

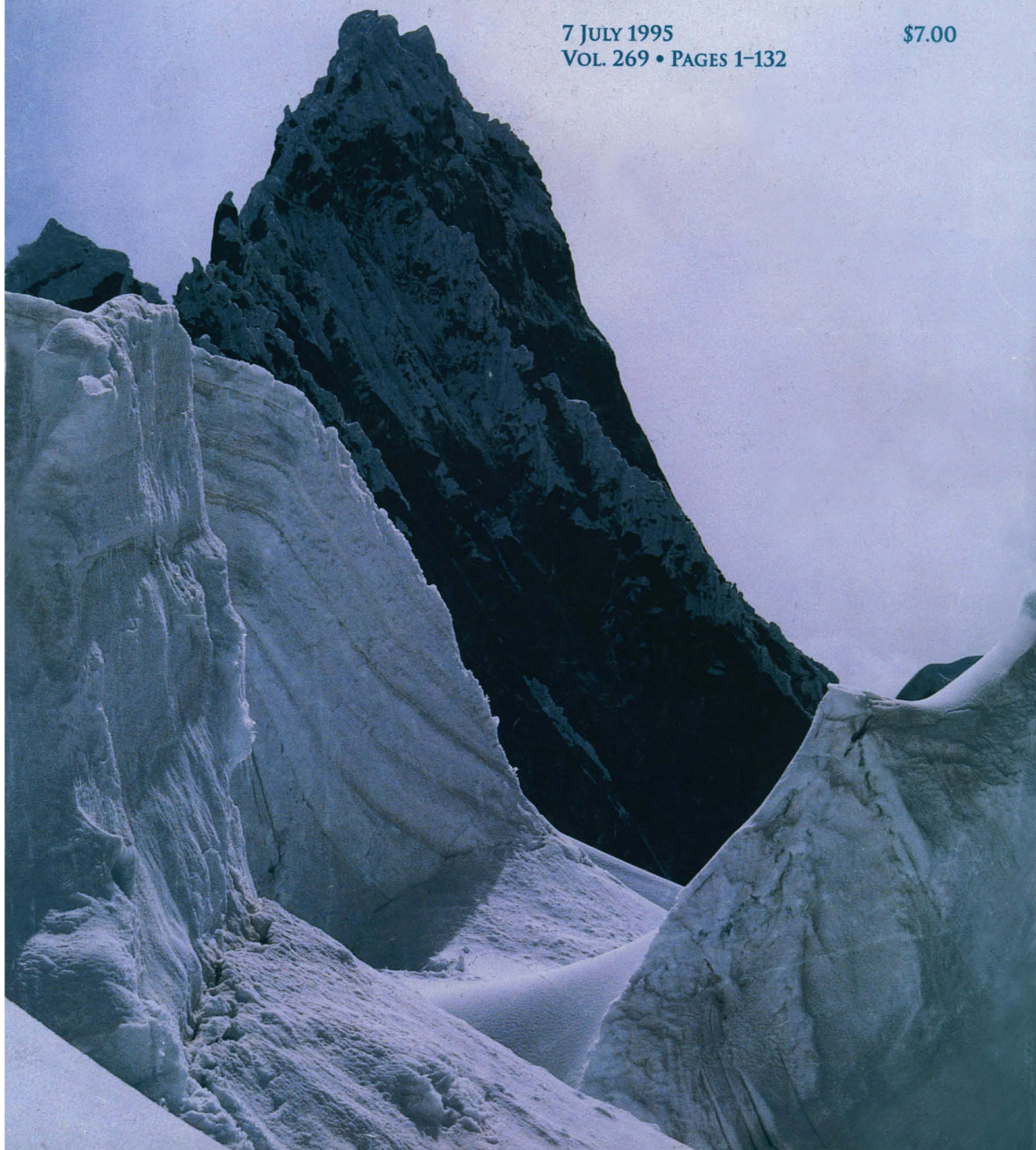


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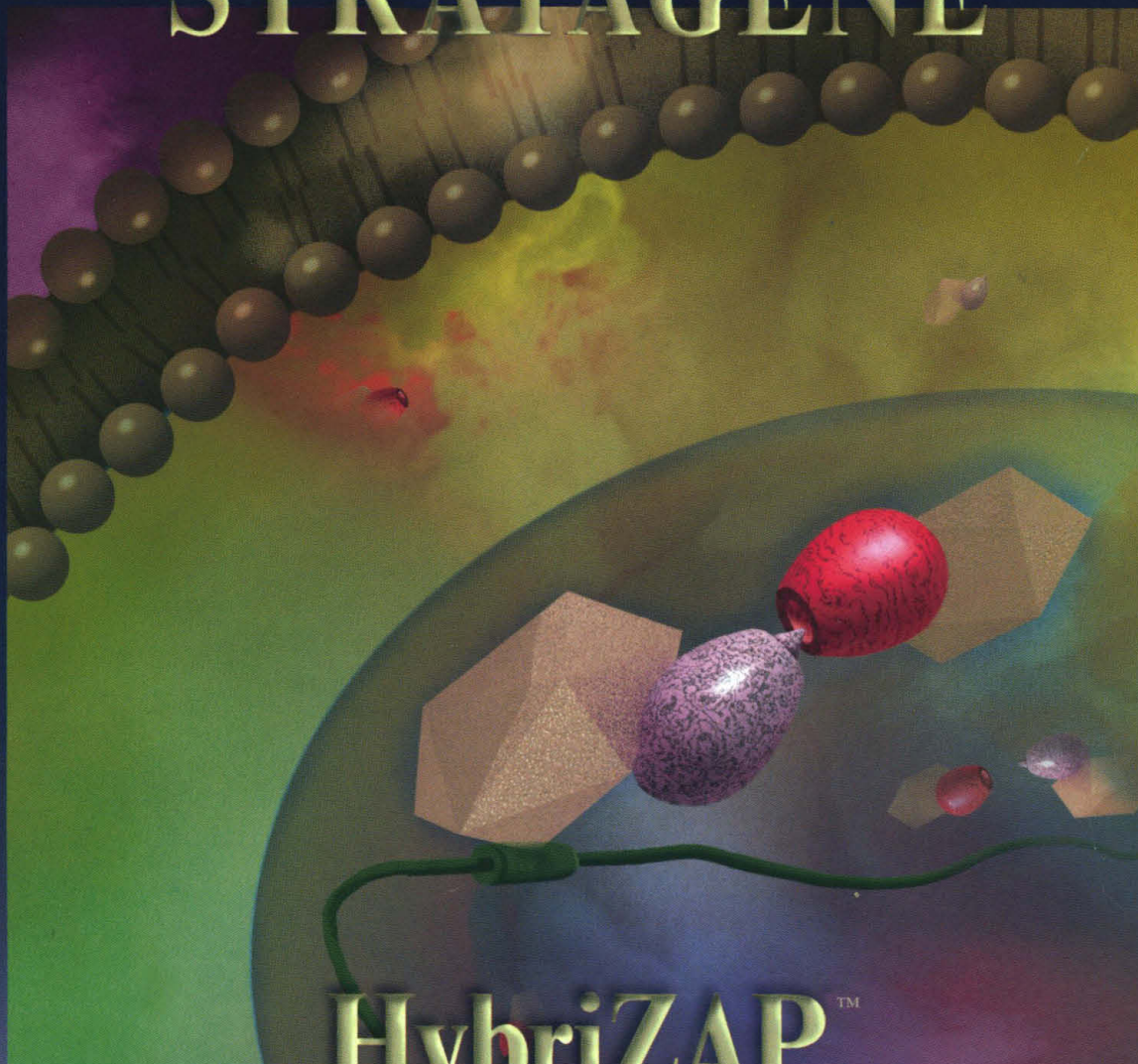
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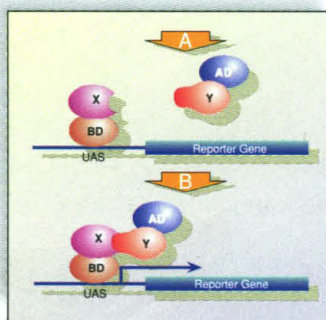


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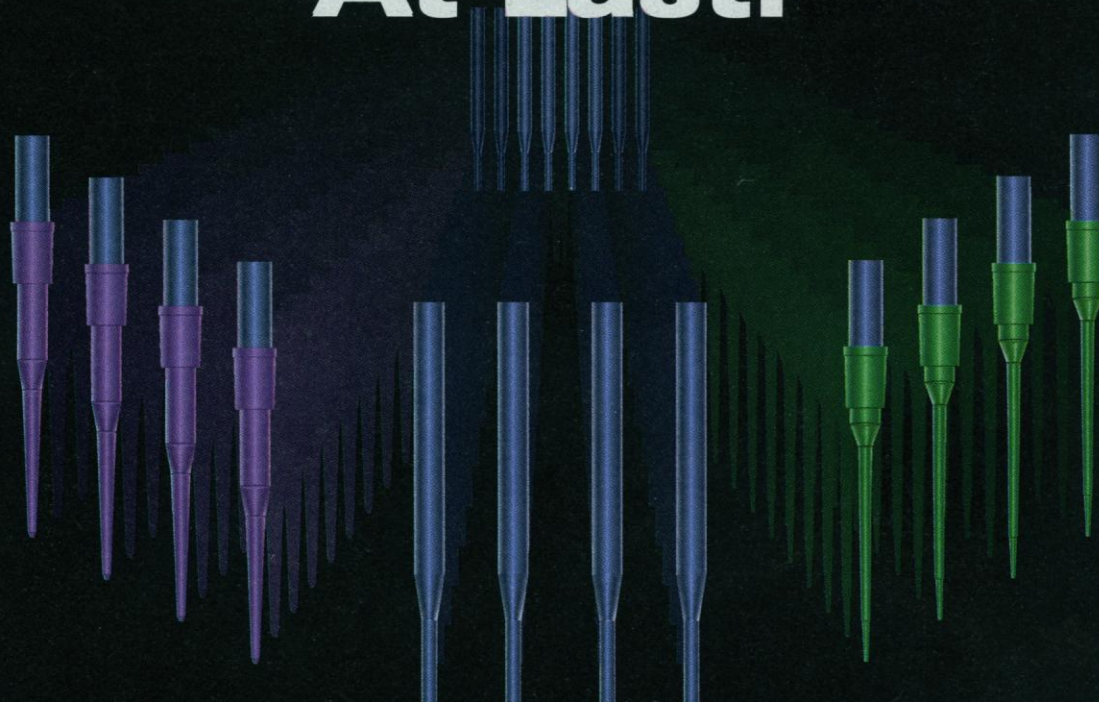
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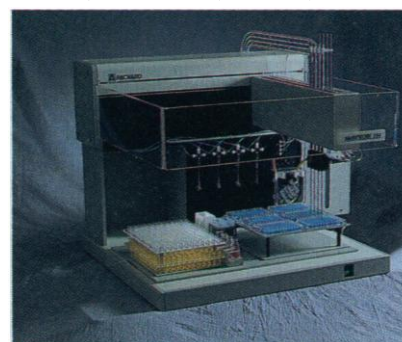
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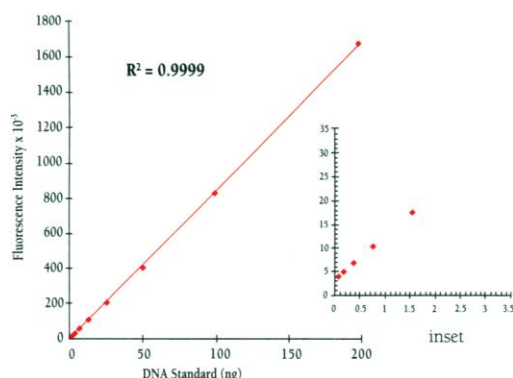
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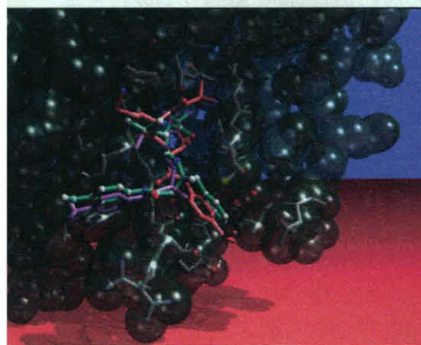
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Pinnacles of ice and rock on Nevado Taulliraju (5830 meters above sea level) guarding extensive ice fields in the Cordillera Blanca, Peru. Two ice cores from an ice field on the col of Huascarán provide a perspective of climate and the environment in the tropics back to

glacial times. These frozen archives are disappearing rapidly under the present climate conditions. See page 46 and the News story on page 32. [Photo: Lonnie G. Thompson]



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Assembly hanger

The ferritin protein contains a large cavity that can contain several thousand iron atoms. Douglas *et al.* (p. 54) have adapted this iron storage system to control the formation of iron sulfide nanoparticles. Particles with 500 or 3000 iron atom clusters could be made; the former exhibit an unusual oxidation state.

Unscrambling ions

Hydrocarbons can be quite unreactive, but protonation by acid catalysts can create highly reactive carbonium ions. The simplest example, CH_5^+ , appears to have no stable equilibrium structure; the hydrogen atoms scramble continuously, so much so that vibrational spectroscopy reveals little about this process. Boo *et al.* (p. 57) found that solvating this ion with neutral H_2 molecules in the gas phase stabilizes the CH_5^+ core. The vibrational spectra obtained were interpreted in light of molecular dynamics simulations.

Designer peptides

In addition to the ribosomal peptide synthesis, microorganisms can generate a variety of small peptides by using large, multi-domain peptide synthetases. These enzymes link amino acids that may have been modified previously by acylation or glycosylation into linear, branched, or cyclic peptide structures. Stachelhaus *et al.* (p. 69) re-engineered a synthetase from the bacterium *Bacillus subtilis*, which makes the lipopeptide surfactin, by substituting genes encoding domains from similar synthetases in *Bacillus brevis* and the fungus *Penicillium chrysogenum*.

Ice records in the tropics

Climate records from the tropics covering warming from the late glacial stage (LGS, more than 15,000 years ago) have been sparse. Most ice caps are small compared to the polar ice sheets and ice cores had extended only back a few thousand years. Thompson *et al.* (p. 46; see cover and news story by Mlot, p. 32) obtained two ice cores from Huascarán, Peru, that extend back to the LGS. The stable isotope variations in the ice imply that the tropical Atlantic was 5 to 6 Celsius degrees cooler during the LGS than today.

Signals in the water

Sudden slip on faults generating earthquakes may often be facilitated by a build up of fluid pressures in the fault zone; in turn, precursory cracking of the crust can affect local hydrology. Tsunogai and Wakita (p. 61) and Igarashi *et al.* (p. 60; see the Perspective by King *et al.*, p. 38) report that a variety of chemical and physical signals, including increases in chloride, sulfate, and radon concentrations in ground water, preceded the destructive Kobe earthquake of 17 January 1995.

A start for STATs

Many growth factors and cytokines regulate transcription by activating transcription factors known as STATs. The STATs are activated by phosphorylation on tyrosine by protein kinases called Jaks. Activation of STATs is seen in cells transformed by expression of an oncoprotein or by infection with a virus. Yu *et al.* (p. 81) found that transforming cells with the Src tyrosine kinase oncoprotein activated Stat3. Cells infected with human T cell leukemia virus I (HTLV-I) for some time no longer require interleukin-2 for growth. Migone *et al.* (p. 79) report that the Jak-STAT pathway is constitutively activated in such cells. Activation of this growth-promoting signal in the absence of cytokines appears to

be part of the mechanism by which T cells are transformed by HTLV-I.

Changing pumps

Bacteriorhodopsin (bR) actively pumps protons outward across the cell membrane when stimulated with light. Halorhodopsin, a member of the same family of proteins, responds to light by pumping chloride ions (Cl^-) inward. Sasaki *et al.* (p. 73) replaced a single aspartate residue (at position 85) with threonine in bR and converted it into a light-driven Cl^- transporter. The spectral shifts of the retinal chromophore suggest that the mutant bR and the wild-type halorhodopsin use similar mechanisms for Cl^- transport, and that the interaction of the chromophore and residue 85 controls substrate specificity.

Active partners

The TATA binding protein (TBP) is essential for transcription by all three RNA polymerases (Pols). Stargell and Struhl (p. 75) isolated a mutant TBP that is normal in vivo for transcription by Pol I and Pol III but appears defective in supporting Pol II transcription mediated by the acidic class of activator proteins. This mutant TBP fails to interact properly with a general transcription factor TFIIA, sug-

gesting that the interaction between TFIIA and TBP is necessary for transcriptional activation by acidic activators in vivo.

Cell-to-cell service

Can proteins move from the membrane of one cell to that of another? Kooyman *et al.* (p. 89) present evidence that this occurs, at least for proteins anchored to the cell membrane through covalently attached glycosyl phosphatidylinositol (GPI). The GPI-anchored proteins expressed in transgenic mice only on blood cells were transferred in functional form to endothelial cells. Whether such transfer serves a physiological function remains unknown, but it could provide a way to transfer therapeutic proteins to the vascular endothelium.

Knowing where to grow

Developing neuronal axons find their way to distant targets, but the cues that guide their growth are not always clear. Mammalian retinal axons from the eyes



must cross over one another in the optic chiasm to project to the opposite side of the brain. Sretavan *et al.* (p. 98) used immunological methods to specifically ablate embryonic neurons in mouse embryos in the future site of the optic chiasm. This procedure stopped the retinal axons from crossing the brain midline, indicating that these early-generated neurons are necessary for proper development.

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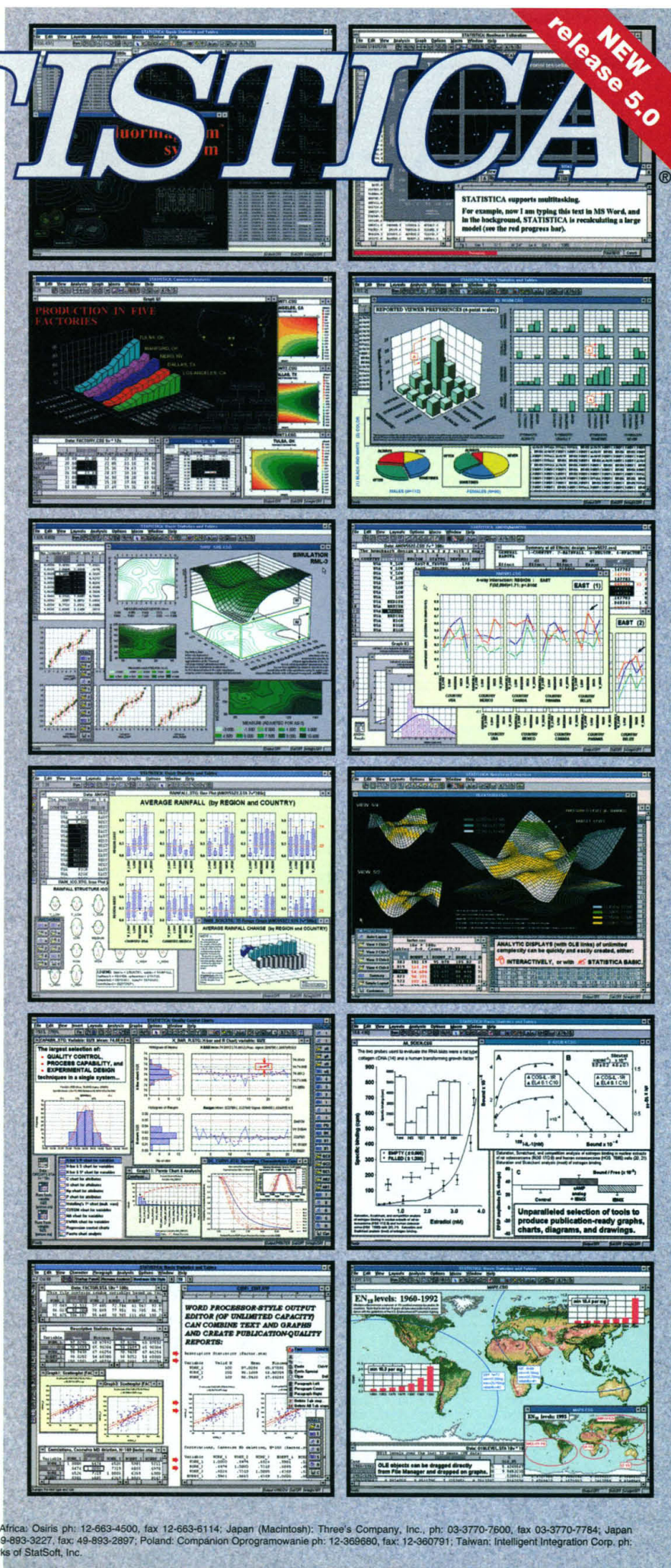


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- DNA Subcloning





—illustration by Pat Babcock



AMERICAN ASSOCIATION FOR THE
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19-22 September 1995 • Fairbanks, Alaska

Landscapes

The 46th AAAS Arctic Division Science Conference

President and Conference Chair: Robert G. White, Director, Institute of Arctic Biology

Preliminary Schedule

Tuesday, 19 September

Plenary Session

Symposium on Landscapes

Human Ecology
Chair: Gerald Shields
Dale Guthrie, Jeff Leer

Landscape Ecology
Chair: John Bryant
Roger Ruess, Marilyn
Walker, David Klein

Earth System Science
Chair: Amanda Lynch
Larry Hinzman, Diana
Versegny, Warren
Washington

Symposium on Landscapes
Panel Discussion

Wednesday and Thursday, 20-21 September

Technical Sessions

Technical Sessions cover all
disciplines, including:

Land-Atmosphere Interactions
Chair: Jeffrey Tilley

*Spatial Statistics, Geographic
Information Systems and
Spatially Explicit Models*
Chairs: Terry Bowyer, Sue
Hills

*SEAScape—Ecosystem Studies
of Prince William Sound*
Chair: David Eslinger

*Subsistence and Wildlife/
Fisheries Resources*
Chair: Elizabeth Andrews

*Biological Diversity and
Landscapes*
Chairs: Wendy Nixon,
Scott Armbruster, Joe
Cook

*Anthropogenic and Natural
Change in Forest Landscapes of
Alaska—Scientific and Policy
Aspects*

Chair: Glenn P. Juday

Ecosystem-Based Management
Chair: Rosa Meehan

Cold Regions Engineering
Chair: Debendra Das

*A Retrospective on Research at
the Naval Arctic Research
Laboratory (NARL),
sponsored by the Arctic
Institute of North America
(AINA)*

Chairs: Carl S. Benson,
Jerry Brown

*Integrative Teaching—Human
and Landscape Ecology*
Chair: Mark Oswood

Special Workshop

Friday, 22 September

Preparing for an Uncertain Future: Impacts of Short and Long-term Climate Change on Alaska

Chairs: Juan Roederer
TBA State of Alaska
Plenary Session and Working
Group Discussions on:

- Climate scenarios and
physical effects
 - Biological effects
 - Socio-economic effects
 - Policy implications
- Invited papers only at special
workshop.*

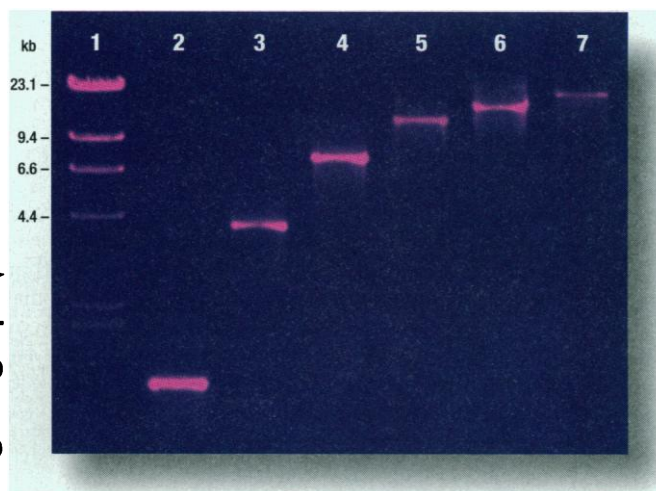
For Information, contact:

Patricia A. Anderson,
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PO Box 757740
University of Alaska Fairbanks
Fairbanks, AK 99775-7740
Phone: (907) 474-5698
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Abstracts for Arctic Science Conference deadline: 17 July 1995
Early Registration deadline: 1 August 1995

GIBCO BRL Products for Long PCR

When you
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way to go,



Human Genomic DNA K562 DNA (100 ng) was amplified with ELONGASE Reagent for 35 cycles in a 50 µl volume. Lane 1 is lambda DNA/Hind III Fragments. Lanes 2-4 are amplifications of 1.3 kb, 4.1 kb and 7.5 kb β -globin targets, respectively. Lane 5 is an amplification of a 12.4 kb serum albumin target. Lanes 6 and 7 are amplifications of 15.1 kb and 20 kb Factor IX targets, respectively. Sample loads range from 4-10 µl.

choose
the best way
to get there.

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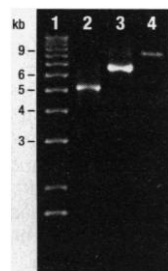
ELONGASE Reagents* contain an optimized mixture of recombinant, thermostable polymerases, including a proofreading (3' → 5' exonuclease) activity, resulting in efficient amplification of long templates and exceptionally high yields.

Efficient Amplification of Long Templates

- Amplification of λ DNA up to 30 kb and single-copy genomic DNA up to 20 kb.
- Amplification of long cDNA templates in RT-PCR applications.

Exceptionally High Yield

- 10^6 fold amplification of DNA templates < 10 kb in size.



RT-PCR cDNA was synthesized from HeLa RNA (500 µg) with the SUPERScript™ Pre-amplification System using oligo dT. A portion of the reaction was amplified with ELONGASE Reagent. Lane 1 is the 1 kb DNA Ladder. Lanes 2-4, respectively, are amplifications of 5.3 kb tuberous sclerosis II, 6.8 kb DNA polymerase ϵ and 8.9 kb adenomatous polyposis coli full length cDNAs.

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	10480-028	500 rxn
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Tuesday, July 25th, Palo Alto, CA • Wednesday, July 26th, South San Francisco, CA

Tuesday, July 25th at 10 am

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Equipment no longer necessary in the ongoing operation of Immunologic—Fully outfitted departments for tissue culture research & protein chemistry analysis featuring cell processing, peptide synthesis, chromatography & central laboratory research. Highlights include: Becton Dickinson Facstar fluorescence cell sorter; Packard, LKB & Wallac cell counters & harvesters; Advanced Chemtech 396MPS robotic protein synthesizer; Ap-

plied Biosystems peptide synthesizer, derivatizer & DNA synthesizer; Bio-Rad & HP HPLC systems; Spex spectrofluorometer system; (2) Applied Biosystems 230A HPEC systems; plus Beckman centrifuges, cryogenic storage, incubating cabinets, lyophilizers, Nordion gamma irradiator, facility equipment, uninterruptible power system, Sony video communications system and Silicon Graphics & Mac workstations

Call **1-800-421-2144** for details and free illustrated brochures. Inspection one day prior to sale or earlier by appointment

Wednesday, July 26th at 10 am

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eted tanks to 3,500 gal.; Romicom ultrafiltration systems; Groen 20 gal. mix kettle; Bally high bay walk-in cooler; (15) Nuare biological safety cabinets; centrifuges, incubators, extreme cold units & autoclaves. Chemistry instrumentation includes sequencers; gamma counters, fermenters, fluorescence detectors, spectrophotometer; large quantities of general lab instruments, spare motors & motor control panels and new stainless valves

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Pharmacia Biotech & SCIENCE Prize for Young Scientists

IN MOLECULAR BIOLOGY 1995

world-wide prize will include US\$20,000 awarded to the best young scientist of the year, and up to 7 additional prizes of US\$5,000 each.

For 115 years SCIENCE has been one of the world's leading scientific journals, promoting science through print, exhibitions and conferences. Pharmacia Biotech, as one of the pioneers of biotechnology, is committed to serving the changing needs of the international scientific community.

Call for entries

You must be a recent Ph.D. graduate (awarded between 1 January and 31 December 1994) working in molecular biology. Submissions must be in the form of a 1000 word essay, in English, on your thesis, highlighting the significance of its contribution and overall implications in the field. The winning essay will be published in SCIENCE. Closing date for entries is 5 July 1995. The prizes will be presented in Stockholm, Sweden, during December 1995.

Full details can be requested from the administrator, at the address below, or via Internet to:

science_editors@aaas.org (US/ROW enquiries)
science@science-int.co.uk (European enquiries)

SCIENCE

The Award Committee
Pharmacia Biotech & SCIENCE Prize for Young Scientists
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