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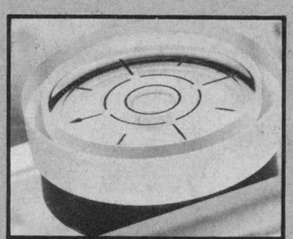

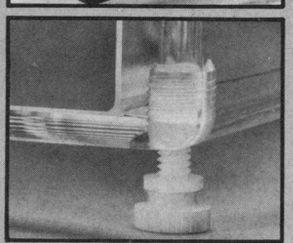

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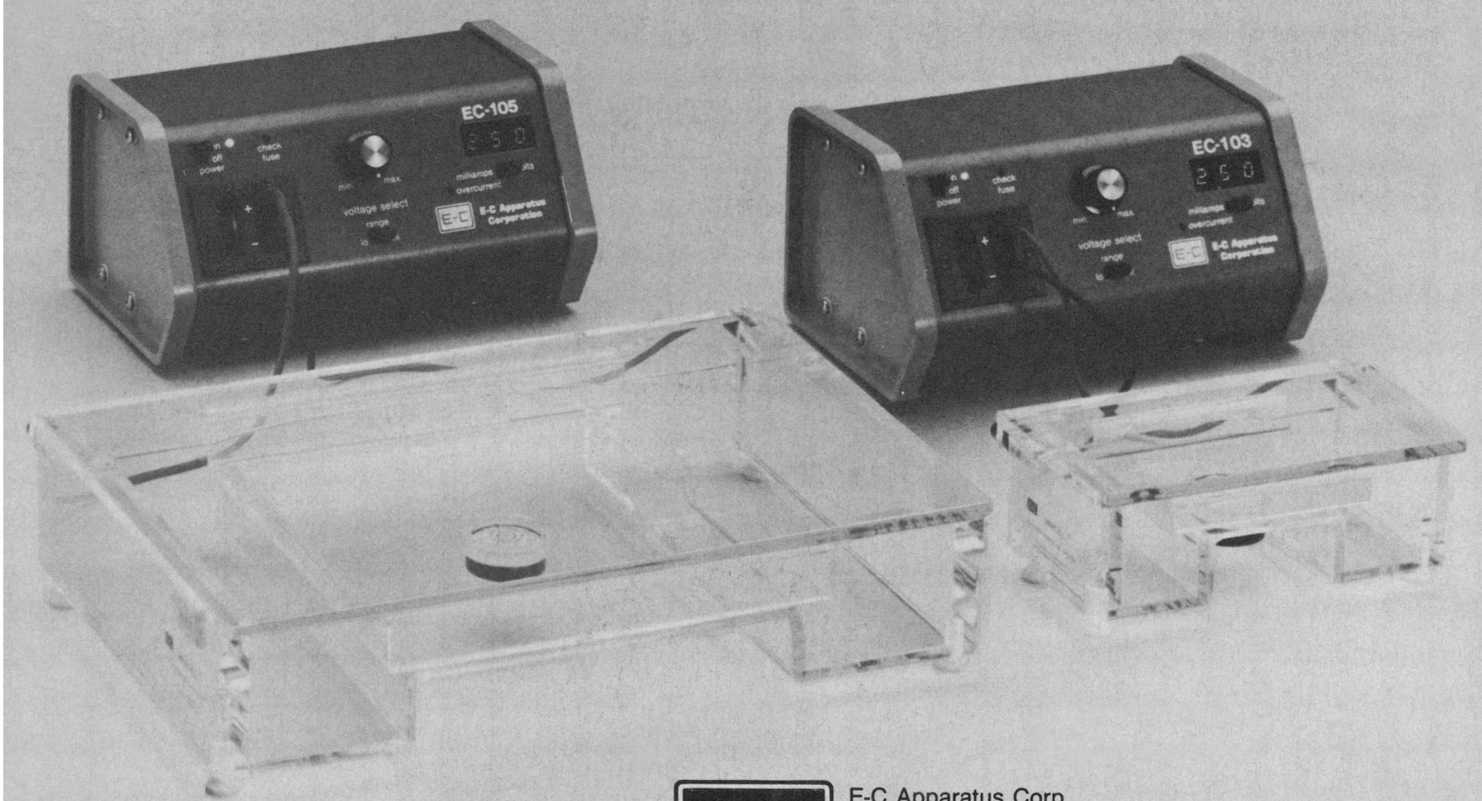

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

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■ The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects 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, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

COVER Early morning launching of a 138,000-cubic-meter polyethylene balloon by the Air Force Geophysical Laboratory, 28 February 1984, at Alamogordo, New Mexico. Filter sampling equipment was flown on the balloon for the Environmental Measurements Laboratory, Department of Energy, to retrieve nuclear reactor ablation aerosol from the burnup of Cosmos-1402 at 36 kilometers. See page 512. [Official U.S. Air Force Photograph]

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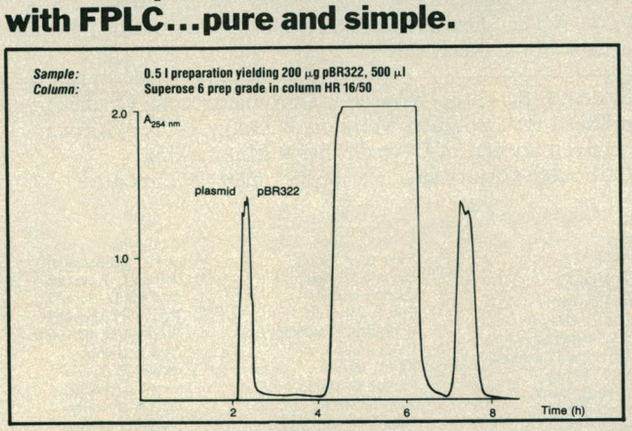
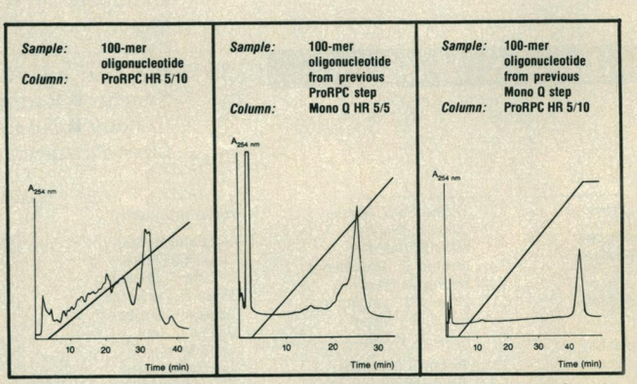


Preparative purification of the plasmid pBR322.



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Cell adhesion

THE extracellular matrix that surrounds a cell is important to the cell in a number of ways (page 491). Within this matrix, adhesion proteins assist the cell in attaching to the matrix, in moving from place to place, in differentiating, and in other functions crucial to cell survival. The various adhesion proteins interact with receptors (called integrins) on cell membranes. The integrins recognize a sequence of three amino acids—arginine (R), glycine (G), and aspartic acid (D)—that is common to most of the adhesion proteins; how RGD imposes specificity on any one protein may depend on what conformation these amino acids assume in that protein. (At least ten adhesive proteins and ten integrins have been identified, but they are not paired: some integrins recognize the RGD of several adhesive proteins whereas others recognize RGD of only one.) Ruoslahti and Pierschbacher describe what is known about structural and functional features of the adhesion proteins and their receptors in normal cells from a range of species and in abnormal cells associated with diverse human diseases.

X-ray holograms

TECHNOLOGIC advances in x-ray holography are increasing the likelihood that high-resolution three-dimensional x-ray holographic reconstruction will someday be made representing living materials (pages 514 and 517). In theory, biologic materials should not be subjected to damaging fixative substances (such as those used for electron microscopy and other high-resolution procedures) before x-ray holography, and, therefore, the reconstruction of an image should accurately reflect microstructure. Howells *et al.* describe high-resolution detectors and a soft x-ray source featuring improved coherence properties that were used for making x-ray holographic recordings of fixed zymogen granules from the pancreas. Trebes *et al.* show how x-ray lasers (bright, coherent x-ray sources) can be used for recording holograms from which accurate reconstructions of samples (a carbon fiber and gold bars at the tip of a glass stalk) were then made. Because x-ray lasers limit sample illumination time to less than a nanosecond, they should prove of use in generating unblurred images of living materials.

Ribonuclease function

RIBONUCLEASE P is an enzyme that participates in the processing of transfer RNA molecules from large immature precursors to smaller mature forms; the latter then can participate in protein synthesis (page 527). This enzyme has been found in all organisms. The role of ribonuclease P is to generate the 5′ end of the transfer RNA molecule. McClain *et al.* have evaluated substrate requirements of bacterial ribonuclease P and its catalytic subunit M1 RNA. A number of small synthetic substrates were tested with the holoenzyme and with the M1 RNA subunit: minimum structures of the transfer RNA molecule that permit catalytic processing are the amino acid acceptor stem, the T stem, and the T loop. These are adjacent features of the molecule that form one of its two helices, and they are common to all the cloverleaf-shaped transfer RNA molecules. The three terminal bases (cytosine-cytosine-adenine) at the 3′ end of transfer RNA molecules are also important for complete enzymatic activity.

Potent immunotoxin

A potent immunotoxin has been constructed from altered diphtheria toxin (the substance that kills cells) and antibody molecules (the substances that find the cells to kill) (page 536). Diphtheria toxin and antibody were covalently linked together; they killed only those target cells against which the antibody reacted. In experiments described by Greenfield *et al.*, monoclonal antibody that reacts with a surface component of human T cells was used, but similar complexes can be made with antibodies having reactivity directed against other (for example, tumor) cell surface antigens. Diphtheria toxin, which has been used less successfully in other immunotoxins, was altered by a point mutation; this mutation prevented the toxin from binding to the surfaces of a range of cells that carry receptors for diphtheria toxin but did not interfere with transport of the conjugate inside a cell selected by the antibody. The mutation also did not alter the toxicity of the diphtheria toxin, which is such a powerful toxin that it takes only a single internalized molecule to kill a cell. Complexes of this type have clinical uses in cancer therapy.

Membrane fluidity in Alzheimer's disease

IN a subset of patients with Alzheimer's disease, the fluidity of platelet membranes is increased; close but asymptomatic relatives of these patients also show an increase in platelet membrane fluidity (page 539). Clinically, these Alzheimer's disease patients develop disease symptoms relatively early in life, have a rapid disease progression, and have a family history of dementia. Because the abnormal membrane fluidity seems to precede the onset of disease and appears not to be a consequence of chronic illness, and because the increased fluidity is apparently not associated with other forms of dementia, detection of a membrane fluidity increase could be useful in identifying among neurologically healthy family members those at risk for developing Alzheimer's disease. The membrane fluidity measurements were made by Zubenko *et al.* by means of a fluorescence assay that assesses the rotational freedom of a fluorescent probe dissolved within the membrane. The defect appears to represent faulty membrane synthesis or turnover leading to an accumulation of internal membranes, which are more fluid than external membranes. The observed family pattern accords with numerous pedigree analyses that implicate an autosomal dominant gene in Alzheimer's disease.

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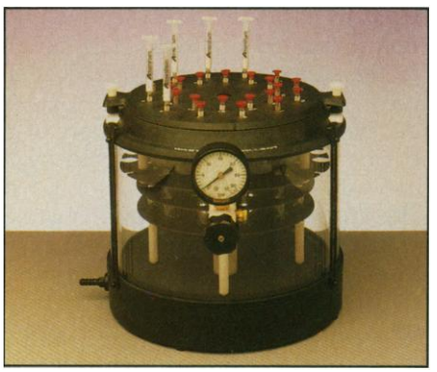

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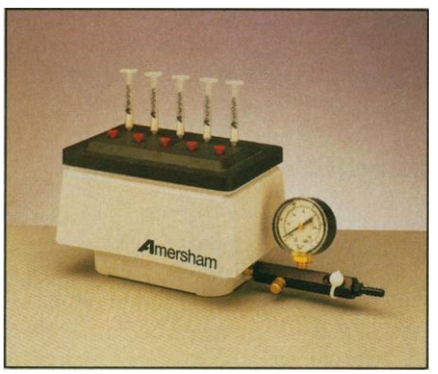

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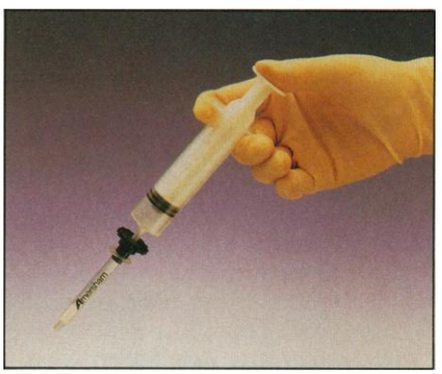

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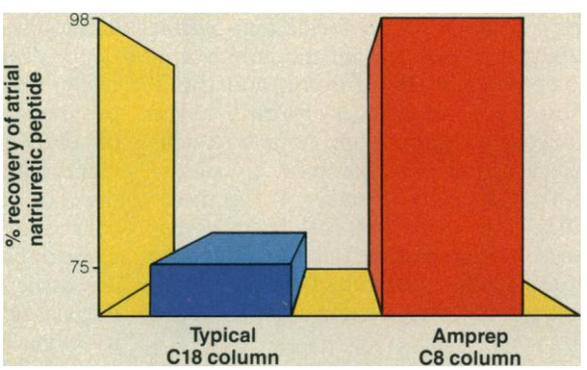

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SCIENCE

23 OCTOBER 1987
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NUMBER 4826

Cassette Principles

It is time for scientific method to be applied to moral principles, lest society sink into sanctimonious chaos. Hardly a day passes in which an editorial writer, politician, or philosopher does not lament the absence of principles in our society. What they are talking about, of course, is the absence of principles in others, since each of us personally is confident that he or she is highly principled, quite willing to walk the plank, endure ostracism and, in extremis, miss a three-martini lunch in defense of our moral imperatives. Principles that appear in 72-point type, and loom so loudly in political arguments, have a cassette quality, being inserted for appropriate occasions and withdrawn on others.

In political debates, the principle resounds, "Our country should not be concerned with or meddle in the internal affairs of other countries." Some conservatives find this extraordinarily convincing when applied to group A (Chile, South Africa, and Iran under the late Shah) but highly inappropriate in relation to group B (Cuba, the Soviet Union, and China). Some liberals heartily agree with the principle of "hands off" in regard to group B but find it highly inapplicable to group A. The cassette principle allows the same individual to proclaim heatedly on Monday, Wednesday, and Friday that "we should not do business with dictators," referring to group A, and on Tuesdays and Thursdays that "dictatorships are sometimes necessary when people are too poor or too inexperienced to cope with democracy," referring to group B. At the other end of the political spectrum are those who agree with both statements but in reverse.

These principles are not only applied to foreign policy. "No one is above the law" is espoused emphatically by liberals in regard to Watergate and Irangate, and by conservatives in regard to California's former high court judge Rose Bird and nuclear power protestors, but by neither in regard to those with whom they are sympathetic. "Better to let a 100 guilty people go free than to convict one innocent person" is a slogan happily applied by some partisans to indigent criminals but not to insider traders on Wall Street, whereas others in the political spectrum argue that a prominent person "suffers enough" by being caught; prison is therefore superfluous for the privileged, but more scruffy types deserve prison.

The truth is probably that individuals make decisions by following a general philosophy of social progress. We tend to excuse "minor improprieties" in those whom we identify as good soldiers in a worthy cause and condemn the same peccadillos in those who oppose our broad general agenda. The danger of cassette principles is that widespread selective use tends not only to generate cynicism in regard to principles but also to obscure the pragmatic decisions needed to resolve a complex problem.

It is unlikely that cassette principles will disappear from the national or international scene. Nor does it seem likely that they are any more invoked or more ignored today than in previous eras. However, there is an easy scientific method to distinguish between cassette and true principles, the litmus test of increased generalization: if a principle is being applied to friends, extend it to foes (or vice versa) and see if it still fits. If it does not, then there is no principle at issue but only a debating point.

It is important to know when principles are inapplicable and to expose cassette principles as sophistries. If we cannot state our principles in clear language, each person can interpret the law in his or her own way. Foreign policy guided by principles that are not principles lurches from one precipice to another. Society would be far better off solving each case on the relevant issues, without pretense of principle, rather than trying to convince skeptics by invoking some highly adjustable principle, which will be withdrawn as soon as it becomes inconvenient. For example, dealing with dictators of powerful nations and even of small nations may be necessary temporarily even if undesirable in the long run. It is better to recognize this as an unpleasant reality rather than to invoke it in cassette fashion as a principle that merits allegiance.

To update Emerson, we could say, "A sanctimonious inconsistency creates hobgoblins in little minds." The test of a principle is whether it applies to friend and foe alike. If not, store it with the other cassettes to be used in political arguments but not to solve problems.—D. E. KOSHLAND, JR.

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The 1987 Contest Year is 1 November 1986 — 31 October 1987. All entries must be postmarked before midnight, 13 November 1987.

The 1987 Awards will be presented at the National Association of Science Writers' banquet during the Annual Meeting of the American Association for the Advancement of Science in Boston in February 1988.

The Awards are administered by the American Association for the Advancement of Science under a grant from the Westinghouse Educational Foundation.

For further information and entry forms, contact the AAAS Office of Communications, 1333 H Street, N.W., Washington, D.C. 20005 or call (202) 326-6440.

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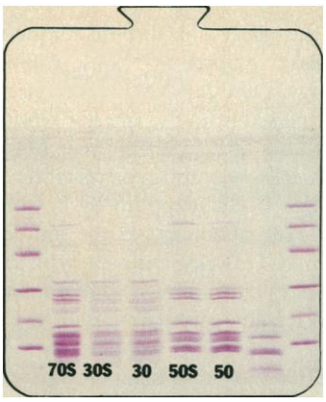
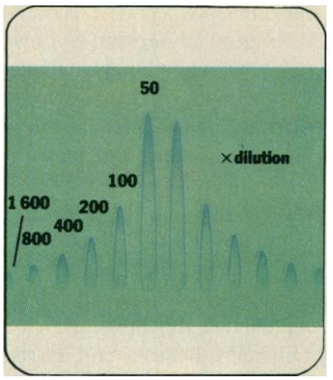
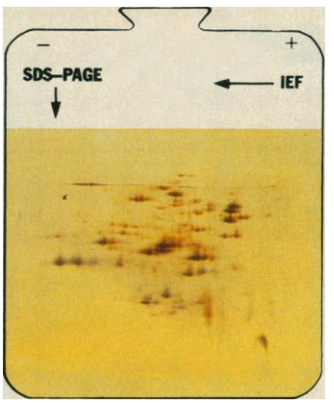
BANDS, ROCKETS, SPOTS, AND CURVES



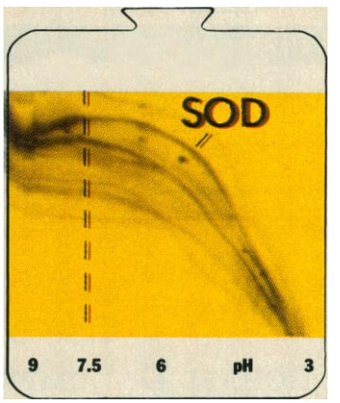
Analysis of *E. coli* ribosomal proteins by SDS–PAGE with subsequent coomassie staining. Sample to result: 60 min.



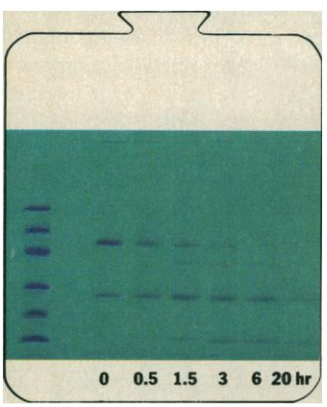
Analysis of human serum by immunoelectrophoresis with subsequent coomassie staining. Sample to result: 65 min.



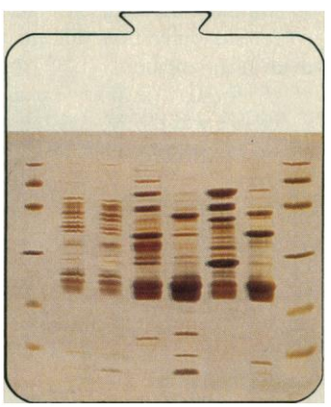
Analysis of *E. coli* proteins by 2D PAGE with subsequent silverstaining. Sample to result: 2.5 hr.



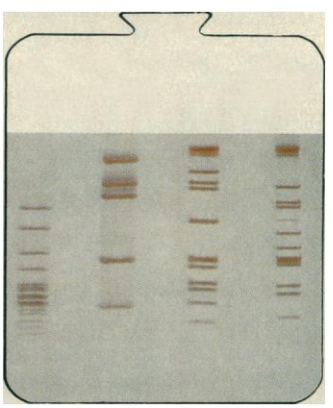
Characterization of a clarified cell homogenate by electrophoretic titration prior to purification. Sample to result: 90 min.



Optimizing a pepsin digest of Murine IgG Mab with SDS–PAGE. From sample to result: 60 min.



Analysis of peptides from an early step in the production of rH-growth hormones by SDS–PAGE. Sample to result: 90 min.



Analysis of DNA fragments from various digests by PAGE with subsequent silver staining detecting 75 pg. Range: 10 to 2 000 bp. Sample to result: 70 min.

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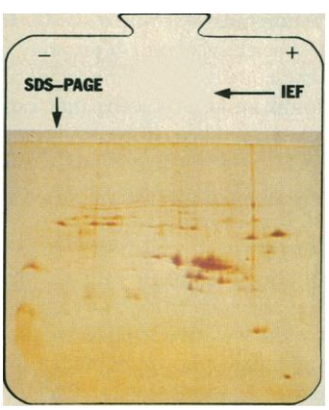
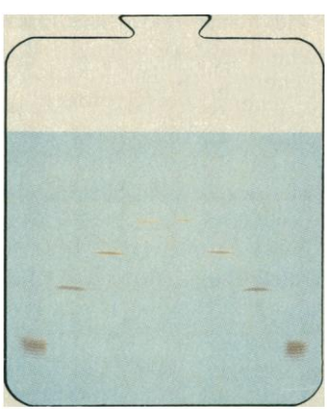


2D analysis of a membrane protein fraction from Mycoplasma hyorhinis. Sample donated by K-E Johansson NVI, Uppsala, Sweden. Sample to result: 2.5 h.



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Some of the international meetings scheduled for 1988 are:

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Scientific Organization: B.A. Cooke (UK)

Endocrinology Under 35
Florence, Italy / May 23-25
Scientific Organization: M. Maggi (I) and C.J. Johnston (USA)

Platelets and Vascular Occlusion
Rome, Italy / June 1-3
Scientific Organization: G.A. FitzGerald (USA) and C. Patrono (I)

Advances in Biotechnology of Membrane Ion Transport
L'Aquila, Italy / September 19-20
Scientific Organization: R. Verna (I), P.L. Jörgensen (DK) and R.P. Garay (F)

Third Conference on Differentiation Therapy
Villasimius (CA), Sardinia/September 6-9
Scientific Organization: G.B. Rossi (I), F. Takaku (J) and S. Waxman (USA)

The Adrenal and Hypertension: From Cloning to Clinic
Tokyo, Japan / July 25-26
Scientific Organization: E.G. Biglieri (USA), J. Funder (AUS), F. Mantero (I) and R. Takeda (J)

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□ We come from the same country. We have the same academic background at Uppsala University in Sweden. And we share the same scientific heritage in Theodor Svedberg and Arne Tiselius, both Nobel Prize winners and prominent foreground figures in bioscience and separation technology.

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MEET A FEW OF MISSISS

Among those who are making Mississippi a place where world-class researchers can do good work are, from left, ***Sally B. Cornwell****, director of TechNet, an Institute for Technology Development technology transfer program in North Mississippi;* ***Dr. Lawrence Crum****, acting director of the National Center for Physical Acoustics at the University of Mississippi;* ***Dr. George May****, research program manager for the Space Remote Sensing Center;* ***Dr. David Murphree****, president of the Institute for Technology Development;* ***Dr. James Perkins****, Superconducting Super Collider project manager;* ***Dr. W. Steve Shepard****, director of the Magnetohydrodynamic Energy Center at Mississippi State University; and* ***Dr. Joseph A. Portera****, a founder of the accelerated math and science high school at Mississippi University for Women.*

They're part of a powerful team that quietly and deliberately is transforming Mississippi into a place where technology can thrive.

Witness their accomplishments of the last few years...creation within Mississippi of the Institute for Technology Development, a national demonstration project in technology-based economic development; the National Center for Physical Acoustics and the Mississippi Super Computer Center in Oxford; the U.S. Center for Advanced Scientific Computing in Starkville; and the Space Remote Sensing Center and Mississippi Technology Transfer Center on the Gulf Coast. All are programs that complement strong research and development activities in the state, such as the 12-year-old Magnetohydrodynamic Energy Center at Mississippi State University.

Their Mississippi is a much different place from the

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Mississippi of 20 years ago. It's a Mississippi whose public school improvements today inspire reform efforts around the country...a Mississippi that can tout one of only five residential math/science high schools in the nation.

Their Mississippi is unified in its commitment to change. It wants progress and is willing to pay for it.

Witness their legislature's recent approval of $1.6 billion in educational, cultural and physical improvements to the region surrounding the proposed Mississippi Superconducting Super Collider site. Combined with the site's superb geology, the enhancement package ensures the U.S. Department of Energy of a true international center of scientific excellence for the SSC.

Note that this package is one of the *largest* financial offers made by any state, that it commits an impressive *15 percent* of SSC construction contracts to minority businesses, that its adoption came through a *unanimous* vote by the Mississippi Legislature.

That's not what you'd expect from a state once publicized only for racial division, a state once dismissed as a noncompetitor in the technology field.

But then, not much in Mississippi is what you might expect these days.

...not even its good old boys.

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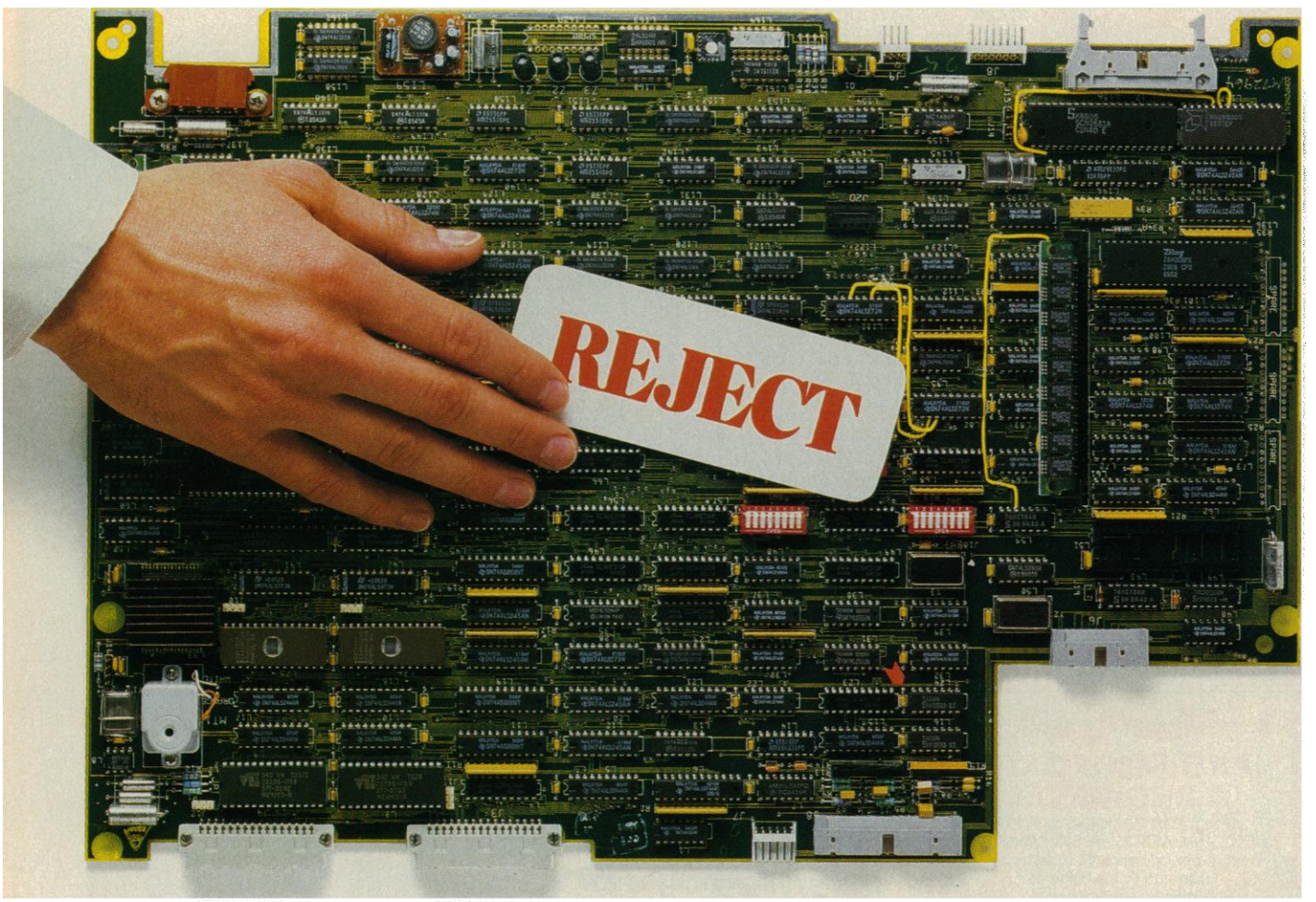

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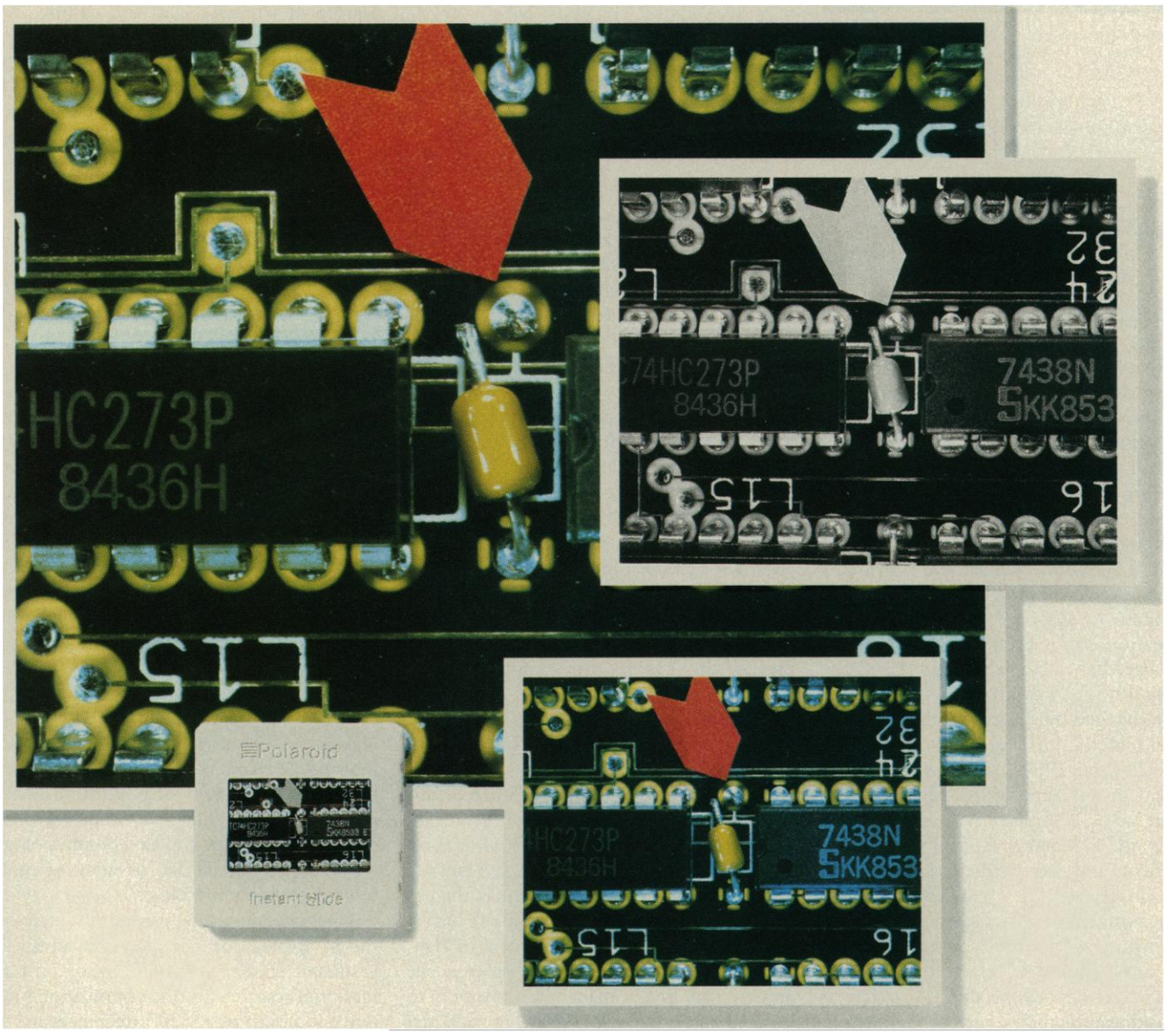

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