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6 JUNE 1997
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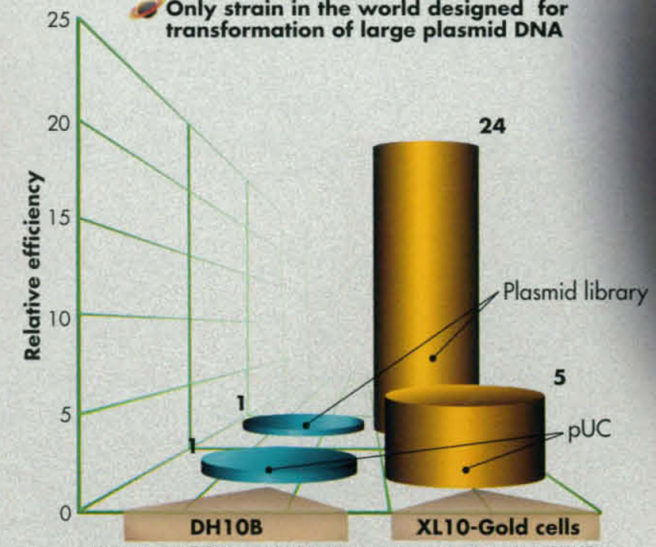

Equal amounts of pUC DNA or a cDNA ligation mixture were transformed into DH10B or XL10-Gold competent cells according to manufactures instructions. Efficiency (cfu/µg DNA) was calculated. Relative transformation efficiency for pUC and the cDNA ligation were determined seperately.

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*Patent pending

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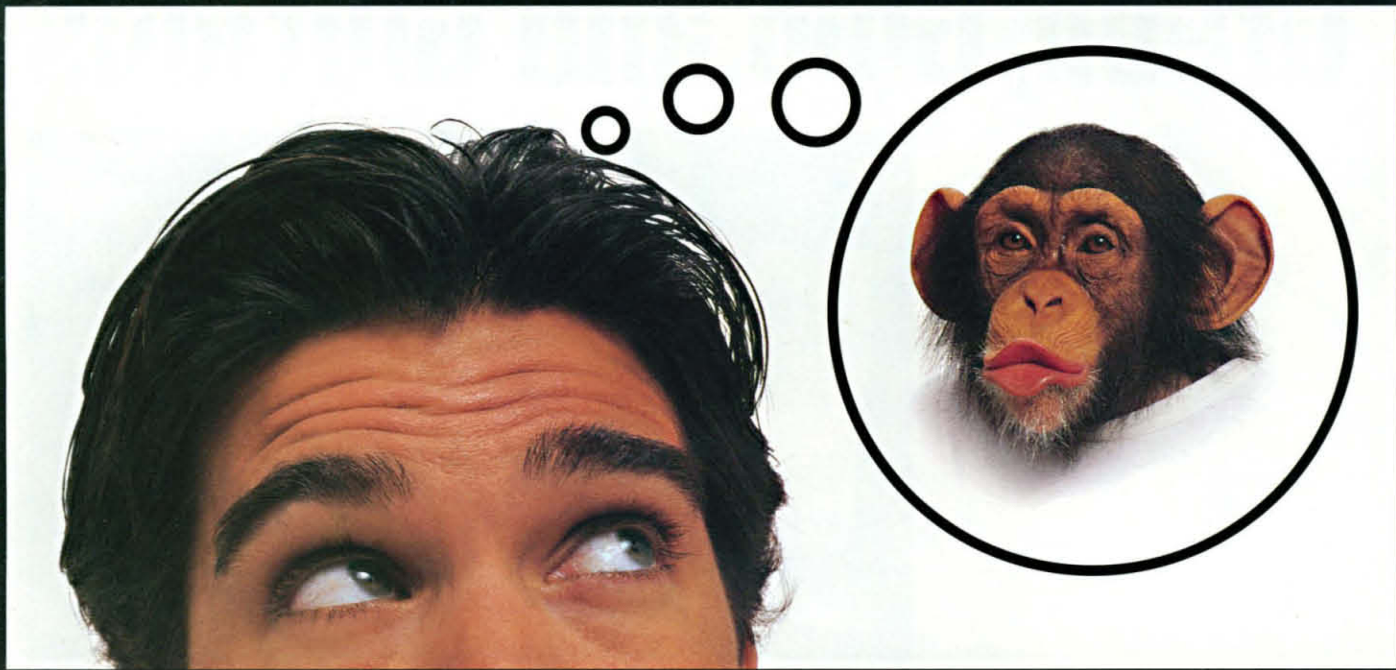

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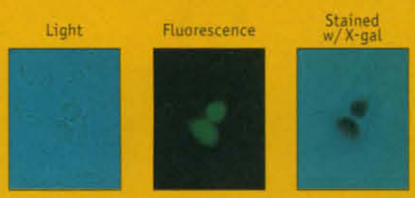

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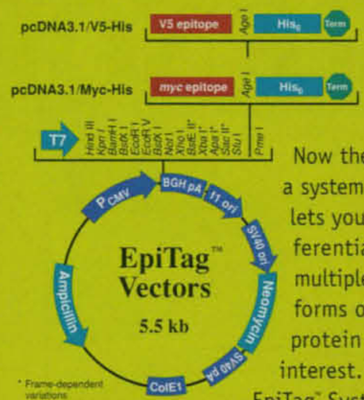

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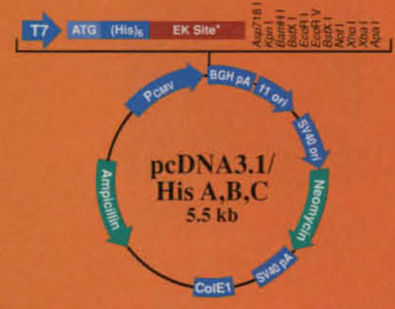

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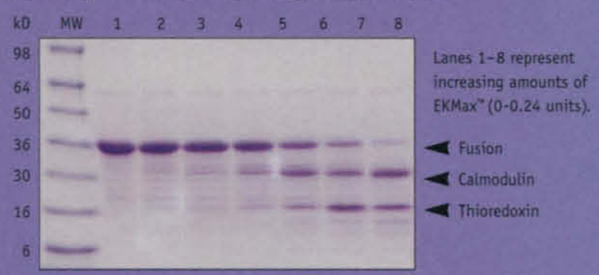

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pSecTag A,B,C	5.2	CMV	Secreted expression	V900-20

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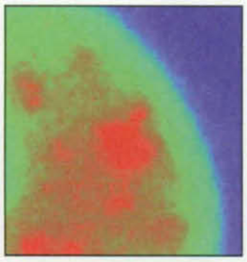

1495
Coordination in the nucleus

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Sexual pheromones in flies

NEWS & COMMENT

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DEPARTMENTS

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COVER

Ruth and Annié Nyström are 93-year-old monozygotic Swedish twins who are participants in "OCTO-Twin," a longitudinal study on genetic and environmental influences on individual differences in aging funded by the National Institute on Aging. The study involves same-sex twins 80 or more years of age and measures a broad array of behavioral variables. The report in this issue focuses on cognitive functioning. See page 1560 and the related Perspective on page 1522. [Collage: Preston Morrighan, also an identical twin]

REPORTS

TECHNICAL COMMENTS

M. ANTON

1501 & 1543
Heads up for early birds

◩ **Indicates accompanying feature**

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THIS WEEK IN SCIENCE

edited by PHIL SZUROMI

Our not-so-icy moon?

When the Clementine satellite was used to bounce radar signals off the moon for detection here on Earth, the signals from the lunar polar regions were suggestive of ice, which perhaps was in shadowed craters. Stacy *et al.* (p. 1527) have used the Arecibo radar system and detected a radar signal similar to that seen in the Clementine experiment. However, they also mapped the lunar poles at a higher resolution than Clementine and determined that some of the areas that produced the unusual radar signal are in sunlight. Rather than being an ice signature, the authors suggest that the radar signal is due to surface roughness.

■

Green spectroscopy

Atmospheric scientists have long observed and used the green nighttime emission at 5577 angstrom wavelength to study the Earth's ionosphere. The source of this emission has been thought to be molecular oxygen ions (such as O_2^+), which are created by daytime solar ultraviolet exposure but recombine with electrons and dissociate at night. Direct measurement of the recombination processes from different electronic states that might produce the green light has proven difficult. Kella *et al.* (p. 1530), using an imaging technique at a heavy-ion storage ring, directly measured the yield of oxygen atoms in the ^1S excited state from O_2^+ and found that the yield is greater than theory would predict. This measurement should help to reconcile inconsistencies between atmospheric models and observations for planetary ionospheres of Earth and other planets.

Sending out the wrong signals

In the fruit fly *Drosophila*, the gene *transformer* controls sexual characteristics. Expression of *tra* in certain areas of the brain of a male can change his sexual orientation to that of a female. Ferveur *et al.* (p. 1555) expressed *tra* selectively in abdominal endocrine cells of *Drosophila*, the oenocytes, which changed the pheromone profile on the surface of the fly from that of a male (monoenes) to that of a female (dienes). These flies have normal male sexual orientation but elicited inappropriate courtship behavior from other males (as if they were female). These results emphasize the multifaceted nature of the genetic control of behavior.

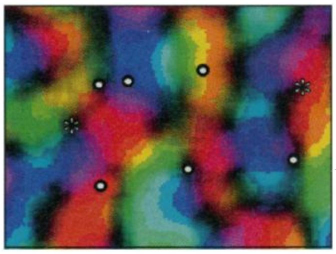
Simpler solitons

In a nonlinear medium, solitary waves (or solitons) can propagate for long distances yet retain their shape. Conventional models of solitons are mathematically very complex, even more so when soliton interactions such as collisions are involved. Snyder and Mitchell (p. 1538; see the Perspective by Shen, p. 1520) report a model in which the complexity can be radically simplified. With this model, the authors offer a straightforward analysis of soliton collisions. Moreover, they suggest the possibility of a photonic switch in which light is controlled by light.

■

Visual cortex connections

A central tenet of visual processing is that neurons in the primary visual cortex respond strongly to lines of a single orientation and weakly or not at all to lines of other orientations. The neurons are grouped by their preferred orientation in columns extending into the deeper cortex, and these columns appear to be arrayed circularly when viewed with optical imaging from above the cortical surface, yielding a pinwheel-like arrangement. The central parts of these pinwheels revealed little orientation-specific activity, suggesting that nonselective neurons might exist. Maldonado *et al.* (p. 1551)



have combined optical imaging with multielectrode recordings to show that the orientation preferences of the columns do project faithfully into the center of the pinwheel, in much the same fashion as the spokes of a wheel meeting at the hub. How the connectivity and selective response of these central neurons are established and maintained still remain to be determined.

■

Bird evolution

Archaeopteryx has been one of the key fossils in terms of understanding the early evolution and origin of birds, in part because the fossils are beautifully preserved and also contain dramatic feather imprints. Sanz *et al.* (p. 1543; see the news story by Morell, p. 1501) describe the fossil of a nestling bird from Spain that contains feather imprints but also provides a clear view of the neck and head. The fossil evidence and comparison with *Archaeopteryx* implies that the distinctive bird skull did not evolve until late in their evolution.

■

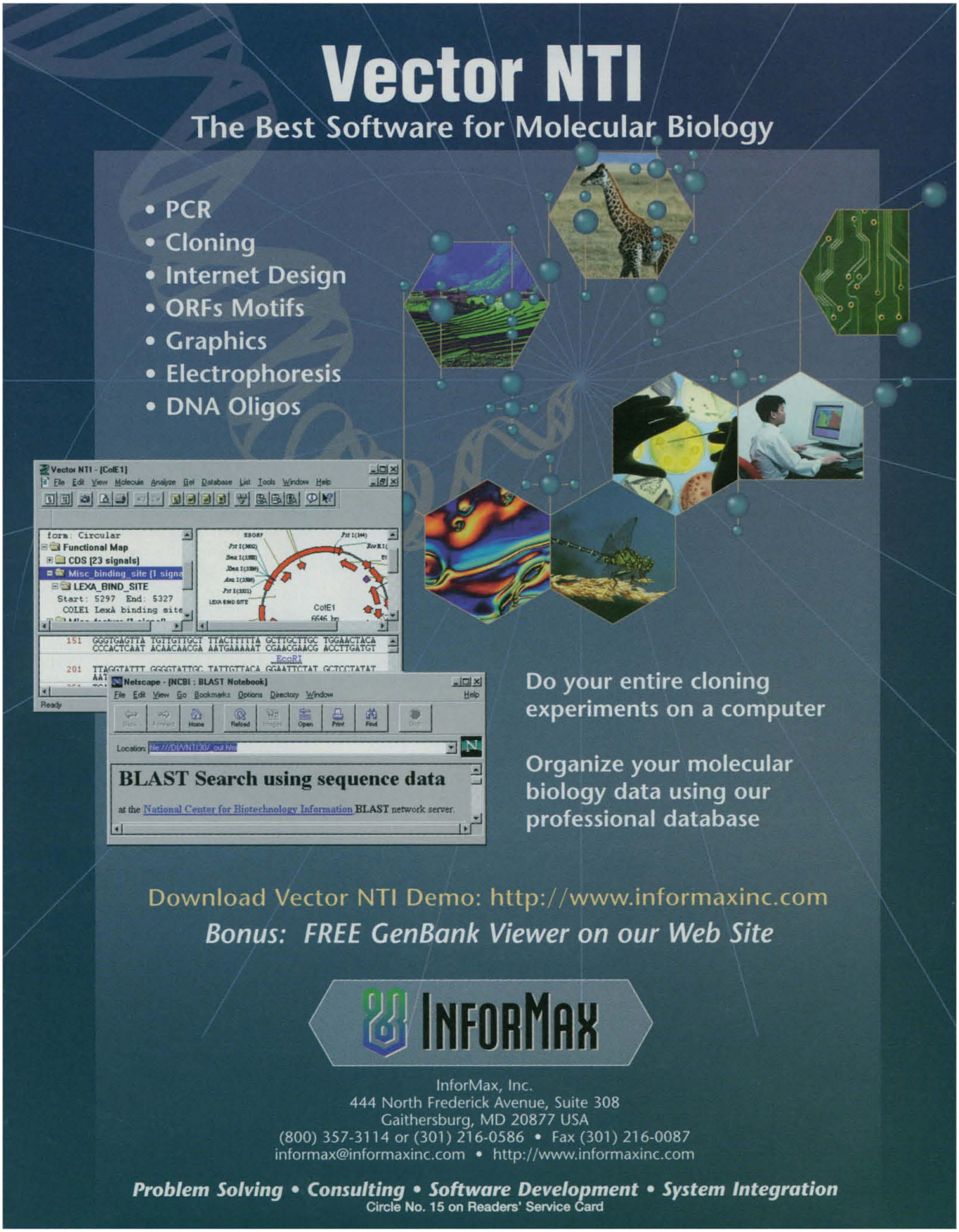
Self avoidance

After a pollen grain lands on the flower's stigma, it takes up water and begins the growth process that leads eventually to a fertilized seed unless the pollen and flower are incompatible. Certain species of plants have a self-incompatibility system that ensures that pollen from the same flower cannot function, allowing pollen transported in from other flowers, with a new set of genes, to fertilize the flower. Thus, the problems caused by excessive inbreeding are kept to a minimum. Ikeda *et al.* (p. 1564) identified mutations in a protein, MOD, that can suppress self-incompatibility; MOD has features that suggest it may transport water across the cell membrane.

■

Acid and plants

Agricultural productivity can be lower in excessively acidic soils, a problem that affects about 40 percent of arable land. Although treatment of the soil can help, another approach is to develop plants with greater tolerance. De la Fuente *et al.* (p. 1566; see the news story by Barinaga, p. 1497) have demonstrated that transgenic plants carrying a bacterial gene that supports overexpression and release of citric acid are more resistant to one of the problematic aspects of acidic soil—that of excess soluble aluminum.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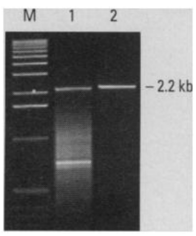

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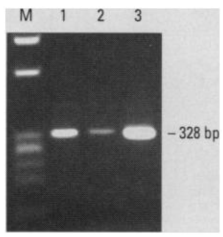
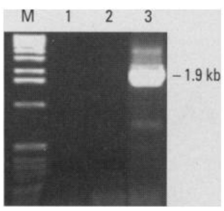
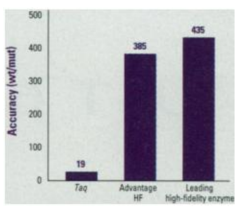


Clean, robust amplification in RT-PCR expression analysis of a low abundance transcript.



Advantage-GC (Lane 3) amplifies a 69% GC template that blocks standard PCR (Lane 1) and PCR with DMSO (Lane 2).



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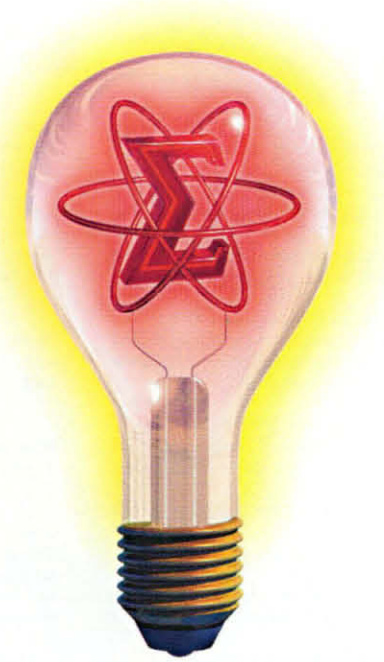

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PRODUCTS & MATERIALS

Elution Medium

ActiSep is a nondenaturing, neutral elution medium used to recover antibodies from immunoadsorbents and protein A resins without the loss of biological activity. ActiSep gently releases antibodies by individually breaking up the multiple interactions between the antibody and the antigen/protein A. ActiSep preserves the biological activity of antibody/antigen while increasing the longevity of the immunoadsorbent and improving the economy of purification by a factor of 10. It is nontoxic. **Sterogene. For information call 800-535-0735 or circle 142 on the reader service card.**

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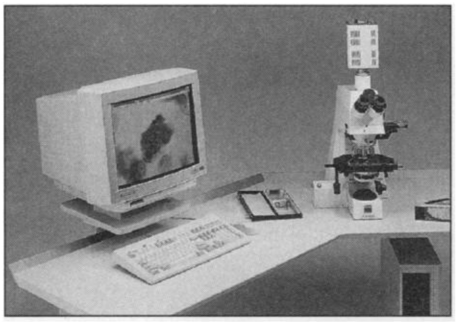
Image Analysis Software



The KS 400 series is high-end image analysis software in modular configuration that enables users to purchase a system that meets their budgets and to later add additional capabilities. Applications include a wide variety of image measurements, processing, and archiving in material analysis, industrial inspection, process and quality control, and cell and tissue analysis. A new feature is the adaptive classifier, which permits classification of objects according to specified parameters and checks divergence automatically. All inputs can be entered by mouse or digitizer, which is especially advantageous when the user wants to measure object contours. **Kontron Elektronik. For information call 800-566-8766 or circle 143 on the reader service card.**

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Chemiluminescent Protein Immunoblot Kit

Immun-Star chemiluminescent protein immunoblotting kits produce a light signal that lasts more than 24 hours after activation, providing flexibility in gathering data. Exposure times are typically 30 s to 5 min on either nitrocellulose or polyvinylidine fluoride membranes. Sensitivity ranges to 10 pg, which helps detect hard-to-find proteins. **Bio-Rad Laboratories. For information call 510-741-1000 or circle 144 on the reader service card.**

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Laboratory Automation Software

POLARA (Programming Architecture for Laboratory Automation) software provides laboratories in the biotechnology, pharmaceutical, food, and chemical industries with a powerful, flexible tool for building and operating automated systems. The software's graphical user interface provides a single point of contact for creating, scheduling, running, and monitoring methods. The underlying software architecture allows automated systems to be easily modified or extended as application requirements change. The interface runs under Windows NT. **CRS Robotics. For information call 800-365-7587 or circle 145 on the reader service card.**

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Signal Transduction Pathway Reporting Systems

The PathDetect reporting systems are designed for specific, rapid, and convenient assessment of the in vivo activation of signal transduction pathways. These reporting systems can be used to study the in vivo effects of new genes, growth factors, and drug candidates on the activation of signaling molecules and kinases. **Stratagene. For information call 800-424-5444 or circle 146 on the reader service card.**

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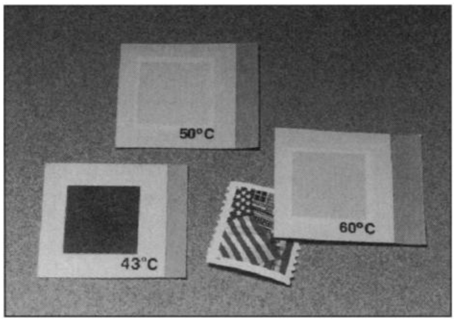
Temperature-Indicating Labels

The 900 Series labels for temperature-sensitive goods provide a permanent record of when a temperature has been exceeded during shipping or storage. The labels record when the temperature exceeds 43°C (Model 943), 50°C (Model 950) or 60°C (Model 960). When the ambient temperature reaches the calibrated temperature of the label sensor, the indicator window turns irreversibly from silver to black. **Telatemp. For information call 800-321-5160 or circle 147 on the reader service card.**



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Literature

Lab Instrumentation and Equipment 1997 Master Catalog is a 300-page publication featuring more than 1000 new products from a group of manufacturers including OHAUS, Corning, Oakton, Hanna, Orion, Nalge, Kimble, and many more. Product lines include pH meters and monitors, glassware and plasticware, balances, centrifuges, thermometers, microscopes, and electrophoresis equipment. **Whatman. For information call 800-942-8626 or circle 148 on the reader service card.**

FMC BioProducts Catalog 1997 provides detailed information on agarose, precast gels, and products for DNA sequencing, mutation detection, and DNA and protein electrophoresis. An expanded technical section features detailed protocols. **FMC BioProducts. For information call 800-521-0390 or circle 149 on the reader service card.**

Radiomatic Flow Scintillation Analyzers: Beyond Traditional Radio-HPLC Detectors describes a line of counters for high-performance liquid chromatography with such features as electronic background discrimination, multichannel analysis, and luminescence detection and correction for maximum counting sensitivity. **Packard. For information call 800-323-1891 or circle 150 on the reader service card.**

Newly offered instrumentation, apparatus, and laboratory materials of interest to researchers in all disciplines in academic, industrial, and government organizations are featured in this space. Emphasis is given to purpose, chief characteristics, and availability of products and materials. Endorsement by *Science* or AAAS is not implied. Additional information may be obtained from the manufacturers or suppliers named by circling the appropriate number on the Readers' Service Card and placing it in a mailbox. Postage is free.