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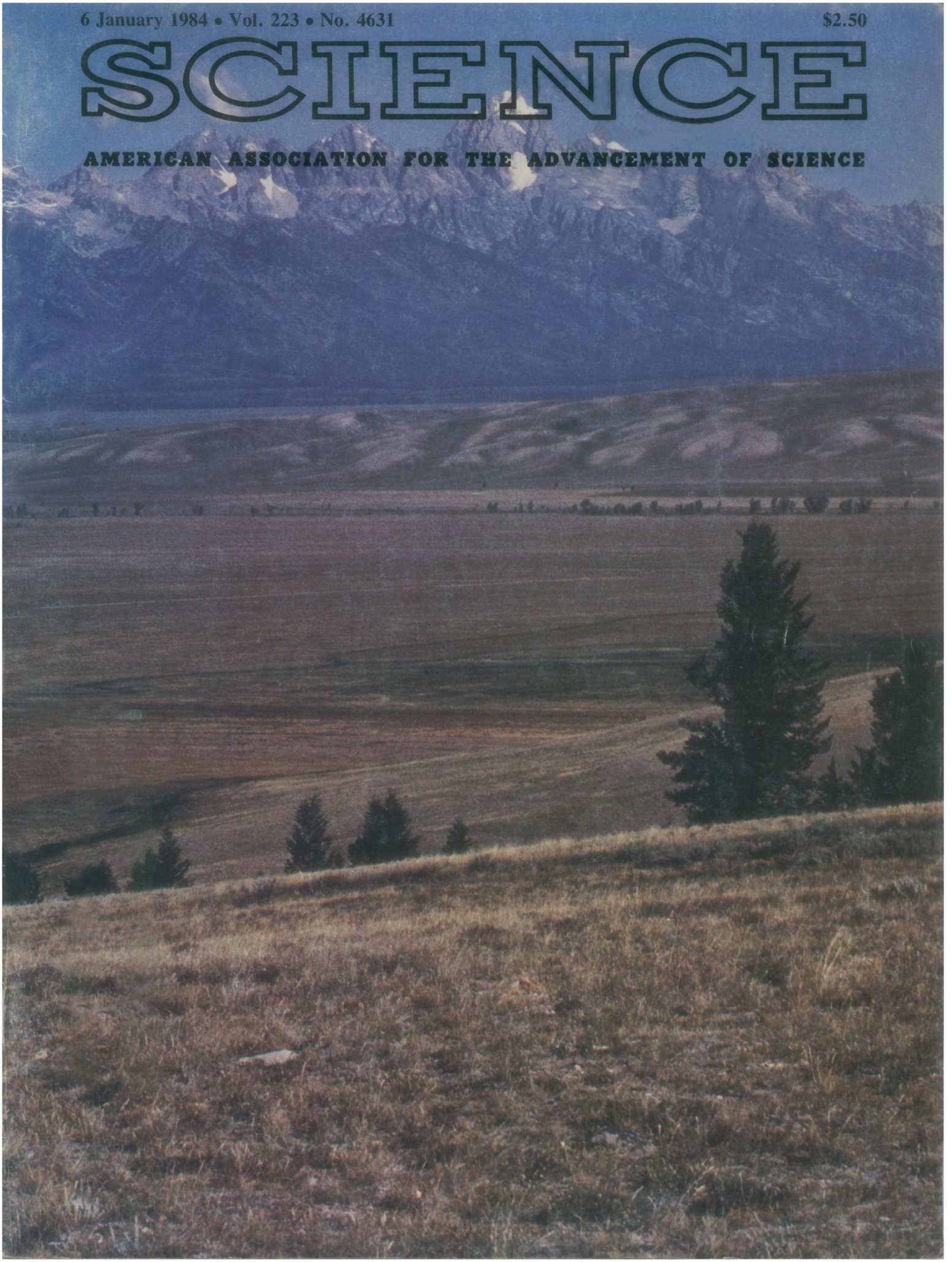
SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



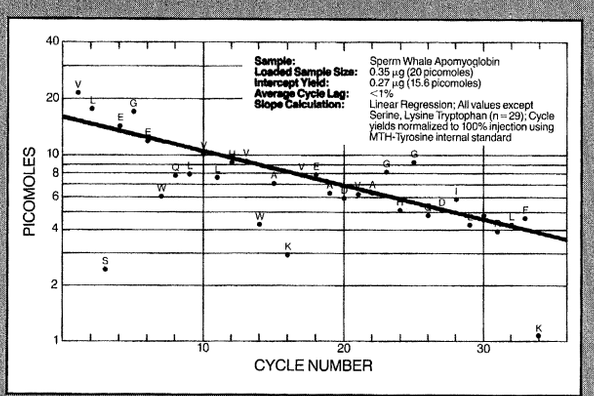
BIOSYSTEMS UPDATE

Gas-Phase Protein Sequencing

A Progress Report

Less than two years ago, Applied Biosystems introduced new gas-phase protein sequencing technology which, though in its infancy, set new standards of analytical performance and sensitivity. We are now pleased to announce the first in a series of improvements in chemistry, programming and hardware which begin to further realize the still untapped potential of the Model 470A Gas-Phase Protein Sequencer.

Changes in the coupling, cleavage and solvent extraction times, and use of an optional miniature sample cartridge, substantially increase repetitive yields and decrease lag on picomole level samples. Sequencer artifacts which can interfere with high sensitivity PTH-AA chromatography are also reduced by a factor of three to five.

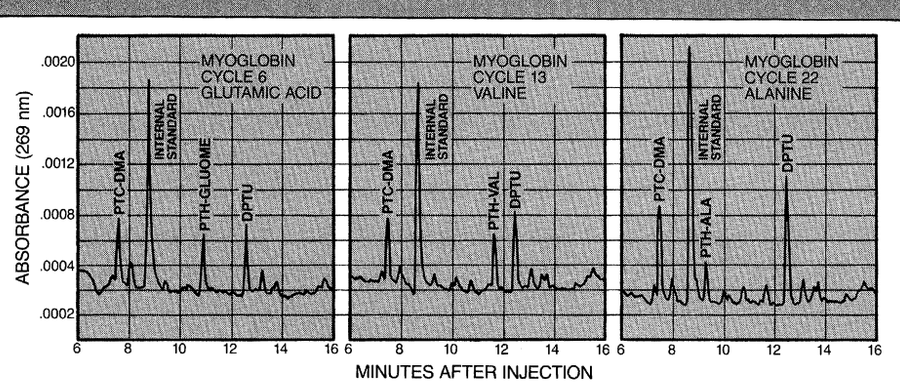


34 residues of 20 picomoles of sperm whale apomyoglobin. Repetitive yield is 96% calculated from the least squares linear regression plot of individual amino acids quantitatively recovered at each sequenced cycle. Lag averages less than 1%/cycle.

A user evaluating our new chemistry has reported sequencing the octapeptide angiotensin II to completion with only 25 picomoles of sample.

A new miniature PTH conversion flask increases typical PTH-AA recovery to greater than 95%. The improvement is most significant on serine, threonine and tryptophan since drying times are reduced threefold.

Best of all, these improvements, and others still under development, are designed to be compatible with every instrument we've built so our current users will continue to be at the leading edge of protein sequencing technology. The 470A Gas-Phase Protein Sequencer is capable of setting even higher performance standards and Applied Biosystems, in collaboration with many of our users, is continuing to investigate further improvements to this remarkable instrument. Write or phone if you'd like more information.



Actual HPLC chromatograms, without background subtraction or data enhancement, of residues 6, 13 and 22 from sequencing analysis of 20 picomoles of sperm whale apomyoglobin. The data illustrate the low background and high sensitivity of the Model 470A Gas-Phase Protein Sequencer.*

Chromatography: IBM Cyano Column. Internal Standard: MTH tyrosine. PTH yields normalized to 100% injection. Cycle 6 (glutamic acid)—11.7 pmol, cycle 13 (valine)—9.1 pmol, cycle 22 (alanine) 6.2 pmol. PTC-DMA, phenylthiocarbamyldimethylamine; DPTU, diphenylthiourea.

Applied Biosystems

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COVER

Against the backdrop of the Grand Tetons, Wyoming, the late Miocene Teewinot Formation (exposed as buff-colored hills in the middle distance) contains a pollen record that shows vegetational and climatic fluctuations of the same frequency as that observed in more recent geologic time. See page 49. [Cathy W. Barnosky, Department of Geological Sciences, University of Washington, Seattle 98195]

6 January 1984, Volume 223, Number 4631 **SCIENCE**

An International Effort in Chemical Science

The International Organization for Chemical Sciences in Development (IOCD) was founded in July 1981 with the main objective of involving chemists from Third World nations in the search for solutions to the urgent problems of their countries. To do this, the IOCD intends to use essentially three channels—initiation of research programs, provision of services, and improvement of education in the chemical sciences. Because scientists from industrial countries will serve as scientific advisers and monitor IOCD research projects, technology transfer and the strengthening of institutions in Third World countries will also be facilitated.

The IOCD has already made an impressive start in accomplishing some of its objectives in the brief period since its founding. A program of chemical synthesis designed to uncover new drugs for the treatment of tropical diseases has been initiated. Eleven laboratories located mainly in developing countries are participating in this program, and IOCD is planning a similar chemical synthesis program in the area of food sciences. Possibilities for making contributions in the field of human fertility regulation are also being investigated. And IOCD is conducting a survey to identify principal investigators and groups throughout the world who are involved in research relevant to such activities. In particular, the organization is making an attempt to identify scientists from developing countries who are working in the chemistry of natural products.

In addition to organizing facilities for analyzing samples from developing countries, IOCD is initiating a program for maintaining and repairing instrumentation and equipment in chemical laboratories in these countries. Eventually there will be a comprehensive biological screening program in Third World nations for compounds prepared by synthesis or isolated from natural sources. Scientific and technical advice will be provided free of charge to managers or governments in countries attempting to build chemical research programs or industrial facilities.

Plans to improve education in the chemical sciences include dissemination of information on modern methods of teaching chemistry as well as sponsorship of seminars and round-table discussions on multidisciplinary research areas. There has been a limited distribution by IOCD of information letters in some countries, and publication of a newsletter with wider distribution is contemplated.

The administrators and staff of IOCD are all volunteers who work directly with scientists from developing countries. Its small infrastructure and low overhead give IOCD a great deal of independence and flexibility.

Start-up funding from the United Nations Educational, Scientific, and Cultural Organization (Unesco) has enabled IOCD to take some significant first steps toward accomplishing its major objectives. It has initiated several joint programs, some sponsored in part by such organizations as the World Health Organization, the Walter Reed Institute for Medical Research, the National Institutes of Health, and others. In the future, however, IOCD must obtain funding from governmental organizations and private sources, including foundations and companies in industrialized countries as well as in the developing world.

Responses from chemists around the world have been encouraging and have confirmed the conviction that IOCD has an important role in aiding the development of Third World countries and in assisting them in improving the quality of life through chemistry. It is gratifying that chemists in developed nations now have a way to collaborate in their areas of expertise with colleagues in the developing countries. So far, only the groundwork for facilitating international communication and collaboration has been laid; now a great deal more work must be done.—GLENN T. SEABORG, *President, IOCD, and Lawrence Berkeley Laboratory, Berkeley, California 94720*

Inquiries from scientists and organizations interested in becoming involved in this activity should be addressed to Pierre Crabbe, Secretary General, International Organization for Chemical Sciences in Development, c/o Unesco, 7, Place de Fontenoy, 75700 Paris, France.

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Ralph A. Reisfeld, Scripps Clinic and Research Foundation

IMMUNOREGULATION
Fritz Melchers, Basel Institute for Immunology

ANALYSIS OF INFECTIOUS PROCESSES USING MONOCLONAL ANTIBODIES
Michael B.A. Oldstone, Scripps Clinic and Research Foundation

IMMUNODIAGNOSIS
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