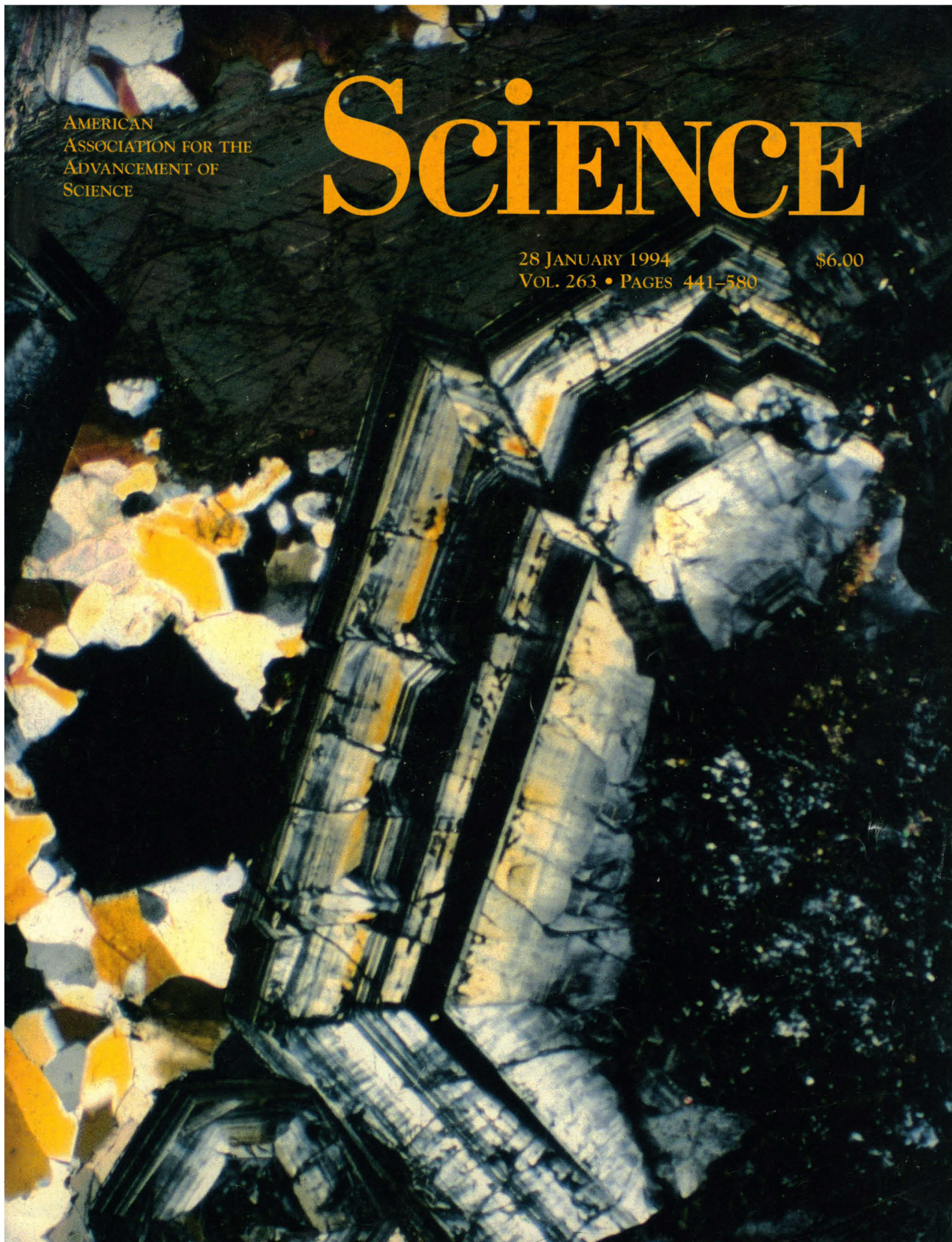


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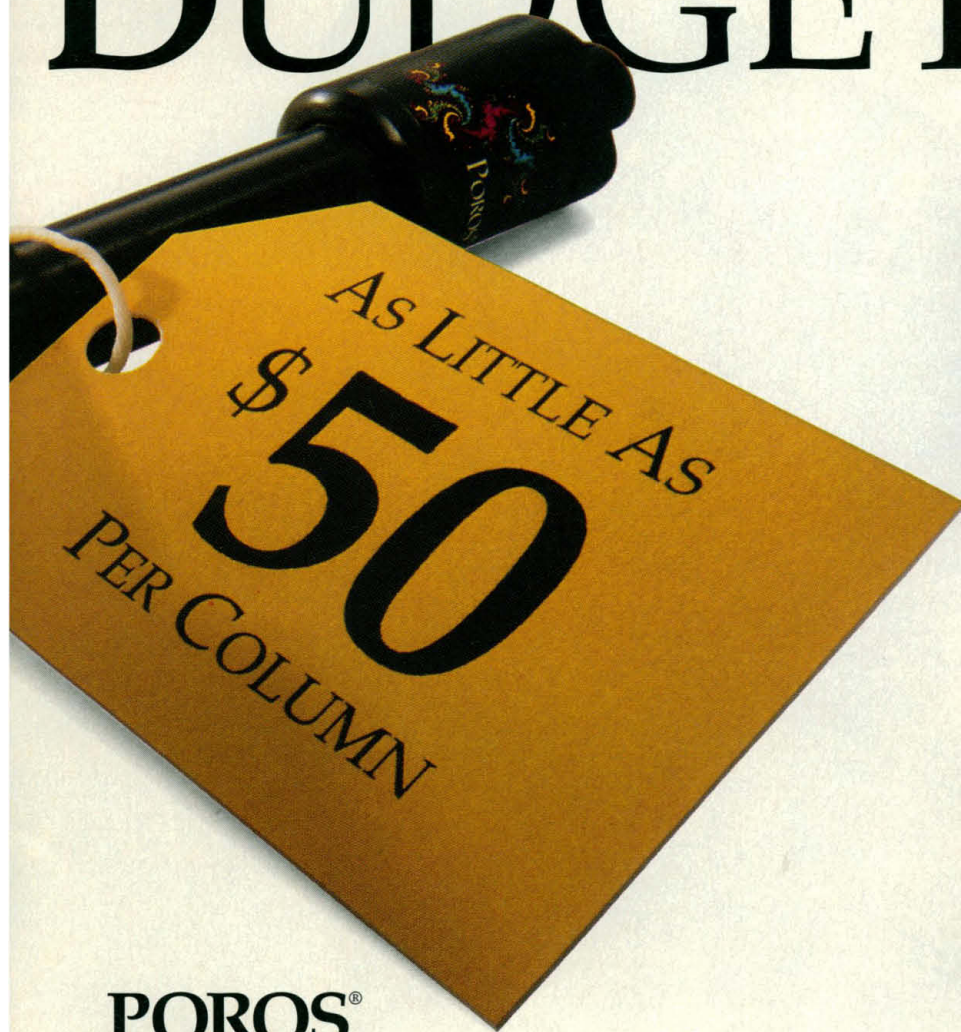
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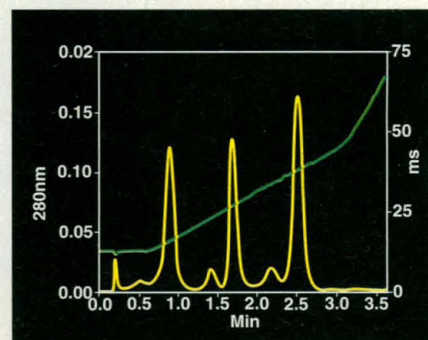
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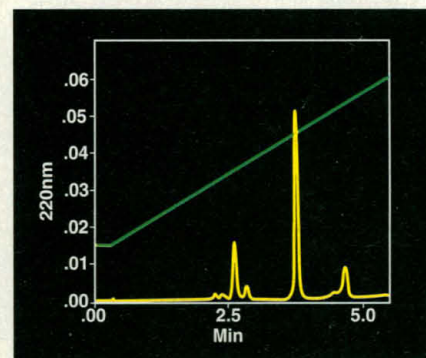


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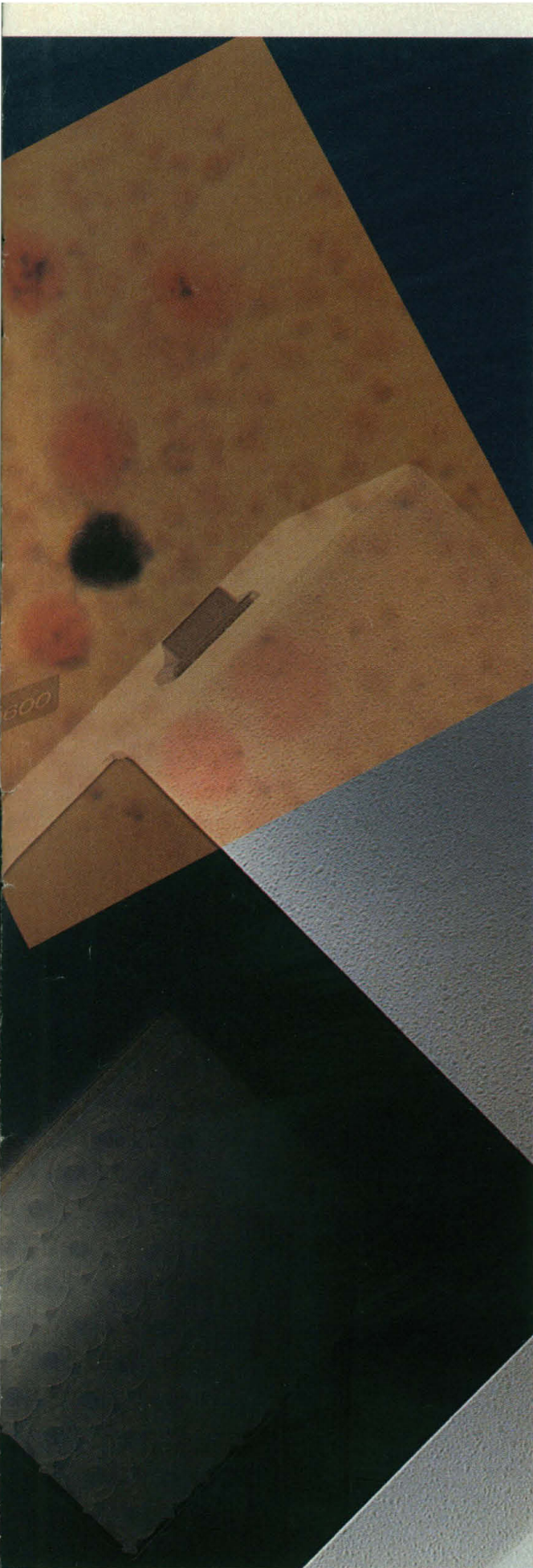
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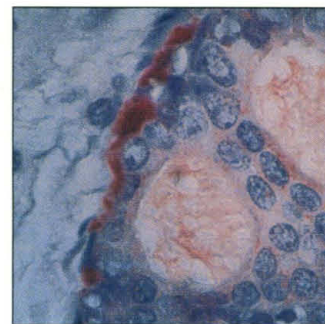
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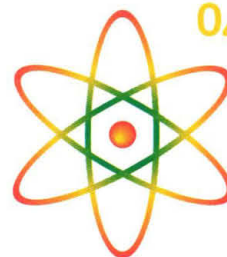
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Photomicrograph of garnet in crossed polarized light. The dark layers are nearly pure andradite (calcium-iron garnet), whereas the light layers also contain varying amounts of grossular (calcium-aluminum garnet). This sample is from the metamorphic aureole of the Drammen

granite in the Permian Oslo Rift. Analysis of the garnet provides information on the evolution of the hydrothermal system during metamorphism. (Field width is 3.2 mm.) See page 505. [Photomicrograph: Bjørn Jamtveit]



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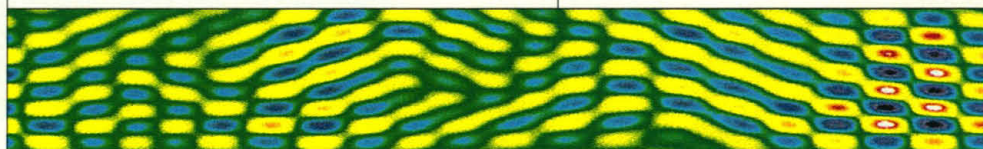
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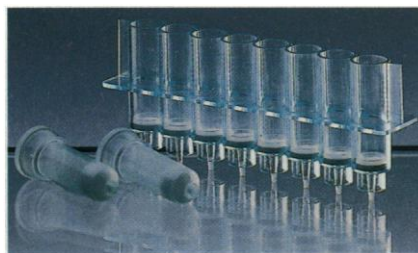


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Order from chaos

Fluid entrained between a stationary and a rotating cylinder develops increasingly complex turbulence as the rotation rate is increased. Both axial vortices and azimuthal waves appear. At the highest rotations, the motion of the azimuthal wave is modulated by a second wave; the overall motion becomes quasi-periodic and has been thought to be fundamentally chaotic. Takeda *et al.* (p. 502) used ultrasonic Doppler analysis to map the so-called modulated wavy vortex flow and find that a small number of individual modes suffices to account for the whole velocity structure. For once, a case of turbulent motion is simpler than it first appears.

Fickle fluids

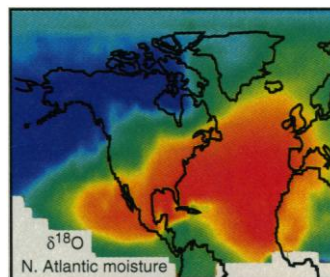
Mixing of fluids of different origins, for example, magmatic and meteoric fluids, are common in many hydrothermal systems and can lead to the deposition of important ores. Jamtveit and Hervig (p. 505) show that ion microprobe analysis of stable isotopes, halogens, and rare earth elements in single garnet crystals (see cover) can be used to trace the history of fluid flow and fluid sources in such systems. Analysis of garnets from the Oslo Rift reveal that meteoric fluids replaced magmatic fluids as the garnets grew.

Precambrian gardens

When did life originate on land? While some geochemical data have been suggestive of terrestrial plant life during the Precambrian (before about 600 million years ago), fossil evidence of land plants has been lacking in rocks formed before about 500 million years ago. Hor-

Storm tracks in the past

The dramatic and rapid changes in $^{18}\text{O}/^{16}\text{O}$ ratios with depth in ice cores from Greenland record broad changes in past climate that could reflect changes in temperature, sources of precipitation and thus polar atmospheric dynamics, or other factors. In a modeling study, Charles *et al.* (p. 508) show that the changes in source regions of moisture likely had a profound effect. The results suggest that at times, over particularly northern Greenland, moisture from the North Pacific with quite low $^{18}\text{O}/^{16}\text{O}$ ratios may have replaced moisture derived from the North Atlantic and North America.



dyski and Knauth (p. 494) now describe plant microfossils from two Precambrian karst terranes in the southwest United States. The microfossils resemble cyanobacteria, and their occurrences suggest that these plants lived close to or on the Earth's surface at least 1200 million years ago. Extensive microbial communities would have impacted erosion, chemical weathering, and cycling of elements such as carbon.

Engineering nonlinearity

Optical properties, particularly nonlinear properties, are tightly coupled to a material's molecular structure. Marder *et al.* (p. 511) report dramatic improvements in nonlinearity that result from strategically engineering the π -electron system of conjugated polyene molecules. A logical control of molecular geometry enables the authors to achieve unusually high values of the second-order hyperpolarizability in organic chromophores. Background and comment on current research in this technologically important area are provided by Brédas in his Perspective (p. 487).

One-step tumor vaccine

The ability of tumor cells to evade the immune system is crucial to their survival and growth. Guo *et al.* (p. 518) have shown that rat hepatoma cells become more immunogenic when they are fused in vitro with activated B cells. The resultant hybrid cells lose their tumorigenicity and, when injected into rats, they can both prevent the development of hepatomas and cure established hepatomas. If broadly applicable to other tumor types, this vaccine strategy—by virtue of its simplicity—will be a welcome addition to current strategies in cancer immunotherapy.

Memory and game shows

The television game show "Concentration" tested how well contestants could recall the location of one of a pair of phrases, that were hidden behind an array of panels, and subsequently name which location concealed a matching pair. Miller and Desimone (p. 520) have identified two types of visually responsive cells in the inferior temporal cortex of mon-

keys. One type displays a diminished response to a stimulus that matches any member in a series of stimuli. The second type shows an enhanced response only when the stimulus matches the first one in the series. These cells provide support for the suggestion that incoming stimuli are deposited into one storage cache automatically, but also can be held in another buffer if actively needed.

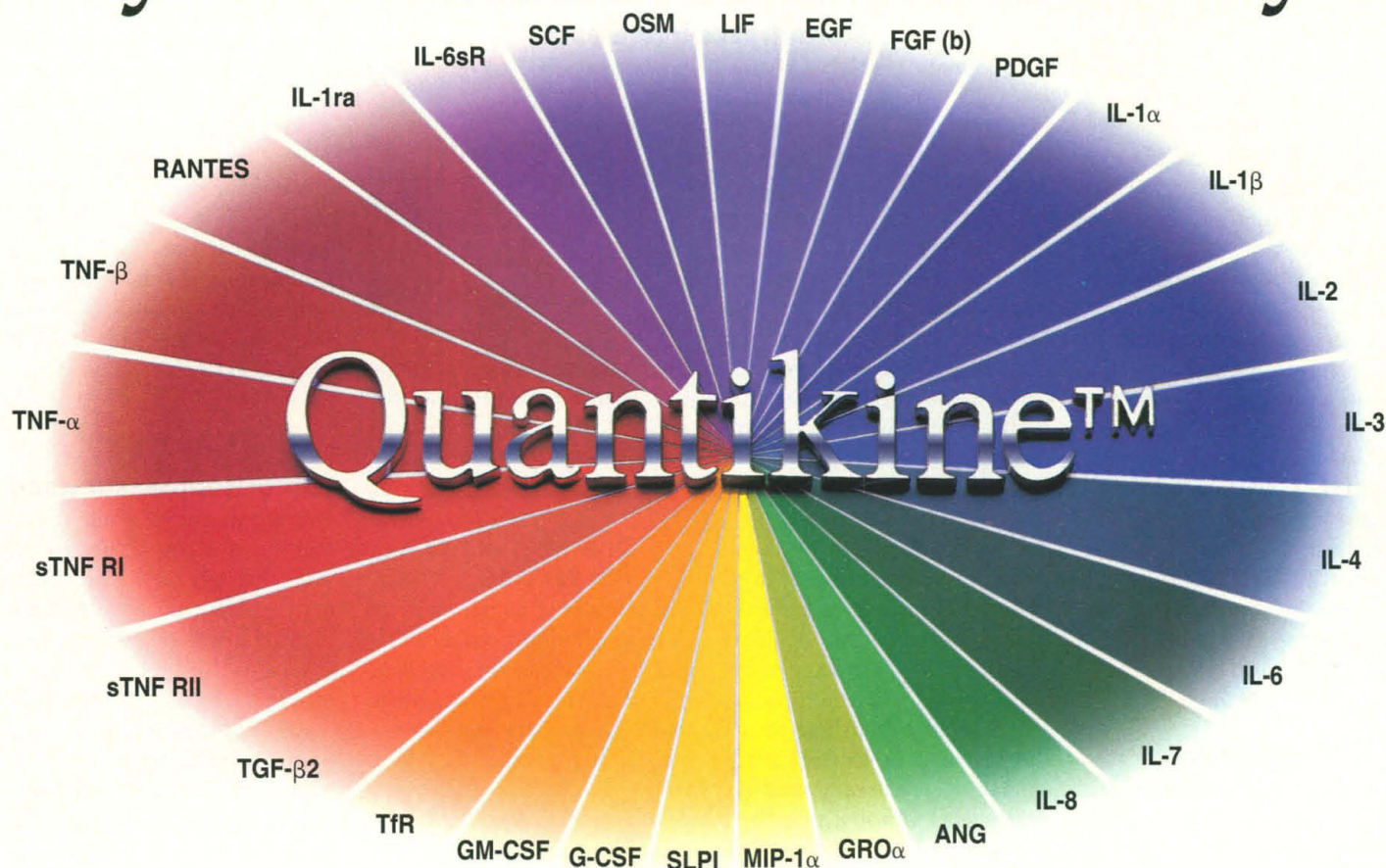
Tumor suppressor gene

An essential step in tumor cell metastasis is the ability to invade through the extracellular matrix. Zou *et al.* (p. 526) have identified a gene that may be crucial to this process in breast cancer. The gene encodes a protease inhibitor, "maspin," that is expressed in normal human mammary epithelial cells but not in most breast cancer cells. Reintroduction of maspin into breast cancer cells reduces their ability to form tumors in mice and their invasive capacity in vitro. Maspin is thought to function as a tumor suppressor.

Shared strength

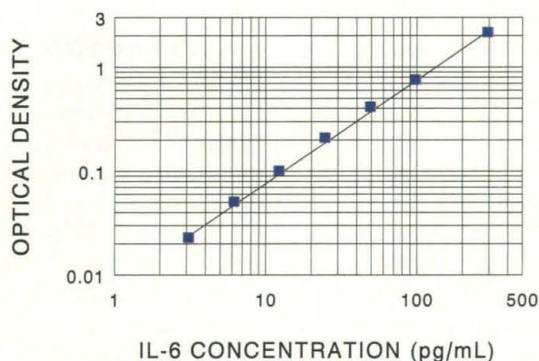
Intense synaptic activity can result in long-term potentiation, or LTP, in which there is a long-lasting increase in synaptic transmission between neurons. Schuman and Madison (p. 532) studied LTP in CA1 pyramidal neurons in hippocampal slices. They found that induction of LTP in a neuron, as monitored by excitatory postsynaptic potentials (EPSPs), could lead to similar EPSP responses in nearby neurons but not in more distant neighbors. A possible mechanism for this effect would be the action of a diffusible messenger, such as nitric oxide.

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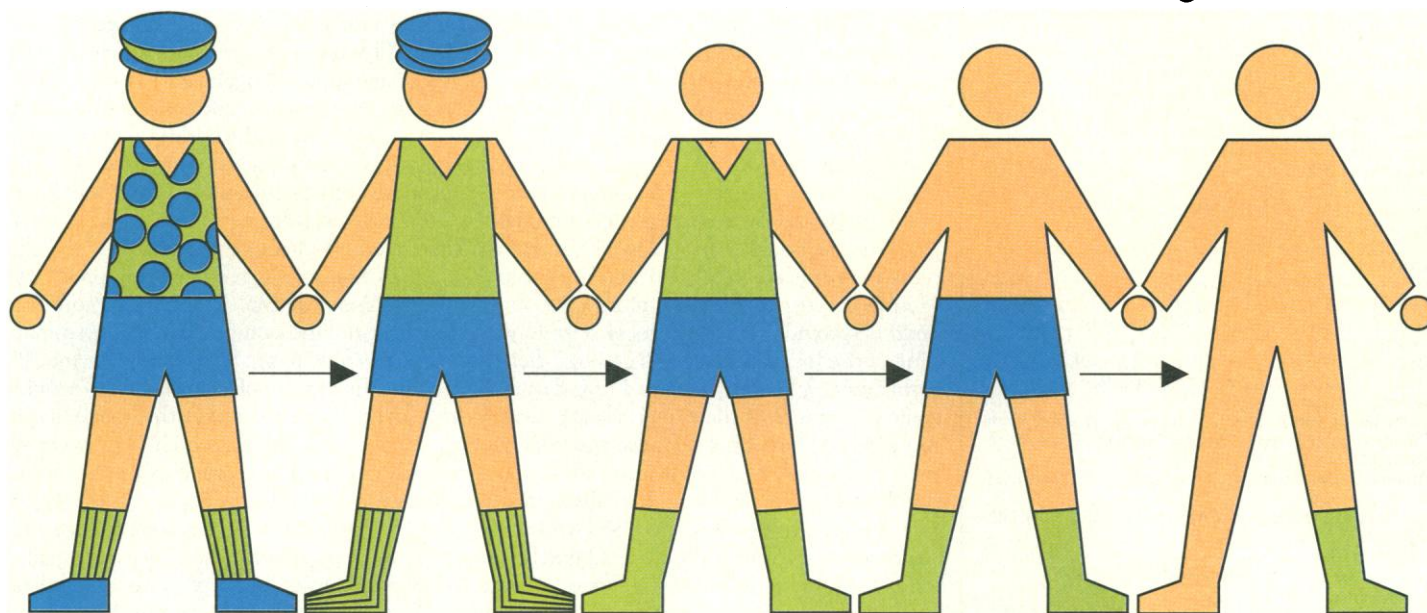
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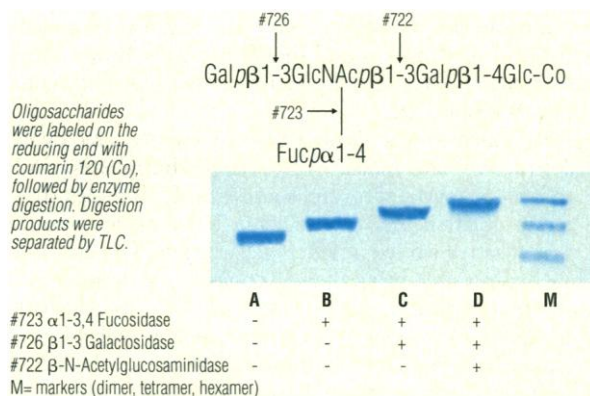
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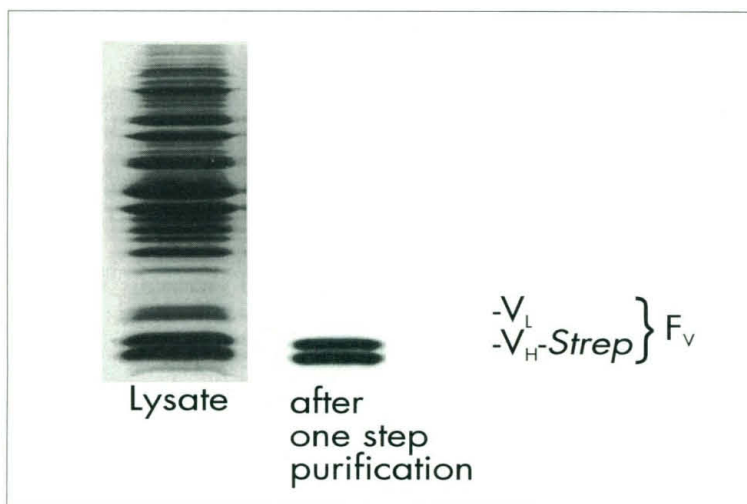
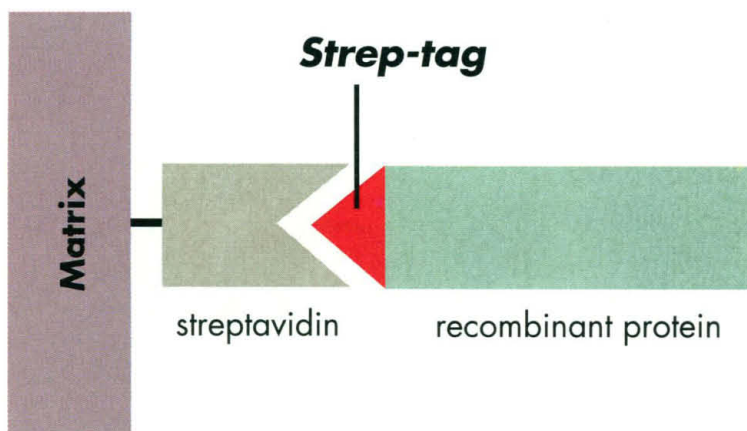
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¹ Schmidt & Skerra, Prot. Engineering 6, 109-122 (1993)
² Patent pending

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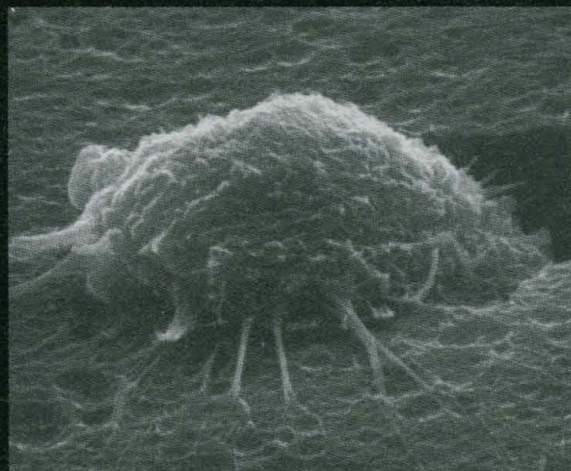
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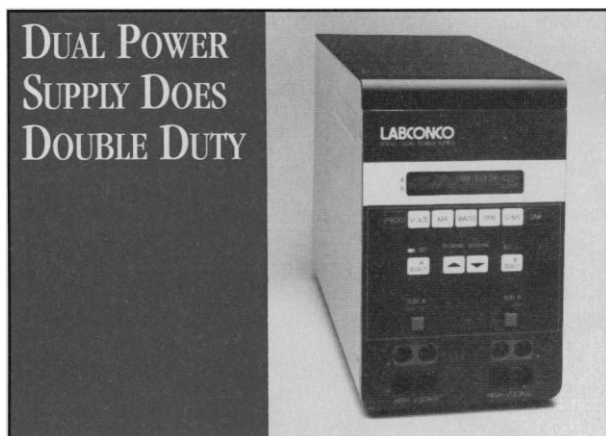
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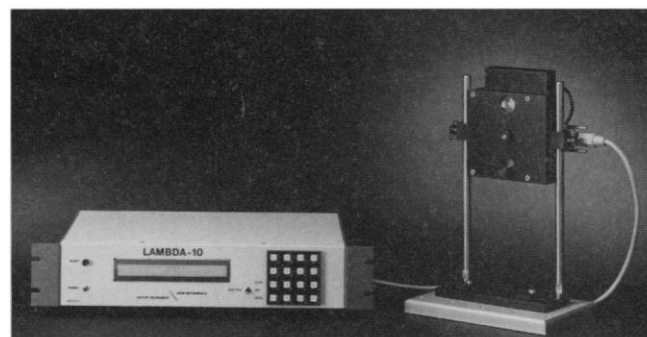
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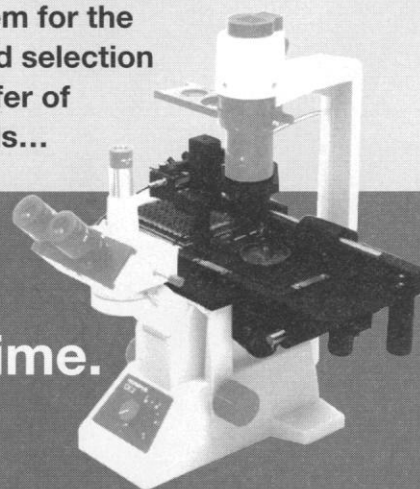
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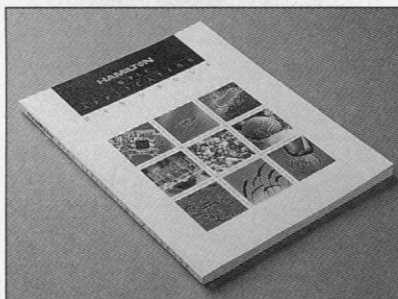


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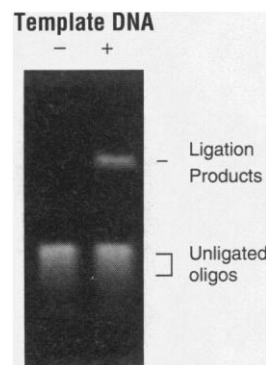
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1. M. Schalling, T.J. Hudson, K.H. Buetow and D.E. Houseman, *Nature Genetics*; 4: 135-139, 1993.
2. V. Morell, *Science*; 260: 1422-1423, 1993.

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1994 CALENDAR OF EVENTS

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Endocrinology Under 35

Scientific Organization: A. De Bellis (I) • E. Schipani (USA)

Rome, Italy • May 25-27

Paracrine and Autocrine Signals in the Hypothalamic Pituitary Complex

Scientific Organization: L. Martini (I) • D. de Wied (NL) • S.M. McCann (USA)

Stresa, Italy • September 9-10

Endothelins in Endocrinology

Scientific Organization: I. T. Cameron (UK) • M. J. Dunn (USA) • M. Serio (I)

Florence, Italy • October 6-8

Immunology

Differentiation Therapy

Scientific Organization: A. Kimchi (IL) • G.B. Rossi (I) • S. Waxman (USA)

Herzlia, Israel • March 7-10

Cytokines: Basic Principles and Practical Applications

Scientific Organization: A. K. Abbas (USA) • S. Romagnani (I)

Florence, Italy • March 28-30

Primary Immunodeficiency Diseases

Scientific Organization: F. Aiuti (I) • M. D. Cooper (USA) • F. S. Rosen (USA)

Orvieto, Italy • June 18-21

New Horizons in Gynaecological Malignancies

Scientific Organization: D. Ayalon (IL)

Eilat, Israel • November 16-18

Reproduction

Puberty: Basic and Clinical Aspects

Scientific Organization: C. Bergadá (ARG)

Buenos Aires, Argentina • April 6-8

Male Factor in Human Infertility

Scientific Organization: J. Tesarik (F)

Paris, France • April 21-22

Immunocontraception

Scientific Organization: O. Nilsson (S)

Uppsala, Sweden • June 30 - July 1

Recent Advances In:

Nutritional Aspects of Osteoporosis

Scientific Organization: P. Burckhardt (CH) • R. P. Heaney (USA)

Lausanne, Switzerland • May 5-7

Where Phenotype Does Not Match Genotype

Scientific Organization: M.I. New (USA)

Volterra, Italy • October 13-14

Gordon Research Conferences

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Fractals

May 1 - 6 • San Miniato (I)

Extrachromosomal Elements: Mitochondria and Chloroplasts

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May 8 - 13 • Volterra (I)

Bioelectrochemistry

September 18 - 23 • Irsee (FRG)

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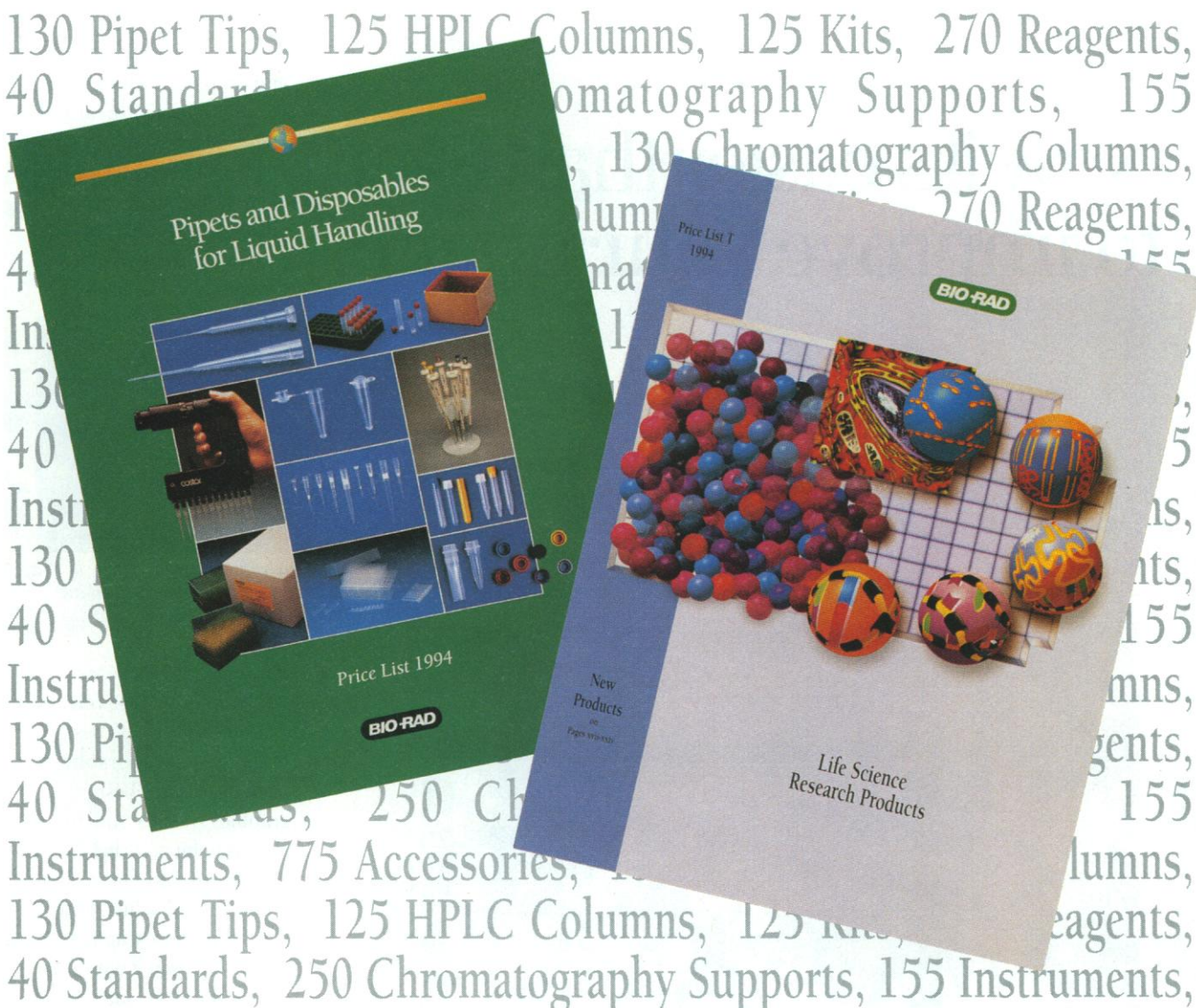
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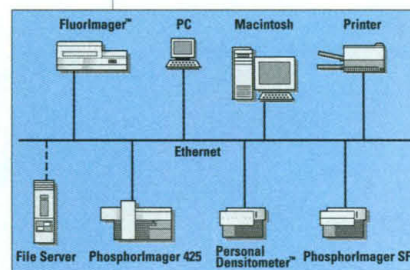
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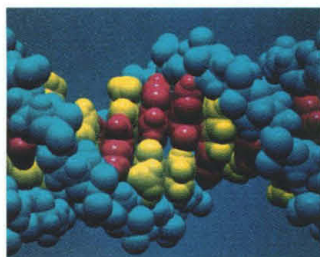


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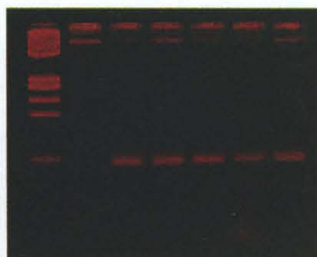
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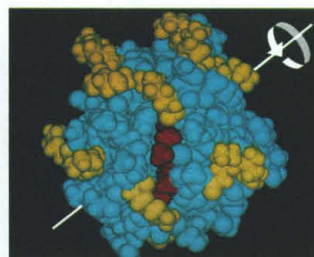
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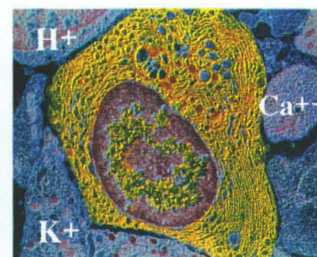
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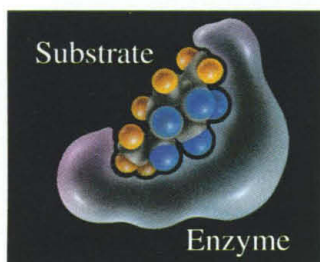
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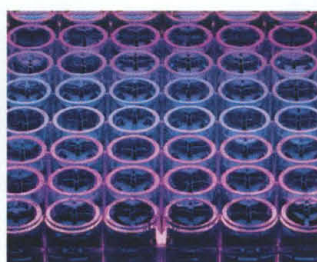
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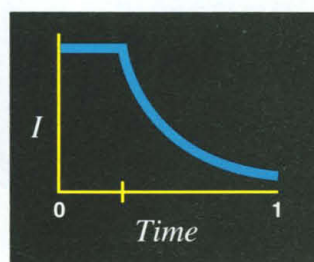
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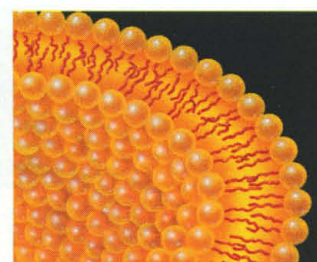
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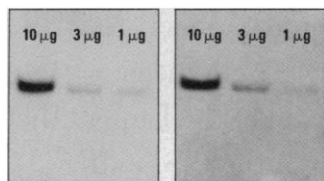
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F. Peng et al. (1992) *J. Virol.* **66**, 7389-96

H. Yang and I. H. Czapla (1993) *J. Biol. Chem.* **268**, 5905-10

... poly(A)+ RNA was isolated using the PolyAtract mRNA isolation kit III." K.-J. Appenroth et al. (1992) *Planta* 188, 587-93

"Poly(A)+ RNA was purified by the PolyAtract (Promega) method ..."
J.A.T. Dow et al. (1993) *Gene* **122** 355-60

"Poly A+ RNA was prepared by the PolyAtract method (Promega) ..."

"Poly(A) RNA was isolated ... using the PolyAtract kit (Promega) ..."
T.A. Buhler et al. (1993) *Develop. Biol.* **155**,

“... poly(A)+ RNA was purified by PolyATtract magnetic capture technology (Promega).”
D. Tannahill et al. (1992) *Development* 115, 695-702

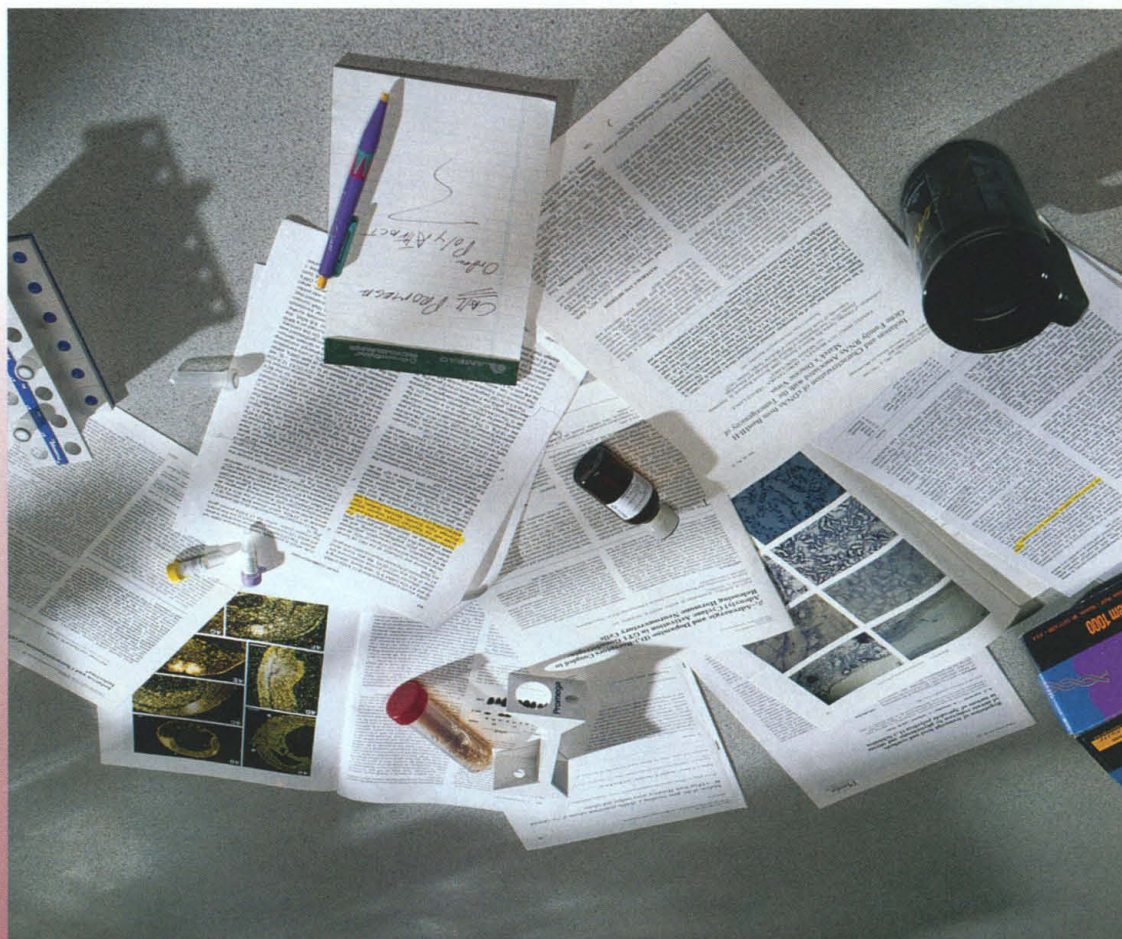
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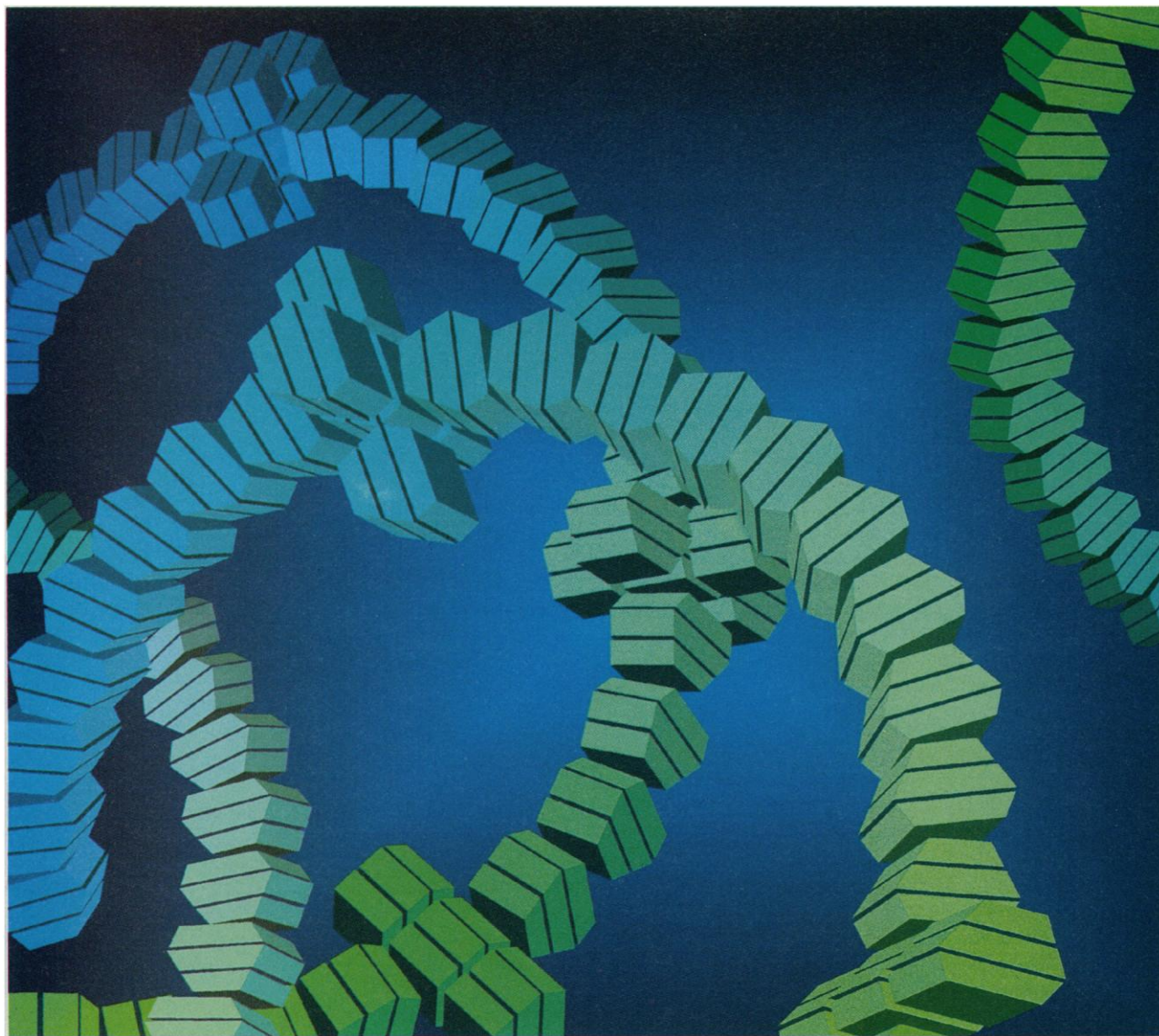
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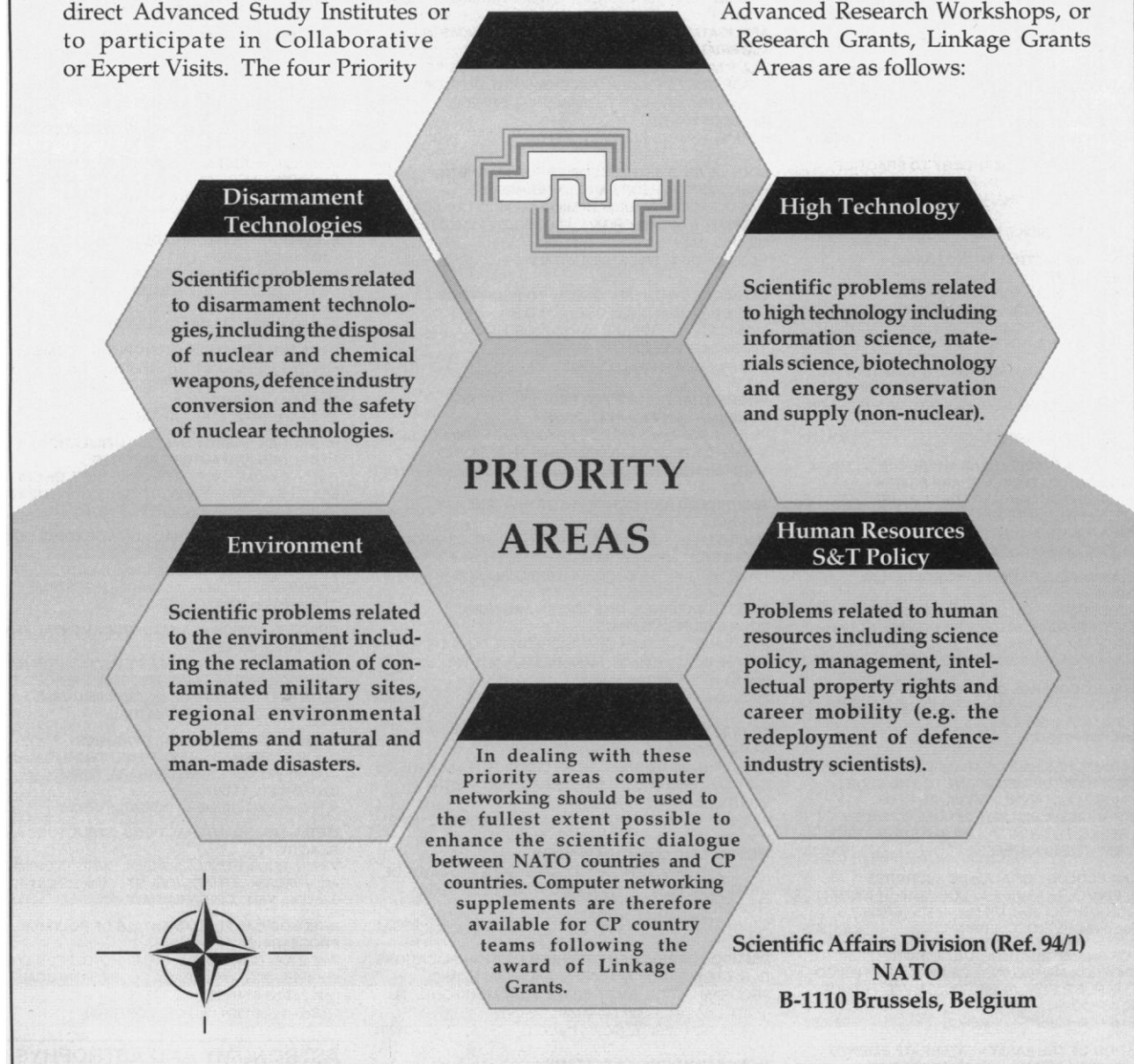
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NATO INTERNATIONAL SCIENTIFIC EXCHANGE PROGRAMMES

The NATO Science Programme has reoriented some of its activities to address scientific and technological problems identified as having high priority by its Cooperation Partners, members of the North Atlantic Cooperation Council. Applications are therefore invited from scientists in NATO countries and Cooperation Partner countries (the Commonwealth of Independent States and countries of Central and Eastern Europe) for funding of collaborative activities in these priority areas.

Applications may be submitted to the NATO Scientific Affairs Division for support to organize and direct Advanced Study Institutes or to participate in Collaborative or Expert Visits. The four Priority

Advanced Research Workshops, or Research Grants, Linkage Grants Areas are as follows:



1994 PROGRAMME OF MEETINGS

The Advanced Study Institutes (ASIs) and Advanced Research Workshops (ARWs) to be held in 1994 are given in the following pages. **Each meeting is held under the responsibility of its director, to whom all requests for information, attendance or support should be addressed.** Participation or tuition fees are not required from participants; some participants from NATO countries or Cooperation Partner (CP) countries (the Commonwealth of Independent States and countries of Central and Eastern Europe) may obtain grants from the meeting director to assist with travel and living expenses.

Those wishing to organize future ASIs or ARWs should write to the NATO Scientific Affairs Division for application forms and further information. Please note that ARWs can now only be supported when they are co-directed by a scientist from a NATO country and a scientist from a CP country and when the subject relates to one of the Priority Areas outlined above. ASIs may either be directed by a NATO scientist in any area, or co-directed by a NATO and CP scientist in a Priority Area.

ADVANCED STUDY INSTITUTES

Advanced Study Institutes (ASIs) are high-level tutorial courses of two weeks' duration where a subject is treated in depth by lecturers of international standing. Presentations are made to about 100 scientists or research students already specialised in the field, or who have an advanced general scientific background. Attendance at ASIs is open to all suitably-qualified applicants irrespective of nationality, upon application to the director of the individual meeting, whose name and address may be found below.

LIFE SCIENCES

MOLECULAR ASPECTS OF LIVER CARCINOGENESIS

Dr. G.G. SKOUTERIS, HELLENIC PASTEUR INSTITUTE, LAB. OF BIOTECHNOLOGY, 127 V. SOFIAS AVE., 11521 ATHENS, GREECE (fax: 30-1 6423 498)
8-18 Jan 1994 : DELPHI, GREECE 930583

MODULATION OF CELLULAR RESPONSES IN TOXICITY

Prof. C.L. GALLI, UNIV. DEGLI STUDI DI MILANO, INST. OF PHARMACOLOGICAL SCIENCES, VIA G. BALZARETTI 9, I-20133 MILAN, ITALY (fax: 39-2 29404961)
24 Jan-3 Feb 1994 : PONTE DI LEGNO, ITALY 920334

PHARMACOKINETICS - FROM THEORY TO PRACTICE

Dr. A.K. THAKUR, HAZLETON WASHINGTON, 9200 LEESBURG TURNPIKE, VIENNA, VA 22182, USA (fax: 1-703 759 6947)
5-16 Apr 1994 : ERICE, SICILY, ITALY 930517

BIOINORGANIC CHEMISTRY : AN INORGANIC PERSPECTIVE OF LIFE

Prof. D.P. KESSISOGLU, ARISTOTLE UNIV. OF THESSALONIKI, DEPT. OF GEN. & INORG. CHEMISTRY, PO BOX 135, THESSALONIKI 54006, GREECE (fax: 3031 206318)
5-17 Jun 1994 : RHODES, GREECE 930519

VASCULAR ENDOTHELIUM: RESPONSES TO INJURY

Prof. J.D. CATRAVAS, MEDICAL COLLEGE OF GEORGIA, DEPT. OF PHARMACOLOGY & TOXICOLOGY, GA 30912, USA (fax: 1-706 721 2347)
18-27 Jun 1994 : CRETE, GREECE 931320

TRAFFICKING OF INTRACELLULAR MEMBRANES : FROM MOLECULAR SORTING TO MEMBRANE FUSION

Prof. M.C. PEDROSO DE LIMA, UNIV. DE COIMBRA, CTRO DE BIOLOGIA CELULAR, DEP. DE BIOQUIMICA, APART. 3126, 3000 COIMBRA, PORTUGAL (fax: 351-39 35672)
19 Jun-1 Jul 1994 : ESPINHO, PORTUGAL 930567

VACCINES : NEW-GENERATION IMMUNOLOGICAL ADJUVANTS

Prof. G. GREGORIADIS, UNIV. OF LONDON, CENTRE FOR DRUG DELIVERY RESEARCH, 29-39 BRUNSWICK SQUARE, LONDON WC1N 1AX, UK (fax: 44-71 278 06 22)
24 Jun-5 Jul 1994 : CAPE SOUNION, GREECE 931087

MULTI-SENSORY CONTROL OF MOVEMENT

Dr. F. LACQUANITI, INB-CNR, VIA MARIO BIANCO 9, 20131 MILAN, ITALY (fax: 39-2 2610846)
3-14 Jul 1994 : TRIESTE, ITALY 931088

MOLECULAR MECHANISMS OF TRANSCELLULAR SIGNALLING: FROM THE MEMBRANE TO THE GENE

Prof. L. PACKER, UNIV. OF CALIFORNIA, DEPT. OF MOLECULAR AND CELL BIOLOGY, 251 LIFE SCIENCE ADDITION, BERKELEY, CA 94720, USA (fax: 510 642 8313)
14-26 Aug 1994 : SPETSAI, GREECE 930514

MOLECULAR ECOLOGY OF AQUATIC MICROBES

Dr. I. JOINT, PLYMOUTH MARINE LABORATORY, PROSPECT PLACE, PLYMOUTH PL1 3DH, UK (fax: 44-752 670637)
28 Aug-9 Sep 1994 : IL CIOCCO, ITALY 931305

A WORLD OF RNA: STRUCTURE AND FUNCTION

Dr. M. GRUNBERG-MANAGO, INST. DE BIOLOGIE PHYSICO-CHEMIQUE, 13 RUE P. ET M. CURIE, 75005 PARIS, FRANCE (fax: 33-1 40 46 83 31)
28 Aug-10 Sep 1994 : SPETSAI, GREECE 931562

ORGANIZATION OF THE EARLY VERTEBRATE EMBRYO

Dr. N. ZAGRIS, UNIV. OF PATRAS, DEPARTMENT OF BIOLOGY, PATRAS, GREECE (fax: 30-61 99 19 96)
16-26 Sep 1994 : SPETSAI, GREECE 931079

LIGHT AS ENERGY SOURCE AND INFORMATION CARRIER IN PLANT PHOTOPHYSIOLOGY

Dr. R.C. JENNINGS, UNIV. DI MILANO, DIPTO DI BIOLOGIA, VIA CELORIA 26, MILANO, ITALY (fax: 39-22 36 10 70)
25 Sep-6 Oct 1994 : VOLTERRA, ITALY 931078

PHYSICS AND CHEMISTRY

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Dr. M.G. SIGNORE, ECOLE NORMALE SUPERIEURE, LAB. DE RADIOASTRONOMIE, 24 RUE L'HOMOND, 75231 PARIS CEDEX 5, FRANCE (fax: 33-1 43 36 72 04)
25 Jan-4 Feb 1994 : LES HOUCHEs, FRANCE 930591

ADVANCES IN QUANTUM PHENOMENA

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16-28 Feb 1994 : ERICE, SICILY, ITALY 930561

FORCES IN SCANNING PROBE METHODS

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APPLICATION OF PARTICLE AND LASER BEAMS IN MATERIALS TECHNOLOGY

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CORE LEVEL SPECTROSCOPES FOR MAGNETIC PHENOMENA: THEORY AND EXPERIMENT

Prof. G. PACCHIONI, UNIV. DI MILANO, DIP. DI CHIMICA INORGAN. E METALLORGAN., VIA VENEZIA 21, 20133 MILANO, ITALY (fax: 39-2 236 27 48)
15-26 May 1994 : ERICE, SICILY, ITALY 930576

CHEMICAL SYNTHESIS: GNOSIS TO PROGNOSIS

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Prof. G.J. LONG, c/o INST. DE PHYSIQUE B5, UNIV. DE LIEGE, B-4000 SARTILMAN, BELGIUM (fax: 32-41 562355)
12-24 Jun 1994 : IL CIOCCO, ITALY 930587

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10-23 Jul 1994 : PORTO CARRAS, GREECE 90593

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25 Jul-5 Aug 1994 : VARENNIA, ITALY 931318

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Prof. M. LEVY, UNIV. P. & M. CURIE, IESG/BOITE 230, 4 PLACE JUSSIEU, 75230 PARIS CEDEX 05, FRANCE (fax: 43 29 82 13)
1-13 Aug 1994 : CARGESE, CORSICA, FRANCE 931080

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1 Aug-9 Sep 1994 : LES HOUCHEs, FRANCE 930599

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Prof. A.O. BARUT, UNIV. OF COLORADO AT BOULDER, DEPT. OF PHYSICS, BOX 390, BOULDER, CO 80309, USA (fax: 1-303 492 3352)
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15-26 Aug 1994 : STIRLING, UK 921091

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Prof. M.M. SHAPIRO, 205 YOAKUM PKWY, APPT. 1514, ALEXANDRIA, VA 22304, USA
7-18 May 1994 : ERICE, SICILY, ITALY 930589

RECENT DEVELOPMENTS IN APPROXIMATION THEORY, WAVELETS AND APPLICATIONS

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ADVANCED STUDY INSTITUTES (continued)

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Prof. M. BROY, TECHNISCHE UNIV. MUNCHEN, INST. F. INFORMATIK, POSTFACH 24 20 24, W-8000 MUNCHEN 2, GERMANY (fax: 49-80 2105 8183)
26 Jul-7 Aug 1994 : MARKTOBERDORF, GERMANY 931076

CONCEPTUAL MODELS FOR DESIGNING HYPertext

Prof. R. McALEESE, HERIOT-WATT UNIV., COMPUTER-BASED LEARNING INSTITUTE, RICCARTON, EDINBURGH EH14 4AS, UK (fax: 44-31 451 3283)
15-23 Aug 1994 : EDINBURGH, UK 911042

FROM IDENTIFICATION TO LEARNING

Dr. S. BITTANTI, POLITECNICO DI MILANO, PIAZZA L. DA VINCI 32, 20133 MILANO, ITALY (fax: 39-2 2399 35 87)
22 Aug-2 Sep 1994 : COMO, ITALY 930588

APPLIED SCIENCES AND ENGINEERING

MODERN ELECTRICAL DRIVES

Prof. H.B. ERTAN, MIDDLE EAST TECHNICAL UNIV., ELECTRICAL & ELECTRONICS ENG. DEPT., 06531 ANKARA, TURKEY (fax: 90-4 210 1261)
31 Jan-11 Feb 1994 : ANTALYA, TURKEY 930586

MATERIALS SCIENCE AND IMPLANT ORTHOPAEDIC SURGERY

Dr. R. KOSSOWSKY, MATERIALS ENG. & SYSTEMS DIV., EMERGING TECHNOLOGIES INC., 6327 BURCHFIELD AVE., PITTSBURGH, PA 15217, USA (fax: 1-412 421 4342)
19 Jun-2 Jul 1994 : CRETE, GREECE 930524

LASER PROCESSING: SURFACE TREATMENT AND FILM DEPOSITION

Prof. J. MAZUMDER, UNIV. OF ILLINOIS AT URBANA-CHAMPAIGN, DEPT OF MECH. & INDUSTRIAL ENG., 1206 W. GREEN ST., URBANA, IL 61801, USA (fax: 1-217 244 65 34)
2-14 Jul 1994 : SESIMBRA, PORTUGAL 931303

MATERIALS AND PROCESSES FOR SURFACE AND INTERFACE ENGINEERING

Prof. Y. PAULEAU, NUCLEAR RESEARCH CENTER, CEREM-DEM-SGSA-LTS 85X, 38041 GRENOBLE, FRANCE
(fax: 33-76 88 51 30)
18-29 Jul 1994 : BONAS, FRANCE 931188

METHODS OF MODEL BASED PROCESS CONTROL

Prof. R. BERBER, UNIV. OF ANKARA, DEPT. OF CHEMICAL ENGINEERING, TANDOGAN, ANKARA 06100, TURKEY
(fax: 4 223 2395)
7-17 Aug 1994 : MARMARIS, TURKEY 931312

FABRICATION, PROPERTIES AND APPLICATIONS OF LOW-DIMENSIONAL SEMICONDUCTOR STRUCTURES

Prof. M. BALKANSKI, UNIV. P & M CURIE, LAB. DE PHYSIQUE DES SOLIDES, 4 PLACE JUSSIEU, TOUR 13, 2 ET., 75252 PARIS CEDEX 05 FRANCE
19-30 Sep 1994 : SOFIA, BULGARIA (HTECH) 931558

NEW TECHNOLOGIES FOR LARGE WATER SUPPLY PROJECTS

Prof. F.F. CALOMINO, UNIV. DELLA CALABRIA, DIPTO DI DIFESSA DEL SUOLO, C DA S. ANTONELLO, MONTALTO UFFUGO SCALO 87040, ITALY (fax: 39-984 934245)
Oct 1994 : VARNNA, BULGARIA(ENVIR) 931663

STABILITY OF MATERIALS

Dr. A. GONIS, LAWRENCE LIVERMORE NATIONAL LABORATORY, L-268, LIVERMORE, CA 94550, USA
(fax: 1-415-422-7300)
Date to be announced : USA (HTECH) 931197

ENVIRONMENTAL SCIENCES

DEFENCE FROM FLOODS AND FLOODPLAIN MANAGEMENT

Prof. Y. YEVJEVICH, 8837 S.BLUE MOUNTAIN PLACE, HIGHLANDS RANCH, CO 80126, USA (fax: 1-303 790 9509)
26 April-7 May 1994 : BUDAPEST, HUNGARY (ENVIR) 930575

TRANSBOUNDARY WATER RESOURCES MANAGEMENT: ENVIRONMENTAL AND INSTITUTIONAL ISSUES

Prof. J. GANOULIS, ARISTOTLE UNIV. OF THESSALONIKI, DEPT. OF CIVIL ENGINEERING, 54006 THESSALONIKI, GREECE (fax: 20 03 92)
13-23 May 1994 : SKOPELOS, GREECE (ENVIR) 931619

THE ROLE OF WATER AND THE HYDROLOGICAL CYCLE IN GLOBAL CHANGE Dr.

H.R. OLIVER, INST. OF HYDROLOGY, MACLEAN BLDG, CROWMARSH GIFFORD, WALLINGFORD, OX10 8BB, UK
(fax: 491 32256)
27 May-6 Jun 1994 : IL CIOCCO, ITALY 921452

THE DETERMINATION OF GEOPHYSICAL PARAMETERS FROM SPACE

Prof. A.P. CRACKNELL, UNIV. OF DUNDEE, DEPT. OF APPLIED PHYSICS, DUNDEE DD1 4HN, UK
(fax: 44-382 20 28 30)
15 Aug-3 Sep 1994 : DUNDEE, UK 930570

BIOMASS BURNING EMISSIONS AND GLOBAL CHANGE

Prof. J.S. CLARK, DUKE UNIV., DEPT. OF BOTANY, DURHAM, NC 27706, USA (fax: 1-919 660 7425)
11-15 Oct 1994 : ALGARVE, PORTUGAL (SGEC) 931616

SOCIAL AND BEHAVIOURAL SCIENCES

COOPERATION: GAME THEORETIC APPROACHES

Prof. A. MAS-COLELL, HARVARD UNIVERSITY, DEPT. OF ECONOMICS, 327 LITTAUER CTR., CAMBRIDGE, MA 02138, USA (fax: 1-617 495 7730)
17-28 Jul 1994 : NEW YORK, USA 931316

BEHAVIOURAL BRAIN RESEARCH IN NATURALISTIC AND SEMI-NATURALISTIC SETTINGS: POSSIBILITIES AND PERSPECTIVES

Dr. E. ALLEVA, IST. SUP. DI SANITA, LAB. DI FISIOPATOLOGIA O.S., VLE. REGINA ELENA 299, 00161 ROME, ITALY
(fax: 39-6 495 78 21)
9-20 Sep 1994 : MARATEA, ITALY 930511

COGNITIVE AND LINGUISTIC BASES OF READING, WRITING AND SPELLING

Dr. R. MALATESHA JOSHI, OKLAHOMA STATE UNIV., COLLEGE OF EDUCATION, 301 GUNDERSEN HALL, STILLWATER, OK 74078-0146, USA (fax: 1-405 744 7713)
26 Sep-8 Oct 1994 : ALVOR, PORTUGAL 931163

ADVANCED RESEARCH WORKSHOPS

Advanced Research Workshops (ARWs) are working meetings of about four days' duration, where scientists and engineers researching at the frontiers of a subject are able to engage in an intense but informal exchange of views, aiming at a critical assessment of existing knowledge and identification of directions for future action. Attendance at ARWs is mainly by invitation, but a few places are available for particularly wellqualified scientists of all nationalities upon application to the director.

LIFE SCIENCES

DYNAMICAL DISEASE

Prof. L. GLASS, MCGILL UNIV., PHYSIOLOGY DEPT., 3655 DRUMMOND STREET, MONTREAL, QUEBEC H3G 1Y6, CANADA (fax: 1-514 398 7452)
20-23 Feb 1994 : QUEBEC, CANADA (COP) 921434

POSTTRANSCRIPTIONAL CONTROL OF GENE EXPRESSION : THE CENTRAL ROLE OF RNA STRUCTURE

Dr. J.E.G. MCCARTHY, GBF, MASCHERODER WEG 1, 38124 BRAUNSCHWEIG, GERMANY (fax: 49-531 6181 458)
29 Apr-2 May 1994 : ARUBA, DUTCH ANTILLES 930583

AETIOLOGY OF HODGKIN'S DISEASE

Dr. R.F. JARRETT, UNIV. OF GLASGOW, DEPT OF VETERINARY PATHOLOGY, BEARDSDEN RD., BEARDSDEN, GLASGOW G61 1QH, UK (fax: 44-41 330 5733)
3-6 May 1994 : LOCH LOMOND, UK 931115

CARDIAC GROWTH AND REGENERATION

Prof. W.C. CLAYCOMB, LOUISIANA STATE UNIV., DEPT. OF BIOCHEMISTRY & MOLECULAR BIOLOGY, 1901 PERDIDO ST., NEW ORLEANS, LA 70112-1393, USA
(fax: 1-504 568 3370)
23-29 May 1994 : VITERBO, ITALY 930594

THE PINEAL GLAND AND ITS HORMONES: FUNDAMENTALS AND CLINICAL PERSPECTIVES

Prof. F. FRASCHINI, UNIV. OF MILAN, DEPT. OF PHARMACOLOGY, VIA VANVITELLI 32, 20129 MILAN, ITALY
(fax: 39-2 718687)
7-11 Jun 1994 : ERICE, SICILY, ITALY 930743

PHYSICS AND CHEMISTRY

ELECTROWEAK PHYSICS AND THE EARLY UNIVERSE

Prof. J.C. ROMAO, I.S.T., DEPTO DE FISICA, AV. ROVISCO PAIS No.1, 1096 LISBOA CODEX, PORTUGAL
(fax: 351-1 8499242)
23-25 Mar, 1994 : SINTRA, PORTUGAL 930937

ULTIMATE LIMITS OF FABRICATION AND MEASUREMENT

Dr. M.E. WELLAND, UNIV. OF CAMBRIDGE, ENGINEERING DEPT., TRUMPINGTON ST., CAMBRIDGE CB2 1PZ, UK
(fax: 44-223 332662)
1-3 Apr 1994 : CAMBRIDGE, UK (NANO) 930837

OVERTONE SPECTROSCOPY AND DYNAMICS

Dr. H. HERMAN, LAB. DE CHIMIE PHYSIQUE MOLECULAIRE, CP160, U.L.B. 50 AV. F.D. ROOSEVELT, 1050 BRUSSELS, BELGIUM (fax: 32-2 650 4232)
11-15 Apr 1994 : HAN-SUR-LESSE, BELGIUM 930960

TRANSITION METAL IONS IN SUPRAMOLECULAR CHEMISTRY

Prof. L. FABBRIZZI, UNIV. DI PAVIA, DIPTO DI CHIMICA GENERALE, V. TARAMELLI 12, 27100 PAVIALI 12, ITALY
(fax: 39-382 528544)
14-16 Apr 1994 : S.MARGHERITA LIGURE, ITALY (CHEM) 921453

FLASH REACTION PROCESSES

Dr. T.W. DAVIES, UNIV. OF EXETER, SCHOOL OF ENGINEERING, NORTH PARK ROAD, EXETER EX4 4QF, UK
(fax: 44-392 217965)
6-9 May 1994 : ANTALYA, TURKEY 931108

MOLECULAR ENGINEERING FOR ADVANCED MATERIALS

Prof. J. BECHER, ODENSE UNIV., DEPT OF CHEMISTRY, CAMPUSVEJ 55, DK-5230 ODENSE M., DENMARK
(fax: 45-66 158780)
7-11 May 1994 : DENMARK (CHEM) 931034

MESOSCOPIC SUPERCONDUCTORS

Prof. G. SCHON, UNIV. KARLSRUHE, INST F. THEORETISCHE FESTKORPERPHYSIK, ENGESSERSTR. 7, 7500 KARLSRUHE 1, GERMANY (fax: 49-0721 69 81 50)
24-28 May 1994 : KARLSRUHE, GERMANY (NANO) 931611

SCANNING PROBE MICROSCOPIES AND MOLECULAR MATERIALS

Dr. J.P. RABE, UNIV. OF MAINZ, MPI F. POLYMERFORSCHUNG, PF 3148, W-6500 MAINZ, GERMANY (fax: 49-6131 379 100)
29 May-3 Jun 1994 : TEGERNSEE, GERMANY (NANO) 921417

NUCLEAR MAGNETIC RESONANCE OF PARAMAGNETIC MACROMOLECULES

Prof. G.N. LA MAR, UNIV. OF CALIFORNIA AT DAVIS, DEPT OF CHEMISTRY, DAVIS, CA 95616, USA (fax: 1-916 752 8995)
5-8 Jun 1994 : SINTRA, PORTUGAL (CHEM) 931580

SUBMICRON QUANTUM DYNAMICS

Dr. H. CERDEIRA, I.C.T.P., STRADA COSTIERA 11, 34100 TRIESTE, ITALY (fax: 39-40 224531)
13 Jun-1 Jul 1994 : TRIESTE, ITALY (NANO) 931592

SCIENCE AND TECHNOLOGY OF ELECTROCEAMIC THIN FILMS

Prof. O. AUCIELLO, MICROELECTRONICS CTR. OF N. CAROLINA, 3021 CORNWALLIS RD., RESEARCH TRIANGLE PARK, NC 27709-2889, USA (fax: 1919 248 1455)
20-24 Jun 1994 : VILLA DEL MARE, ITALY 931106

SCIENCE AND TECHNOLOGY/RAPID SOLIDIFICATION AND PROCESSING TECHNOLOGIES

Dr. M.A. OTOONI, USAAR, ARMAMENT ENG. DIRECTORATE, PICATINNY ARSENAL, DOVER, NJ 07806-5001, USA
(fax: 1-201 724 4600)
21-24 Jun 1994 : WEST POINT, NY, USA (DISRM) 930050

QUANTUM TUNNELING OF THE MAGNETIZATION

Dr. B. BARBARA, CNRS, LABORATOIRE L. NEEL/BP 166 CEDEX 09, 38042 GRENOBLE, FRANCE (fax: 33-76 88 11 91)
26 Jun-2 Jul 1994 : GRENOBLE, FRANCE (NANO) 931612

HOT HADRONIC MATTER: THEORY AND EXPERIMENT

Prof. J. RAFELSKI, UNIV. OF ARIZONA AT TUCSON, DEPARTMENT OF PHYSICS, TUCSON, AZ 85721, USA
(fax: 1-602 621 4657)
27 Jun-1 Jul 1994 : DIVONNES, FRANCE 930602

THE SYNERGY BETWEEN DYNAMICS AND REACTIVITY AT CLUSTERS AND SURFACES

Dr. L.J. FARRUGIA, UNIV. OF GLASGOW, DEPT OF CHEMISTRY, GLASGOW, G12 8QQ, SCOTLAND, UK
(fax: 44-41 330 4888)
3-8 Jul 1994 : GLASGOW, UK 930801

ADVANCED RESEARCH WORKSHOPS (continued)

APPLICATIONS OF ORGANOMETALLIC CHEMISTRY IN THE PREPARATION AND PROCESSING OF ADVANCED MATERIALS

Prof. J.F. HARROD, MCGILL UNIV., DEPT. OF CHEM., 801 SHERBROOKE ST. W., MONTREAL H3A 2K6, CANADA (fax: 1-514 398 3797)
28 Aug-1 Sep 1994 : CAP D'AGDE, FRANCE 931103

PHOTONS AND LOCAL PROBES

Dr. O. MARTI, UNIVERSITAT KONSTANZ, FAKULTAT FUR PHYSIK, 78434 KONSTANZ, GERMANY (fax: 49-7531 883072)
11-17 Sep 1994 : INSEL REICHENAU, GERMANY (NANO) 931589

SUPRAMOLECULAR STEREOCHEMISTRY

Prof. J.S. SIEGEL, UNIV. OF CAL. SAN DIEGO, DPT. OF CHEMISTRY, B-014, SAN DIEGO-LA JOLLA, CA 92093-0314, USA (fax: 1-619 534-7244)
15-19 Sep 1994 : REYKJAVIK, ICELAND (CHEM) 931583

ASTRONOMY AND ASTROPHYSICS

THE OPACITY OF SPIRAL DISKS

Dr. J.I. DAVIES, UNIV. COLLEGE, DEPT OF PHYSICS & ASTRONOMY, PO BOX 913, CARDIFF CF2 3YB, UK (fax: 44-222 874056)
24-28 Jul 1994 : CARDIFF, UK 931116

COMPUTERS AND SYSTEMS SCIENCE

HYDROINFORMATICS

Dr. H.J. VAN ZUYLEN, DELFT HYDRAULICS, POB 177, 2600 MH DELFT, THE NETHERLANDS (fax: 31-15 619674)
11-13 Apr 1994 : PUTTEN, THE NETHERLANDS (HTECH) 931649

EMERGENT COMPUTING METHODS IN ENGINEERING DESIGN

Prof. D.E. GRIERSON, UNIV. OF WATERLOO, CIVIL ENGINEERING DEPT, WATERLOO, ONTARIO N2L 3G1, CANADA (fax: 1-519 888 6197)
10-15 Jul 1994 : WEST POINT, NY, USA 931124

APPLIED SCIENCES AND ENGINEERING

PLUTONIUM FUTURES

Dr. R.L. GARWIN, T.J. WATSON RESEARCH CENTER, PO BOX 218, YORKTOWN HEIGHTS, NY 1059-0218, USA (fax: 1-914 945 4419)
24-25 Jan 1994 : LONDON, UK (DISRM) 931673

ADVANCES IN CERAMICS MULTI-CHIP MODULES (MCM) AND HIGH PERFORMANCE ELECTRONIC MATERIALS

Dr. K JONES, FLORIDA INTERNATIONAL UNIV., MECHANICAL ENG. DEPT., UNIVERSITY PARK CAMPUS, MIAMI, FL 33199, USA (fax: 1-305 348 1932)
15-18 Feb 1994 : MIAMI, FLORIDA, USA (HTECH) 931674

COGNITIVE ASPECTS OF HUMAN-COMPUTER INTERACTION FOR GEOGRAPHIC INFORMATION SYSTEMS

Dr. T.L. NYERGES, UNIV. OF WASHINGTON AT SEATTLE, DEPT OF GEOGRAPHY, SEATTLE, WA 98195, USA (fax: 1-206 543 3313)
21-25 Mar 1994 : PALMA DE MALLORCA, SPAIN 931121

GENESIS AND PROPERTIES OF COLLAPSIBLE SOILS

Prof. E. DERBYSHIRE, UNIV. OF LONDON, ROYAL HOLLOWAY COLLEGE, DEPT. OF GEOGRAPHY, EGHAM, SURREY TW20 OEX, UK (fax: 44-273 748 919)
11-13 Apr 1994 : LOUGHBOROUGH, UK 931148

WIDE BAND-GAP ELECTRONIC MATERIALS

Prof. M.A. PRELAS, UNIV. MISSOURI AT COLUMBIA, ENGINEERING BUILDING EAST, COLUMBIA, MO 65211, USA (fax: 1-314 884 4801)
2-4 May 1994 : MINSK, BELARUS (HTECH) 931621

THE MODELLING OF MICROSTRUCTURE AND ITS POTENTIAL FOR STUDYING TRANSPORT PROPERTIES AND DURABILITY

Prof. H. JENNINGS, NORTHWESTERN UNIV., DEPT OF CIVIL ENG., 2145 SHERIDAN RD, EVANSTON, IL 60208, USA (fax: 1-708 491 4800)
11-13 Jul 1994 : ST REMY-LES-CHEVREUSE, FRANCE 930629

NUCLEAR WEAPONS SAFETY AFTER THE COLD WAR: TECHNICAL AND ORGANIZATIONAL OPPORTUNITIES FOR IMPROVEMENT

Prof. S.D. SAGAN, STANFORD UNIV., POLITICAL SCIENCE DEPT, 320 GALVEZ STREET, STANFORD, CA 94305-6165, USA (fax: 1-415 723 0089)
25-27 Aug 1994 : OXFORD, UK (DISRM) 931669

AQUEOUS ORGANOMETALLIC CHEMISTRY AND CATALYSIS

Dr. I.T. HORVATH, CORPORATE RESEARCH LAB., RT 22 EAST, ANNANDALE, NJ 08801, USA (fax: 1-908 730 3042)
29 Aug-1 Sep 1994 : DEBRECEN, HUNGARY (HTECH) 931348

ENVIRONMENTAL SCIENCES

ATMOSPHERIC NUCLEAR TESTS: ENVIRONMENTAL AND HUMAN CONSEQUENCES

Prof. C.S. SHAPIRO, SAN FRANCISCO STATE UNIV., DEPT OF PHYSICS, SAN FRANCISCO, CA 94132, USA (fax: 1-415 338 2178)
10-14 Jan 1994 : VIENNA, AUSTRIA (ENVIR) 931343

CLIMATIC VARIATIONS AND FORCING MECHANISMS OF THE LAST 2000 YEARS

Prof. R.S. BRADLEY, UNIV. OF MASSACHUSETTS, DEPT. OF GEOLOGY & GEOGRAPHY, AMHERST, MA 01003, USA (fax: 1-413 545 1200)
March 1994 : IL CIOCCO, ITALY (SGEC) 930110

CLOUDS

Prof. P. CRUTZEN, MPI F. CHEMIE DER ATMOSPHERE, AIRCHEMISTRY DEPT, POSTFACH 3060, 6500 MAINZ, GERMANY (fax: 49-6131 305 436)
March 1994 : BAVARIA, GERMANY (SGEC) 930752

DEEP WATER FISH SPECIES OF THE ATLANTIC OCEANIC RIM

Mr. J.E. TUMILTY, SEA FISH INDUSTRY AUTHORITY, SEAFISH HOUSE, ST. ANDREW'S DOCK, HULL, HU3 4QE, UK (fax: 44-482 223310)
1-4 Mar 1994 : HULL, UK 921075

SUSTAINABILITY OF IRRIGATED AGRICULTURE

Prof. L.S. PEREIRA, UNIVERSITA TECNICA, DEPT OF AGRICULTURAL ENG., TAPADA DA AJUDA 1399, LISBOA CODEX, PORTUGAL (fax: 351-1 3635031)
21-26 Mar 1994 : LISBON, PORTUGAL 931101

REMEDIATION AND MANAGEMENT OF DEGRADED RIVER BASINS WITH EMPHASIS ON CENTRAL AND EASTERN EUROPE

Prof. V. NOVOTNY, MARQUETTE UNIV., ENVIRONMENTAL & WATER RESOURCES ENG., MILWAUKEE, WI 53233, USA (fax: 1-414 288 7082)
May 1994 : LAXENBURG, AUSTRIA (ENVIR) 931643

CRITICAL SCIENTIFIC ISSUES OF THE ARAL SEA PROBLEM: STATE OF KNOWLEDGE AND FUTURE RESEARCH NEEDS

Prof. P.P. MICKLIN, WESTERN MICHIGAN UNIV., GEOGRAPHY DEPT, KALAMAZOO, MI 49008, USA (fax: 1-616 387 0958)
2-5 May 1994 : TASHKENT, UZBEKISTAN (ENVIR) 931625

OCEAN CONTINENT LITHOSPHERE BOUNDARY

Prof. E. BANDA, C.S.I.C., INST. OF EARTH SCIENCES, MARTI I FRANQUES, S/N, 08028 BARCELONA, SPAIN (fax: 34-3 41100 12)
11-15 May 1994 : MAJORCA, SPAIN 931114

THE EDUCATION AND TRAINING OF GLOBAL ENVIRONMENTAL CHANGE SCIENTISTS

Prof. D. WADDINGTON, UNIV. OF YORK, DEPARTMENT OF CHEMISTRY, HESLINGTON, YORK, Y01 5DD, UK (fax: 44-904 432605)
28 May-1 Jun 1994 : IL CIOCCO, ITALY (SGEC) 931676

ATMOSPHERIC OZONE AS A CLIMATE GAS

Prof. W.C. WANG, STATE UNIV. OF NEW YORK AT ALBANY, ATMOSPHERIC RESEARCH CENTER, 100 FULLER ROAD, ALBANY, NY, USA (fax: 1-518 442 3360)
19-23 Jun 1994 : LILLEHAMMER, NORWAY (SGEC) 931610

CLIMATE SENSITIVITY TO RADIATIVE PERTURBATIONS: PHYSICAL MECHANISMS AND VALIDATION

Dr. H. L.E. TREUT, ENS, LAB DE METEOROLOGIE DYNAMIQUE, 24 RUE LHOMOND, 75231 PARIS CEDEX 05, FRANCE (fax: 33-1 4336 8392)
11-15 Jul 1994 : PARIS FRANCE (SGEC) 930805

PROSPECTS FOR CARBON SEQUESTRATION IN THE BIOSPHERE

Dr. O.W. HEAL, INST OF TERRESTRIAL ECOLOGY, EDINBURGH RESEARCH STATION, PENICUIK, MIDLOTHIAN EH26 OQB, UK (fax: 44-31 445 5719)
18-22 Jul 1994 : EDINBURGH, UK (SGEC) 920524

THE EFFECTS OF THE MT. PINATUBO ERUPTION ON THE ATMOSPHERE AND CLIMATE

Prof. G. FIOCCO, UNIV. "LA SAPIENZA", DIPTO DI FISICA, PIAZZALE ALDO MORO 2, 00185 ROMA, ITALY (fax: 39-6 4463158)
September 1994 : ROME, ITALY (SGEC) 931653

THE ROLE OF GLOBAL FOREST ECOSYSTEMS AND FOREST RESOURCE MANAGEMENT IN THE GLOBAL CARBON CYCLE

Dr. M.J. APPS, NORTHERN FORESTRY CENTRE, 5320 - 122 STREET, EDMONTON, ALBERTA T6H 3S5, CANADA (fax: 1-403 435 7359)
12-16 Sep 1994 : BANFF, CANADA (SGEC) 930721

THIRD MILLENNIUM CLIMATE CHANGE AND THE OLD WORLD SOCIAL COLLAPSE

Dr. G. KUKLA, COLUMBIA UNIV., LAMONT-DOHERTY GEOLOGICAL OBSERVATORY, PALISADES, NY 10964, USA (fax: 1-914 365 8154)
19-24 Sep 1994 : ANTALYA, TURKEY (SGEC) 931587

THE ECONOMICS OF ATMOSPHERIC POLLUTION, APPLIED MODELS AND IMPLICATIONS FOR INTERNATIONAL POLICY MAKING

Dr. E.C. VAN IERLAND, WAGENINGEN AGRICULTURAL UNIV., DEPT OF GENERAL ECONOMICS, POB 8130, 6700 EW WAGENINGEN, NETHERLANDS (fax: 318370 84763)
16-18 Nov 1994 : WAGENINGEN, NETHERLANDS (ENVIR) 931607

SOCIAL AND BEHAVIOURAL SCIENCES

THE SELF IN EUROPEAN AND NORTH AMERICAN CULTURE: DEVELOPMENT AND PROCESSES

Dr. A. OOSTERWEGEL, UNIV. OF AMSTERDAM, DEPT OF DEVELOPMENTAL PSYCHOLOGY, ROETERSSTRAAT 15, 1018 WB AMSTERDAM, NETHERLANDS (fax: 31-20 639 0279)
10-14 Jan 1994 : CRETE, GREECE 930614

EVERYDAY CONCEPTIONS OF EMOTION

Prof. J.A. RUSSELL, UNIV. OF BRITISH COLUMBIA, DEPT. OF PSYCHOLOGY, VANCOUVER, B.C., CANADA V6T 1Z4 (fax: 1-604 822 6329)
1-6 May 1994 : ALMAGRO, SPAIN 931095

STRESS AND COMMUNITIES

Prof. S.E. HOBFOLL, KENT STATE UNIV., APPLIED PSYCHOLOGY CENTRE, KENT, OH 44242, USA (fax: 1-216 672 3786)
15-18 Jun 1994 : BONAS, FRANCE 930527

SCIENTIFIC UNCERTAINTY AND ITS INFLUENCE ON THE PUBLIC COMMUNICATIONS PROCESS

Dr. M. LUM, CDC/ATSDR, DIV. OF HEALTH EDUCATION, 1600 CLIFTON ROAD MS E-33, ATLANTA, GA 30333, USA (fax: 1-404 639 6207)
8-10 Sep 1994 : BUDAPEST, HUNGARY 931149

HUMAN RESOURCES AND LEADERSHIP FOR TECHNOLOGY TRANSFER IN AND TO AND FROM COOPERATION PARTNER COUNTRIES

Dr. G. BUGLIARELLO, POLYTECHNIC UNIV., BROOKLYN. 6 METROTECH CENTER, BROOKLYN, NY 11201, USA (fax: 1-718 260 3755)
June 1994 : ANKARA, TURKEY (HUMRS) 931568

THE PROBLEMS AND PROSPECTS FOR THE UPGRADING OF SCIENCE AND TECHNOLOGY IN THE CENTRAL ASIAN REPUBLICS OF THE FORMER USSR

Prof. A. CAGLAR, HACETEPE UNIV., FACULTY OF ENGINEERING, BEYTEPE ANKARA 06532, TURKEY (fax: 90-312 235 2575)
11-14 Oct 1994 : ANKARA, TURKEY (HUMRS) 931684

MARKETING OF HIGH-TECH KNOWHOW

Dr. Y.M. RABKIN, UNIVERSITE DE MONTREAL, DEPT D'HISTOIRE, C.P. 6128, SUCC. "A", MONTREAL H3C 3J7, CANADA (fax: 1-514 345 9704)
27 Jun-1 Jul 1994 : ST PETERSBURG, RUSSIA (HUMRS) 931690

Note: DISRM, HTECH, ENVIR, HUMRS indicate meetings supported under the Priority Areas on Disarmament Technologies; High Technology; Environment; and Human Resources/Science and Technology Policy. CHEM, COP, NANO, SGEC indicate meetings sponsored by the Special Programmes on Supramolecular Chemistry; Chaos, Order and Patterns, Aspects of Nonlinearity; Nanoscale Science; and the Science of Global Environmental Change.

Further information on a particular meeting should be obtained from the meeting director named above. Further information on the NATO Science Programme may be obtained from:

Scientific Affairs Division (Ref. 94/1)
NATO, B-1110 Brussels, Belgium