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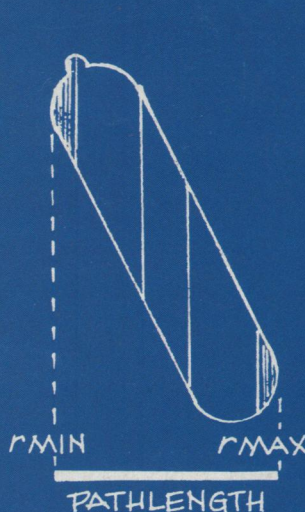
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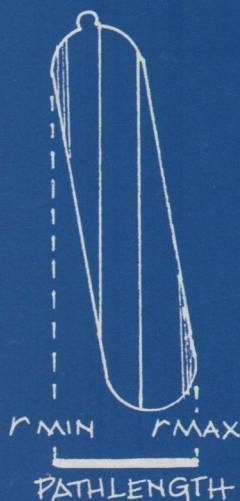
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COVER Thymus from a diabetic rat in which pancreatic islets (light pink clusters) from a foreign strain have been engrafted. The graft caused blood glucose to return to normal. The islets were not rejected, which indicated the immunologically privileged nature of this novel transplant site. The presence of the foreign tissue also induced unresponsiveness to donor strain transplantation antigens. See page 1293 and related news story, page 1248. [Photomicrography by John E. Tomaszewski]

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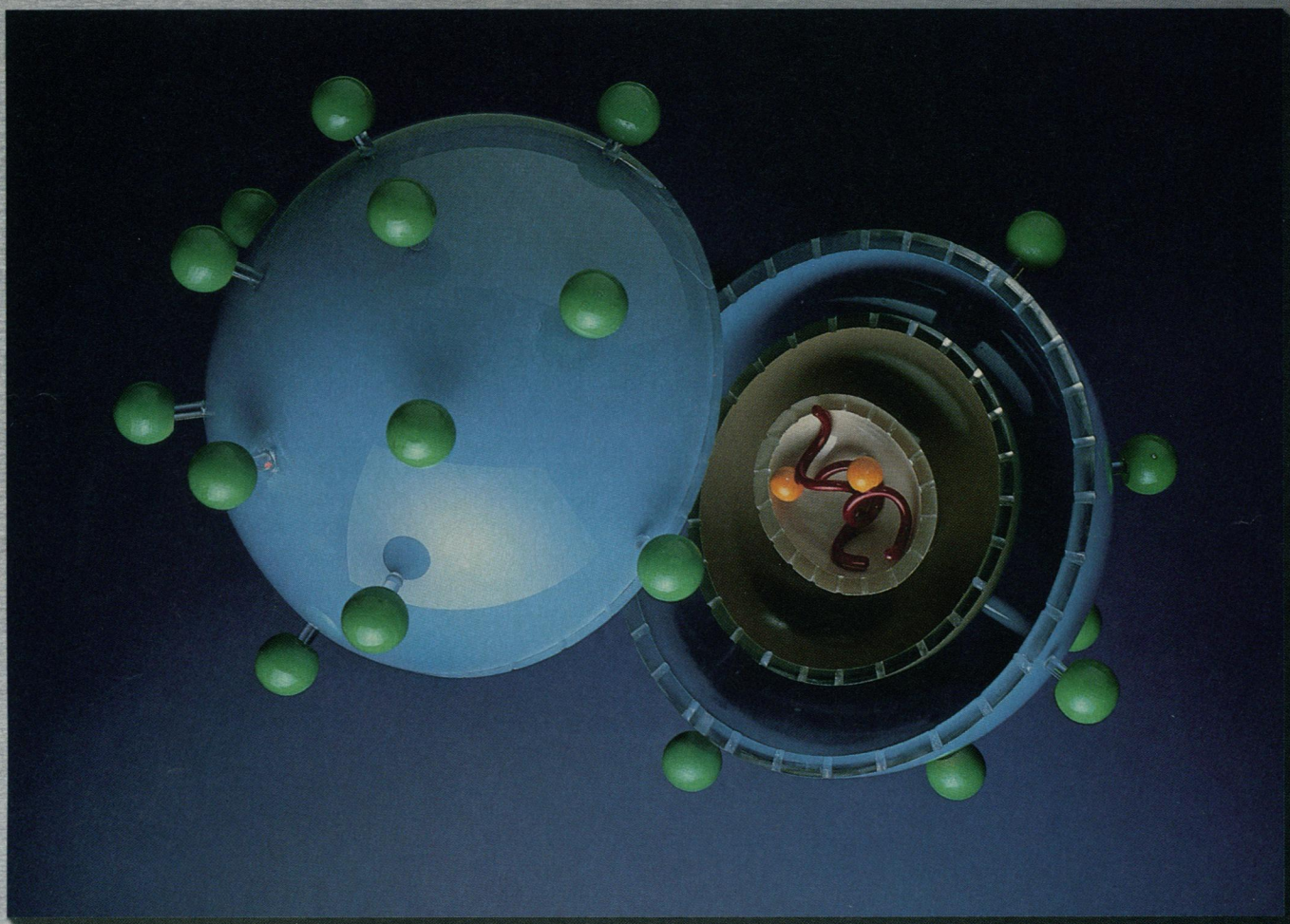
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This Week in SCIENCE

Climate connection

WEST African summer rainfall and Atlantic hurricane activity in the Caribbean and along the southeastern coast of the United States are related: many more intense hurricanes have occurred in years of heavy rainfall than during dry years (page 1251). Although rainfall and hurricanes are regional phenomena, they are manifestations of global-scale events, reflecting the interplay of various physical parameters of atmosphere and ocean circulation. For as long as records are available, there is evidence that the climate in the Sahel cycles between long wet and long dry periods; the most recent drought, from 1970 to 1987, was well publicized. Gray cautions that intense Atlantic hurricanes may soon become more frequent: rainfall in the Sahel has been heavier, a wet period may be beginning, and the drought may have ended. The strongest Atlantic hurricanes (category 3, 4, and 5) cause damage that is a factor of 15 to 25 greater than the damage from milder (category 1 and 2) hurricanes. Extensive coastal development and dramatic growth in population since the last intense hurricane period have greatly increased the potential for destruction and damage from major storms. Awareness is the first step toward improved preparedness and responsiveness by coastal communities and relief agencies.

Water at Venus

EARLY space missions to Venus produced discrepant data on the abundance of water in the atmosphere of the planet. Venus is very hot (750 K at the surface) yet has an extremely dry atmosphere; if Earth were similarly heated, its atmosphere would be very wet. Lewis and Grinspoon reassess spectral data from the Pioneer Venus and Venera 11 and 12 spacecraft in light of a model in which water in the atmosphere can exist not only as water vapor but also locked into sulfuric acid ($\text{H}_2\text{O} + \text{SO}_3 = \text{H}_2\text{SO}_4$) and carbonic acid ($\text{H}_2\text{O} + \text{CO}_2 = \text{H}_2\text{CO}_3$) (page

1273). The new profile of the vertical distribution of free and combined water in the Venus atmosphere suggests the following features: close to the surface most of the water is trapped in carbonic acid; at the cloud base, sulfuric acid is enriched; at altitudes between 19 and 35 kilometers, some 70% of the water may be present as free water vapor. Additional thermodynamic studies and future space probes should provide further tests of the free and bound water distributions on Venus, which may resemble the water distribution of Earth's atmosphere early in its evolution.

Gene therapy

EFFECTIVE gene therapy will depend on getting the right gene to the right place at the right time. A convenient and straightforward method for successfully getting a gene to the right place has been demonstrated in studies by Nabel *et al.* (page 1285); it should be applicable to gene therapy in a variety of diseases as long as the target site is accessible via catheterization. In the prototype studies, a double balloon catheter was used for inserting a reporter gene into the arterial wall of a pig. In one case the gene was carried on a retrovirus; in another the vector was a liposome (a fat vacuole). The reporter gene functioned properly, expressing its protein product at the desired site for many months. Proliferation of helper viruses (a possible drawback of the retroviral vector) was not observed in the area. This technology may be effective for gene therapy in a range of cardiovascular and malignant diseases for which target sites and target genes can be identified.

Islet transplantation

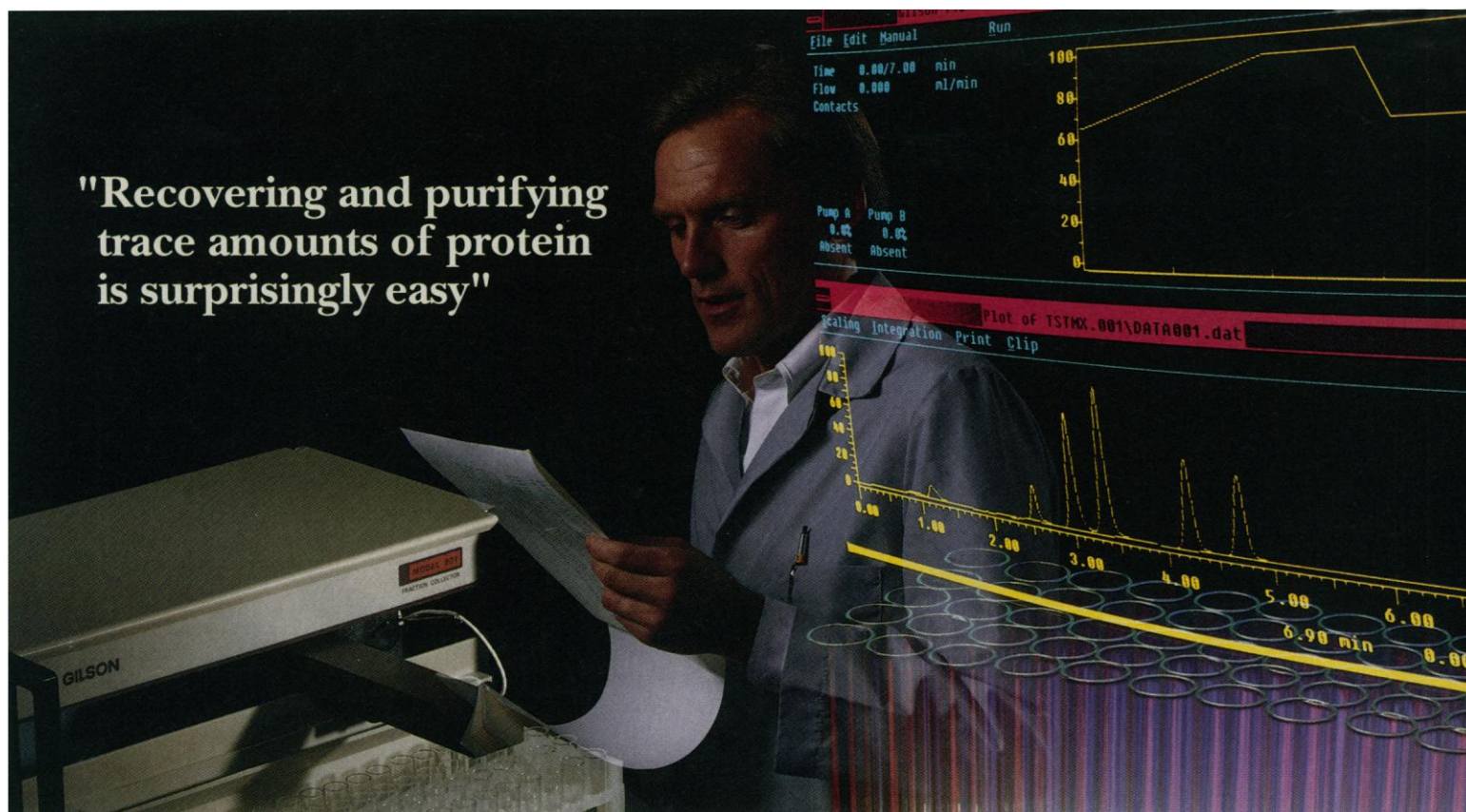
IN theory, it should be possible to reverse diabetes by replacing the dysfunctional pancreatic islet cells with functional ones that can produce insulin, which is needed to regulate glucose levels in the blood. In practice, this approach commonly has been un-

successful because the transplanted islets generally are rejected as foreign grafts. Posselt *et al.* now report on the successful "take" of islet cells in mature rats made diabetic (blood glucose concentration was raised to greater than 300 mg/dl) with the drug streptozotocin (page 1293). Islets were transplanted to the thymus (cover), which proved to be an immunologically "privileged" site. The intrathymic grafts survived permanently; furthermore, subsequent islet transplants to the kidney also were not rejected, suggesting that the initial transplant present in the thymus induced a state of specific immune tolerance to islet cells. It will be a major technical achievement if, in humans too, intrathymic islet transplantation is effective (where other strategies, such as prolonged immunosuppression, were not) in ensuring longterm survival of islet grafts. The clinical potential of intrathymic transplants for therapy in human diabetes and for facilitating general organ grafting is discussed by Skerrett (page 1248).

Natural killer receptors

NATURAL killer cells do just that: they kill a range of virus-infected cells and cancer cells on first exposure to them. How they recognize their targets and how the killer cells are activated are unsolved puzzles. However, a candidate molecule has now been identified that might be responsible for target recognition and cell activation (page 1298). The molecule, a dimer that is probably glycosylated, is present in high density on the surfaces of natural killer cells of rats. When a specific antibody reacts with this surface-bound receptor, the killing ability of the killer cell is triggered. Complementary DNA for these receptors was cloned and the receptors expressed and characterized. Giorda *et al.* note that these receptors are similar to C-type animal lectins, which bind carbohydrates. The natural killer cell receptors may also bind carbohydrates although peptide ligands have not been ruled out.

■ RUTH LEVY GUYER



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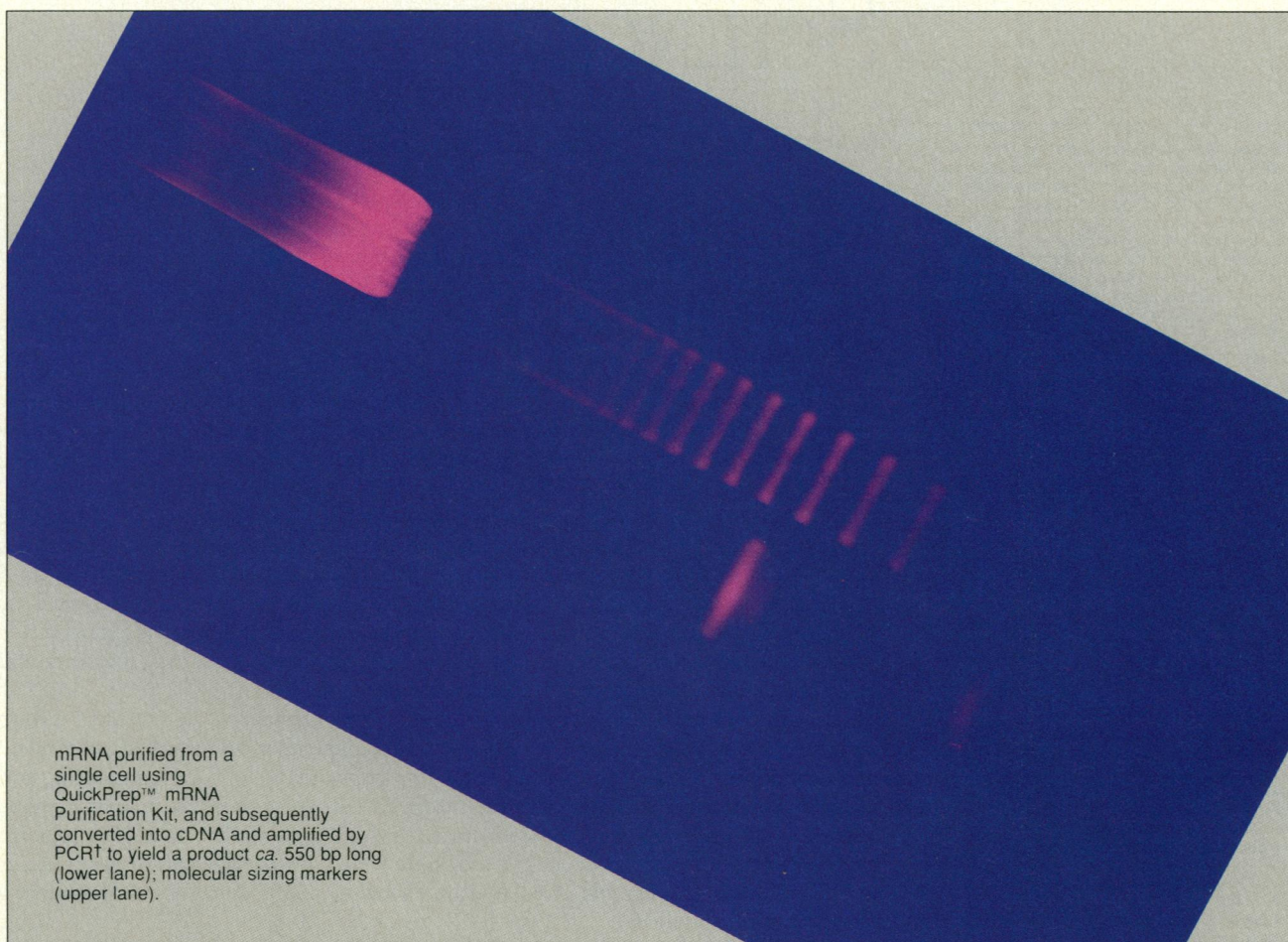
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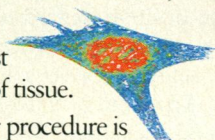
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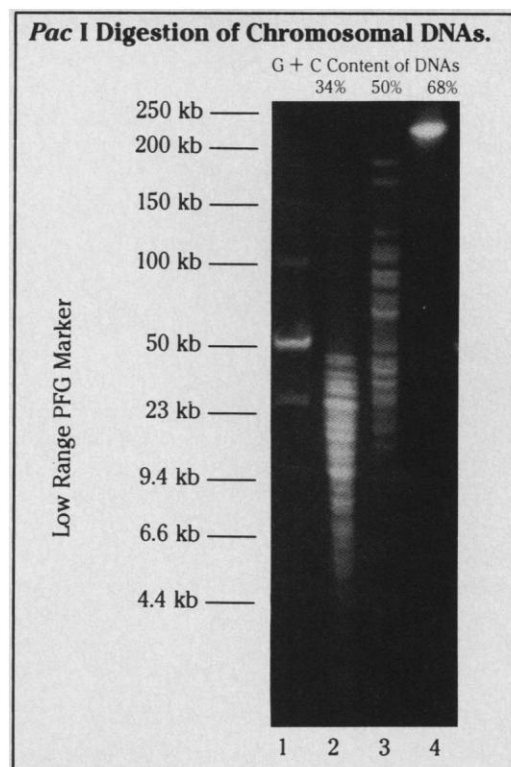
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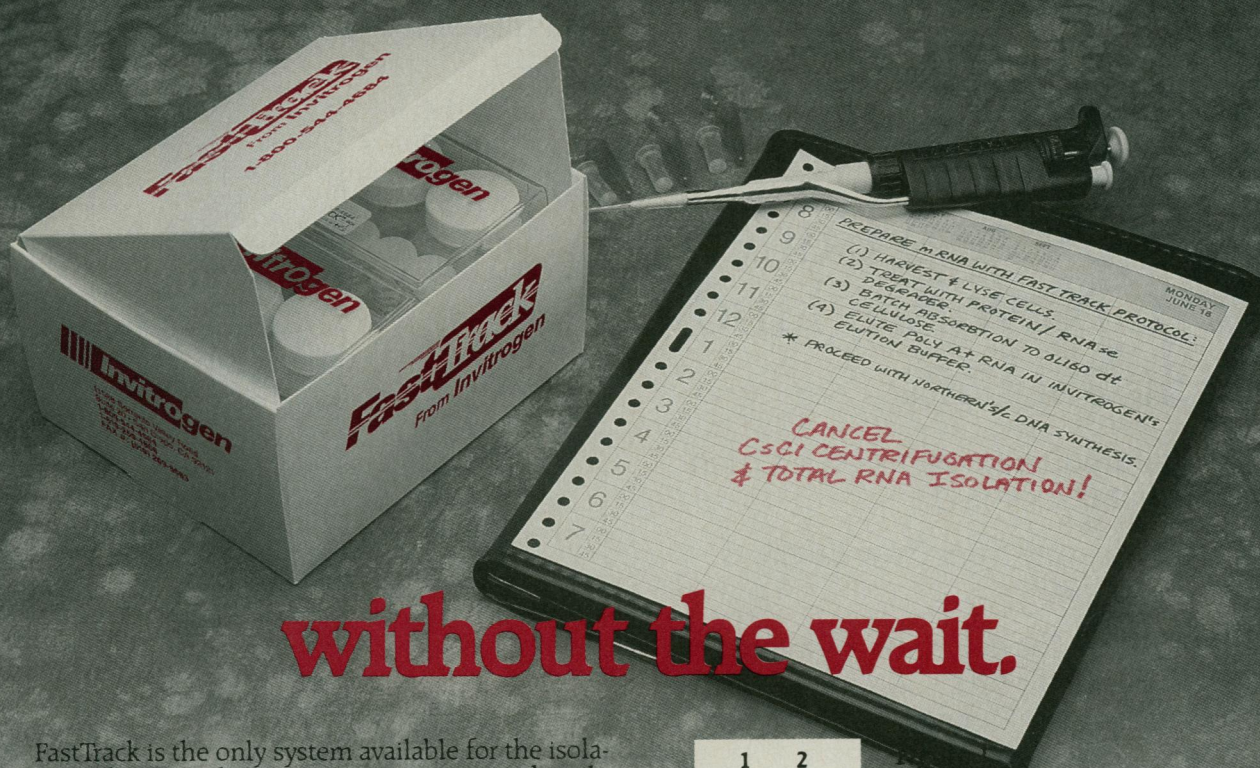
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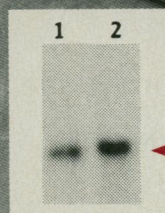


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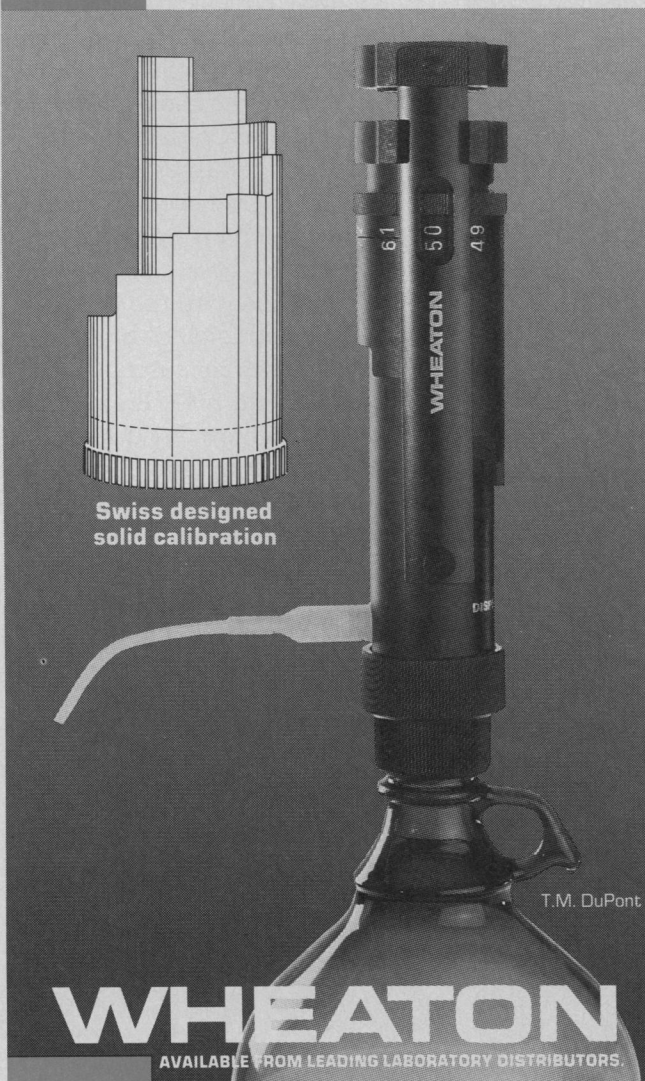
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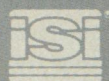
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1. American Council of Life Insurance. 2. The CREF Bond Market and Social Choice Accounts may not be available under all institutional retirement plans, but are available for all Supplemental Retirement Annuity Plans. 3. Lipper Analytical Services, Inc., Mutual Fund Performance Analysis Reports: Growth Funds Index and General Equity Funds Average, ending 6/30/90. 4. The fund was introduced in April, 1988, and has beaten the industry average since May, 1988. Donoghue's Money Fund Averages/All Taxable.

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