 80,000 rpm in 3 min, 50 sec. For delicate gradient separations, there are 10 special microprocessor-controlled profiles.

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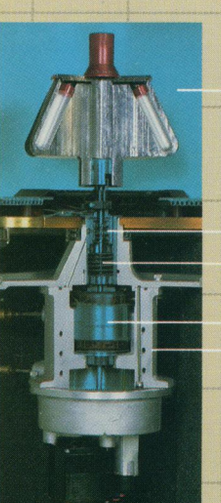

Cutaway of actual Ultra-Smooth Induction Drive and a Type 80 Ti Rotor with exclusive Quick-Seal® Tubes—all within a vacuum envelope.

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Drive spindle

No high-speed seal

Vacuum envelope (blue area)

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HIGH-TECH MATERIALS EXHIBITION 1987

May 20 (Wed.)—May 23 (Sat.), 10:00 a.m.—5:00 p.m.
Sunshine City, Tokyo, Japan
Sponsored by:
Nihon Keizai Shimbun, Inc.
Federations of Material Science and Technology
In Collaboration with:
New Materials Study Group/Japan Fine Ceramics Association

High-Tech Materials: 63 trillion yen business in year 2000.

New materials have been targeted as one of the strategic components of Japanese business planning. Their market in the year 2000 is expected to be 5.4 trillion yen. This estimate grows to 63 trillion yen when associated manufactured products are included. That is why Japanese industry is concentrating its efforts in the development and application of new materials.

The High-Tech Materials Exhibition has been organized to publicize the progress that has taken place in the field to date. First held in 1984, it is Japan's largest and most comprehensive new materials exhibition. Its scale has been growing yearly and it has consistently received high marks from both exhibitors and visitors. Here new materials manufacturers and those looking for materials with new functions and high performance have a chance to meet.

The third High-Tech Materials Exhibition will be held in Tokyo in May 1987. It will provide a forum for exchanging new ideas and information on widening the range of new materials application, which is important to business planning, R&D, and operations. It will also offer an excellent opportunity to make new business contacts.

- Admission Fee:¥700(Group Rate ¥500)
- Anticipated Visitors:100,000
- Exhibition Space:11.284 ㎡
- Display Booths:700(tentative)
- Number of Exhibitors:180(tentative)
- Subject Areas

1. New Materials: Organic, Metal, Semiconductor, Composite Materials and Fine Ceramics
2. Materials Production and Analysis Equipment
3. High-Quality Products

- Exhibition Booth Applications

1. Booth Fee
   Overseas Exhibitors:¥210,000
   Local Exhibitors:¥230,000
2. Deadline:January 31(Sat.), 1987

- Comparison of High-Tech Materials Exhibition

	1984 (first)	**1985** (second)
Dates	November 27—30	October 28—31
Visitors	57,728	81,837
Participating Companies	91	147
Booths	285	505

For inquiries please contact:
Secretariat of the High-Tech Materials Exhibition
Nihon Keizai Shimbun, Inc. Projects Development Bureau
9-5, Otemachi 1-chome, Chiyoda-ku, Tokyo 100, Japan
Telex:NIKKEI J22308, J24798 Fax:(03)256-5746

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

SCIENCE

ISSN 0036-8075
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NUMBER 4783

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■ 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 Combining site (heavy chain in red, light chain in blue) of antibodies which bind ligands containing tetrahedral phosphate (here phosphorylcholine shown as blue surface with phosphate bonds colored cyan) can stabilize a hydrolytic transition state and thus function as a highly specific enzyme. See page 1570. [Coordinates of the McPC603 antibody-antigen complex from D. Davies, National Institutes of Health. Computer graphic modeling and photograph by Arthur J. Olson, Research Institute of Scripps Clinic, La Jolla, CA, using software by A. J. Olson and Michael L. Connolly]

This Week in
SCIENCE

Kalahari life

CROP cultivation, herding, ceramics, metal-working, long-distance trading, and other sophisticated human activities have been taking place for more than a thousand years in the Kalahari; this is an indication that pastoralists have long been living in this region in southern Africa that was formerly thought to be peopled (except during the past couple of centuries) only by foraging "Bushmen" (page 1509). Denbow and Wilmsen review the archeologic findings—carbonized seeds (evidence of crop cultivation), vitrified dung deposits and thousands of bones (evidence of herded animals), glass beads and marine shells from the Indian Ocean (evidence of trade), ceramic artifacts, metal-working remnants—and the supportive geologic, linguistic, and archival discoveries that show that pastoralism has been a part of Kalahari life for tens of centuries. Furthermore, the foragers and pastoralists did not remain apart all of that time but, in fact, interacted extensively. This new view, a result of a decade of study by diverse researchers interested in Kalahari history and human societal evolution, will have an impact not only on models of social evolution but also on policies directed toward integrating the diverse Kalahari peoples whose paths have converged before.

Interactions of Eco RI and DNA

ECO RI endonuclease, the most widely used restriction enzyme, has contributed greatly to analyses of the structure of DNA; it generates fragments of DNA by selective cleavage wherever the particular sequence (in this case, GAATTC) appears (page 1526). The atomic interactions between Eco RI endonuclease and a synthetic DNA substrate containing this recognition sequence have now been resolved crystallographically at 3 angstroms through a strategy described by McClarin *et al.* The data indicate that the DNA unwinds, becoming distorted, as enzyme binds; more space is thereby provided in which the enzyme can locate and interact with specific base sequences. A dozen hydrogen bonds that are specific to GAATTC form between it and the enzyme and, along with other enzyme-DNA bonds, they stabilize the complex preparatory to cleavage. Some of the molecular mechanisms involved in the recognition and interactions of Eco RI endonuclease and substrate will undoubtedly apply to interactions of other restriction enzymes with their specific sites on DNA. In a Perspective, Berman reviews the crystallographic and biochemical research on DNA and on proteins that has made possible this landmark analysis of a crystal containing both DNA and protein components (page 1482).

Dopamine receptors in schizophrenics

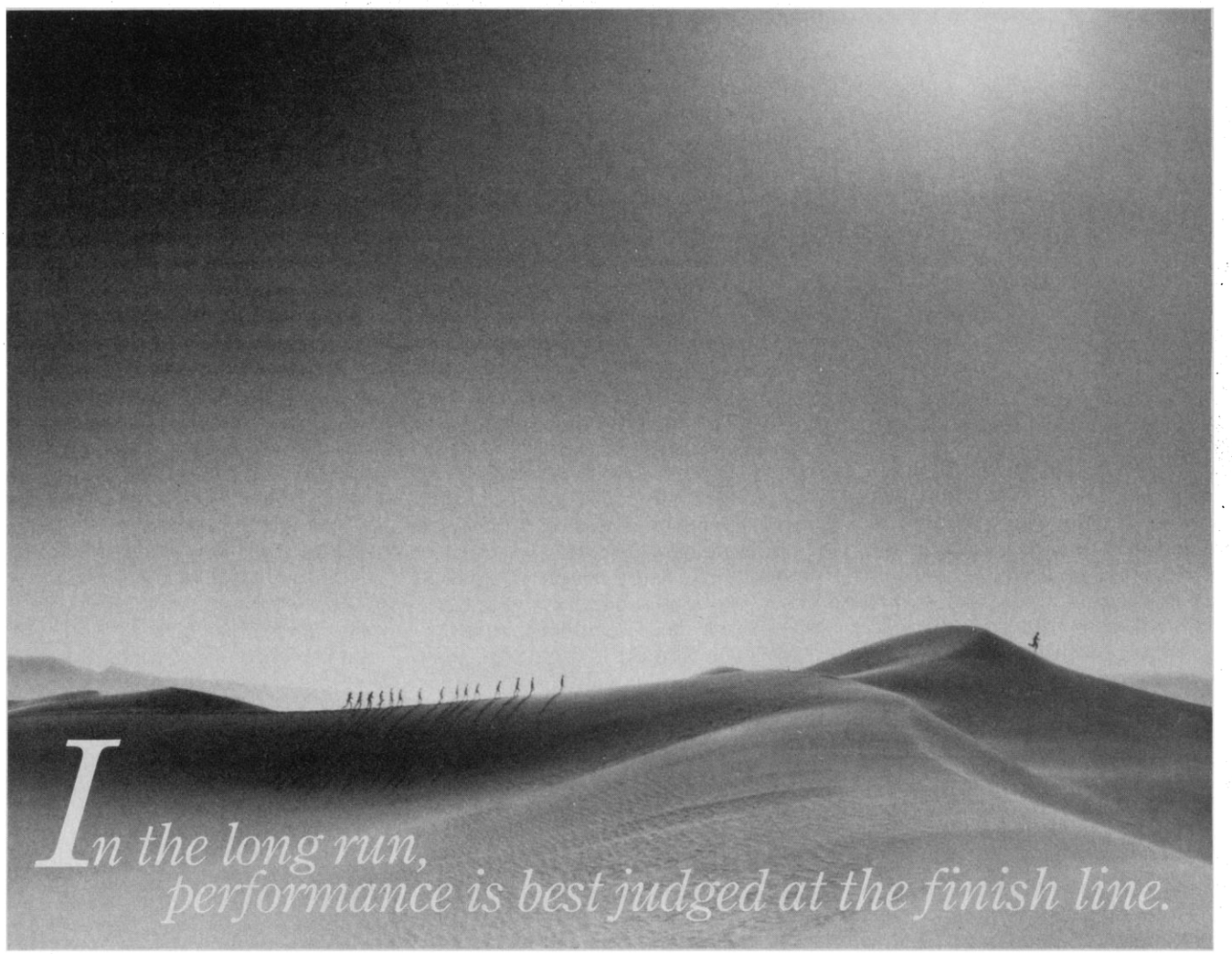
WHETHER or not they have been treated with antipsychotic drugs, schizophrenics have more D_2 dopamine receptors in their brains than do normal controls (page 1558). Wong *et al.* evaluated dopamine receptors using positron emission tomography, an imaging technique that can detect minute amounts of radiolabeled compounds bound to the receptors that are known to bind antipsychotic drugs. Previous studies performed on brains at autopsy had indicated that D_2 dopamine receptors were present in excess in schizophrenics but, because most schizophrenics are treated with neuroleptic drugs to control their psychotic behavior, the receptors could have been induced by drug treatment; few untreated schizophrenics have been evaluated for receptors at autopsy, and the results with them have been conflicting. The increase in receptors now appears to be associated with the disease process rather than with the treatment. It remains to be determined whether this increase is specific to schizophrenia or also accompanies other psychotic disturbances.

Suppressed replication of AIDS virus

REPLICATION of the AIDS virus can be inhibited in vitro by a subset of T lymphocytes, the $CD8^+$ cells (page 1563). If similar suppression can be brought about in vivo, a useful therapy may be available for slowing or halting the replication of this virulent agent in infected individuals. Walker *et al.* found that in blood of infected individuals in which there was no evidence of replicating viruses $CD8^+$ cells were actively suppressing virus expression. The extent of suppression in vitro was directly related to the number of $CD8^+$ cells present in the culture. Exactly how the suppression is being effected is not known; the best guess now is that the cells are secreting a soluble suppressive mediator.

Pigs with atherosclerosis

STUDIES of pigs that have a genetic predisposition to develop atherosclerosis and hypercholesterolemia may provide insights into aspects of human coronary heart disease (page 1573). Rapacz *et al.* describe pigs in which accelerated atherosclerosis is associated with mutations in genes that encode plasma apolipoproteins, some of which are known transporters of cholesterol. Among 14,000 pigs, those with elevated serum cholesterol also had the *Lpb*^{5} lipoprotein allele; further genetic studies indicated that two other genetic loci (or closely linked loci) also encode proteins that affect plasma cholesterol levels. Early signs of atherosclerosis—fatty streak and foam cell lesions large enough to restrict blood flow—were apparent in the hearts of mutant pigs despite their being fed a low-fat diet. Later, complex lesions formed, and most animals developed severe disease within 2 years. Typically the mutant pigs died before reaching 4 years of age; normal pigs lived three times that long. Many histologic and clinical features of the porcine disease resemble features of human atherosclerosis.



The strategy for running the marathon is vastly different than for the 100-yard dash.

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SCIENCE

19 DECEMBER 1986
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New Year's Resolutions and the Black Bear

As we go about making New Year's resolutions, I will once again vow to follow my role model, the female black bear.

The black bear hibernates for 5 months, during which time she neither eats, drinks, urinates, or defecates but delivers several cubs. This paradigm of fuel efficiency, absence of toxic wastes, budget balancing, and productivity is one from which individuals, governments, and businesses have much to learn. The black bear achieves this fabulous efficiency by converting fat cleanly and completely to CO_2 and H_2O, recycling the H_2O as well as all of its nitrogen. The black bear eats in summer for its big winter sleep, yet there is no record of the spouse of a black bear criticizing her for a bulge in the midriff section. Black bears resist cosmetic arguments for jogging and find ambling totally satisfactory for getting from place to place. They are not belligerent but can use claws effectively to preserve freedom or defend loved ones.

Black bears deserve commendation because they have adjusted their goals to be in agreeable harmony with their internal machinery. They recognize that they cannot degrade proteins at both ends without devising a cycle that gives them a favorable balance of nitrogen trade. They cannot have trim waistlines and hibernate. The needed internal enzymes to avoid external pollution have been selected by an exacting evolutionary process.

Today nations and individuals are operating with systems that lack the disciplined logic of the black bear's metabolism. Sophistries such as "service industry can replace manufacturing industry," "we can have commitment without marriage and marriage without commitment," "we can maintain standards without flunking anyone," "world opinion will enforce good behavior," and "you can help the poor without inconveniencing the rich" are mistaken for analysis in which assets and liabilities are evaluated in a realistic way.

The modern world has Herculean challenges and it is a lot easier to invent a slogan than develop a logical disciplined policy. It is easy for intellectuals to say, "protectionism is bad," but the blue collar worker in Detroit is not convinced he will be welcomed in Silicon Valley. The plea for "no nuclear weapons" is highly humane and laudable, but unless we are first able to erase human conflict from the globe, it opens up the prospect of the return to an era of "conventional" warfare. "No sports without a C average" emphasizes the basics, but it may alienate those who most need to be enticed into more learning.

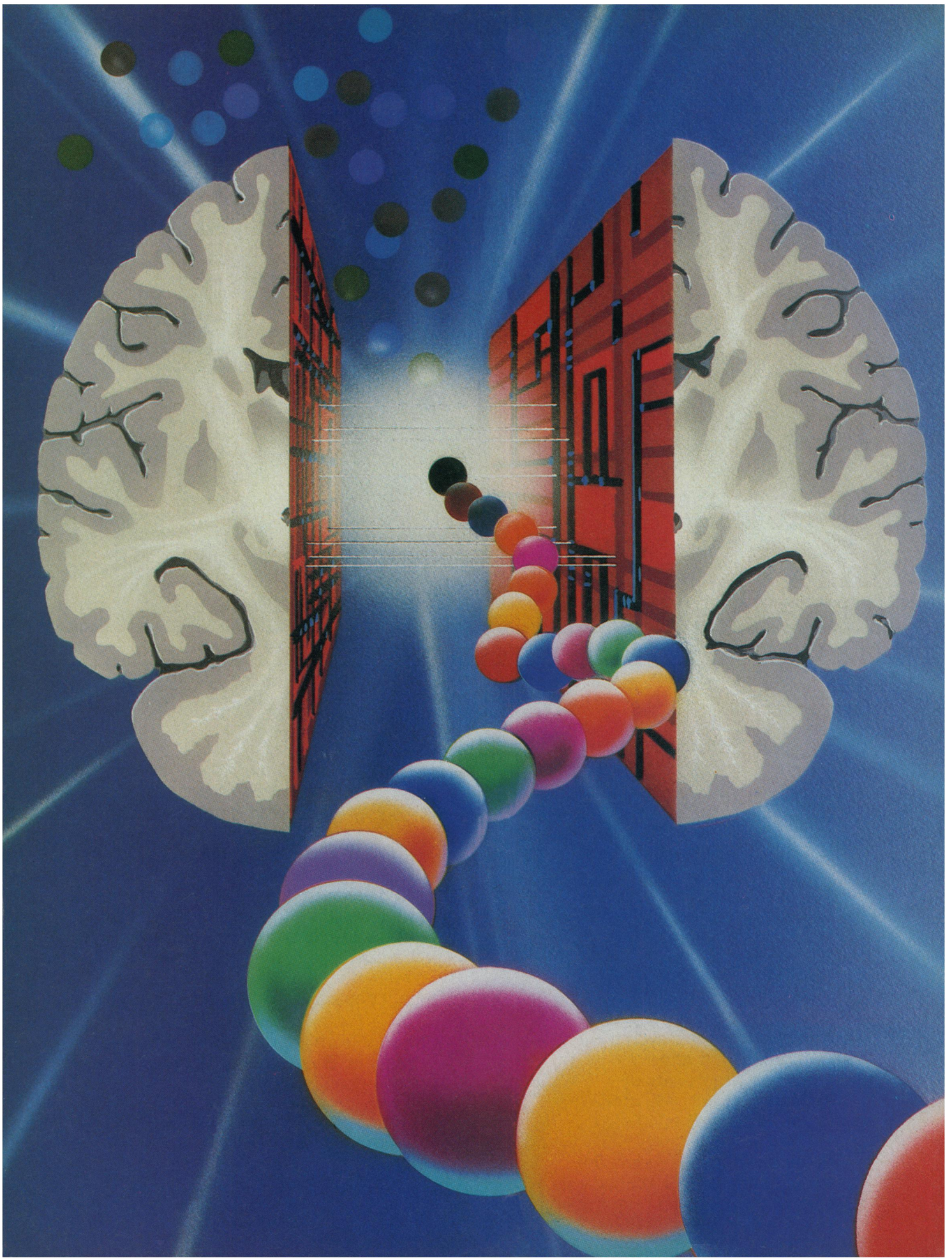
It is time that society recognizes that in order for a policy to be a real policy, it must be thought through to an internally consistent system.

There may be several such systems, and we can choose among them on the basis of our value judgments. For example, protectionism could be a consistent policy for our country, but it would have consequences such as high costs of goods, subsidized inefficiency, and retaliation by other countries. Completely free trade is also a potentially beneficial policy, but it requires an understanding that much manufacturing will move to low wage countries and displaced workers will need assistance to allow transition to new jobs. A carefully developed compromise might be devised that could provide protection for selected key industries and let others struggle for survival. However, a system in which protection ebbs and flows with political clamor is destined for failure.

Any self-consistent policy will have both assets and liabilities and, therefore, will always be vulnerable politically to those who pick out the liabilities and emphasize them. We will never have a society that can cope with terrorism, overpopulation, famine, and war if we do not demand from those who criticize whether they have an internally consistent policy that is better. My New Year's vow is to respect those who have a well-thought-out policy, even if parts of it are against my own deeply felt, sincerely believed, but highly emotional personal policy.

I shall also resolve to develop my own well-designed policy for *Science* to achieve harmonious science policy, faster publication schedules, and more exciting articles. I have taken the first step. There is a slight bulge where my waistline used to be.

—DANIEL E. KOSHLAND, JR.



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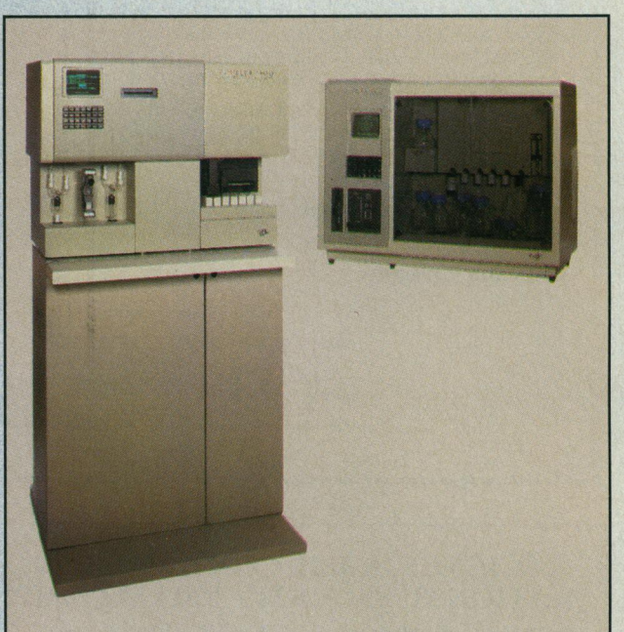

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Responses to this solicitation are to be in the form of a clearly stated scientific problem, the research approach, the time schedule, and a cost estimate. Proposals from educational institutions involving graduate student participation, and at a total level of effort in the range of one to one and one-half person years per year, for a period not exceeding three years, are especially encouraged.

If you wish to respond to this soliciation, write to the address below requesting RFP799-26.

Proposals Office
Contracts Division
Electric Power Research Institute
3412 Hillview Avenue
P.O. Box 10412
Palo Alto, CA 94303

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SCIENCE, ARMS CONTROL, AND NATIONAL SECURITY FELLOWSHIPS

AAAS Invites Applications

The American Association for the Advancement of Science invites applications for two Science, Arms Control, and National Security Fellowships. The Fellowship term will be for one year and will begin on 1 September 1987.

The Fellowship program will provide a unique opportunity for outstanding postdoctoral to mid-career scientists, engineers, and other appropriate scholars and professionals to participate directly in the policy-making process in the area of arms control and national security. Fellows will work in appropriate executive branch agencies of the federal government, congressional committees or support agencies, or non-profit institutions in Washington, D.C.

The AAAS will guide the placement process, provide an informative orientation program, and coordinate frequent seminars on a variety of topics related to arms control and national security.

The 1987–88 Science, Arms Control, and National Security Fellows will receive a stipend of up to $30,000 and a nominal relocation and travel allowance. Applications are invited from candidates with some experience in the arms control/national security field and primary expertise in any area of engineering; the physical, biological, behavioral, social, or policy sciences; or science-related professions. Minority and handicapped candidates are especially encouraged to apply.

For application requirements and additional information, contact:

Dr. W. Thomas Wander, Senior Program Associate
Science, Arms Control, and National Security Fellowships
American Association for the Advancement of Science
1333 H Street, N.W., Washington, D.C. 20005

THE DEADLINE FOR THE RECEIPT OF ALL APPLICATION MATERIALS IS
FEBRUARY 23, 1987.

CALL FOR RESEARCH PROPOSALS

U.S. ENVIRONMENTAL PROTECTION AGENCY BIOTECHNOLOGY RISK ASSESSMENT PROGRAM

The U.S. EPA anticipates funding of new extramural RESEARCH COOPERATIVE AGREEMENTS AND/OR CONTRACTS in FY-87. Research must relate to agency needs regarding recombinant microorganisms or strains which are potential candidates for genetic engineering. Proposals are also encouraged for novel and creative interdisciplinary approaches to assessing ecological risk of releasing genetically engineered microbes (GEMs). EPA is now soliciting two page preproposals which will clearly summarize the idea, express the concept for the study and present the experimental approach(es) anticipated. Indicate which topic (1-3) is being addressed. More than one preproposal may be submitted. A breakdown of the total project costs and the applicant's resume must be provided on separate pages.

Areas of primary interest include:

1. Methods to evaluate ecological risks of exposing nontarget plants and organisms to microbial pesticides, including GEM pesticides, development of alternate end-points for measuring effects on nontarget organisms and principles that govern host range specificity of these microorganisms.

2. Methods to determine effects on ecological processes including effects on population dynamics and communities.

3. Transport, fate/survival, detection, and genetic exchange including: methods to mitigate the spread of GEMs and microbial pesticides in the environment (environmental and biological containment), models for transport/survival of GEMs, and microcosm/field testing of procedures for estimating fate and survival.

Submit preproposals by January 31, 1987.

Information on terrestrial systems may be obtained from the Biotechnology/Microbial Ecology Program, USEPA/CERL, 200 S.W. 35th Street, Corvallis, OR 97333, and on aquatic ecosystems from Microbial Ecology and Biotechnology Branch, USEPA/GBERL, Sabine Island, Gulf Breeze, FL 32561.

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(Use the registration and housing forms on the following page.) ➡

For a full program, see the 12 December 1986 issue of *Science*, or contact: AAAS Meetings Office, 1333 H Street, NW, Washington, DC 20005; (202) 326-6448.

Advance Registration Form
AAAS Annual Meeting

Name of registrant _____ (Last) (First & initial)

Name of spouse registrant _____ (Last) (First & initial)

Institution/Company _____ (To be printed on badge) (Registrant)

_____ (Spouse registrant)

Mailing address _____ (Street)

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Convention address _____ (Where you can be reached) (Hotel and/or telephone number)

Check days on which you will attend meeting:	Sat	Sun	Mon	Tue	Wed
	☐	☐	☐	☐	☐

☐ Check here if you need special services due to a handicap. We will contact you before the meeting.

■ Your registration badge, receipt, and voucher for full Program and Abstracts will be mailed to you in early January. ■ Registrations received after 30 January will be held at the Advance Registrants' Desk at the Hyatt Regency Hotel. ■ Refund requests must be made by letter or telegram to the above address before 6 February 1987 and will be honored after the Meeting. No refunds are made on cancellations received after this date. ■ Student registration fees apply to full-time undergraduate or graduate students only.

Mail to: AAAS Meetings Office, Annual Meeting Registration, 1333 H Street, NW, Washington, DC 20005

Fees:

	AAAS Member	Non-Member	
AAAS Annual Meeting			
Regular	☐ $65	☐ $90	$ ___
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Frontiers of Neuroscience — Special Seminar			
Regular	☐ $60*	☐ $85*	$ ___
Graduate Student ..	☐ $30*	☐ $45*	$ ___

***Note:** Registrants for this seminar must also register for the AAAS Annual Meeting (see above). If you have already registered for the Meeting, please check here ☐ .

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Hotel Reservation Form ✦ Hyatt Regency Chicago
AAAS Annual Meeting ✦ Chicago ✦ 14 – 18 February 1987

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☐ wheelchair accessible room; other _____

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Club Level	☐ $102	☐ $118		

Arrival date _____

Time _____ ☐ a.m. ☐ p.m.

Departure date _____

Time _____ ☐ a.m. ☐ p.m.

Be sure to list definite arrival and departure dates and times. reservations will be held only until 6 p.m. unless accompanied by 1 night's deposit or major credit card guarantee.

■ Reservations must be submitted to the Hyatt Regency (address above) on this official form by **23 January 1987.** Reservations received after this cut-off date are conditional on space availability. ■ Make any changes or cancellations directly with the hotel, which will also confirm your reservations.

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HILARY KOPROWSKI, *The Wistar Institute*

JOSEPH DAVIE, *Washington University School of Medicine*

THE *DNA-Hybridoma Congresses* focus this year on the important research developments in molecular biology and immunology. Held as two individual meetings, they are presented concurrently to encourage registrants to attend sessions in both programs in order to maximize the critical interdisciplinary approach that the tools of biotechnology make possible.

Emphasizing the role molecular biology is playing in immunology, the first day of the Congress will present a Joint Session on AIDS RESEARCH; it brings together the foremost authorities from around the world to discuss specific aspects of this disease. A reception will follow this program to allow presenters and registrants to meet and exchange ideas.

The *DNA-Hybridoma Congresses* present the significant data on advances in research and application. This year's program targets the areas of medical-science research that are especially pertinent at this time.

While invited speakers comprise the scheduled portions of the meetings, the expanded poster sessions and exhibits provide additional presentations of new and important work.

Sunday evening, March 1 Keynote Addresses

6:00 p.m. **Genetics and Biochemistry of Retroviral Replication**
Stephen Goff, *Columbia University, New York*

7:00 p.m. **Left-Handed and Right-Handed DNA in Genetic Recombination**
Alexander Rich, *M.I.T.*

Monday, March 2 *Joint Session on AIDS RESEARCH*

Chairman: ERLING NORRBY, *Karolinska Institutet*

8:30 a.m. **Immunopathophysiology of AIDS**
Luc Montagnier, *Institute Pasteur*

9:05 a.m. **HTLV-III and Other Factors in Origin of AIDS and Associated Malignancies**
Robert C. Gallo, *National Institutes of Health*

9:40 a.m. **Immunologic and Molecular Features of HIV Infection**
Jay A. Levy, *University of California, San Francisco*

10:45 a.m. **Molecular Biology and Immunosuppressive Retrovirus**
Simon Wain-Hobson, *Institute Pasteur*

11:20 a.m. **Defining Viral Genes for HTLV-III Replication and Cytopathogenicity**
Flossie Wong-Staal, *National Institutes of Health*

1:30 p.m. **Molecular Biology of AIDS Virus**
William Haseltine, *Dana-Farber Cancer Institute*

2:05 p.m. **Relative Immunogenicity of HTLV-3, HTLV-4, and STLV-3 Proteins**
Myron E. Essex, *Harvard University, School of Public Health*

2:40 p.m. **Envelop Properties of HIV**
Robin Weiss, *Chester Beatty Cancer Research Institute*

3:45 p.m. **Targets for Immune Attack in Retroviruses Associated with AIDS**
Dani P. Bolognesi, *Duke University Medical Center*

4:20 p.m. **Use of Vaccinia Vectors to Study Expression and Immunogenicity of Retroviral Proteins**
Bernard Moss, *NIAIA*

Discussions will follow each presentation, and there will be 2 coffee breaks.
A reception will follow the day's presentations.

CONGRESSES March 1-4, 1987

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DNA

Monday, March 2, 1987

2:00 p.m. *Session on Chromatin*
Chairman: Gary Felsenfeld
Presenters
Harold Weintraub
Robert Simpson
Gary Felsenfeld
John Sedat

Tuesday, March 3, 1987

8:30 a.m. *Session on Transcription*
Chairman: George Khoury
Presenters
Robert Tjian
Carl Wu
Keith R. Yamamoto
George Khoury

3:00 p.m. *Session on Intracellular Protein Targeting*
Chairman: Harvey Lodish
Presenters
Keith Mostov
James Rothman
Peter Walter
Harvey Lodish

Wednesday, March 4, 1987

8:30 a.m. *Session on Neurobiology*
Chairman: James L. Roberts
Presenters
Lewis Reichard
Mark Darlison
Peter Seeburg
Axel Ullrich

2:30 p.m. *Session on Development Biology*
Chairman: Peter Gruss
Presenters
Patrick O'Farrell
Gerald M. Rubin
Igor David
Erwin Wagner
Peter Gruss

HYBRIDOMA

Tuesday, March 3, 1987

8:30 a.m. *Symposium on Transgenic Mice as Tool In Immunology*
Chairman: David Solter
Presenters
Rudolf Grosschedl
Ken-Ichi Yamamura
Jean-Claude Weill
Barbara A. Knowles

2:00 p.m. *Symposium on Anti-idiotype Vaccines*
Chairman: J. Donald Capra
Presenters
Katheryn Meek
Ronald C. Kennedy
Dorothee Herlyn
Karl Erik Hellstrom
David Sacks

Wednesday, March 4, 1987

8:30 a.m. *Symposium on The Use of Hybridomas in Determining Cytokine Structures and Functions*
Chairman: Robert Schreiber
Presenters
Robert Coffman
Frank Fitch
Carl Pierce
Robert Schreiber

8:30 a.m. *Symposium on Anti-Carbohydrate MAb's in the Study of Glycolipid-Mediated Cellular Effects*
Chairman: Jan Thurin
Presenters
David A. Cheresh
Tomas Brodin
Bruce Fenderson
Nobuo Hanai

Summary Session
Chairman: Joseph Davie

Working Group Meetings

This year we are planning two working groups:

Immunotherapy
Chairman: Michael Mastrangelo

Immunodiagnosis
Chairman: Edgar Haber

Working groups will meet in closed sessions. It is our intent to select participants actively involved in the above listed research for in-depth discussion of progress made recently. Consensus reached by working groups will be presented to the whole Congress and results of these discussions will be published in *Hybridoma*.

Investigators interested in participating in the Group Meetings should send a short summary to Dr. Zenon Steplewski The Wistar Institute, Thirty-sixth at Spruce, Philadelphia, PA 19104, 215-898-3924 by January 10, 1987.

REGISTRATION FEES:

$450 On-site registration
$400 ADVANCE REGISTRATION — (Received by Jan. 15)
$150 STUDENT REGISTRATION — Undergraduate, graduate students only. Confirmation in writing by department chairman.
4-7 registrations received together from same organization $300 each.
8-10 registrations received together from same organization $200 each.
Larger group rates available upon request. Cancellations must be received in writing by February 1, 1987.

REGISTRATION FORM

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