American Association for the Advancement of Science

SCIENCE

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Dr. Mei Yafang

Institute of Virology
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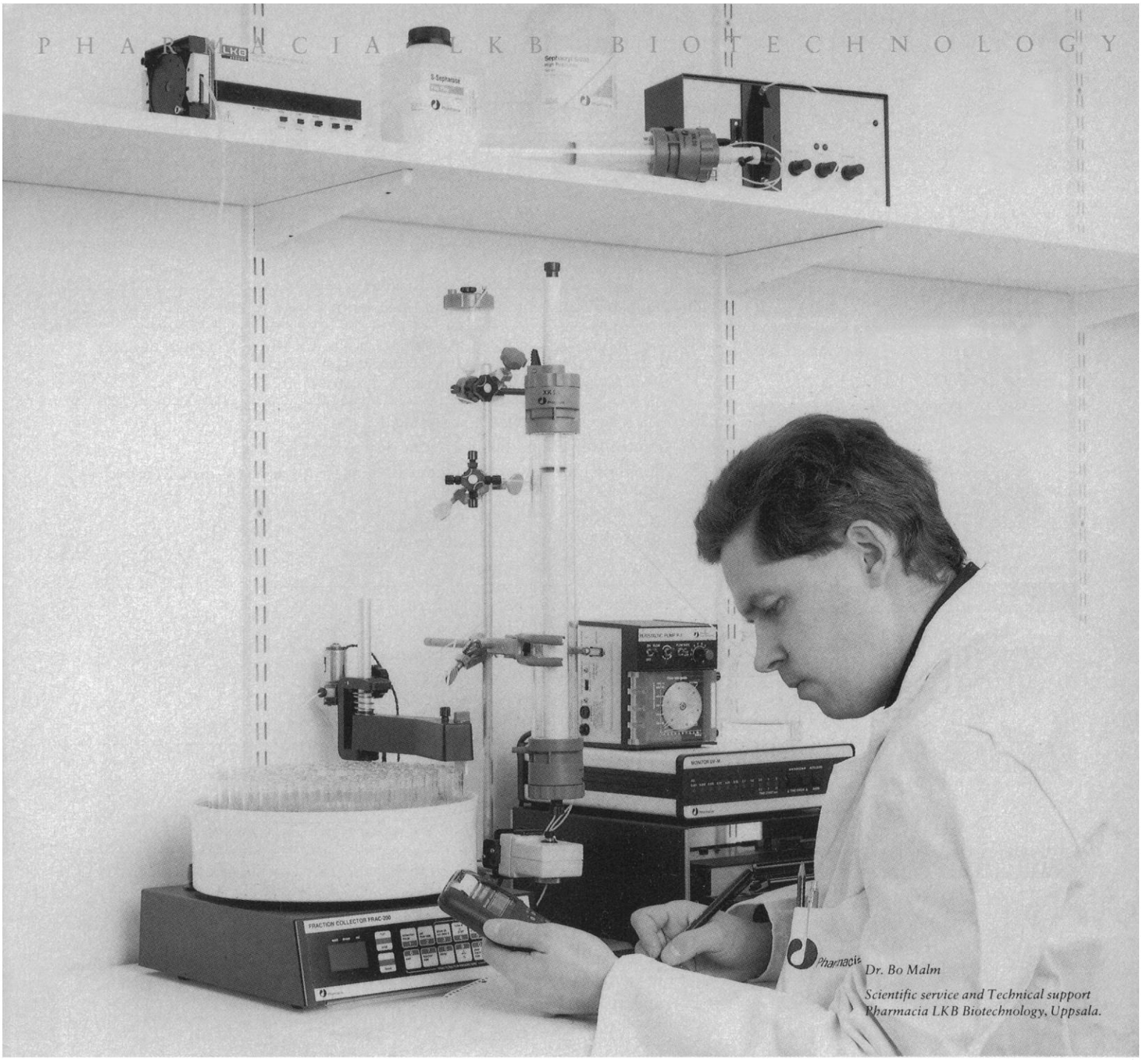

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

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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 A pseudocolor photographically derived image of an *Anopheles stephensi* mosquito. This mosquito transmits *Plasmodium falciparum*, the deadliest of the human malaria parasites. Malaria-infected red blood cells evade destruction by binding to a receptor on endothelial cells. See page 1469. [Original photograph provided by Edgar Rowton, Walter Reed Army Institute of Research, Washington, DC 20307]

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Neighborhoods, schools, and life chances

How does growing up in a poor neighborhood or in one that is richer affect the future of a poor child? The question bears directly on the extent to which economic and racial desegregation could improve the chances for children who are born into poverty to eventually escape from it. Mayer and Jencks summarize available data on how the racial and socioeconomic mixes of schools and neighborhoods affect high academic achievement, the likelihood that, as teenagers, individuals from different backgrounds will commit crimes or engage in certain sexual behaviors, and how well individuals from different neighborhoods later succeed in the labor market (page 1441). Also reviewed are studies that address the impact of poor neighbors or classmates on the achievements of the rich. The conclusions and limitations of such studies can serve as guides to future research into how best the cycle of poverty might be broken.

Malaria sequestration receptor

MATURE malaria parasites live inside host red blood cells. As the parasites mature, infected cells leave the circulation and are sequestered along the endothelium of small veins. Because the cells are no longer scrutinized by the spleen (which would clear infected erythrocytes from the circulation), the parasites survive, the disease progresses, and symptoms worsen. Any means of interfering with sequestration might, therefore, interrupt the life cycle of the parasite and the progression of the disease. To this end, Ockenhouse *et al.* have identified a glycoprotein that is found on endothelial cells, platelets, and other cells and appears to serve as the endothelial receptor to which infected red blood cells bind (page 1469). CD36, a glycoprotein, was isolated from platelets; infected red blood cells from both humans and monkeys bound specifically to it. The purified glycoprotein might, if infused into people, cause a reversal of sequestration. It may also be of help in the identification of the complementary molecule on the surface of infected red blood cells to which it binds.

Tay-Sachs mutation

TAY-SACHS is a metabolic disease; it is more common among Ashkenazi Jews than in the general population. Both adult onset and the more typical infantile forms lead to degeneration of the nervous system. The enzyme β-hexosaminidase A is deficient in both forms (because of mutations in the gene for the enzyme's α chain) and this results in the accumulation of G_{M2} ganglioside which leads to the destruction of the nervous system. For infants, the disease is fatal within a few years; for adults, psychosis is a common first sign, followed by other neurologic symptoms. Navon and Proia have studied a number of individuals with adult-onset Tay-Sachs from five unrelated families; all were found to have the same single-base change in one gene encoding the α subunit (page 1471). The patients were all "compound heterozygotes"; they had one copy of this mutant gene and one copy of another mutant gene previously identified as associated with infantile Tay-Sachs. The gene associated with adult-onset Tay-Sachs is apparently rare in the population, but the carrier frequency for the infantile genes is high. As probes for this and the other Tay-Sachs–specific genes become available, diagnosis and genetic screening will become more informative and accurate.

Amyloid protein in Alzheimer's disease

THE protein β-amyloid is found in the blood vessels and in brain lesions that develop in Alzheimer's disease; although generally considered to be part of the pathology of the disease, β-amyloid may in fact signify the brain's attempt to compensate for disease-associated damage (page 1488). A 28-residue synthetic peptide identical to a portion of the natural β-amyloid molecule was shown, in a test system, to enhance the survival of neurons in culture; thus the β-amyloid fragment had a trophic rather than a toxic effect on neurons. Whitson *et al.* propose that β-amyloid may be a naturally occurring neurotrophic substance. The β-amyloid precursor may be produced regularly in the normal brain where it participates in the brain's neurotrophic activities, and it may be made in excess in diseased degenerating brains; aberrant processing of precursor molecules might result in the production of inactive insoluble β-amyloid molecules that deposit in the brain or form nuclei around which plaques then develop.

Angiogenesis control

THERE would be many interesting clinical applications for drugs that could control angiogenesis, the growth of new capillary blood vessels. Angiogenesis is a beneficial and essential process for wound repair, normal ovulation, menstruation, and placenta formation. However, it can also be detrimental when, as in tumor growth, diabetic retinopathy, rheumatoid arthritis, and other diseases, it serves as a central component of the disease process. A pair of substances—a synthetic hydrophilic sugar compound (β-cyclodextrin tetradecasulfate) and a hydrophobic steriod—when tested jointly have now been shown to be effective in inhibiting angiogenesis in two standard model systems (page 1490). Folkman *et al.* suggest that synthetic β-cyclodextrin tetradecasulfate may be a versatile carrier that can transport different kinds of steroids or other molecules to endothelial cells where binding occurs and effector molecules are released. In the studies reported, angiogenesis was inhibited when the carrier associated with weak angiostatic steroids; in association with angiogenic molecules, this same carrier might facilitate the induction of angiogenesis.

How To Choose The Right Low Pressure LC System Even If It Isn't Ours

To simplify choosing the right peristaltic pump, detector and fraction collector for your LC System, review these guidelines and send for our free Low Pressure System Selection Worksheet:

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Know the characteristics of your sample. What mass will you load on your column? What flow rate will you need to achieve optimal speed and resolution? At which wavelengths does your sample exhibit maximum absorbance? What size fractions will you collect? Are you interested in collecting peaks?

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After you've identified the key operating parameters, take a look at the pump, detector and fraction collector specifications to be sure they meet your needs. To illustrate, let's look at specifications for components in the Gilson Low Pressure System.

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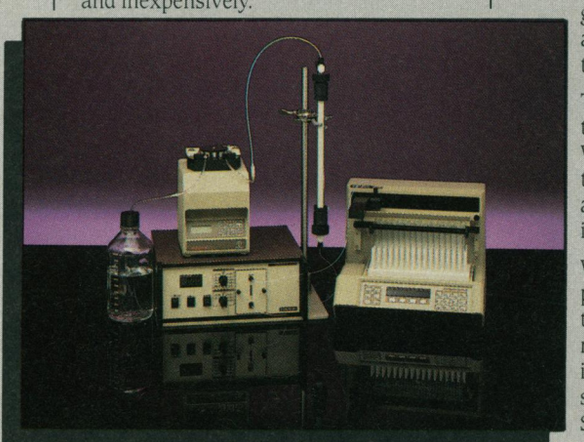
3 Check for compatibility of components with each other and with your future needs.

At this point, you've identified components to meet basic needs, but also look at the components as a system. Were they designed to work together? Or will you need to buy complicated adapters and special plumbing? Working with a single supplier avoids the service and support problems often associated with a system assembled piece-by-piece.

You should also assess your future needs. An LC system may work fine for your current application. But will you need to change detection wavelengths or collection volumes later? Is an upgrade to HPLC a possibility? If so, consider modular equipment that adapts to your changing needs easily and inexpensively.



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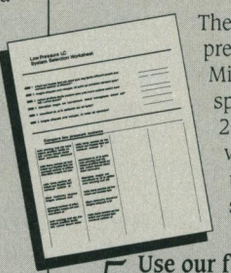

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SCIENCE

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Punitive Taxation of Science and Engineering

The Subcommittee on Oversight of the House Committee on Ways and Means has proposed legislation that would diminish the ability of science and engineering to serve this country. This appears to be an unintended consequence of a major effort to curb some abuses by tax-exempt organizations, which include churches, hospitals, universities, trade associations, and scientific and engineering societies.

Excluding 340,000 churches, there are in this country some 866,000 exempt organizations with total annual revenues exceeding $300 billion. In order to provide financial resources to achieve their purposes, some of them have engaged in commercial activities unrelated to their tax exemption. By so doing they compete with tax-paying companies including small business. Although nonprofits do pay taxes, Congress has been subjected to highly organized lobbying by these companies that claim the taxes are too low. Congress is being called on to take drastic action to tax more of the profits derived from unrelated business income, or "UBIT." Obviously, when a million organizations are involved, each differing somewhat, a detailed judicious approach is difficult. A sweeping broad approach is tempting.

An example of the negative effect of such an approach is the proposed accounting treatment of advertising revenues of *Science* and other scholarly journals. In comparison with profit-making magazines, scientific and engineering journals containing advertising would be subjected to a punitive tax.

When commercial magazines are published, the total cost of editorial matter, printing and mailing, and other expenses is subtracted from net advertising revenues before levying a tax. In contrast, the proposed legislation calls for a 34% tax on net advertising revenue of scholarly journals published by tax-exempt scientific and engineering societies, with no offset allowed for costs of writing, editing, assembling, and printing the scholarly material, as is the case today.

The proposed tax would deleteriously affect the financial capacity of many scholarly societies to carry out their tax-exempt purpose to disseminate research results. For example, it would seriously injure the capabilities of the American Association for the Advancement of Science to the tune of about $1 million a year. To meet such a blow, the Association would be forced to curtail its activities. The scholarly scientific content of *Science* would necessarily be reduced and its illustrious global reputation injured. In addition, public service activities of AAAS such as improvement of secondary education and efforts to help women, minorities, and the handicapped toward greater representation in science and engineering would be reduced. Other major scientific and engineering societies would to varying degrees be affected. In their scholarly journals, they are facing increasing and tremendous competition from large-scale foreign-owned profit-making publishing houses that have already captured a majority of the scientific scholarly market and are charging huge prices to libraries for their low-circulation journals.

Why is the subcommittee even considering such a harmful proviso of its legislation? It appears that some exempt organizations include automobile and other consumer advertisements in their magazines. To curtail such practices, the subcommittee has proposed the tax-accounting change mentioned above. What it should do now is give proper weight to the nature of the advertising appearing in the scholarly scientific and engineering journals. Those that contain no consumer advertising but rather advertisements highly related to scholarly endeavors should be treated differently from those that contain liquor, cigarette, or other consumer advertisements.

The Subcommittee on Oversight has labored for about 2 years to develop legislation to curb abuses by some tax-exempt organizations. It is now under pressure to submit legislation to the Committee on Ways and Means. The subcommittee has an opportunity to act constructively in this arcane and complex area of tax law. If it does not, more than the scientific and engineering societies will suffer. The whole nation will be the loser.

—PHILIP H. ABELSON

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Bicentennial Lecture on

ARTIFICIAL INTELLIGENCE

Gerald M. Edelman, Nobel Laureate,
Vincent Astor Professor at The Rockefeller University, will speak on:

"CONCEPTS OF DARWINIAN SELECTION AND BRAIN FUNCTION"

Gerald M. Edelman will be introduced by Erminio Costa, *Fidia-Georgetown Institute for the Neurosciences*

The Lecture will be followed by a Round Table with the participation of:

W. Maxwell Cowan, Moderator
Howard Hughes Medical Institute, Bethesda, MD

Richard Michod, *Department of Ecology and Evolutionary Biology*
University of Arizona, Tucson, AZ

Vernon B. Mountcastle, *Department of Neuroscience*
The Johns Hopkins University, Baltimore, MD

Tomaso A. Poggio, *Department of Psychology*
Massachusetts Institute of Technology, Cambridge, MA

Pasko Rakic, *Section of Neuroanatomy*
Yale University, New Haven, CT

April 22–24, 1989
Georgetown University Conference Center, Washington, DC
Bicentennial Symposium

"NEUROSCIENCE IN THE TWENTY-FIRST CENTURY: NEW PERSPECTIVES AND HORIZONS"

Saturday, April 22, Morning

LECTURA MAGISTRALIS
Rita Levi Montalcini, Rome, Italy
NERVE GROWTH FACTOR AND NEURONAL PLASTICITY

MODERATOR: Lawrence Kromer,
Georgetown University
SPEAKERS: Lloyd Green, New York, NY
Italo Mocchetti, Washington, DC
Eugene Johnson, St. Louis, MO
Lawrence Kromer, Washington, DC

Saturday, April 22, Afternoon

LECTURA MAGISTRALIS
Julius Axelrod, Bethesda, MD
CATECHOLAMINE NEUROTRANSMITTERS

MODERATOR: Jarda T. Wroblewski,
Georgetown University
SPEAKERS: Irwin J. Kopin, Bethesda, MD
Marc G. Caron, Durham, NC
Donald J. Reis, New York, NY
Martin Rodbell, Research Triangle Park, NC

Sunday, April 23, Morning

LECTURA MAGISTRALIS
Marshall Nirenberg, Bethesda, MD
ASPECTS OF REGULATION OF GENE EXPRESSION IN NEURONAL CELLS

MODERATOR: Erminio Costa,
Georgetown University
SPEAKERS: Shigetada Nakanishi, Kyoto, Japan
Robert H. Costa, Chicago, IL
James I. Morgan, Nutley, NJ
Anna Maria Szekely, Washington, DC

Sunday, April 23, Afternoon

LECTURA MAGISTRALIS
D. Carleton Gajdusek, Bethesda, MD
REPLICATING AMYLOIDOSES: UNCONVENTIONAL SLOW VIRUSES AND DEMENTIA

MODERATOR: Norman P. Salzman,
Georgetown University
SPEAKERS: Anthony S. Fauci, Bethesda, MD
John F. Griffith, Washington, DC
Michael Oldstone, La Jolla, CA

Monday, April 24, Morning

LECTURA MAGISTRALIS
Roger C. Guillemin, San Diego, CA
THE BRAIN PEPTIDES CONTROLLING PITUITARY FUNCTION AND MORE

MODERATOR: Alessandro Guidotti,
Georgetown University
SPEAKERS: Michael Comb, Boston, MA
Dan Lanhammar, Uppsala, Sweden
Claes Wahlestedt, Washington, DC
Alessandro Guidotti, Washington, DC
Solomon H. Snyder, Baltimore, MD

Monday, April 24, Afternoon

ROUND TABLE
Torsten N. Wiesel, New York, NY
FUNCTIONAL ORGANIZATION OF THE STRIATE CORTEX

MODERATOR: Stefano Vicini,
Georgetown University
SPEAKERS: Denis A. Baylor, Stanford, CA
Elio Raviola, Boston, MA
Lamberto Maffei, Pisa, Italy
Carla J. Shatz, Stanford, CA
Tomaso Poggio, Boston, MA

The symposium will be held from 9:00am to 12:45pm and from 2:00pm to 5:30pm at Georgetown University Conference Center. The registration fee is $150.00 ($75.00 for students and postdoctoral fellows) and includes lunches.
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its current state of knowledge. At the same time, we believe that the scientific community should vigorously pursue the 3Rs of the alternatives approach, namely, reduction, refinement, and replacement, as well as carefully evaluate proposed animal research for consistency with society's increasing ethical concern for animals and science's highest standards.

Regardless of our policy, we object to characterizations of animal activists as anti-science, anti-intellectual, and anti-rational. Demands for animal protection are grounded in well-established, rational, philosophical debate. Scientists themselves have participated in this debate and should realize that differences in moral judgment occur and do not imply that the other side has abandoned rational argument. Nor is it appropriate to state that protestors' rationality is compromised by their emotional investment in the issues.

Holden suggests that a fundamental fear is that critics aim to limit scientific freedom and progress. Yet other attempts to regulate scientists, such as efforts to control research fraud, are not labeled as "anti-science" or "anti-intellectual." Scientists accept some limits to their freedom, as do all humans, when they recognize the need to weigh freedom of inquiry against other values held by society. Emotions can run high when attempting to balance contrasting values, but neither side gains by hurling invectives.

JOHN A. HOYT
President,
The Humane Society of the United States,
2100 L Street, NW,
Washington, DC 20037

Erratum: Table 1 of the report "Reversible cleavage and ligation of hepatitis delta virus RNA" by H.-N. Wu and M. M. C. Lai (3 Feb., p. 652) contained an error. The religation percentage when the concentration of Mg^{2+} in the cleavage reaction was 2.4 m*M* and the concentration of EDTA was 3.0 m*M* should have been 10. The correct table is printed below.

EDTA (m*M*)	Religation (%) when Mg^{2+} in cleavage reaction is		
	7.2 m*M*	4.8 m*M*	2.4 m*M*
0	0	0	0
1.5	0	0	0
3.0	0	0	10
6.0	0	14	10
12.0	13	13	11
24.0	15	15	13
60.0	16	14	16

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2. Applied Sciences (Arabic Computational Linguistics and Applications)
   Withheld
3. Economics and Social Sciences (Economics of Higher Education in the Arab World)
   Withheld
4. Arts and Letters (Arabic Rhetoric)
   Prof. Ayyad Abdulfattah Shokri (known as Shokri Ayyad) from Cairo University, Egypt
5. Scientific Arabic and Islamic Culture (Geology and Geography in Arab Heritage)
   Prof. Al-Ghonaim Abdallah from Kuwait University, Kuwait

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San Francisco State University, San Francisco, CA

JUNE 13 - 16
St. Olaf College, Northfield, MN

JULY 18 - 21
San Diego State University, San Diego, CA

AUGUST 15 - 18
University of Wisconsin, Madison, WI

SEPTEMBER 12 - 15
Cleveland State University, Cleveland, OH

NOVEMBER 7 - 10
Iowa State University, Ames, IA

DECEMBER 12 - 15
University of Alabama, Birmingham, AL

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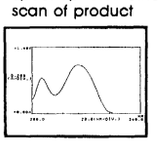
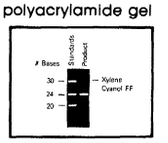
• Documentation provided		
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Rabbit anti-Yf	(Subunit - 7)
Rabbit anti-Yk	(Subunit - 8)
Rabbit anti-Π	(Human Π)

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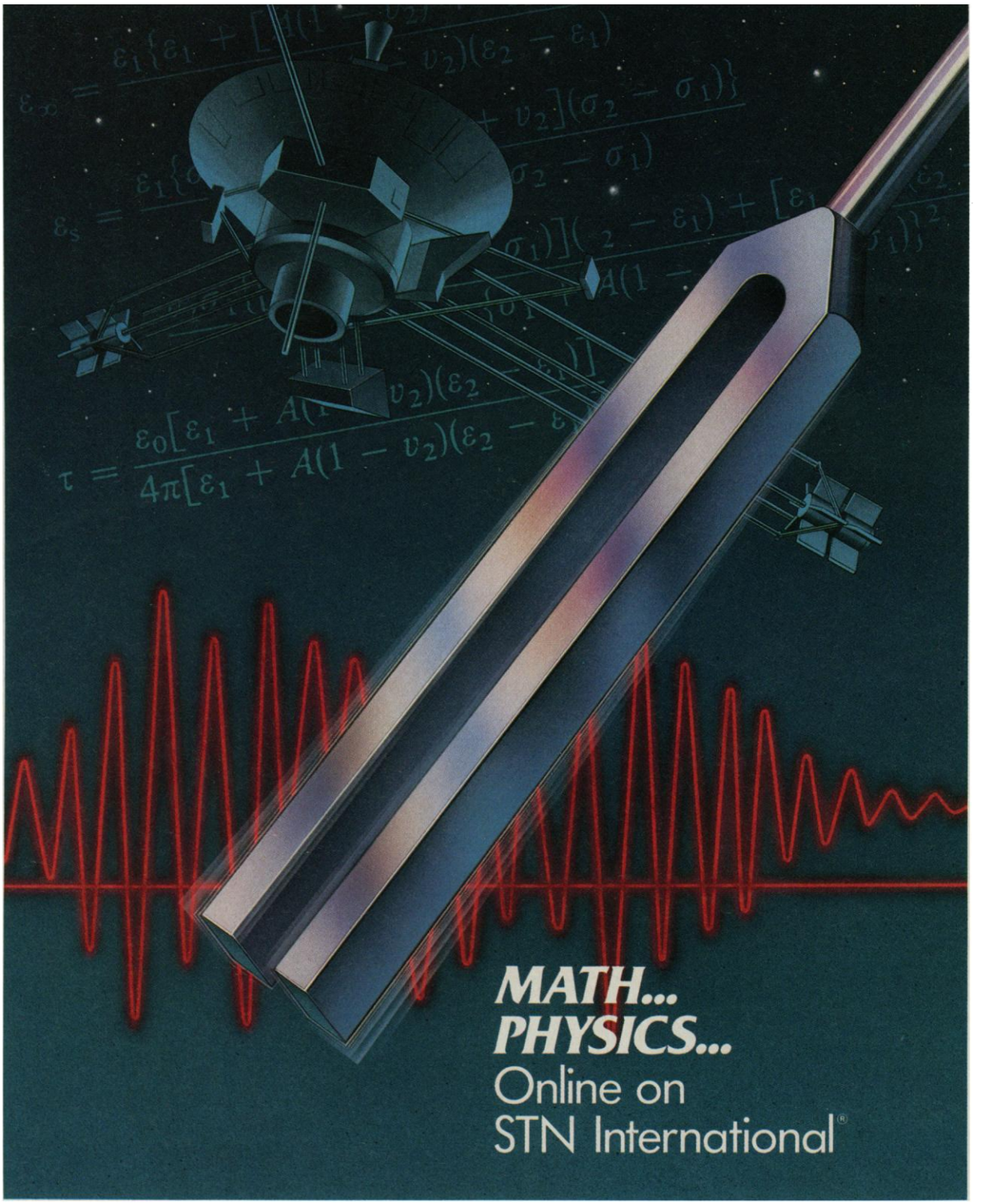

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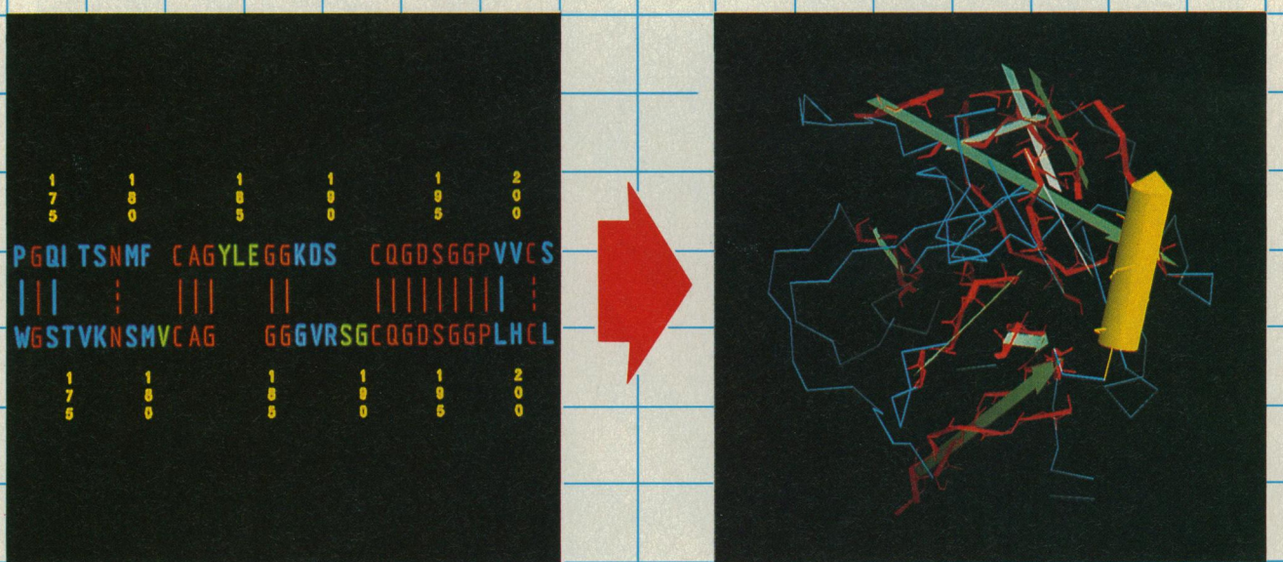

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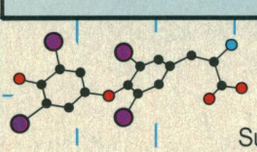

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Co-chaired By

Charles R. Cantor, Ph.D.
Director, Human Genome Center
Lawrence Berkeley Laboratory

Daniel E. Koshland Jr., Ph.D.
Editor of SCIENCE

PARTIAL LIST OF SPEAKERS FOR HUMAN GENOME 1

Sydney Brenner	*MRC, Cambridge*
Eric Lander	*Whitehead Institute*
Robert Moyzis	*Los Alamos National Laboratory*
Charles Cantor	*University of California, Berkeley*
James Watson	*Cold Spring Harbor, N.I.H.*
Victor McKusick	*Johns Hopkins University*
Francis Collins	*University of Michigan*
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Peter Pearson	*Sylvius Laboratories, Leiden*
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Cassandra Smith	*University of California, Berkeley*
Peter Dervan	*California Institute of Technology*
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