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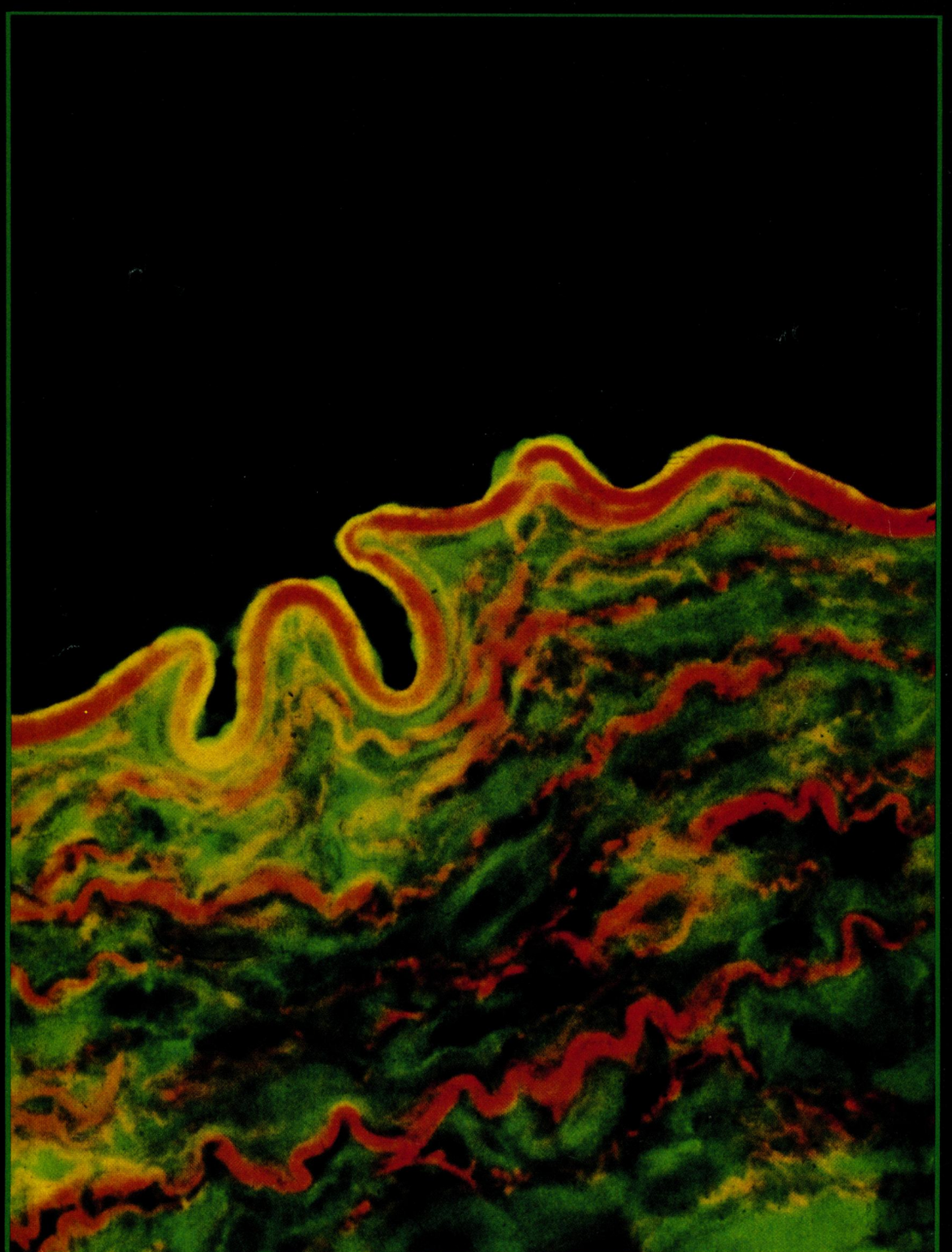
SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



AAAS Chautauqua Short Courses

The AAAS Office of Science Education announces the schedules of the 1980-81 Chautauqua Short Courses.

For college teachers: Fifty-four short courses will be held at twelve Regional Field Centers throughout the United States.

For nonacademic scientists and engineers: Ten short courses — at the Polytechnic Institute of New York and the Oregon Graduate Center — will be open to a mixed audience of college teachers and nonacademic professionals in science and engineering.

For further information (course descriptions, applications, etc.) please write or call:

American Association for the Advancement of Science
Office of Science Education
1776 Massachusetts Avenue, N.W.
Washington, D.C. 20036
(202)467-4465

Field Centers

WESTERN CIRCUIT

OGC—Oregon Graduate Center for Study and Research, Nicholas G. Eror, Department of Materials Science, 19600 N.W. Walker Road, Beaverton, Oregon 97005. Tel: (503) 645-1121.

ANA—Santa Ana College, David Dobos, Division of Social Science, 17th at Bristol, Santa Ana, California 92706. Tel: (714) 835-3000, ext. 475.

UUT—University of Utah, E. Allan Davis, Department of Mathematics, Salt Lake City, Utah 84112. Tel: (801)581-5809.

TXA—University of Texas at Austin, James P. Barufaldi, Science Education Center, EDB 340, Austin, Texas 78712. Tel: (512)471-7354.

CENTRAL CIRCUIT

UIA—University of Iowa, Robert E. Yager, Science Education Center, 450 Physics Building, Iowa City, Iowa 52240. Tel: (319)353-3600.

Satellite Centers:

NDK—University of North Dakota, Grand Forks

NMX—University of New Mexico, Albuquerque

Applications for courses at the satellite centers should be sent to Dr. Robert Yager at the University of Iowa field center.

PAR—Parkland College, Susan G. Kelley, 2400 W. Bradley Avenue, Champaign, Illinois 61820. Tel: (217)351-2465.

DAY—University of Dayton, George K. Miner, Chautauqua Field Center, Department of Physics, University of Dayton, Dayton, Ohio 45469. Tel: (513)229-2327.

CBC—Christian Brothers College, John Edward Doody, Division of Science and Mathematics, 650 East Parkway South, Memphis, Tennessee 38104. Tel: (901)278-0100, ext. 290.

EASTERN CIRCUIT

UGA—University of Georgia, W.R. Zeitler, Department of Science Education, Athens, Georgia 30602. Tel: (404)542-1763.

TEM—Temple University, Leonard Muldawer, Department of Physics, Philadelphia, Pennsylvania 19122. Tel: (215)787-7668.

POL—Polytechnic Institute of New York, Bernard J. Bulkin, Polytechnic/Westchester, 456 North Street, White Plains, New York 10605. Tel: (914)949-1775.

HAM—Hampshire College, Arthur H. Westing, School of Natural Science, Amherst, Massachusetts 01002. Tel: (413)549-4600, ext. 372 or 524.

	WESTERN CIRCUIT	OGC	ANA	UUT	TXA
1.	**Historical Foundations of Modern Science** **DUANE H. D. ROLLER, University of Oklahoma**				**20-21 Nov** **5- 6 Mar**
4.	Cosmology: The Origin, Evolution and Future of the Universe DAVID N. SCHRAMM, University of Chicago	20-21 Oct 26-27 Mar		16-17 Oct 23-24 Mar	
5.	**Cosmology: Man's Place in the Universe** **VIRGINIA TRIMBLE, University of California, Irvine, and University of Maryland**		**20-21 Oct** **16-17 Mar**		
6.	How Life Began on Earth SIDNEY FOX, University of Miami	10-11 Nov 30-31 Mar	13-14 Nov 2- 3 Apr		
10.	**Advances in Coherent Optical Science and Engineering** **BRIAN THOMPSON, University of Rochester**	**24-25 Nov** **9-10 Mar**			
13.	Life in the Oceans EUGENIE CLARK, University of Maryland				10-11 Nov 23-24 Feb
16.	**Solar Energy Conversion by Green Plants** **BERT G. DRAKE, Smithsonian Radiation Biology Laboratory**			**13-14 Nov** **16-17 Mar**	
18.	Recent Advances in Genetics and Fetal Development: Biological and Social Implications ELIZABETH KUTTER, Evergreen State College and JANE A. B. RAIBLE, Northwest Institute for Ethics and Life Sciences	30-31 Oct 26-27 Feb		23-24 Oct 5- 6 Mar	
19.	**Immunobiology: Evolutionary, Developmental and Molecular Perspectives** **RICHARD GOLDSBY, University of Maryland**			**20-21 Oct** **12-13 Mar**	
20.	Frontiers of Neurosciences ROBERT LIVINGSTON and ELISABETH J. STERN, University of California, San Diego	13-14 Nov 12-13 Mar		27-28 Oct 9-10 Mar	
21.	**Mechanisms of Drug Action** **PHILIP C. HOFFMANN, University of Chicago**		**17-18 Nov** **30-31 Mar**		**13-14 Nov** **26-27 Mar**
22.	Genetic and Environmental Determinants of Behavior ISRAEL GOLDIAMOND and PAUL ANDRONIS, University of Chicago		27-28 Oct 5- 6 Mar		
23.	**Mathematical Modeling in the Biological Sciences** **H.T. BANKS, Brown University**				**3- 4 Nov** **12-13 Mar**
24.	Combinatorial Problem-Solving in the Mathematical Sciences ALAN TUCKER, SUNY, Stony Brook		10-11 Nov 19-20 Mar		
26.	**Strategies for Increasing the Participation of Women in Mathematics-Related Fields** **LENORE BLUM, Mills College and RUTH AFFLACK, California State University, Long Beach**	**23-24 Oct** **2- 3 Mar**			
28.	Risk-Benefit Analysis CHRIS WHIPPLE, Electric Power Research Institute	3- 4 Nov 16-17 Mar		6- 7 Nov 19-20 Mar	
31.	***Soft Energy Paths: How to Enjoy the Inevitable** **AMORY LOVINS and L. HUNTER LOVINS, Friends of the Earth**		**20-22 Nov**		
32.	Alternative Fuels from an Engineering Perspective REGINALD VACHON, Vachon, Nix and Associates, JOHN GOODLING, Auburn University, and JEFFREY MOREHOUSE, Science Applications, Inc	27-28 Oct 19-20 Mar			30-31 Oct 16-17 Mar
33.	**Energy and Society: Concepts and Teaching Strategies** **MICHAEL FIASCA and GEORGE TSONGAS, Portland State University**			**17-18 Nov** **30-31 Mar**	
37.	Walter Pollution DAVID KIDD, University of New Mexico		24-25 Nov 2- 3 Mar		16-17 Oct 9-10 Mar
38.	**Science, the Media, and the Public** **SHARON DUNWOODY, Ohio State University, and CAROL ROGERS, Office of Public Information, AAAS**				**24-25 Nov** **19-20 Mar**
39.	Public Affairs Television and Contemporary Politics MICHAEL ROBINSON, George Washington University	20-21 Nov 23-24 Mar			
40.	**Elections: Presidential and Congressional** **ARTHUR H. MILLER, University of Michigan**			**10-11 Nov** **26-27 Feb**	
41.	*Community Power Studies NELSON POLSBY, University of California, Berkeley				2- 4 Apr
43.	**The Changing American Family** **FRANK FURSTENBERG, University of Pennsylvania, and GRAHAM SPANIER, Pennsylvania State University**		**16-17 Oct** **9-10 Mar**		
44.	Aging, Family, and Bureaucracy MARVIN SUSSMAN, University of Delaware			20-21 Nov 2- 3 Apr	17-18 Nov 30-31 Mar
45.	**Psychology of the Female Experience** **SHARON LORD, University of Tennessee**			**30-31 Oct** **23-24 Feb**	
48.	Cognition and Teaching RUTH DAY, Duke University	16-17 Oct 5- 6 Mar			
51.	**Computers as an Aid in Learning Science** **ALFRED M. BORK, University of California, Irvine**				**6- 7 Nov** **23-24 Mar**
52a.	Introduction to Microcomputers and Microprocessors ROGER CAMP, Iowa State University		3- 4 Nov 23-24 Mar		
52b.	**Introduction to Microcomputers and Microprocessors** **ROGER CAMP, Iowa State University**		**6- 7 Nov** **26-27 Mar**		

☐Nonacademic extension courses. *Course meets for single session only.

(Continued on page 542)

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SCIENCE

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AN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

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

Immunofluorescent micrograph of rabbit iliac artery 30 minutes after endothelial removal. Indirect immunofluorescence was used to demonstrate platelet factor 4 antigen in the adhering platelets and in the vessel wall (about ×2000). See page 611 [I. D. Goldberg *et al.*, Beth Israel Hospital, Boston, Massachusetts]

CENTRAL CIRCUIT

		UIA and Satellites‡	PAR	DAY	CBC
1.	**Historical Foundations of Modern Science** **DUANE H. D. ROLLER, University of Oklahoma**	**16-17 Oct** **2- 3 Apr**			
2.	The Personalities of 20th Century Physics: Their Interactions and Struggles MAX DRESDEN, SUNY, Stony Brook			13-14 Nov 26-27 Feb	
3.	**The Theory of Relativity** **ROBERT BREHME, Wake Forest University**		**16-17 Oct** **23-24 Mar**		**20-21 Oct** **26-27 Mar**
7.	The Evolution of Life on Dynamic Earth JAMES VALENTINE, University of California, Santa Barbara	27-28 Oct 23-24 Feb			
8.	**Recent Investigations of the Upper Atmosphere** **JULIUS LONDON, University of Colorado**			**3- 4 Nov** **5- 6 Mar**	
9.	Remote Sensing of the Earth STEPHEN UNGAR, NASA, Goddard Institute for Space Studies and SAMUEL GOWARD, Columbia University	24-25 Nov 30-31 Mar			
12.	***Chemical Oceanography** **CONRAD CHEEK, U.S. Naval Research Laboratory**				**6- 8 Apr** *
14.	Ecology of Terrestrial Microcommunities DANIEL DINDAL, SUNY College of Environmental Science and Forestry	20-21 Nov 23-24 Mar		17-18 Nov 26-27 Mar	
16.	**Solar Energy Conversion by Green Plants** **BERT G. DRAKE, Smithsonian Radiation Biology Laboratory**		**10-11 Nov** **12-13 Mar**		
17.	Reproduction in Mammals C. ALEX SHIVERS, University of Tennessee	3- 4 Nov 26-27 Feb			13-14 Nov 23-24 Feb
19.	**Immunobiology: Evolutionary, Developmental and Molecular Perspectives** **RICHARD GOLDSBY, University of Maryland**			**16-17 Oct** **9-10 Mar**	
20.	Frontiers of Neurosciences ROBERT LIVINGSTON and ELISABETH J. STERN University of California, San Diego	23-24 Oct 5- 6 Mar			
22.	**Genetic and Environmental Determinants of Behavior** **ISRAEL GOLDIAMOND and PAUL ANDRONIS, University of Chicago**		**13-14 Nov** **26-27 Mar**		
24.	Combinatorial Problem-Solving in the Mathematical Sciences ALAN TUCKER, SUNY, Stony Brook		6- 7 Nov 16-17 Mar		
27.	***Numerical Solution of Nonlinear Equations and Optimization Problems** **RICHARD TAPIA, Rice University**	**‡NMX:** **20-22 Nov***			
29.	New Uncertainties in Macroeconomics LAWRENCE SUMMERS, MIT				30-31 Oct 5- 6 Mar
31.	***Soft Energy Paths: How to Enjoy the Inevitable** **AMORY LOVINS and L. HUNTER LOVINS, Friends of the Earth**		**30 Oct -** **1 Nov ***		
34.	Food, Energy, and Society DAVID PIMENTEL, Cornell University			10-11 Nov 23-24 Feb	
35.	**Technology and Humanism in Meeting World Food Needs** **LLOYD SLATER, Aspen Institute for Humanistic Studies**		**20-21 Oct** **9-10 Mar**		**23-24 Oct** **12-13 Mar**
37.	Water Pollution DAVID KIDD, University of New Mexico		23-24 Oct 30-31 Mar		27-28 Oct 2- 3 Apr
38.	**Science, the Media, and the Public** **SHARON DUNWOODY, Ohio State University, and** **CAROL ROGERS, Office of Public Information, AAAS**			**20-21 Nov** **16-17 Mar**	
39.	Public Affairs Television and Contemporary Politics MICHAEL ROBINSON, George Washington University		17-18 Nov 19-20 Mar		
40.	**Elections: Presidential and Congressional** **ARTHUR H. MILLER, University of Michigan**			**24-25 Nov** **23-24 Mar**	
42.	The 1980 Census in the Undergraduate Classroom DUDLEY L. POSTON, JR., University of Texas	6- 7 Nov 19-20 Mar		30-31 Oct 12-13 Mar	3- 4 Nov 16-17 Mar
45.	**Psychology of the Female Experience** **SHARON LORD, University of Tennessee**		**27-28 Oct** **26-27 Feb**		
46.	Linguistics: Current Issues in the Theory of Grammar WAYNE O'NEIL, MIT	13-14 Nov 26-27 Mar			10-11 Nov 23-24 Mar
47.	**Psychology of Problem Solving** **JAMES GREENO, University of Pittsburgh**	**20-21 Oct** **16-17 Mar**			**16-17 Oct** **19-20 Mar**
48.	Cognition and Teaching RUTH DAY, Duke University		3- 4 Nov 2- 3 Apr		
49.	**Calculus for Non-Majors in the Physical Sciences** **ROBERT ROSENBAUM, Wesleyan University**			**23-24 Oct** **19-20 Mar**	
50.	The Handicapped Student in Science MARTHA ROSS REDDEN, Office of Opportunities in Science, AAAS				17-18 Nov 9-10 Mar
54.	**Microcomputers in the Laboratory** **ROBERT TINKER, Technical Education Research Centers**	**‡NDK:** **16-17 Oct** **2- 3 Apr**		**20-21 Oct** **30-31 Mar**	

‡Courses 27 and 54 at satellite centers. *Course meets for single session only.

EASTERN CIRCUIT

		UGA	TEM	POL	HAM
2.	**The Personalities of 20th Century Physics: Their Interactions and Struggles** **MAX DRESDEN, SUNY, Stony Brook**		**10-11 Nov** **23-24 Feb**		
5.	Cosmology: Man's Place in the Universe VIRGINIA TRIMBLE, University of California, Irvine, and University of Maryland		23-24 Oct 19-20 Mar		
7.	**The Evolution of Life on Dynamic Earth** **JAMES VALENTINE, University of California, Santa Barbara**		**30-31 Oct** **26-27 Feb**		
8.	Recent Investigations of the Upper Atmosphere JULIUS LONDON, University of Colorado				6- 7 Nov 9-10 Mar
9.	**Remote Sensing of the Earth** **STEPHEN UNGAR, NASA, Goddard Institute for Space Studies, and SAMUEL GOWARD, Columbia University**			**10-11 Nov** **16-17 Mar**	
10.	Advances in Coherent Optical Science and Engineering BRIAN THOMPSON, University of Rochester			17-18 Nov 12-13 Mar	
11.	**Modern Chemical Dynamics** **LEONARD SPICER, University of Utah**	**20-21 Oct** **23-24 Feb**			**23-24 Oct** **26-27 Feb**
12.	*Chemical Oceanography CONRAD CHEEK, U.S. Naval Research Laboratory			25-27 Mar	
14.	**Ecology of Terrestrial Microcommunities** **DANIEL DINDAL, SUNY College of Environmental Science and Forestry**				**13-14 Nov** **19-20 Mar**
15.	Ecology and Evolution in the Tropics JOHN KRICHER, Wheaton College	Δ 17-18 Nov Δ 30-31 Mar			20-21 Nov 2- 3 Apr
17.	**Reproduction in Mammals** **C. ALEX SHIVERS, University of Tennessee**		**24-25 Nov** **12-13 Mar**		
19.	Immunobiology: Evolutionary, Developmental and Molecular Perspectives RICHARD GOLDSBY, University of Maryland	23-24 Oct 16-17 Mar		30-31 Oct 19-20 Mar	
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22.	Genetic and Environmental Determinants of Behavior ISRAEL GOLDIAMOND and PAUL ANDRONIS, University of Chicago	24-25 Nov 2- 3 Apr			
23.	**Mathematical Modeling in the Biological Sciences** **H.T. BANKS, Brown University**			**13-14 Nov** **30-31 Mar**	
25.	Advances in Statistics: Exploratory Data Analysis, Robust Methods, Log-Linear Models GARY SIMON, SUNY, Stony Brook	13-14 Nov 5- 6 Mar		3- 4 Nov 23-24 Mar	
26.	**Strategies for Increasing the Participation of Women in Mathematics-Related Fields** **LENORE BLUM, Mills College, and RUTH AFFLACK, California State University, Long Beach**				**20-21 Oct** **5- 6 Mar**
29.	New Uncertainties in Macroeconomics LAWRENCE SUMMERS, MIT		27-28 Oct 2- 3 Mar		
30.	**Arms Uncontrolled: Causes and Remedies of the Arms Race** **EVERETT MENDELSOHN, Harvard University**		**17-18 Nov** **26-27 Mar**		**10-11 Nov** **23-24 Mar**
33.	Energy and Society: Concepts and Teaching Strategies MICHAEL FIASCA and GEORGE TSONGAS, Portland State University			20-21 Nov 2- 3 Apr	
34.	**Food, Energy, and Society** **DAVID PIMENTEL, Cornell University**	**30-31 Oct** **26-27 Feb**			
36.	Food and Nutrition Hassles: U.S.A. KATHRYN KOLASA, Michigan State University		20-21 Nov 2- 3 Apr		17-18 Nov 30-31 Mar
40.	**Elections: Presidential and Congressional** **ARTHUR H. MILLER, University of Michigan**	**20-21 Nov** **19-20 Mar**			
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50.	**The Handicapped Student in Science** **MARTHA ROSS REDDEN, Office of Opportunities in Science, AAAS**			**6- 7 Nov** **5- 6 Mar**	
51.	Computers as an Aid in Learning Science ALFRED M. BORK, University of California, Irvine				3- 4 Nov 26-27 Mar
53.	**Microcomputer Interfacing in the Undergraduate Laboratory** **ALBERT S. WOODHULL, Hampshire College**	**3- 4 Nov** **9-10 Mar**			**27-28 Oct** **2- 3 Mar**

*Course meets for single session only. ΔBoth sessions at Ossabaw Island, Georgia. ☐ Nonacademic extension courses.

1 August 1980, Volume 209, Number 4456 **SCIENCE**

Views from Paris

A quadrennial International Geological Congress is a special scientific event. It provides a global view of the status of the earth sciences and brings together leading scientists from many countries. The Congress held this year in Paris on 7 through 17 July was also a political event. It was addressed by the President of the French Republic, Valéry Giscard d'Estaing, by the Minister for the Environment and Human Ecology, Michel d'Ornano, and by the Secretary of State for Research, Pierre Aigrain.

At the Congress there was further evidence that the earth sciences are in the midst of an exciting period. They are beneficiaries of a combination of national needs, new concepts, and powerful equipment. Many nations are experiencing acute problems of inflation, unemployment, and balance of payments. One of their hopes is to find substantial resources of petroleum, natural gas, or minerals. Thus, indigenous geologists are being accorded enhanced status in many countries. Geologists are finding that the simple model of colliding tectonic plates cannot be used to explain many phenomena. However, the concept has been fruitful and has served as a liberating stimulus. Improved methods of geophysical exploration, particularly those employing extensive computational power, have led to discoveries of petroleum and natural gas and are serving to delineate favorable prospects for future drilling. Of particular importance are offshore areas, which are expensive to explore but probably contain substantial resources. One of the highlights of the Congress was a symposium dealing with structures in the continental margins. These areas, particularly those in the North Atlantic off the coast of the United States, have been intensively explored seismically. Careful aeromagnetic surveys have been made. The four wells that were drilled by the U.S. Geological Survey in collaboration with the petroleum industry have contributed important ground truth. In such studies on both sides of the Atlantic, results from deep-sea drilling were helpful. Indeed, it was a heartwarming experience at the Congress to learn of the enthusiasm of geologists from many lands for the cooperation they had received in cruises of the drilling ship *Glomar Challenger*.

Of the three French officials who addressed the Congress, Pierre Aigrain is of special interest to American scientists. Aigrain, who is a physicist, received his doctorate from what is now Carnegie-Mellon University and later spent considerable time at Massachusetts Institute of Technology. He is regarded by those who know him as a blunt and forthright person and is well informed in the natural sciences and in technology. During his appearance at the Congress, Aigrain spoke of the renaissance that has occurred in the earth sciences and presented a thoughtful analysis of the factors contributing to the rejuvenation.

In an interview several days after his speech, Aigrain touched on aspects of French policy for science and technology. A high-level decision has been reached to increase funds for research. The target is to enhance support by 30 percent; the change will occur at the rate of 5 to 6 percent a year above inflation. Some areas will experience larger rates of increase, while support for others will not grow much. For example, Aigrain cited physics as having been unusually well supported earlier and thus not so much in need of expansion. He indicated that the earth sciences, molecular biology, and microelectronics would be among the fields favored during the next period. Aigrain indicated that some further efforts would be made in solar energy and other unconventional energy sources. However, he emphasized that France has a goal of reducing dependence on oil from 60 to 30 percent by 1990. That will be achieved, he asserted, by use of nuclear energy and imports of coal and natural gas.

The U.S. approach to support of research worked well in the past, but lately both the approach and the results seem to be deteriorating. It will be interesting to see whether the more carefully devised and forward-looking French program yields better results.—PHILIP H. ABELSON