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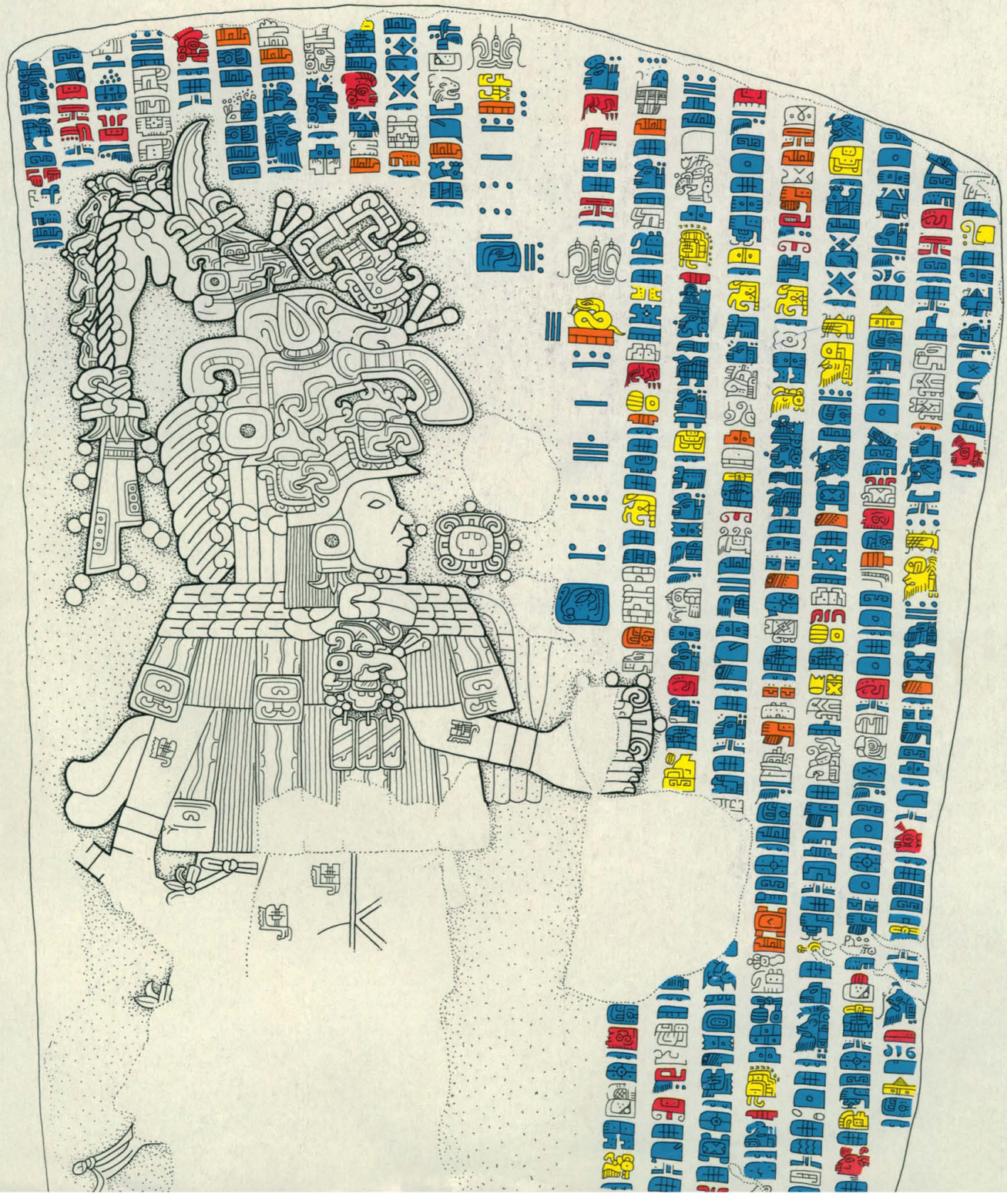

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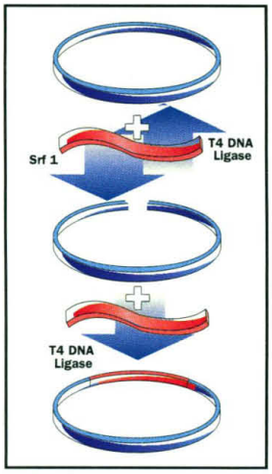

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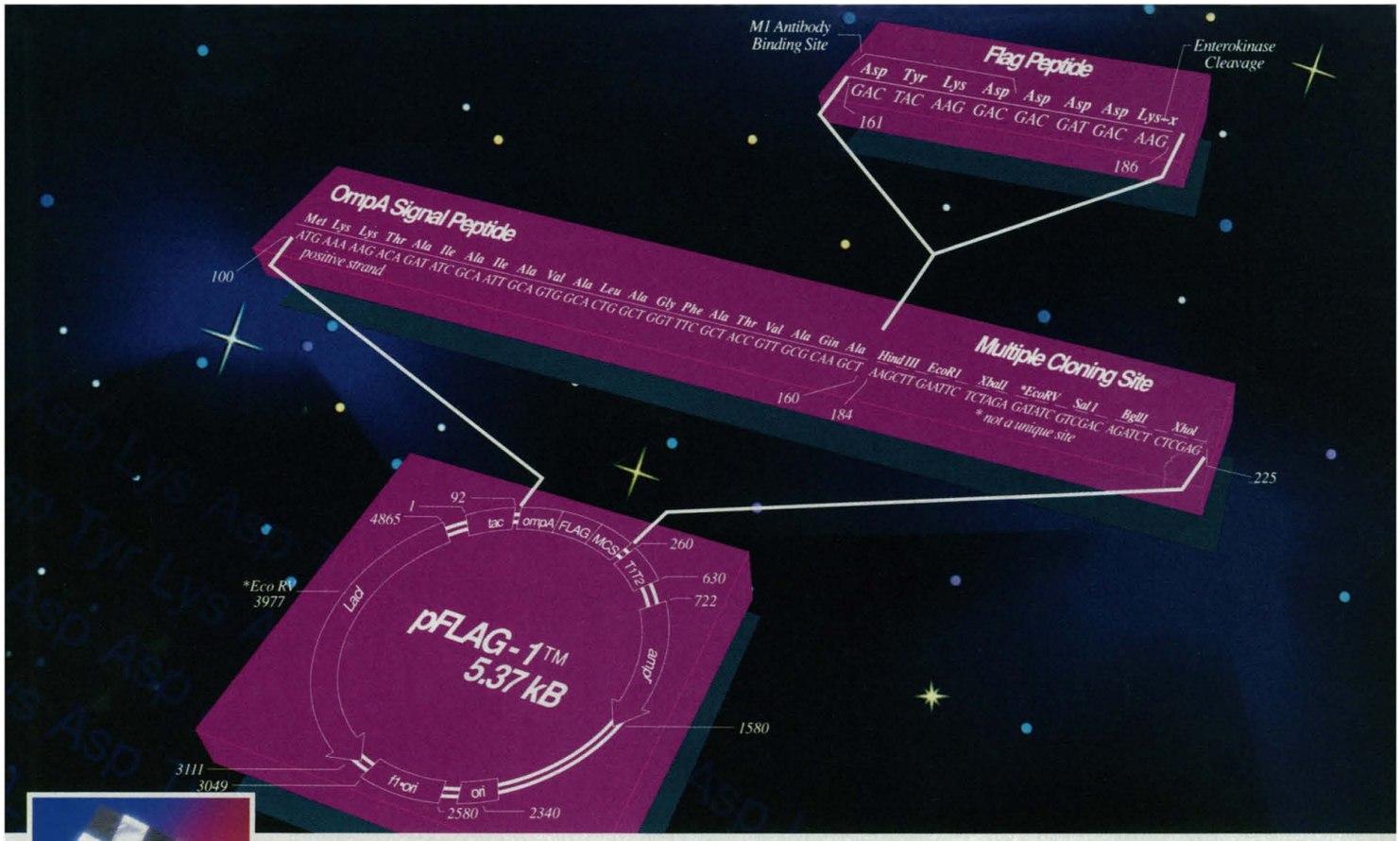
1. Bauer, J., et al. (1992) *Stratagies* 5:2-64



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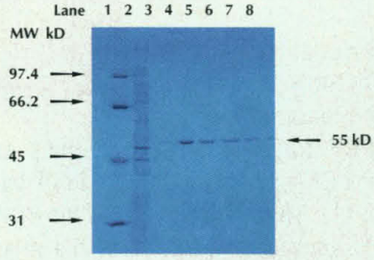

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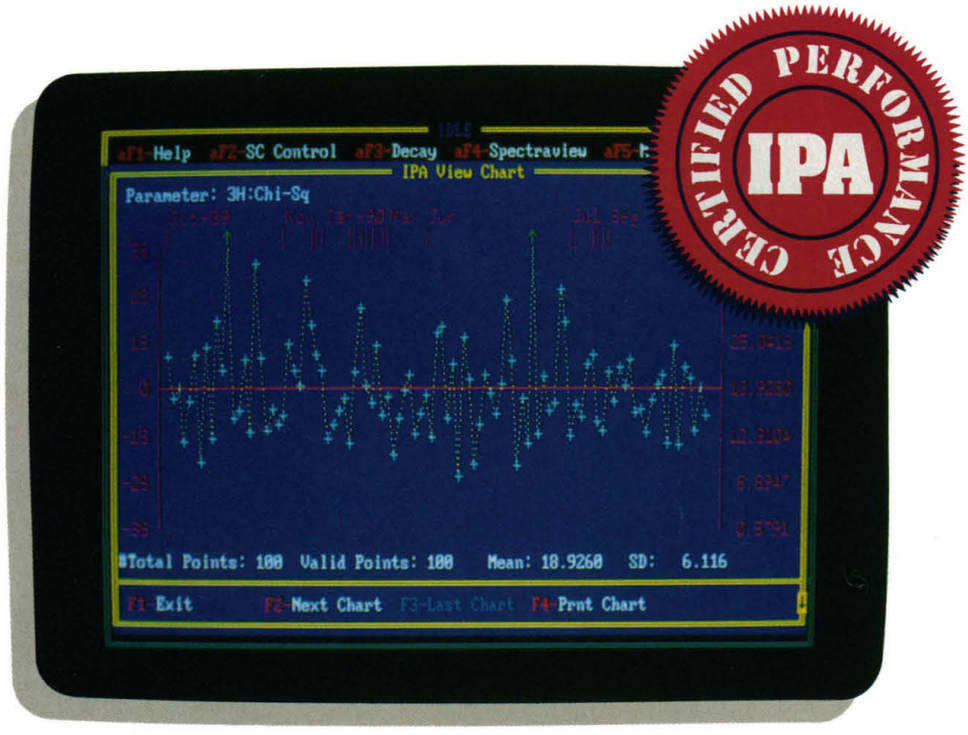

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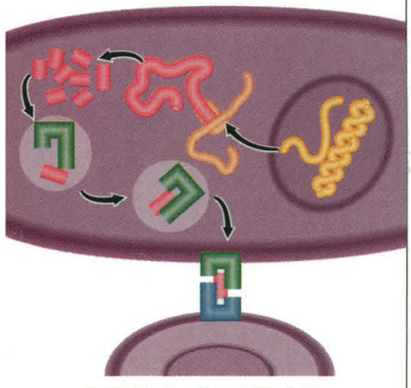


1691 & 1745
Injection of naked DNA to make a vaccine

NEWS & COMMENT

RESEARCH NEWS

PERSPECTIVES

ARTICLES

RESEARCH ARTICLE

DEPARTMENTS

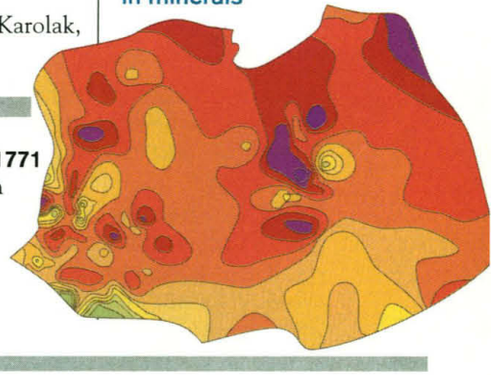
COVER

The lengthy inscription on this recently discovered monument from La Mojarra, Veracruz, Mexico, has made possible a breakthrough in the decipherment of epi-Olmec writing. Signs of precisely determined meaning or pronunciation are in blue when securely interpreted in their context and in orange otherwise. Signs in red are tentatively interpreted and can be read intelligibly in context; those in yellow have approximate semantic interpretations. See page 1703 and the Perspective on page 1700. [Drawing: George Stuart]

REPORTS

TECHNICAL COMMENTS

1729
Complex isotopic zoning in minerals



◩ **Indicates accompanying feature**

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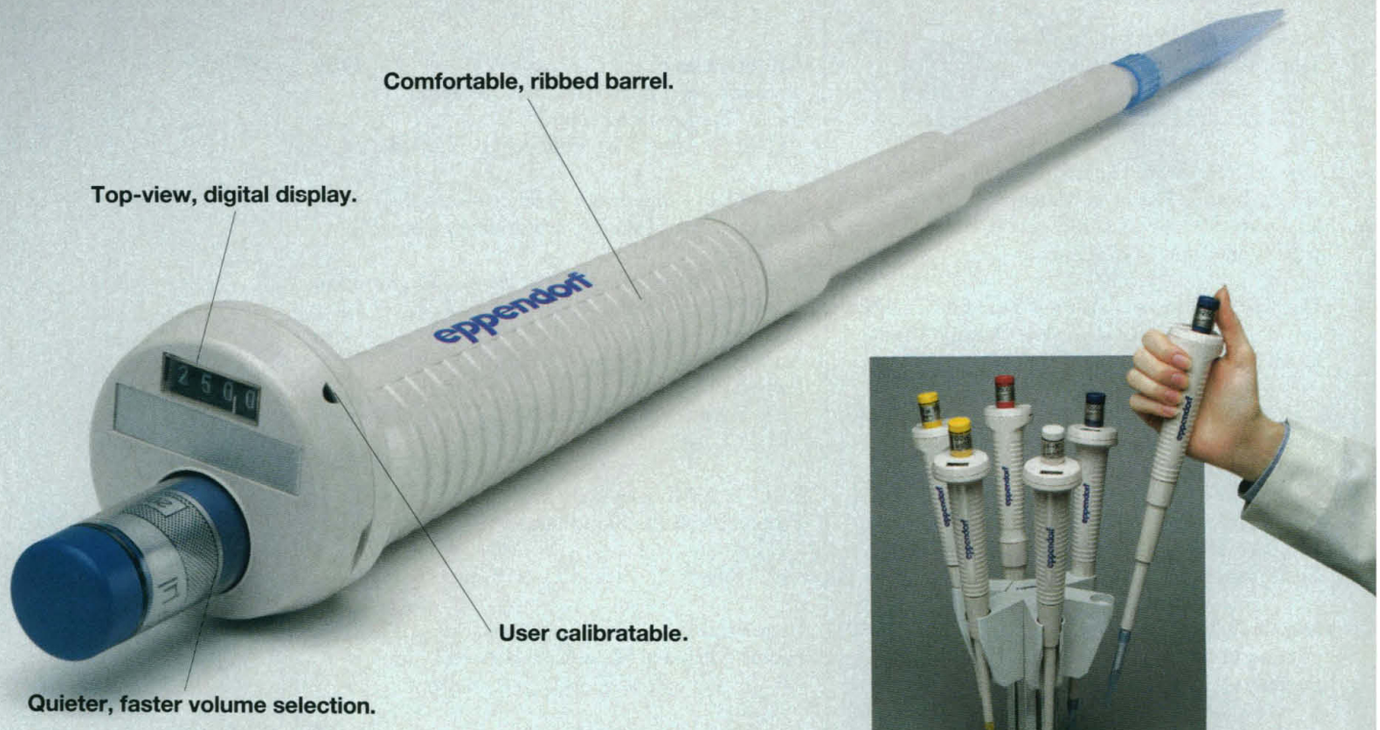

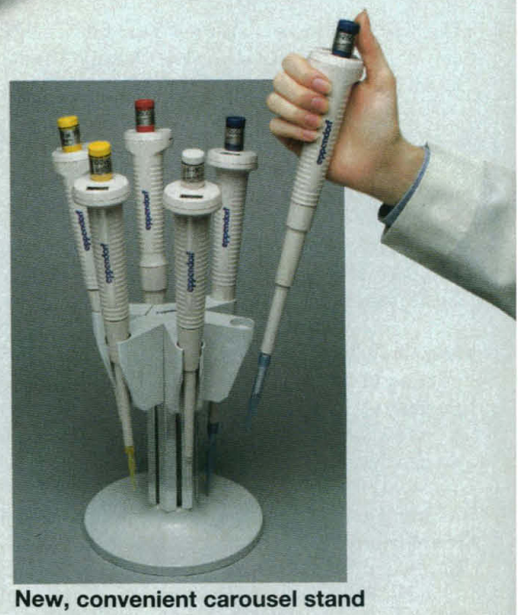

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edited by PHIL SZUROMI

Reactive plasma profile

Reactive plasmas are being used in applications such as depositing diamond films, but the harsh plasma environment can make characterization of the types of chemical species and their spatial distribution difficult. Green *et al.* (p. 1726) have developed a nonlinear optical spectroscopic method that they have used to determine the concentration profiles of CH and C_2 radicals. The rise and fall in CH concentration over the deposition surface is in good agreement with the results of a one-dimensional numerical simulation.

Oxygen in minerals

Oxygen isotopes are commonly used to trace fluid-rock interactions during high-temperature metamorphism. New techniques are allowing investigations of interactions at smaller and smaller scales. Valley and Graham (p. 1729) used the ion microprobe, which allows analyses from a spot 8 micrometers across, to map variations in oxygen isotopes within a magnetite that had undergone high-grade metamorphism (about 775°C and 7.5 kilobars). Dramatic variations in isotopic composition of up to 9 per mil were observed irregularly across the grain. In contrast, a nearby grain showed a variation only along the margin. The large irregular changes may be related to healed microcracks that allowed local fluid infiltration into the crystal during cooling.

Oxygen in the oceans

The chemical and isotopic composition of seawater is influenced by sea-floor volcanism, global tectonics, and Earth's climate. The record of the composition of seawater preserved in rocks provides a means to evaluate past variations in these processes. Whether the oxygen isotopic composition of seawater was different during the Precambrian has been controversial. Holmden and Muehlenbachs (p. 1733) show that the isotopic record of seawater-rock interactions in a 2-billion-year-old ophiolite—a preserved piece of the Precambrian oceanic crust—is similar to that of younger ophiolites and modern ocean crust. These data imply that the oxygen isotopic composition of seawater was not different 2 billion years ago and that rates of sea-floor spreading then were comparable to the rates observed at present.

Fighting several flu strains at once

Each year brings another strain of influenza virus and another vaccine for generating protective antibody immunity. Ulmer *et al.* (p. 1745; see news story by Cohen, p. 1691) present an alternative strategy based on producing a cytotoxic T lymphocyte (CTL) response. The viral antigens that produce this response need not be of the surface of the virus, and thus conserved antigen sequences, such as those of nucleoprotein, could be used. However, such CTL responses are usually elicited by expression of the antigen within the host. Instead of directly delivering viral peptides or viral vectors, plasmid DNA encoding influenza A nucleoprotein was injected into BALB/c mice. These mice were protected against a vital challenge that included several different influenza A strains.

Soluble subunits and receptor activity

Ciliary neurotrophic factor (CNTF) is a peptide that promotes survival or differentiation, or both, of a variety of cells in the nervous system. The receptor for CNTF has multiple components, some of which are shared with the receptors for related growth factors. The CNTF-binding α subunit, CNTFRα, is anchored to the cell membrane by a glycosylphosphatidylinositol linkage that allows it to be released in a soluble form. Davis *et al.* (p. 1736) provide evidence that the CNTFRα subunit is required for signaling by CNTF. Furthermore, cells that do not synthesize CNTFRα but do make the other components of the receptor can become responsive to CNTF if soluble CNTFRα is also present.

Immunity and IFN-γ

Interferon-γ (IFN-γ) stimulates a number of immune system responses; two reports show that mice which lack either IFN-γ or its receptor appear to develop normally but have deficient natural resistance to bacterial and viral infection (see news story by Barinaga, p. 1693). Dalton *et al.* (p. 1739) found that mice which lack IFN-γ could be killed by a normally sublethal dosage of an intracellular pathogen, *Mycobacterium bovis*. Defects in their immune system included reduced production of antimicrobial agents by macrophages. Huang *et al.* (p. 1742) challenged mice that had no functional IFN-γ receptor with microbial and viral pathogens and found that IFN-γ is necessary for producing a normal antigen-specific response by immunoglobulin G2a antibodies.

Sudden shifts

Many Gram-negative bacteria such as *Escherichia coli* respond to starvation conditions by entering a stationary phase in which their numbers cease to increase. These bacteria remain metabolically active and express a distinct set of proteins that, for example, can help protect the cell against environmental stress. Zambrano *et al.* (p. 1757) found that when cells from cultures aged for 10 days were mixed with young cells, the aged cells took over the population. Genetic analysis revealed that this phenotype that grew at the expense of young cells had a frameshift mutation in the *rpoS* gene, which expresses the putative stationary phase–specific σ^S factor. Although the total number of cells in stationary phase cultures may remain static, dramatic population shifts between strains can be taking place.

Kinases and cell arrest

Before fertilization, the eggs of vertebrates are arrested in metaphase II of the meiotic cell cycle. Frog eggs arrested at this stage contain cytostatic factor (CSF), which can cause metaphase arrest when it is injected into blastomeres of fertilized eggs. The Mos^{xe} proto-oncogene product, a serine-threonine kinase, appears to be one component of CSF. Gabrielli *et al.* (p. 1766) found that inhibition of the synthesis of cyclin-dependent kinase 2 (Cdk2) prevented arrest in metaphase II. When they injected Cdk2 into oocytes during meiosis I, which contain Mos^{xe} but have low levels of Cdk2, the cells arrested in metaphase I. Their results suggest that metaphase arrest results from activation of both the Mos^{xe} and Cdk2 protein kinases.

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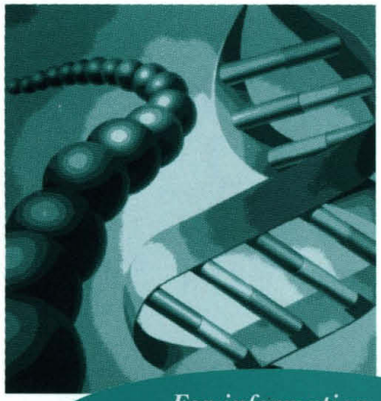

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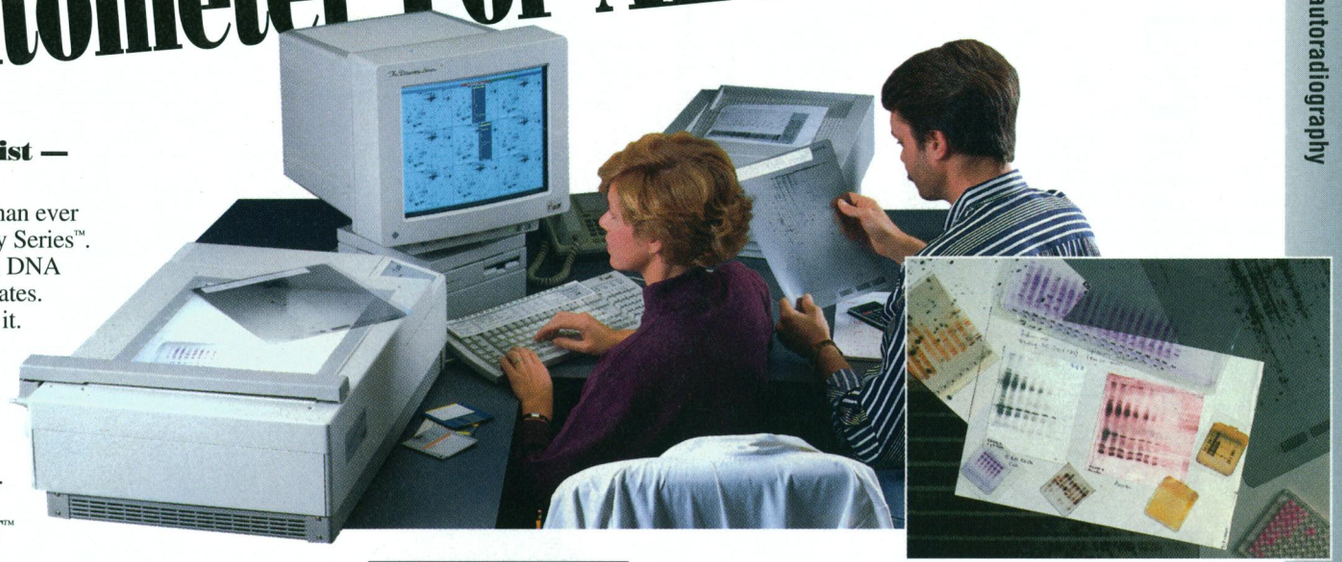
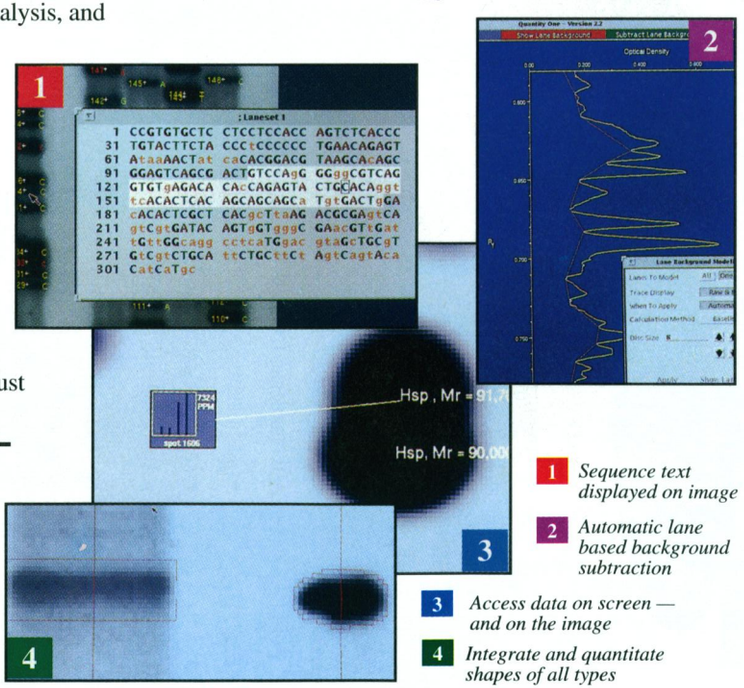


The Densitometer that analyzes all images...

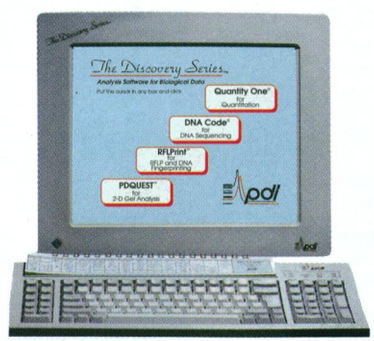


1 *Sequence text displayed on image*

2 *Automatic lane based background subtraction*

3 *Access data on screen — and on the image*

4 *Integrate and quantitate shapes of all types*



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