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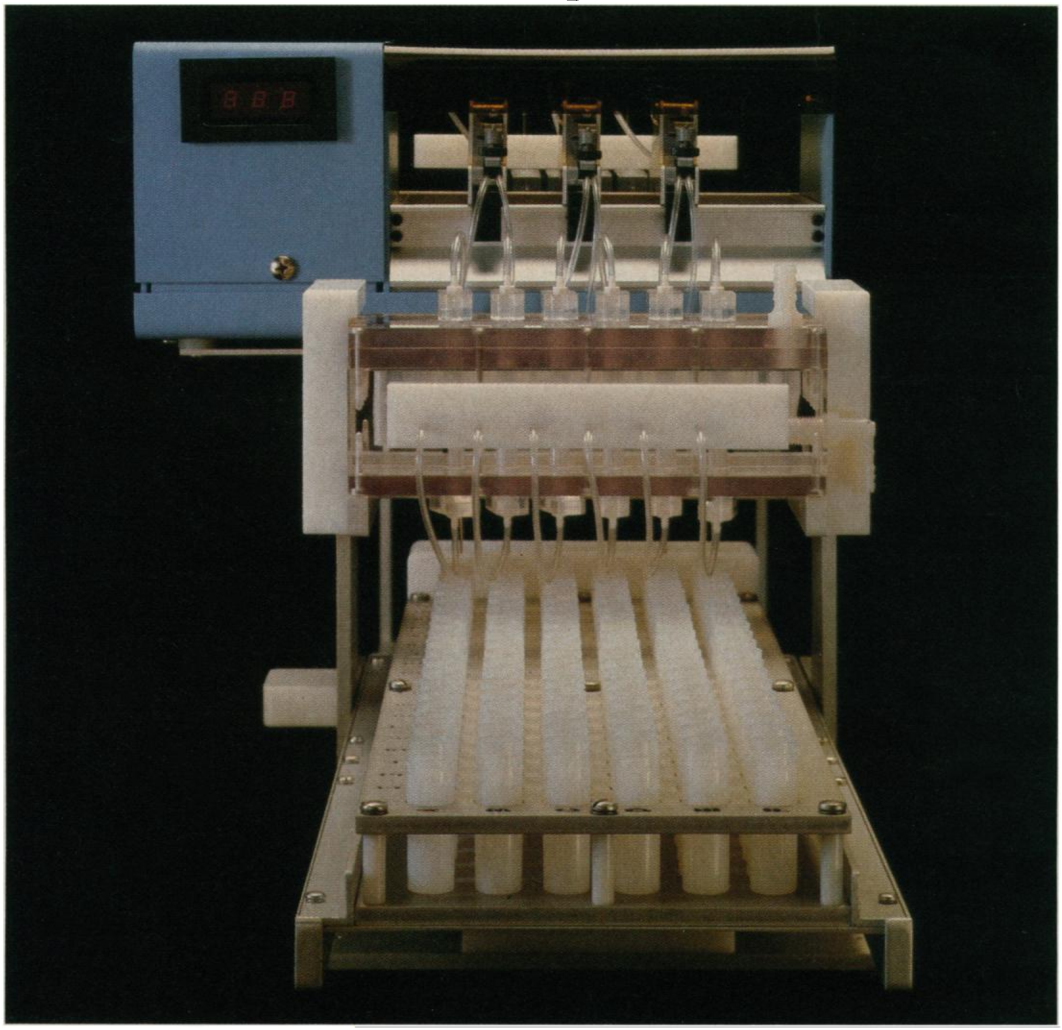

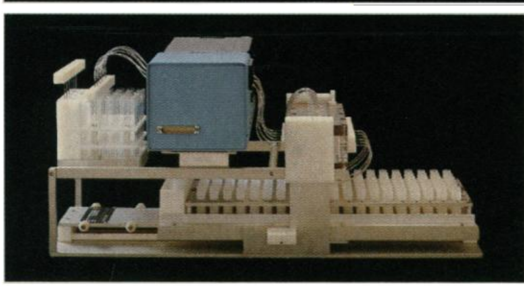

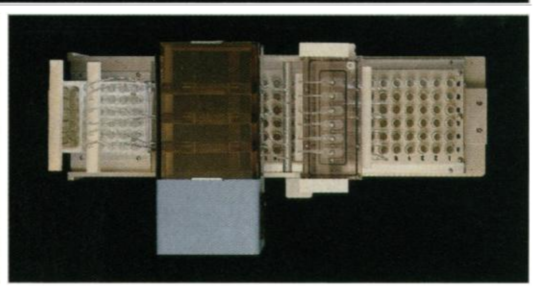

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■ The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objectives are to further the work of scientists, to facilitate cooperation among them, to foster scientific freedom and responsibility, to improve the effectiveness of science in the promotion of human welfare, to advance education in science, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

COVER Enhanced Landsat Thematic Mapper image of the area of the Cady Mountains and Bristol Mountains in the eastern Mojave Desert, California. Color variations primarily denote contrasting iron- and hydroxyl-bearing constituents of the surficial rocks and sediments. The image enhancement reveals faults and associated structural features that were overlooked in previous field mapping. See page 1000. [Processing by Jet Propulsion Laboratory, California Institute of Technology]

Book Reviews

Products & Materials

This Week in SCIENCE

A fair share

It all boils down to a consideration of the three R's—raw data, reagents, and responsibility: how soon after new information is obtained or new research tools are developed should scientists be required to share these valuable commodities with the wider scientific community? What is a fair amount of time for an individual to mull over data and hoard reagents before making them widely available? What roles should be played by funding agencies (should they withhold funds?) or journals (should they block publication?) to enforce sharing policies as they are formulated? These issues and some of the new wrinkles that have surfaced as a result of patent and profit considerations and advances in technology, computing, and communication systems are discussed by Marshall and Roberts beginning on page 952. Now, with few actual policies in place, practices by individual scientists and scientific institutions run the complete gamut from blanket cooperation to suspected sabotage.

Topography of Titan

Titan, the giant among Saturn's many moons, is the second largest moon in the solar system. (Jupiter's Ganymede is the largest.) Close-up observations of Titan made in 1980 during the Voyager 1 flyby led to the hypothesis that a deep liquid hydrocarbon ocean might completely cover the icy surface. This hypothesis is no longer valid: Titan's surface has been found to reflect and scatter radio waves in a manner that suggests a solid surface with a varied terrain rather than a global ocean. Scattered small hydrocarbon lakes have, however, not been ruled out and could accommodate the liquid hydrocarbons that the Voyager data strongly suggest are on the surface (page 975). The NASA/JPL 70-meter antenna in California was used to transmit powerful radio waves to Titan; the Very Large Array in New Mexico served as receiver of reflected waves. The pattern of reflectivity was strong and diffuse, not specular as would be consistent with a global liquid reflecting surface. Muhleman *et al.* point out the similarities between radar reflection characteristics of Titan and those of Jupiter's icy moons Europa, Ganymede, and Callisto.

What the shadow knows

How is it possible to deduce the shapes of structures that are inside objects that diffuse radiation? This is an old problem for which a new solution is described by Singer *et al.* (page 990). Many different types of particles (photons, neutrons, phonons, and other radiation sources) can now be beamed at solid targets. Inside the target object, particles may then be absorbed; however, if they are scattered, arrays of detectors that surround the object will record their emergence. With powerful new algorithms and iterated computations that have only become possible with the advent of supercomputers, measurements of scattered radiation can be turned into reconstructions. The methodology has potential applications for studying what is inside solid objects important in medicine, industry, and geophysics. For example, animal tissues could be probed with beams of infrared lasers, and shadowgraphs would then serve as the raw data from which internal shape can, with mathematical computations, be reconstructed.

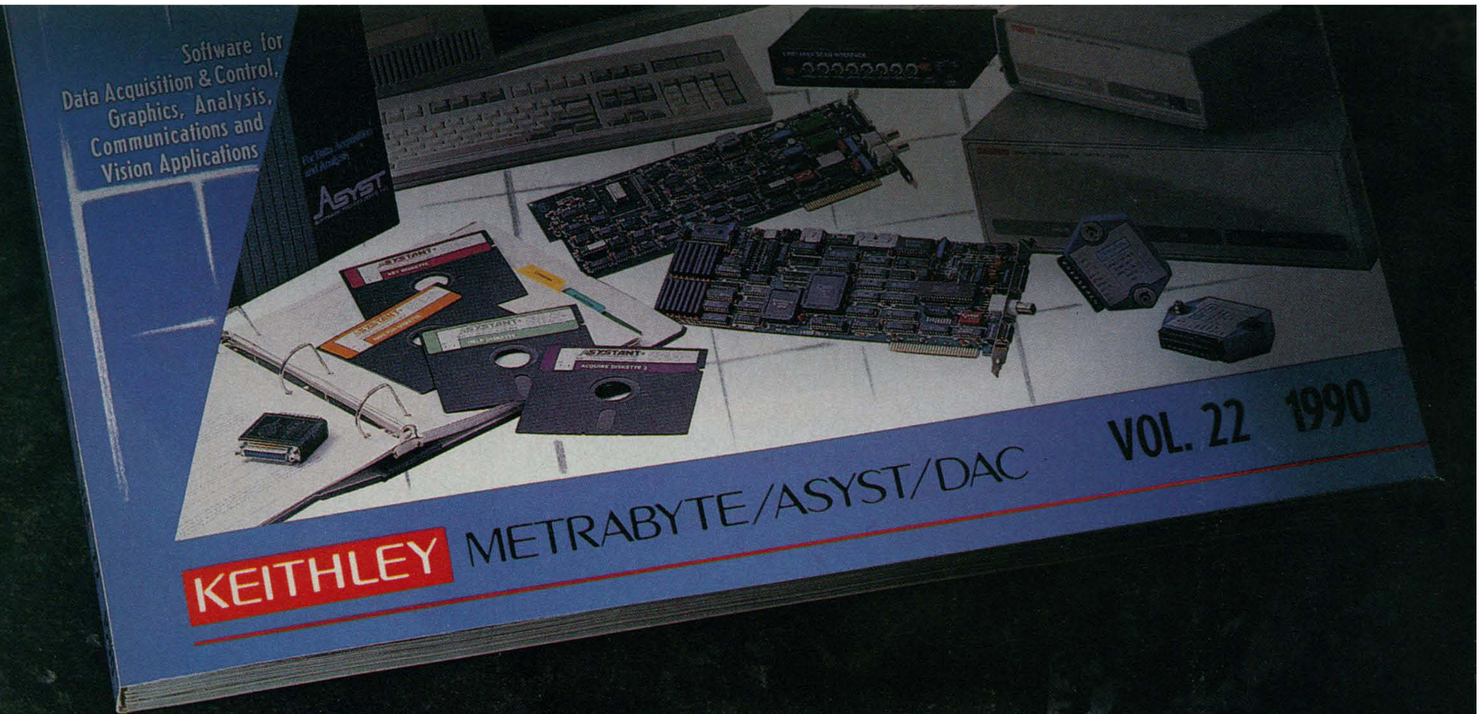
Stratospheric sulfur

During the last decade, there has been an annual increase of about 6% in the background level of sulfates in the stratosphere (page 996). Stratospheric aerosol droplets, which are aqueous spheres that contain between 60 and 80% sulfuric acid, were measured monthly with particle counters aboard balloons situated 20 kilometers above Laramie, Wyoming; supporting data have also been obtained at the North and South poles. The records obtained by Hofmann document the intermittent injection of sulfur-containing gases into the stratosphere by volcanic eruptions and allow for the measurement of background nonvolcanic sulfuric acid levels between such bursts. The sulfate increases perturb stratospheric chemistry and photochemistry and are reflected in phenomena such as ozone depletion and stratospheric dehydration. In addition, there are close connections between these changes and the changing global climate. Sulfurous gases released from well-known anthropogenic sources—the burning of biomasses and fossil fuels, petroleum refining, and other industrial processes—do not fully account for the 6% rise; therefore, there is a need to identify other natural emitters or previously overlooked anthropogenic ones, such as emissions from airplanes flying increasingly close to the stratosphere as new air lanes are opened to alleviate crowding in the skies.

Restricted response in multiple sclerosis

Myelin basic proteins, which are targets for possibly pathogenic immune responses in multiple sclerosis, normally sheath nerve fibers; damage to these nerve coverings causes neurologic impairment, which is a hallmark of the disease. The immune responses to myelin basic proteins are made by T cells that recognize myelin basic protein structures through reactive receptors on their surfaces. Wucherpfennig *et al.* found that T cells that respond to the most important regions of myelin basic proteins use only a few types of receptors both in normal individuals and in those with multiple sclerosis (page 1016). In the case of the immunodominant target MBP(84–102), for example, many responding cells bear the $V_{\beta}17$ variant of the T cell receptor, one of twenty types tested. The identification of limited numbers of markers on pathogenic T cells that may expand clonally in vivo and participate in autoimmunity could contribute to the development of a therapeutic approach for eliminating such autoreactive clones.

■ RUTH LEVY GUYER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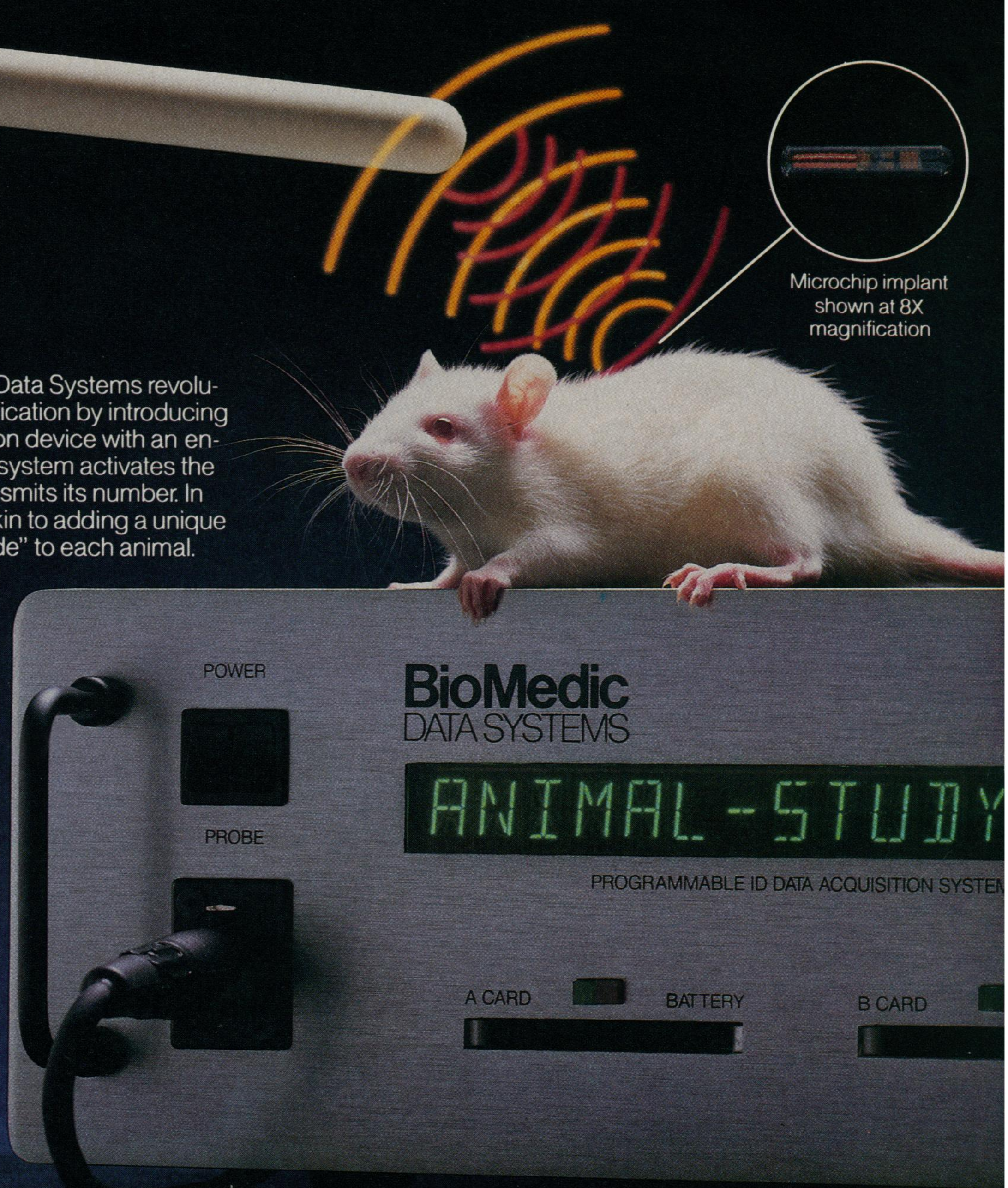

Microchip implant shown at 8X magnification

Background

Some two years ago Bio Medic Data Systems revolutionized laboratory animal identification by introducing an implantable micro-identification device with an encoded number. An interrogation system activates the implantable chip which then transmits its number. In effect: a truly foolproof system akin to adding a unique electronic "universal product code" to each animal.

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In addition: the imprecision of the conventional methods is replaced by *positive animal identification.* Animal misidentification or infection can indeed be catastrophic should they delay, impede, or destroy a crucial investigation. This simple foolproof system now converts ear punching or tagging, toe clipping, and tail tattooing into unacceptable risks ... and who needs that when a positive animal identification system is now available!

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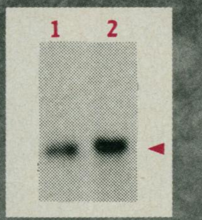

Figure 1.
Lane 1. mRNA isolated using guanidinium, CsCl centrifugation and oligo dT column selection. (30 hrs).
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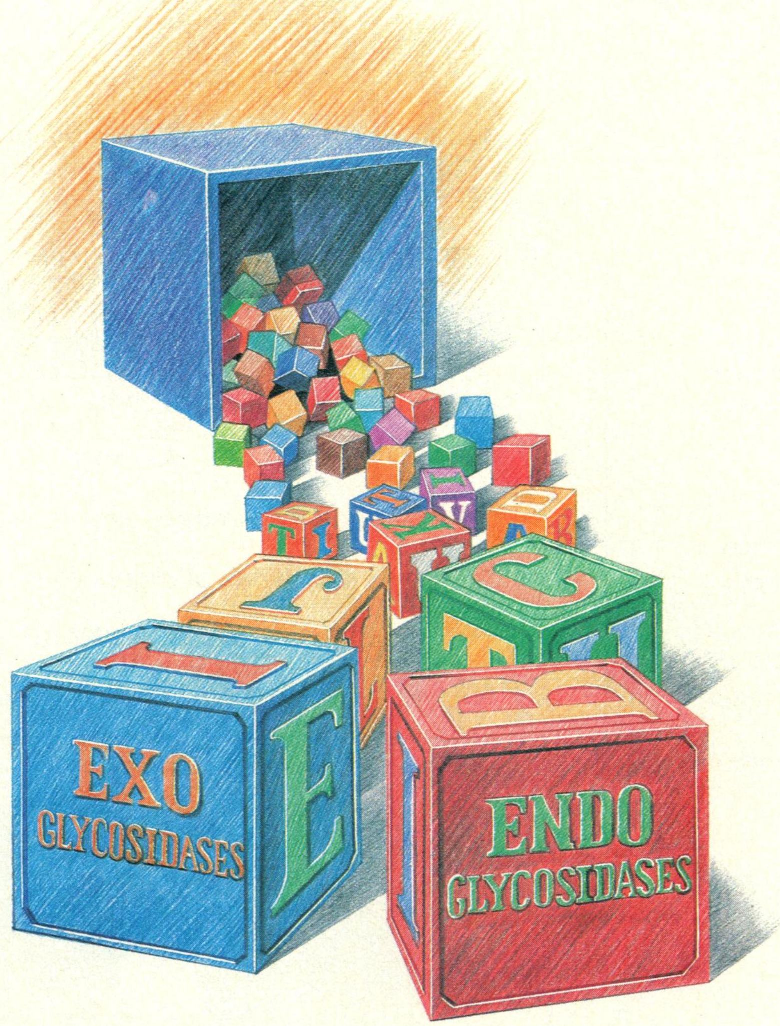
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