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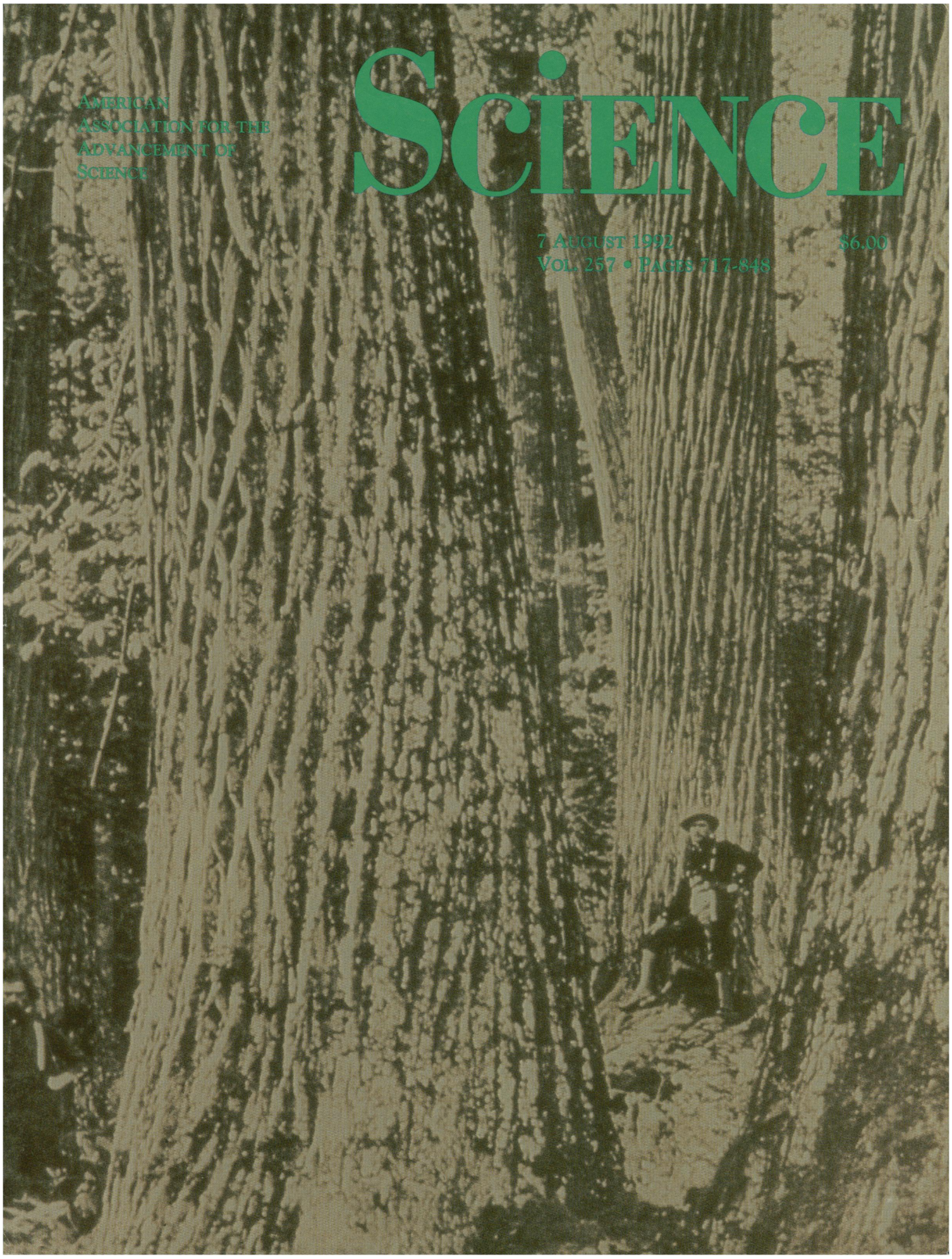

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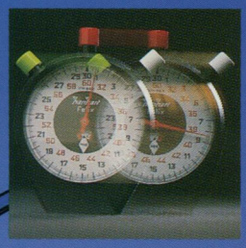

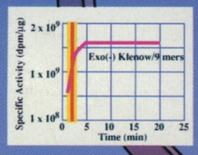

figure 1

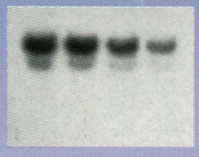

figure 2

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Figure 2:
Detection of a Single Copy Gene Using QuikHyb™ Rapid Hybridization Solution and a Prime-It™ II Random Primed Probe. Human genomic DNA was digested to completion with Eco RI and electrophoresed on a 0.8% agarose gel. The DNA was transferred to a FLASH™ Nylon Membrane and UV crosslinked. This blot was hybridized for 1 hour at 68°C with a Prime-It II generated human alpha-1-antitrypsin DNA probe in 2mls of Quik-Hyb Rapid Hybridization Solution. The blot was washed and subsequently exposed to X-ray film overnight at -70°C with an intensifying screen. Lanes 1-4 are 3µg, 1.5µg, 0.75µg and 0.33µg, respectively, of human genomic DNA.

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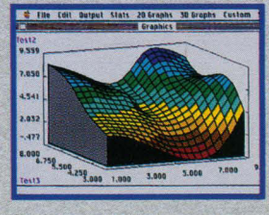

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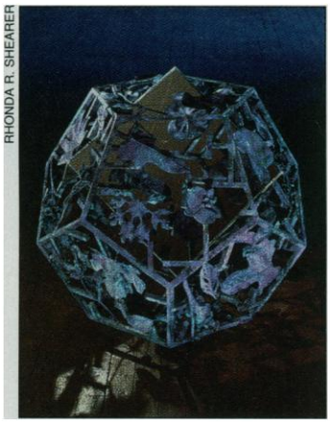


748
Refracting math through art

NEWS & COMMENT

RESEARCH NEWS

PERSPECTIVE

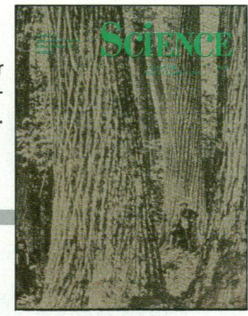
ARTICLES

RESEARCH ARTICLES

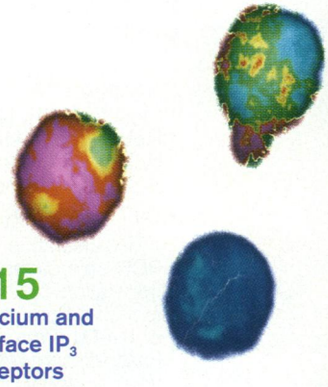
DEPARTMENTS

COVER

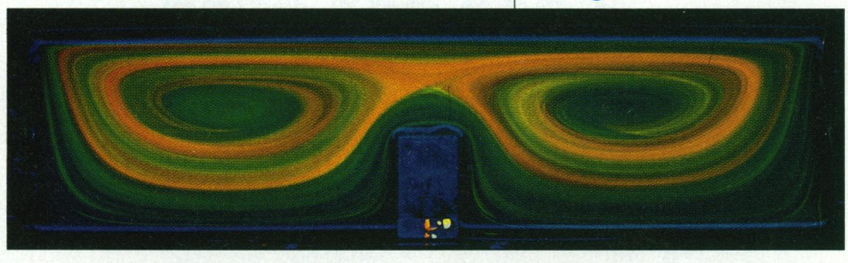
American chestnut trees in the Great Smoky Mountains, North Carolina, before a blight epidemic that destroyed several billion mature trees when the Asian fungus *Cryphonectria parasitica* was unintentionally introduced early this century. The cloning of an endogenous virus that infects the fungus provides the potential for effective biological control of chestnut blight and the restoration of this once valuable forest tree. See page 800. [Photograph: Museum of North Idaho]



REPORTS



815
Calcium and surface IP_3 receptors



754
Mixing and chaos in fluids

◩ Indicates accompanying feature

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**patent pending.* *mRNA model courtesy of* BIOSYM

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edited by PHIL SZUROMI

Venusian tectonics

Venus is the planet that is most like Earth, but its tectonic style and the relation of crustal deformation to mantle processes has been uncertain. Sandwell and Schubert (p. 766) compare the topography of coronae on Venus, which are large elevated circular structures that are commonly surrounded by a moat and an outer rise, to the topography of subduction zones on Earth. They show that as for subduction zones, the topography surrounding Venus' coronae can be explained with a lithospheric flexure model in which bending of the surrounding crust beneath the coronae leads to the trench and outer rise. Subduction of the crust by 100 kilometers or more may be occurring around the largest coronae.

□

Strategic sequencing

Complete sequencing of the *Escherichia coli* genome would yield all of the information necessary to define a life form. Daniels *et al.* (p. 771) describe and analyze the DNA sequence from a 91.4-kilobase segment from an *E. coli* K-12 strain (about 2 percent of the genome). They show how a variety of strategies, from sequencing clones picked at random from libraries to directed approaches that target known genome positions, can be combined to sequence efficiently and accurately an entire stretch of a chromosome.

□

Mercury rising

Although mercury contamination of remote watersheds has generally been attributed to atmospheric deposition, the amount of recent inputs and significance of geologic sources have been uncertain. Swain *et al.* (p. 784) analyzed cores from seven remote lakes in Minnesota and Wisconsin. Analysis of the cores, which provide records back to A.D. 1700, show that mercury deposition has more than tripled from earlier rates since about 1850.

□

Still a natural

Lampreys and hagfishes lack a hinged jaw, and as the surviving members of the jawless vertebrates, their phylogenetic relation to other organisms has been studied extensively. Traditionally considered a natural, or monophyletic group, recent morphological analyses have suggested that the hagfishes are even more primitive than the lampreys and that the lampreys are more closely related to jawed vertebrates. Stock and Whitt (p. 787) analyzed RNA sequences from the small subunit of the ribosome from two hagfishes and two lampreys and compared them with sequences for chordate invertebrates (a tunicate and a lancelet) as well as with jawed vertebrates. The analysis supports the traditional monophyletic grouping of the hagfishes and the lampreys.

□

Costimulation and immunosuppression

A number of immune system responses, such as the proliferation of killer T cells and B cell differentiation, can be brought about through the activation of the helper T cells by antigen-presenting cells (APCs). To become activated, T cells need stimulation not only through their antigen receptors but also through other cell surface molecules. This "costimulation" can occur in vitro through the CD28 molecule. Unwanted immune responses should in theory be thwarted by blockade of this costimulatory pathway. A soluble molecule, CTLA4Ig, was engineered to bind to the CD28 ligand and prevent interaction with the T cell. Lenschow *et al.* (p. 789) found that injection of such a construct into mice that received human pancreatic islet transplants resulted in prolonged unresponsiveness to the donor islets and long-term survival. Linsley *et al.* (p. 792) showed that T cell–dependent production of antibodies by B cells could be specifically suppressed in mice that received CTLA4 constructs (see news story by Cohen, p. 751).

Ubiquitin tag

The T cell antigen receptor (TCR) contains several subunits. The ζ subunit functions in signal transduction from the receptor. Cenciarelli *et al.* (p. 795) report that when the TCR is activated, the ζ chain is modified by the addition of one or more molecules of ubiquitin, a neutral protein of 8 kilodaltons. The effect of ubiquitination on the ζ chain is not yet known, but it might mark the TCR as a target for degradation or otherwise influence the function of the receptor.

□

Chloride channels and human myotonia

Generalized myotonia (GM), an autosomal recessive disease, and myotonia congenita (MC), which is autosomal dominant, are muscle disorders whose symptoms appear in early childhood. Muscle stiffness is caused by repetitive excitation of the muscles, which could be caused by defects in ion channel activity that slow the rate of membrane repolarization. Koch *et al.* (p. 797) have partially cloned a chloride channel from human skeletal muscle (*CLC*-1) from chromosome 7 that shows tight linkage to the T cell receptor locus. These loci were tightly linked to GM and MC in family studies. In two GM families, a mutation from phenylalanine to cysteine was found. Although no mutations were identified linking *CLC*-1 to MC, these findings and the greater severity of the recessive disease suggest that different mutations in a multimeric chloride channel give rise to these diseases.

□

Interferon-α signals

Binding of interferon-α (IFN-α) to its receptor on the cell surface activates transcription of specific genes. The increase in transcription results in part from regulation of a transcriptional activator, ISGF3 (interferon-α–stimulated gene factor 3), which consists of three subunits. Schindler *et al.* (p. 809) found that in cells treated with IFN-α, the ISGF3 subunits were phosphorylated on tyrosine and that they formed a complex that was translocated to the nucleus. In a related report, David and Larner (p. 813) describe a cell-free system in which they have studied activation of ISGF3. Treatment of a membrane fraction with IFN-α was sufficient to allow activation of ISGF3 when the membrane fraction was subsequently mixed with the supernatant fraction from the same cells. These results help to explain how binding of IFN-α at the cell surface can lead to the transcription of certain genes in the nucleus (see news story by Marx, p. 744).

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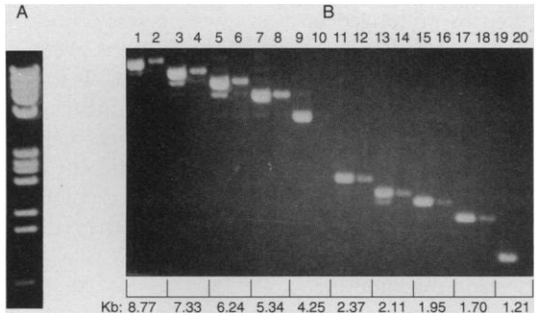

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5. DNA purified using GELase is ready to use and biologically active.

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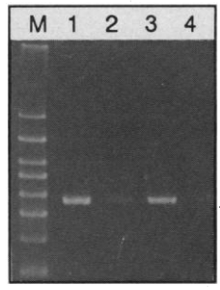

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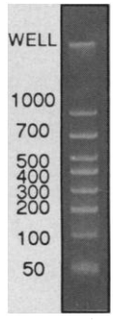

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- Suitable for Plasmid or Phage prep
- Genomic preps
- DNase and RNase free

Alkaline Phosphatase removal Units AP per 100µl	After EnZap O.D. 405nm	% Removal
5 Units	.010	~ 100%
2.5 Units	.010	~ 100%
1.2 Units	.010	~ 100%
0 Units	.010	NA

EnZap™ 5, 25 and 100 Assays Catalog No.'s EZ-5; EZ-25; EZ-100 **Circle Reader No. 11**

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FAX: 1-615-896-4837
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† The PCR process is owned by Hoffmann-La Roche, Inc.