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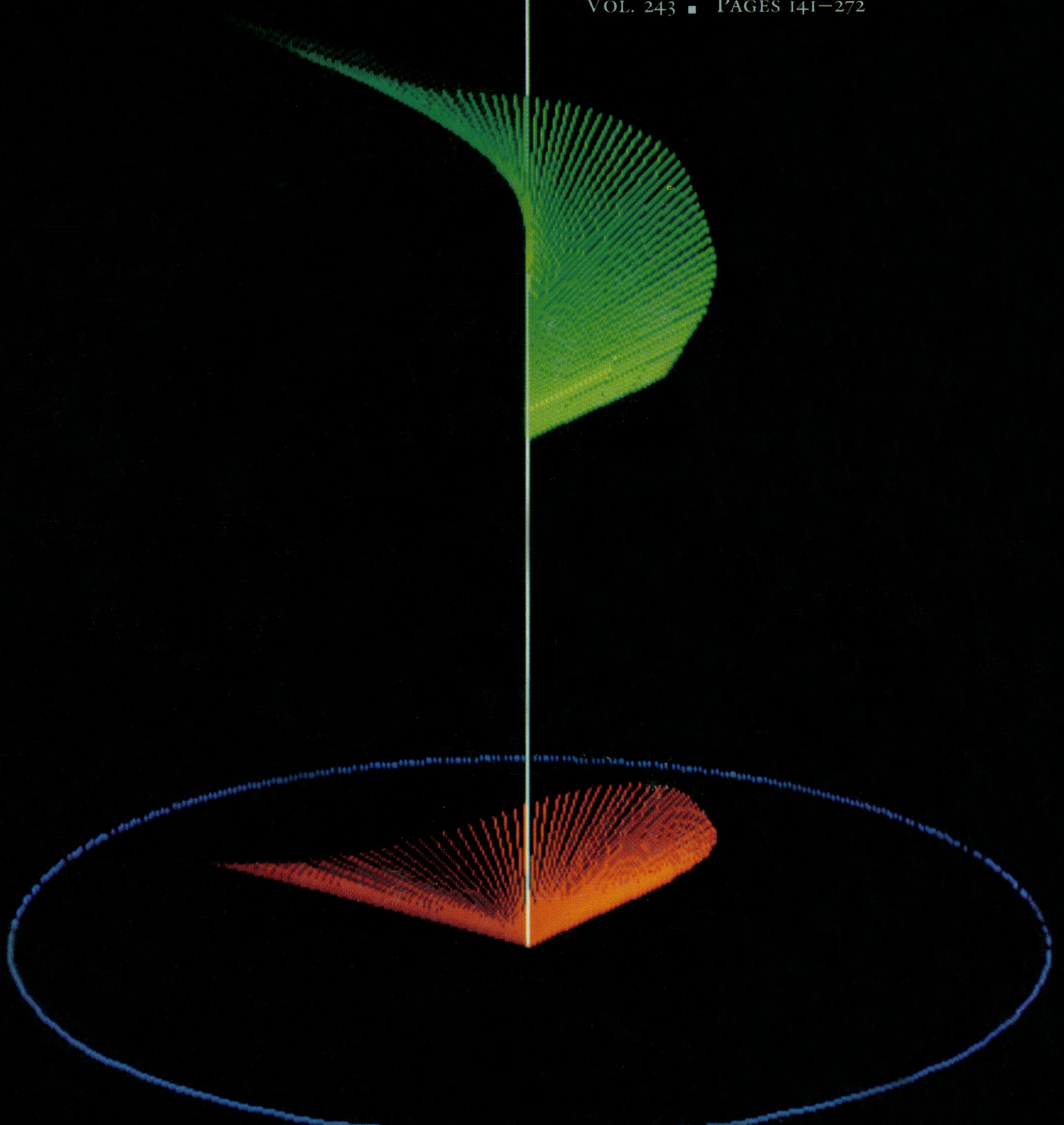

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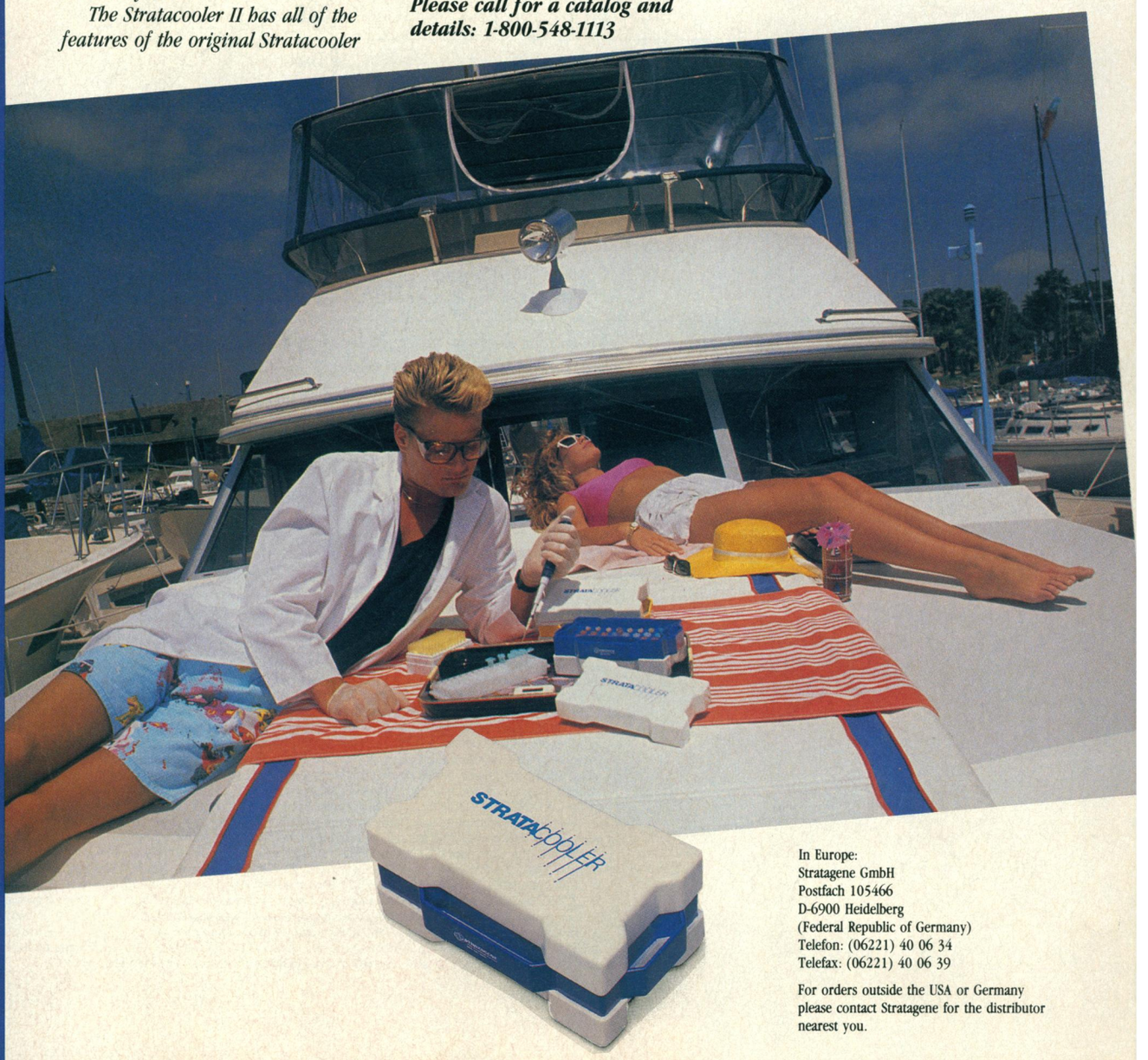

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COVER Visualization of brain activity during mental rotation. The neuronal population vector (green) rotated gradually from 2 to 10 o'clock as a monkey was thinking (time upward, white line). The population vector was calculated from an ensemble of neurons recorded in the motor cortex. See page 234. [A. P. Georgopoulos, Department of Neuroscience, Johns Hopkins University School of Medicine, Baltimore, MD 21205]

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Sorting molecules

SECRETORY cells can export proteins in two ways. One involves the constitutive release of proteins; it appears to occur through "bulk flow" and thus is relatively nonspecific. The other is regulated release in response to hormone signals, and it is thought to be implemented by sorting molecules. Proteins that appear to be the sorting molecules—called HBP25's—have been isolated from dog pancreatic tissues (page 192). HBP25's stuck to affinity columns to which regulated proteins (prolactin, insulin, or human growth hormone) were affixed but did not bind to columns carrying constitutively secreted proteins (immunoglobulins, hemoglobin, myoglobin, and bovine serum albumin). The HBP25's localized to the cells' Golgi regions where sorting takes place; furthermore, HBP25's and dense-core granules (that form when regulated proteins are secreted) accumulated in the same cells. Chung *et al.* propose that soluble sorting molecules aggregate regulated proteins and that these aggregates may then be guided into secretory granules by membrane-bound receptors. HBP25's may serve both roles and were in fact found to be about equally distributed between soluble and membrane fractions. The HBP25's do not get packaged in granules with secretory proteins, suggesting that they deposit sorted molecules and then go on to sort more proteins.

The sun and Halley's nucleus

THE nucleus of comet Halley has, in general, a dark surface mantle that stabilizes the temperature of the comet's icy interior. When the comet was observed in 1986 by the Giotto spacecraft, several brighter active regions were recorded on the surface of the nucleus. The largest and the brightest of these was situated where the north rotation pole of the elliptical nucleus is calculated to be. Reitsma *et al.* examined the recorded features of this active region, a region where the mantle appears to have been substantially eroded (page 198). They attribute the activity to continuous solar illumination of the pole before and during the period of observation; deep heating of the region would have increased gas flow, accelerated dust emissions, disturbed the mantle, and allowed the bright underlying ice to shine through.

Anchored polymerase chain reaction

THE polymerase chain reaction is used for analyzing and amplifying nucleic acid sequences when the sequences at both ends of a gene or gene segment are known. A modification of the procedure has been developed by Loh *et al.* for use with nucleic acids for which sequence information is available at only one end of the molecule (page 217). The genes for the T cell receptor and immunoglobulins are in this category; they encode polypeptide chains that have a constant sequence at one end but a variable sequence at the other. In the modified anchored polymerase chain reaction, a homopolymer tail and an anchor sequence are attached to the variable end of the nucleic acid, thereby substituting a known sequence for the unknown sequence at that end of the molecule. Primers complementary to the anchor and to the known sequence at the opposite end then are used to amplify the sequences in between. The procedure was demonstrated on genetic material encoding a previously unidentified δ chain variable region of a T cell receptor from human peripheral blood lymphocytes.

Endothelial cells in gene therapy

ENDOTHELIAL cells line the blood vessels of the body. Thus positioned with easy access to the bloodstream, they have the potential to deliver missing substances to the circulation and to remove and detoxify deleterious materials already circulating. Their part in gene therapy may therefore be wide-ranging if certain technologic barriers can be overcome. Procedures are needed for transferring genes of interest into endothelial cells, for implanting the transduced cells into the body, and for ensuring long-term stability of the cells in vivo so that they can express the inserted genes. Zwiebel *et al.* report that retroviral vectors can transfer genes into rabbit endothelial cells and that two types of gene products—those that are secreted and those that remain inside the cells—are properly expressed (page 220). In addition, endothelial cells survived well on synthetic grafts in vitro, expressing and secreting products for several weeks; such seeding of vascular tissue with endothelial cells and the grafting of the tissue into a host is one strategy that could be used for implanting transduced endothelial cells. Another approach would involve the placement of cells and growth factors (that can induce vascularization in vivo) on a matrix and subsequent implantation of the matrix in a host.

Movement, neurons, and cognition

A MONKEY was taught to move its arm perpendicular to and counterclockwise from a direction indicated by a target light (page 234). The monkey performed this difficult task—the position of the target changed in each trial—after a period of training. Georgopoulos *et al.* hypothesize that this task, like other "analog" psychological tasks, is accomplished by the monkey imagining the arm rotation before any arm movement actually takes place. Electrical activities in the brain cells that control arm movements were recorded and then represented by a "population vector" computed for the group of responding directionally tuned cells (cover). The neuronal population vector analysis provided a "read out" of the monkey's cognitive process as it conceptualized its task. The procedure should prove of use for the visualization of a range of cognitive operations occurring not only in the motor cortex, as in this experiment, but also elsewhere in the brain.

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1) Actual searches used include references with terms (cancer, tumor, tumour, metast..., malign..., neoplasm, or carcinoma) and (liver or hepat).
2) Actual searches used include (erythrocyte, red cell, red blood cell, Ca^{++}, Ca^{2+}, or calcium).
3) Only the first 85 references displayed. To view remainder of references, entire search must be repeated and text file searched with a word processor.
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Progress at AAAS

During his year and a half as executive officer of AAAS, Alvin Trivelpiece guided the organization in constructive directions. When his successor takes office, he or she will find a staff that is oriented toward the future and toward achieving goals, as well as an organization that is financially sound.

Most of the activities that Trivelpiece initiated are not immediately visible: their effects will be more noticeable with time. One improvement will be evident during the period 14 to 19 January, when the AAAS annual meeting is held in San Francisco. High-quality, timely symposiums have attracted a record-breaking advance registration. More than 600 journalists and others from the media will be present. Delegations from the People's Republic of China and the Soviet Union will participate.

Another constructive development at AAAS has been the creation of *The AAAS Observer*. This bimonthly publication is devoted in part to informing members and others of activities of AAAS other than publishing *Science*. The need for such a different publication was made obvious when the results of a member survey were tabulated early in 1988. Only a minority of the respondents indicated awareness of the numerous programs carried out by AAAS in advancing toward its goals of serving the scientific enterprise and the nation. *Science* has not highlighted such information. The editors and the AAAS Board of Directors have agreed that *Science* should not be a house organ, but rather should emphasize the latest developments in scientific matters.

Looking to the future, results of the member survey will be helpful in guiding management with respect to initiatives to foster. For example, members are particularly supportive of ongoing AAAS efforts to improve the quality of science, mathematics, and technology education. A major program is proceeding. They also give high priority to AAAS activities in conducting seminars for Congress on issues involving science and technology. An expanded series is being planned for the next session of Congress.

One of Trivelpiece's initiatives was to institute an effort in long-range planning. The senior staff participated in a series of workshops leading to a 2-day retreat. Consequences of the activities will become evident later, but in any event, the mind-set of the staff is more imaginative and future-oriented. Early in the spring, the AAAS Board of Directors will conduct a retreat devoted to long-range planning. Subsequently, forward-looking programs are likely to be announced.

An obvious prerequisite for expanded activities is money. During the past few years, AAAS has incurred a substantial operating deficit, though its net worth has increased. The budget for 1989 is in balance with a contingency fund designed to cover some of the urgent needs that could not be met. Improvement in the financial situation came as a result of many factors, including stringent economies in existing programs. A favorable factor was a record-breaking level of outside grants, mainly from foundations. In the past, these grants covered only a fraction of the real costs of the activities they were designed to support. Through improved accounting practices, a larger fraction of the costs is being recovered, and more of them will be captured in the future.

With its broad and distinguished interdisciplinary membership, its cooperating 300 affiliated societies, its headquarters in Washington, D.C., and its exemplary publication *Science*, AAAS is potentially well positioned to initiate and participate in many constructive activities, especially those involving interdisciplinary efforts. Among its 130,000 members are about 28,000 who are listed in *American Men and Women of Science*. About three-fourths of the members of the National Academy of Sciences also belong. AAAS operates almost completely independently of government funding. The present intention is to maintain that status. If potentials of AAAS are to be more fully realized, it must obtain unrestricted funds. Preparatory activities, including tests of donors, are under way to provide a basis and a plan for a fund drive that is likely to be announced in the not too distant future.

When the next executive officer is seated, he or she will quickly identify interesting opportunities and goals, a staff that is experienced and cooperative, and a financial situation that in the future will permit many new initiatives.—PHILIP H. ABELSON

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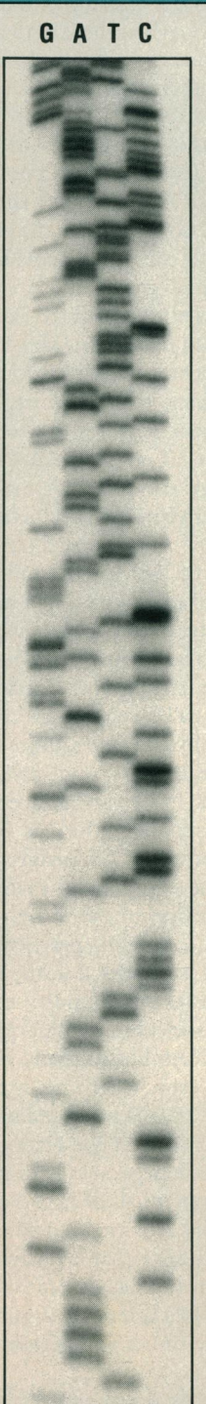

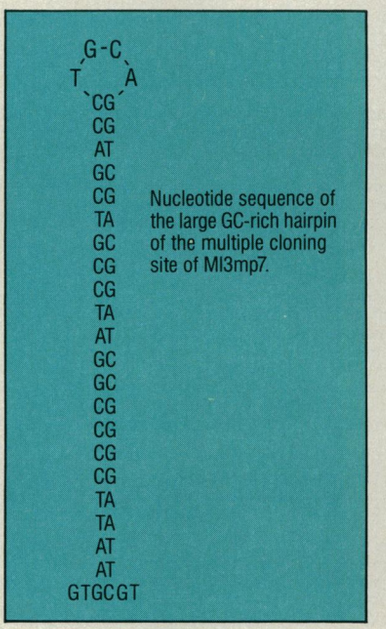

Nucleotide sequence of the large GC-rich hairpin of the multiple cloning site of MI3mp7.

Autoradiograph showing the products of sequencing MI3mp7 with the TaqTrack™ Sequencing System. The figures show the sequence of the multiple cloning site region, which contains a GC-rich, perfectly inverted repeat of 24 base pairs. A reaction temperature of 70°C simplifies polymerization through highly structured templates. The DNA polymerase isolated from *Thermus aquaticus* exhibits a consistent band intensity and a high degree of accuracy when used for sequencing. This thermostable enzyme lacks intrinsic exonuclease activity, which results in a low gel background. In addition, the analogue 7-deaza dGTP can be used to resolve gel artifacts associated with GC-rich regions, as shown.

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Symposium on the Pathogenesis and Control of Viral Infections
Beijing, Republic of China/April 24-26
Scientific Organization: F. Aiuti (I), Z. Zonghan (PRC) and S. Guoxian (PRC)

8th Workshop on Development and Function of the Reproductive Organs
Touraine, France/May 23-25
Scientific Organization: N. Josso (F)

1st International Congress on G.I.F.T.: from Basics to Clinics
Rapallo, Italy/June 8-10
Scientific Organization: R.H. Asch (USA) and L. De Cecco (I)

Membrane Technology in Clinical Pathology, Biochemistry and Pharmacology
L'Aquila, Italy/June 19-23
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Scientific Organization: F. Naftolin (USA)

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Scientific Organization: R.G. Edwards (UK)

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Scientific Organization: P.C. Sizonenko (CH) and M. Aubert (CH)

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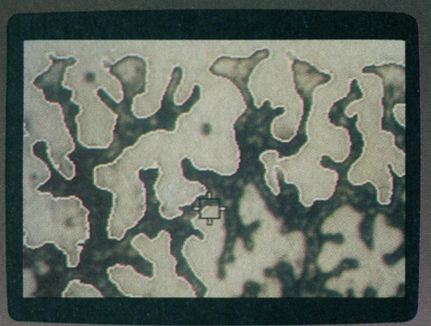

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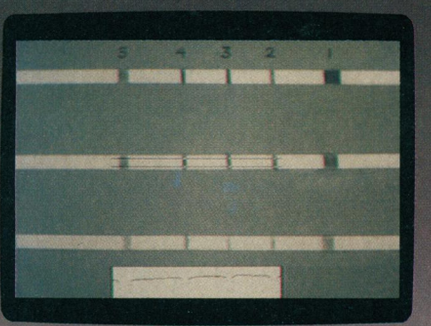

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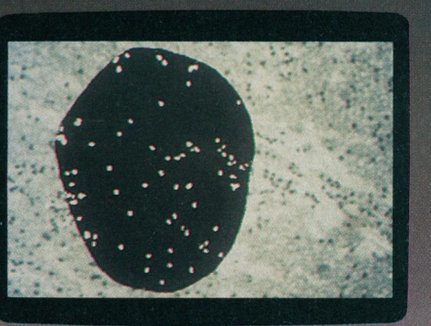

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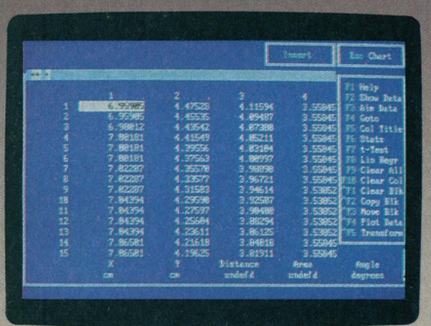

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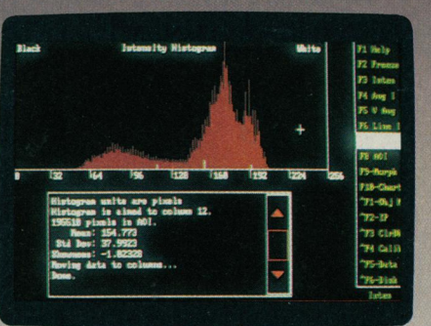

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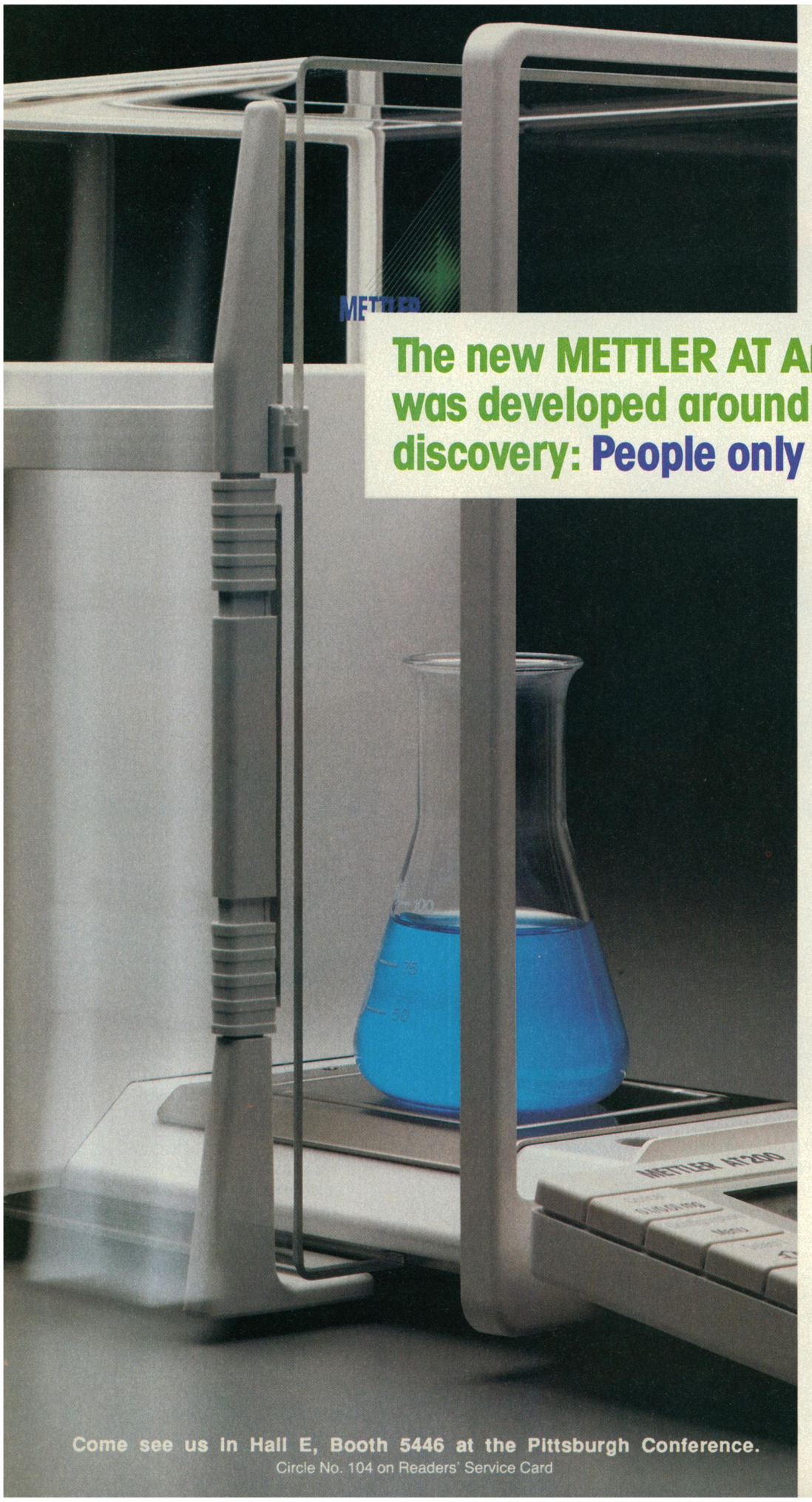

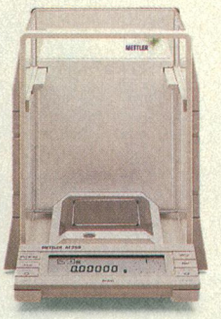

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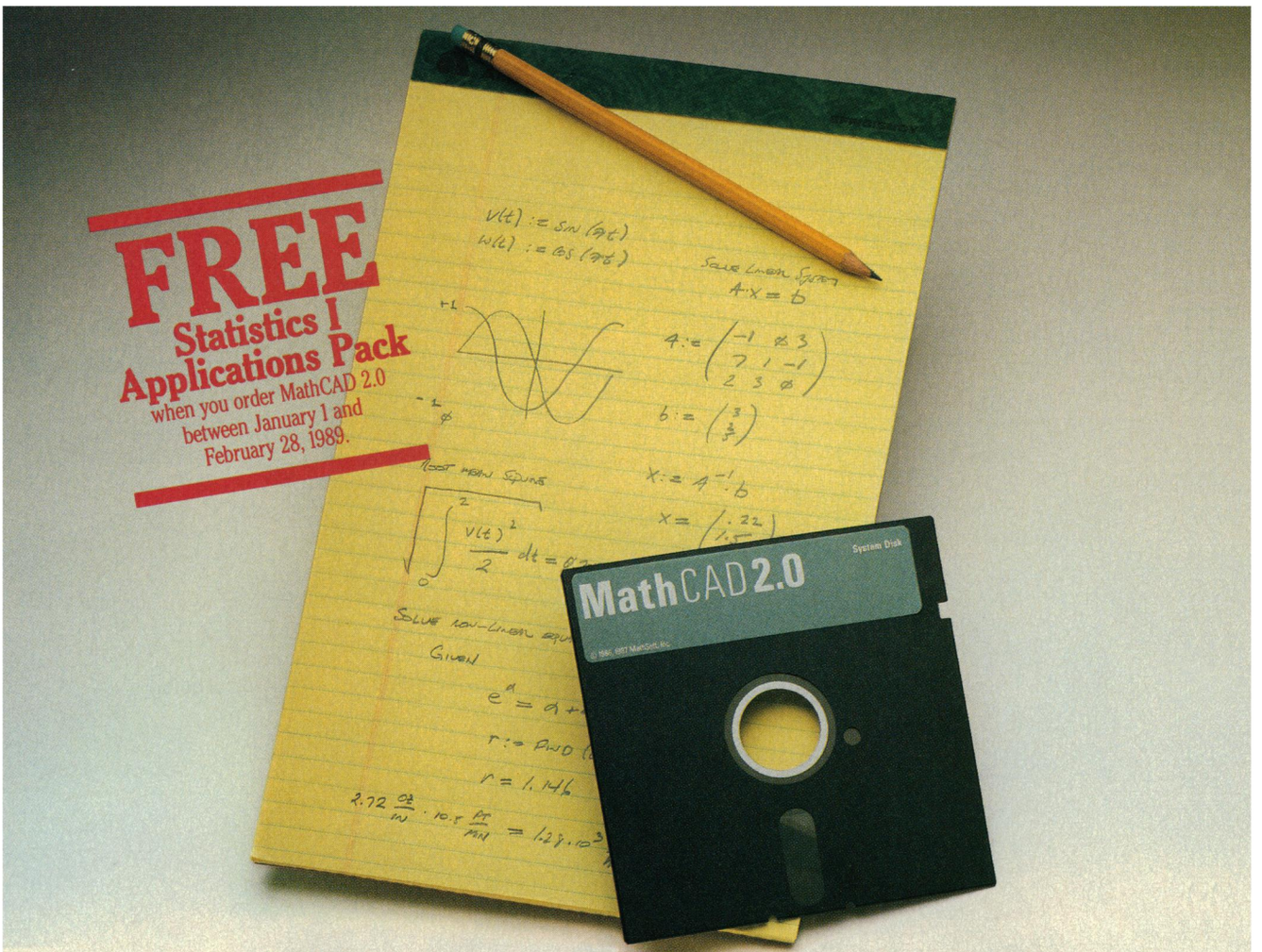

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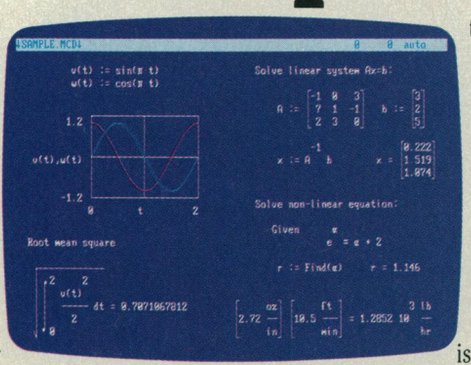

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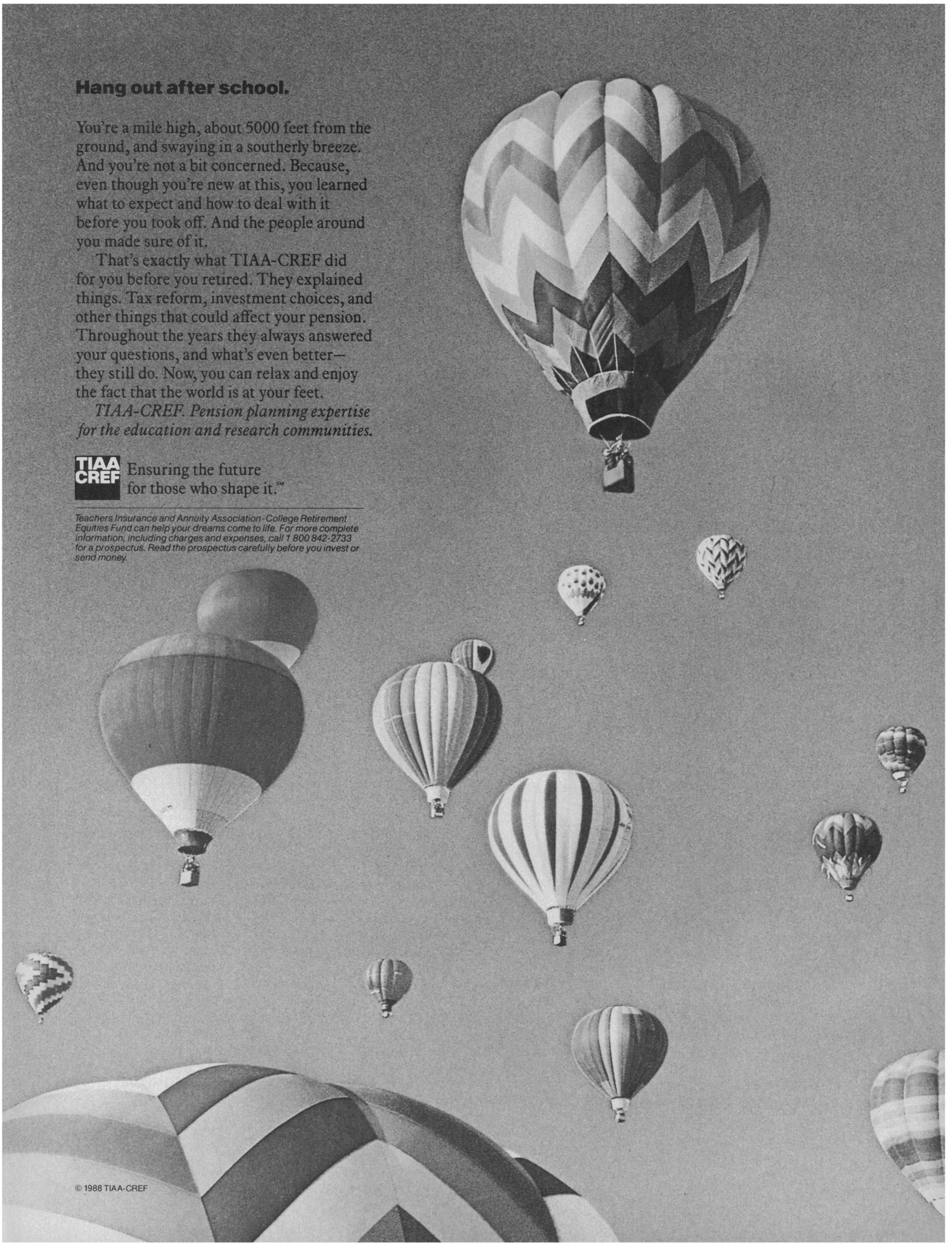
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How To Get From The Zone

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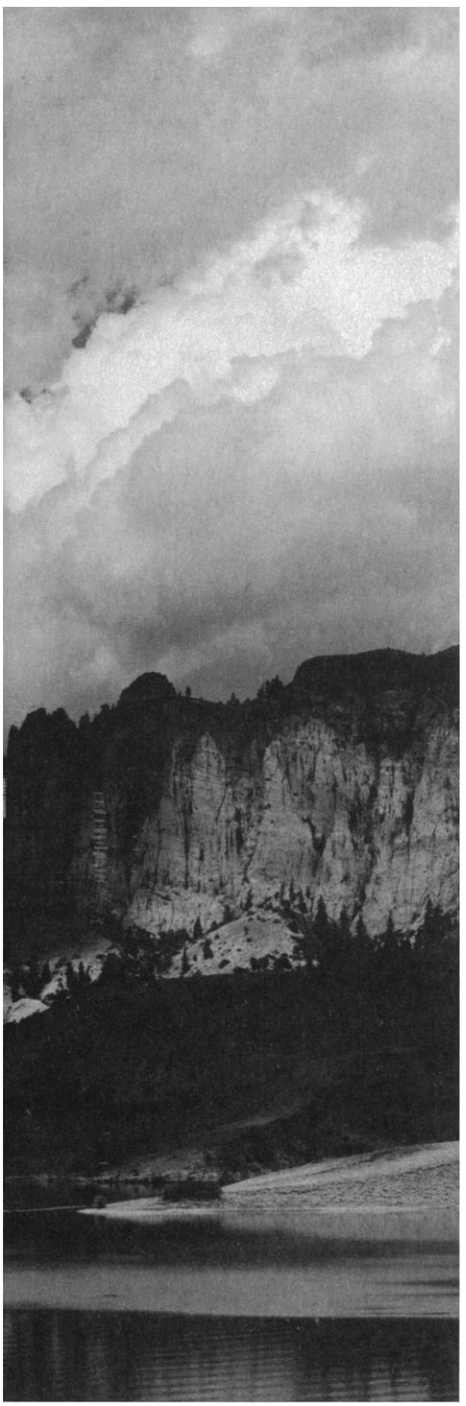
The moon, photographed with a 16-inch telescope on a KODAK T-MAX 100 Professional Plate. ©Richard Albrecht, 1988



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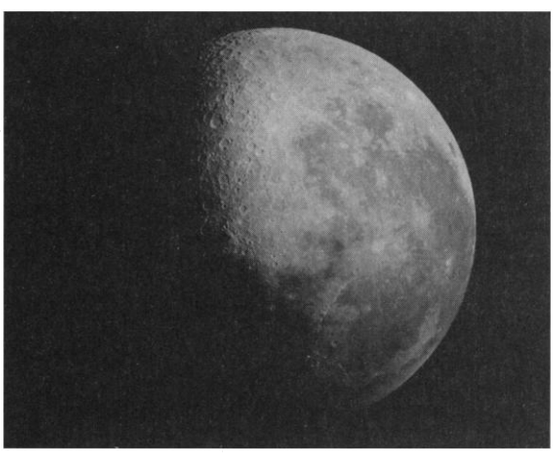

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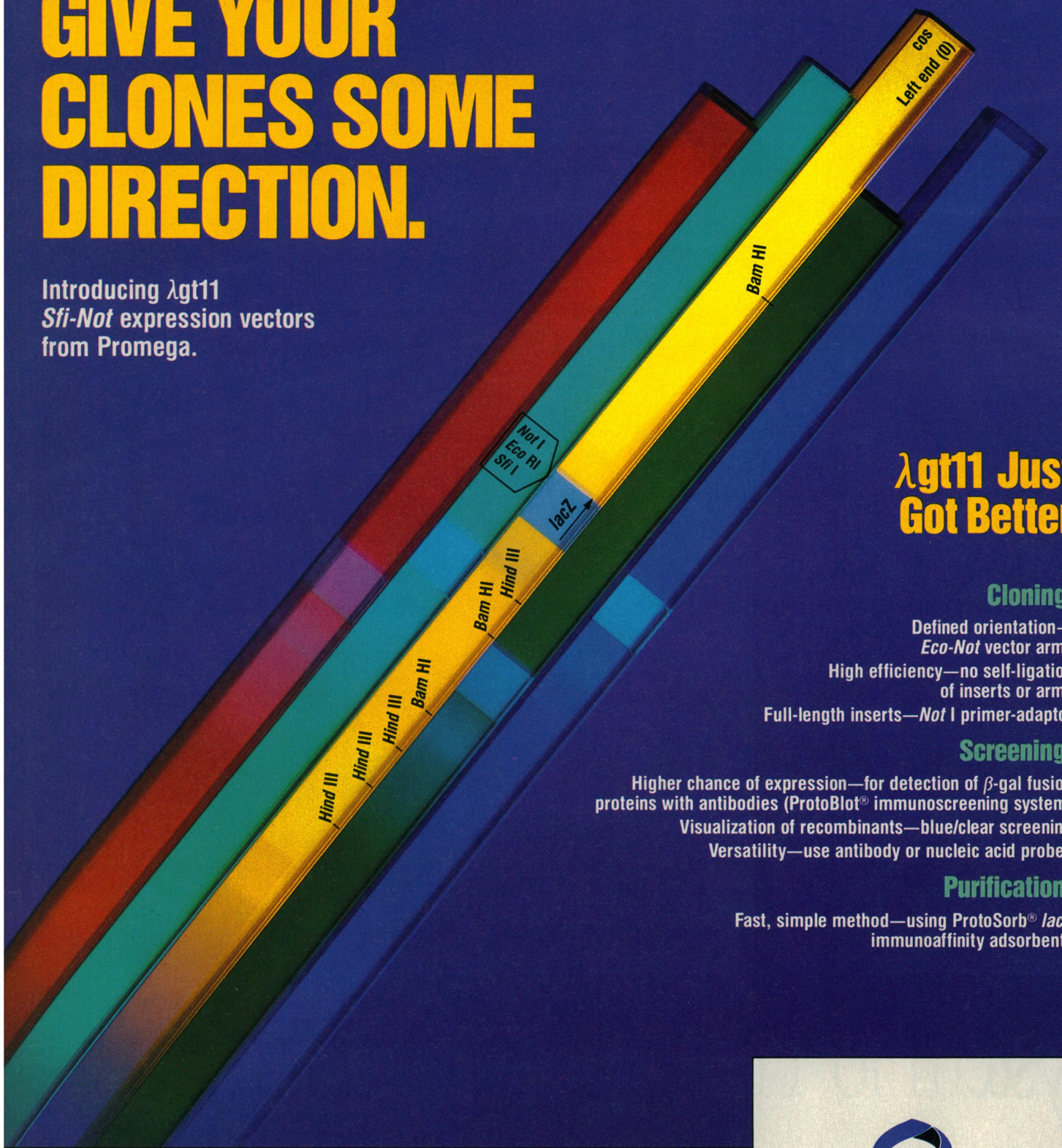

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