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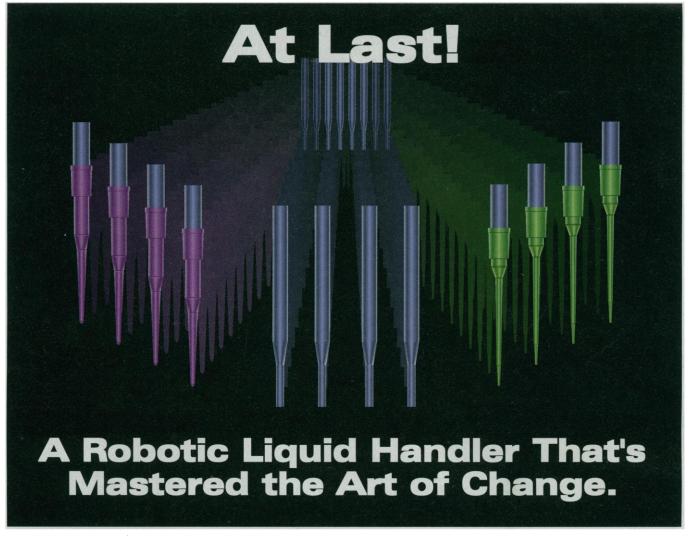
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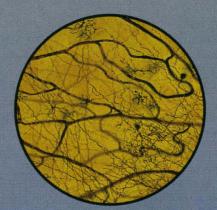


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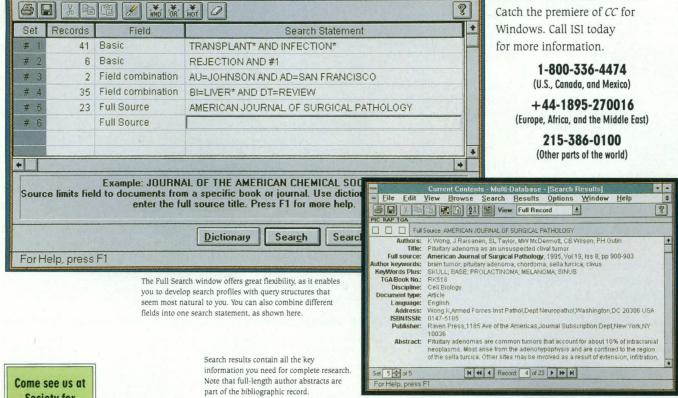
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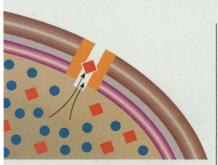
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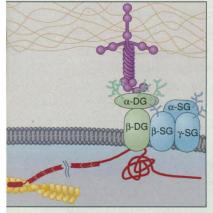
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Putting a Lock on Atoms

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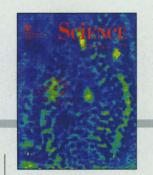
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Columns of neurons (dark blue) responding to a particular orientation of visual stimuli were labeled by the [14C]2-deoxyglucose method in a cat with strabismus. Neurons (red dots) were labeled from a remote site sharing the same orientation and ocular dominance by

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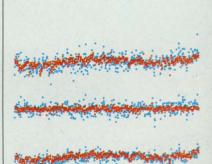
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This Week in Science

edited by PHIL SZUROMI

All pumped up

Porous silicon is an efficient emitter of photoluminescence, compared with the relatively low emission from bulk or smooth surfaces. The mechanism that allows this enhanced emission might involve contributions from quantum confinement in nanocrystallites or excitation and emission from surface chemical species. Chin et al. (p. 776) measured photoluminescence from anodically etched silicon induced by multiphoton excitation with infrared light. The excitation was only effective when the infrared photon frequency matched the vibrational frequency of SiH, surface species. The authors conclude that luminescence is the result of pumping the electronic excitation via a vibrational ladder, indicating that surface states play a key role.

Carbon sink

Estimates of the carbon budget seem to imply that forests represent an important sink for anthropogenically produced carbon, but it has been difficult to determine the magnitude of the sink, or which forests are the most important sinks. Grace et al. (p. 778) measured the carbon flux in an undisturbed tropical forest in Brazil over the wet and dry season. The results indicate that this forest ecosystem acted as a net sink for CO₂ in both seasons.

Tilted crystals

Ferroelectric liquid crystals respond to electric field changes rapidly, making them of interest for technological application in computer displays and electrooptical devices. These materials are of special interest be-

Control of circadian rhythms

The timeless (tim) and period (per) genes are necessary for circadian rhythms in Drosophila. Three reports and a news story by Barinaga (p. 732) focus on advances in the study of the tim gene. Myers et al. (p. 805) have cloned and sequenced tim. Sehgal et al. (p. 808) have found that tim RNA is expressed in a circadian manner in a pattern identical to that of per RNA. This expression is dependent on the presence of PER and TIM proteins. Gekakis et al. (p. 811) show that PER interacts with TIM by way of a PAS dimerization domain in PER and that this interaction is disrupted in mutations that cause an alteration in the circadian period. These studies suggest that the PER-TIM interaction controls the duration of part of the circadian cycle.

cause they exhibit spontaneous electric polarization, but the origins of the polarization are unclear. Photinos and Samulski (p. 783) report the results from a model that suggests the polarization is the result of constraints on the packing of the molecules. By understanding the origins and implications of such ordering, it may be possible to study the effects of different compositions and thereby design even better ferroelectric liquid crystal devices.

In the wrong place

BRCA1, the protein responsible for hereditary breast and ovarian cancer, has limited sequence similarity with known proteins, so its cellular function has remained elusive. Chen et al. (p. 789) show that in normal breast epithelial cells, BRCA1 is localized in the nucleus, whereas in the majority of breast cancer cell lines and in malignant pleural effusions from breast cancer patients, it is localized mainly in the cytoplasm. These results suggest that BRCA1 can be indirectly inactivated by mislocation in the cytoplasm, and that this mechanism of inactivation may be more common in sporadic breast cancers, which have a

much lower frequency of intragenic mutations than occur in hereditary breast cancers.

Orphan opioid

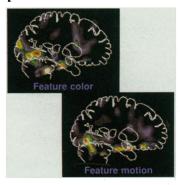
The G protein-coupled receptor known as LC132 is expressed in large amounts in the hypothalamus. Reinscheid et al. (p. 792) identified a new neuropeptide (orphanin FQ) that binds to LC132. Although LC132 has sequence similarity to opioid receptors and orphanin FQ resembles opioid peptides, orphanin FQ was found not to produce analgesia in mice. Rather, it appears to inhibit locomotor activity and to produce enhanced response to pain in some tests. Thus, orphanin FQ may have distinct physiological effects from those of other members of the opioid family.

Jak3 and lymphoid cells

Cytokine receptors are thought to produce their cellular effects in part by activating members of the Janus family of kinases (Jaks). The Jaks phosphorylate and activate transcription factors known as Stats. Three reports clarify the crucial biological roles of Jak3, which is activated by several members of the interleukin receptor family. Nosaka et al. (p. 800) and Thomis et al. (p. 794) describe mice that lack Jak3. Such mice have reduced numbers of B and T cells and associated defects in T and B cell function. Russell et al. (p. 797) describe a human patient who lacks Jak3 and suffers from X-linked severe combined immunodeficiency. The results indicate that Jak3 is essential for proper development of lymphoid cells.

Last place you look

The time required to locate a target object on the basis of a single visual feature, such as its color or rate of movement within a collection of distractor objects is approximately independent of the number of



distractors. However, trying to find an object that has both features takes more time with more distractors. Is this due to the additional time taken to search the visual field serially, or does a parallel search function serve less well with increasing complexity? Corbetta et al. (p. 802) present a functional imaging study in which they localize the cortical areas activated in humans performing the two-feature search process. These areas correspond to those known to participate in spatial shifts of attention, suggesting that the subjects used serial searching.

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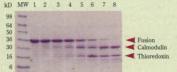
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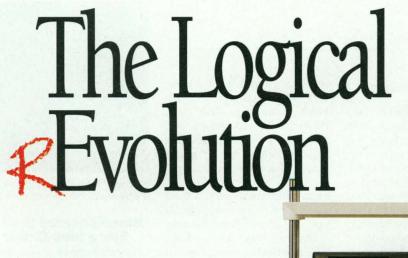
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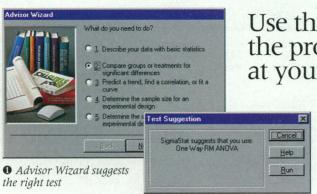
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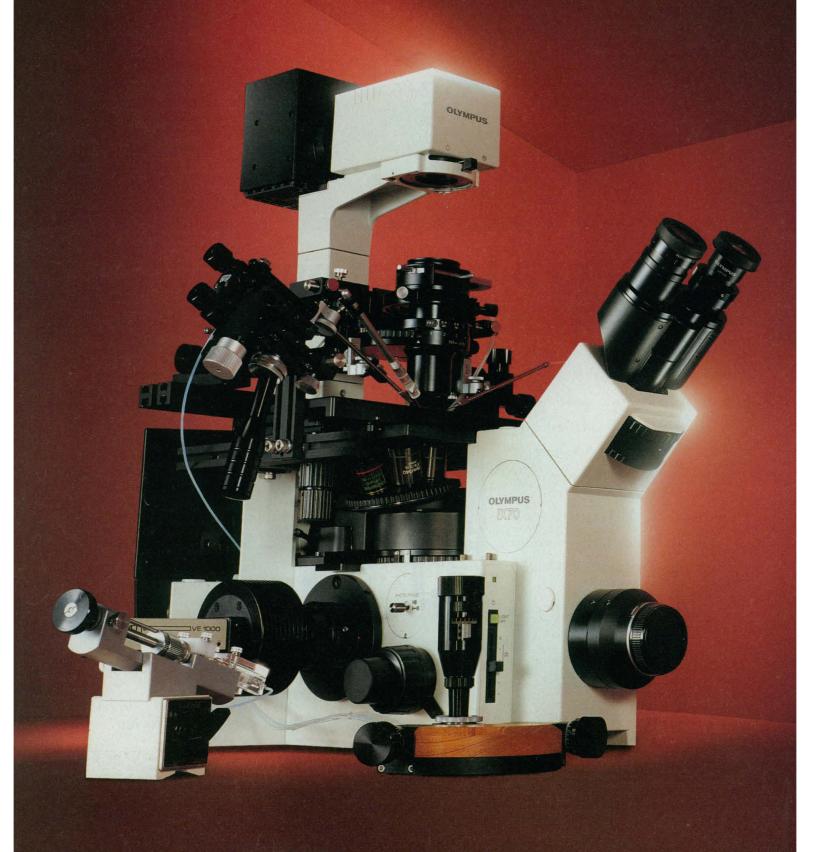


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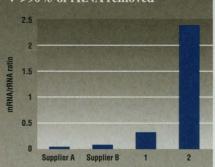


FIGURE. Comparison of mRNA quality purified by three different methods. Amount of GAPDH mRNA was compared to amount of rRNA remaining in each preparation. Supplier A: mRNA isolated by a guanidine isothiocyanate method and single-selection with oligo(dT) cellulose. Supplier B: mRNA isolated by a proteinase K-SDS method and single-selection with oligo(dT) cellulose. 1 and 2: mRNA isolated with the MESSAGEMAKER System and single or double selection with oligo(dT) cellulose.

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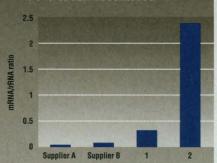
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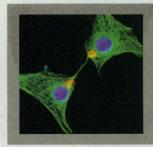
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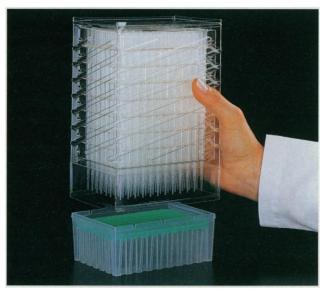
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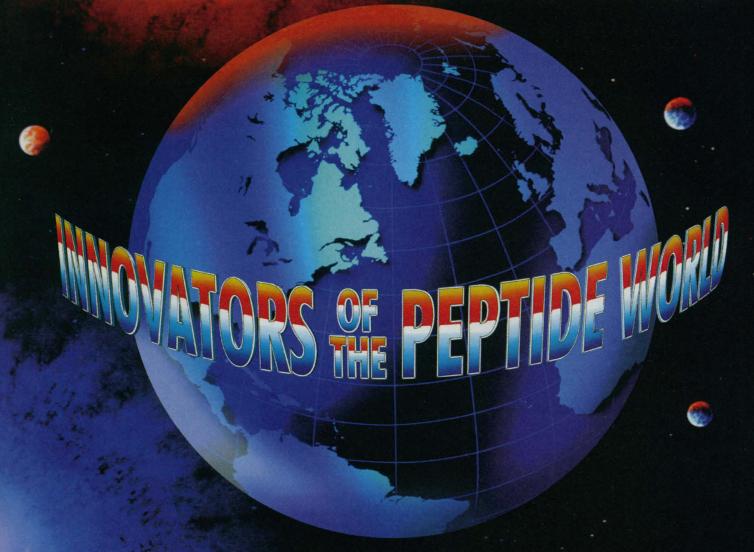
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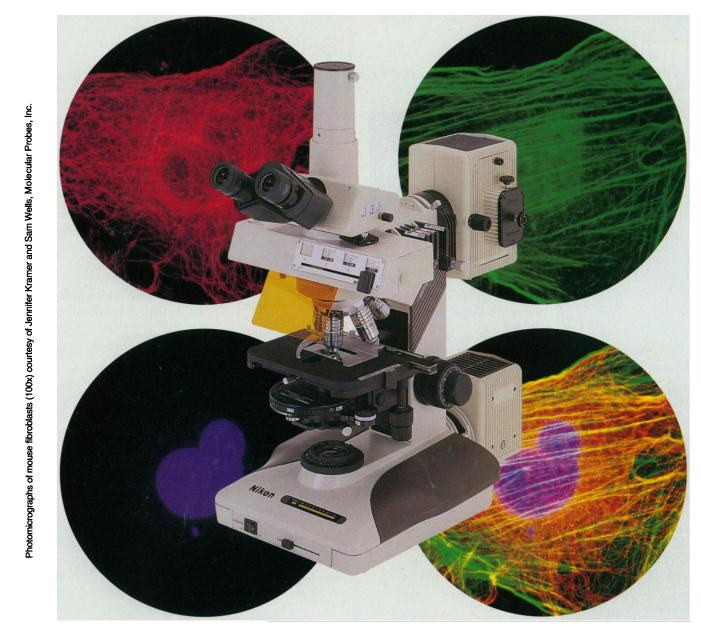
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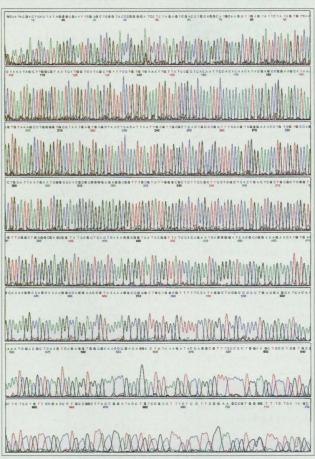
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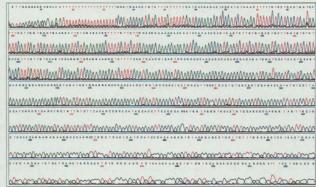
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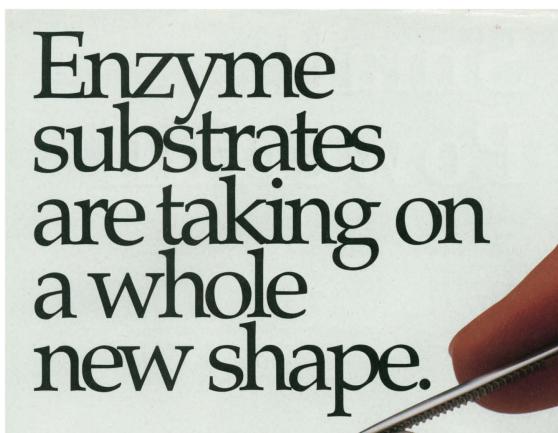
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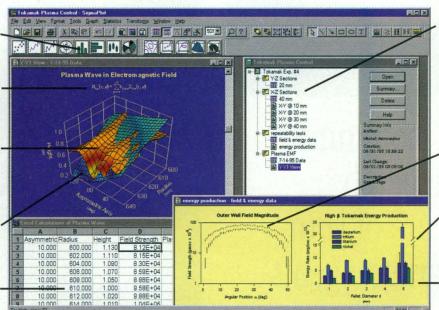
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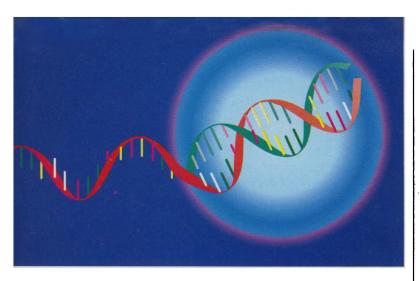
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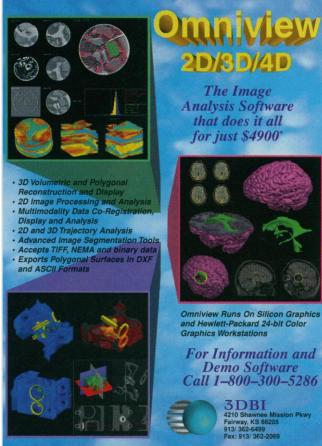
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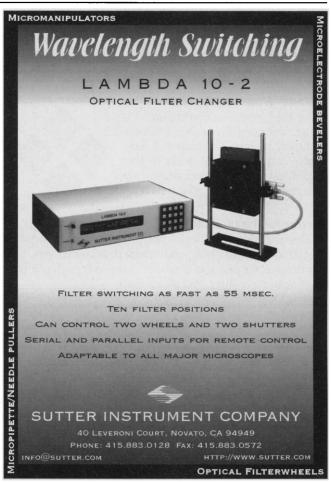
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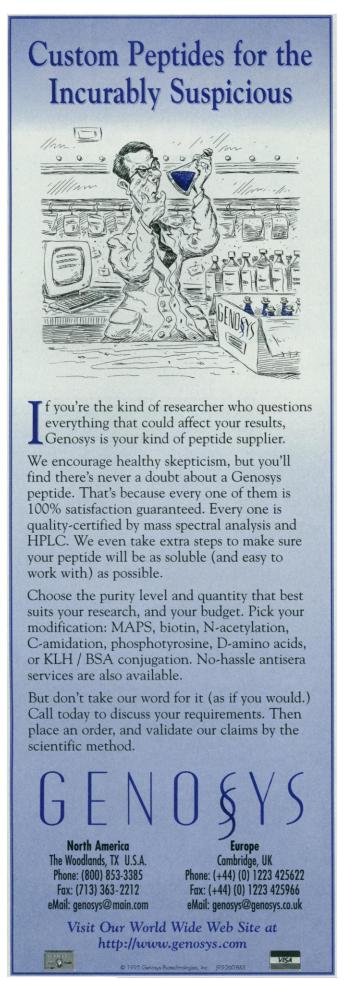
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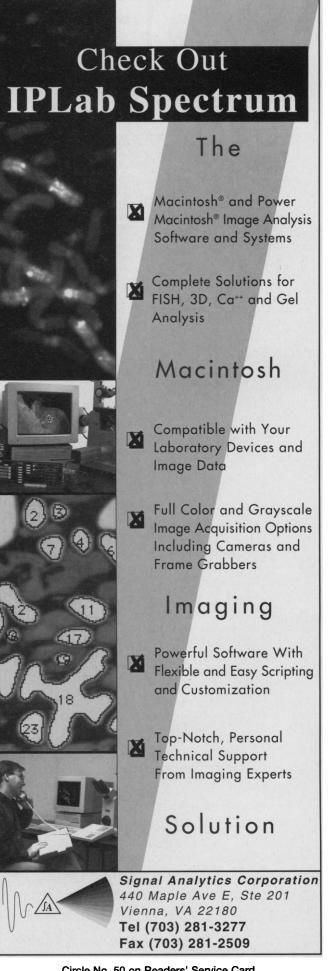


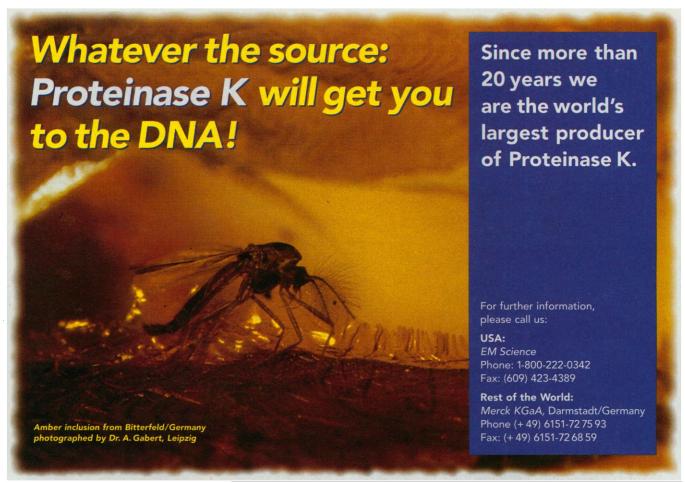
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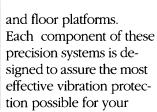
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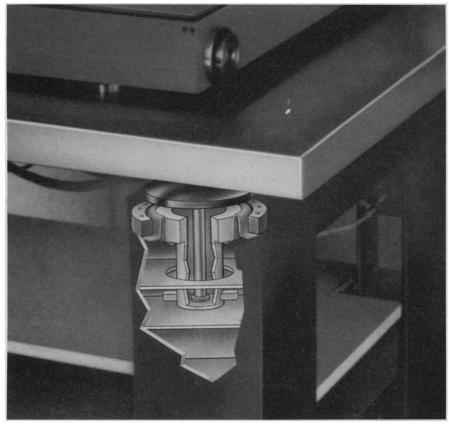
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