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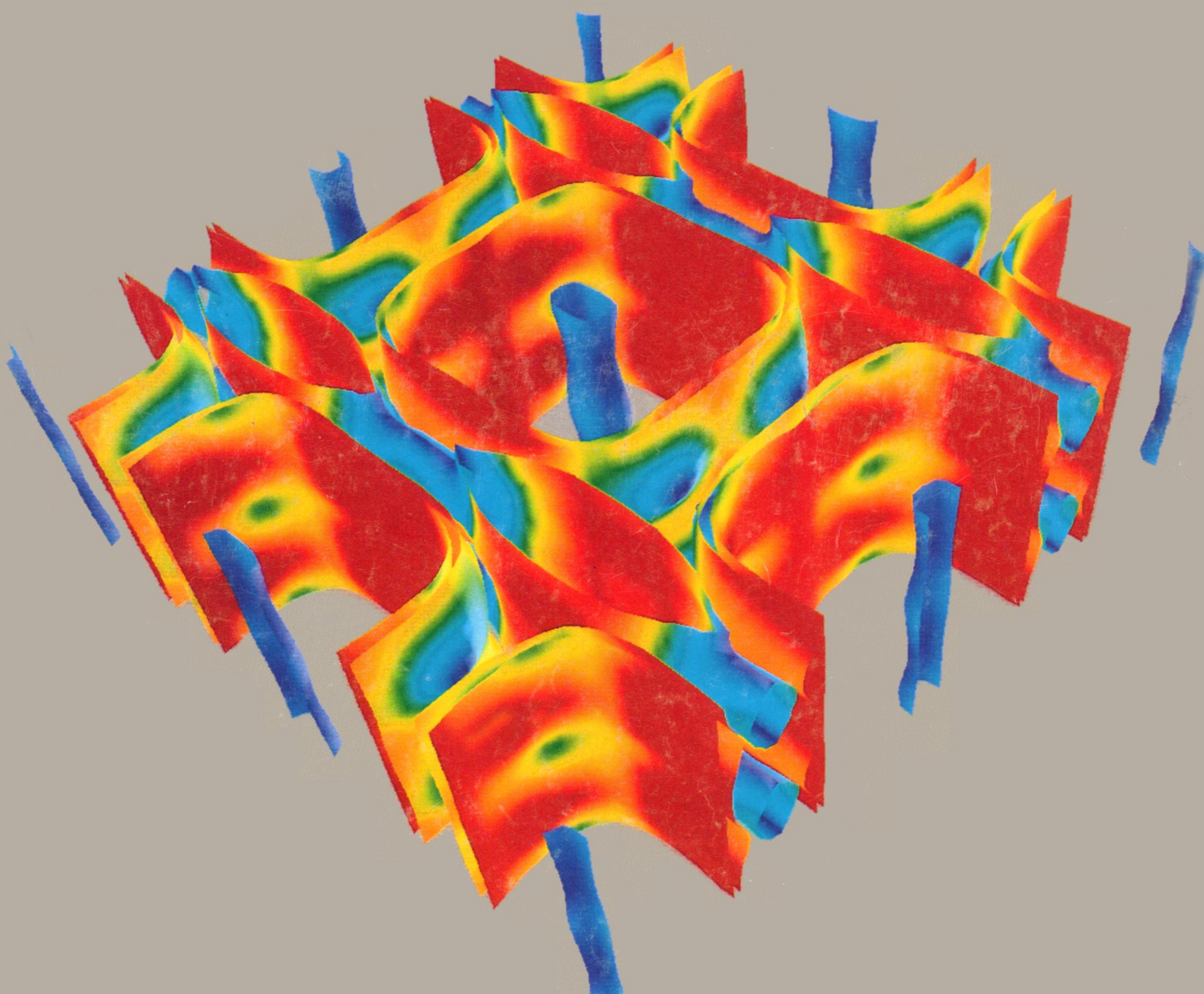

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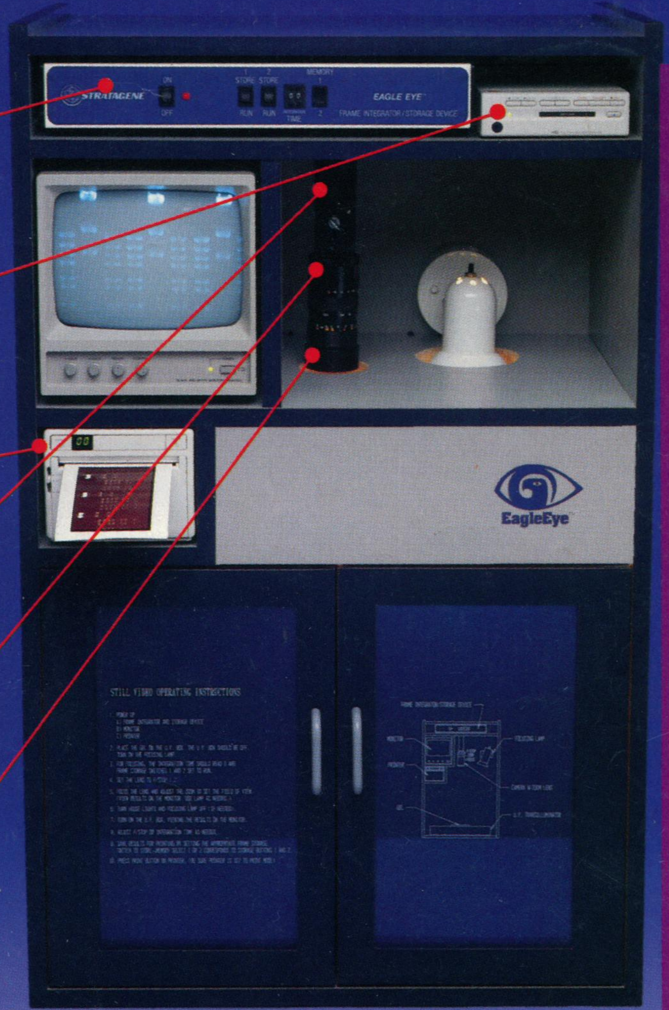

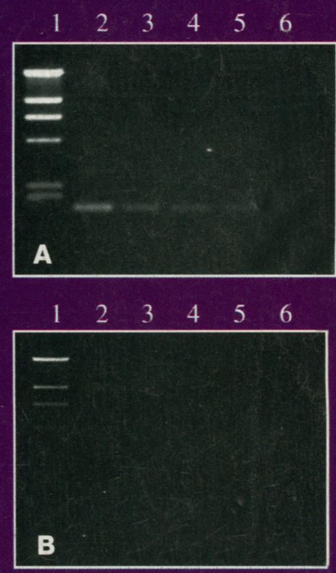

RECORDED STILL VIDEO IMAGING Vs. CONVENTIONAL PHOTOGRAPHY

A: Still video image captured at F/stop 1.2 and integration of 10 frames (0.33 second). **B**: Photo using Polaroid Type 667 film (ISO 3000) exposed for 1 second at F/stop 8

50 ng of lambda/Hind III size markers along with various dilutions of pUC 18 supercoiled DNA were loaded on a 5 mm thick 0.8% agarose, 1X TAE slab gel and electrophoresed. The gel was stained in 0.5 mg/ml ethidium bromide for 30 minutes, then destained for 45 minutes in deionized water. All images were generated using the same transilluminator (302 nm). Lane 1: lambda/Hind III markers; Lane 2: 4 ng pUC 18 DNA; Lane 3: 2 ng pUC 18 DNA; Lane 4: 1 ng pUC 18 DNA; Lane 5: 0.5 ng pUC 18 DNA; Lane 6: 0.25 ng pUC 18 DNA.

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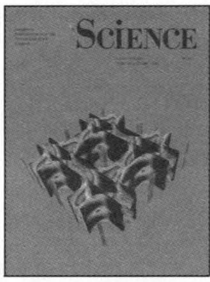

COVER The calculated surfaces in momentum space ("Fermi surfaces") for the charge carriers in the high-temperature superconductor $YBa_2Cu_3O_7$. Charge carriers can be electron-like or hole-like; blue indicates low-velocity, high-mass carriers, and red indicates high-velocity, low-mass carriers. This Fermi surface, first calculated theoretically, has recently been confirmed by several experimental spectroscopies. See page 46. [Image by R. E. Cohen with AVS 3.0 software; image printed on a Kodak XL7700 at the Naval Research Laboratory Connection Machine Facility]

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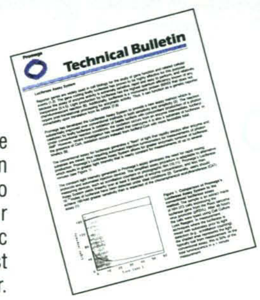

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America's children

American children appear to be worse off than their parents were as children, both materially and culturally. During the 1980s, material conditions of children of lower income parents deteriorated the most, according to census data. Policy discussions have focused either on government mandates on employers to provide benefits to parents or on direct government transfers. Fuchs and Reklis (p. 41) point out that employer-mandated programs would not benefit most poor children, who live in households that would be unaffected by the programs. Paid parental leave, for example, would provide the greatest dollar benefits to children with the highest paid parents. The authors argue that transfer of benefits from households without children to those with them, such as through tax credits, will be required.

Fermi liquid

The high-temperature oxide superconductors are metallic phases at room temperature; Pickett *et al.* (p. 46; cover) argue that recent experimental results show that the normal state is a Fermi liquid, or a band metal, rather than a doped insulator. They discuss some features of the normal state that still need to be resolved, such as low-energy excitations, as well as how these results constrain theoretical explanations of the superconducting state.

Hemoglobin code

Tetrameric hemoglobin is the classical model for understanding allosteric regulation. Ackers *et al.* (p. 54) review recent experimental data that reveal a previously unrecognized symmetry feature in the switching between the tense and the relaxed states. Switching occurs whenever binding of a molecule at the heme site forms a tetramer with at least one ligand-binding subunit on each half of the molecule.

Orienting polymers

Periodic nanometer-scale patterns can be induced in polystyrene films with the atomic force microscope (AFM). The AFM is normally used to image surfaces by recording vertical displacements of a softly sprung tip as it is dragged over a surface. Leung and Goh (p. 64) used relatively large tip forces (10^{-7} newtons) to increase the interaction between the tip and the surface. Repeated scans produced periodic furrowed patterns in the direction perpendicular to the scanning.

Glowing silicon

Luminescent silicon, made by etching silicon wafers to a high porosity, can be dispersed by ultrasound to produce a colloid, which in turn can be put into a polymer matrix to create luminescent films. Silicon does not normally luminesce, but etching silicon in hydrofluoric acid can produce a porous network of small structures that emits red-orange to yellow light after ultraviolet irradiation. The emission presumably arises from quantum-confinement effects. Because porous silicon is itself rather fragile, the preparation of colloids and films by Heinrich *et al.* (p. 66) may provide more convenient options for exploiting its properties.

Brood parasitism

Theories about the coevolution of brood parasite species that use another species, or host species, to raise its young, suggest that a generalist strategy, in which many species are hosts, would be used at first, and that specifically targeting one host species would evolve later. Not so for cowbirds, a brood parasite that uses other blackbirds to raise its young. Lanyon (p. 77) studied an 852–base pair region of the mitochondrial cytochrome b gene of six cowbird species and 20 other blackbirds. The North American cowbird, *Molothrus alter*, which parasitizes more than 200 host species, appears to be the youngest taxon of the group studied. The use of many hosts may reduce the probability of their developing effective defenses against parasitism.

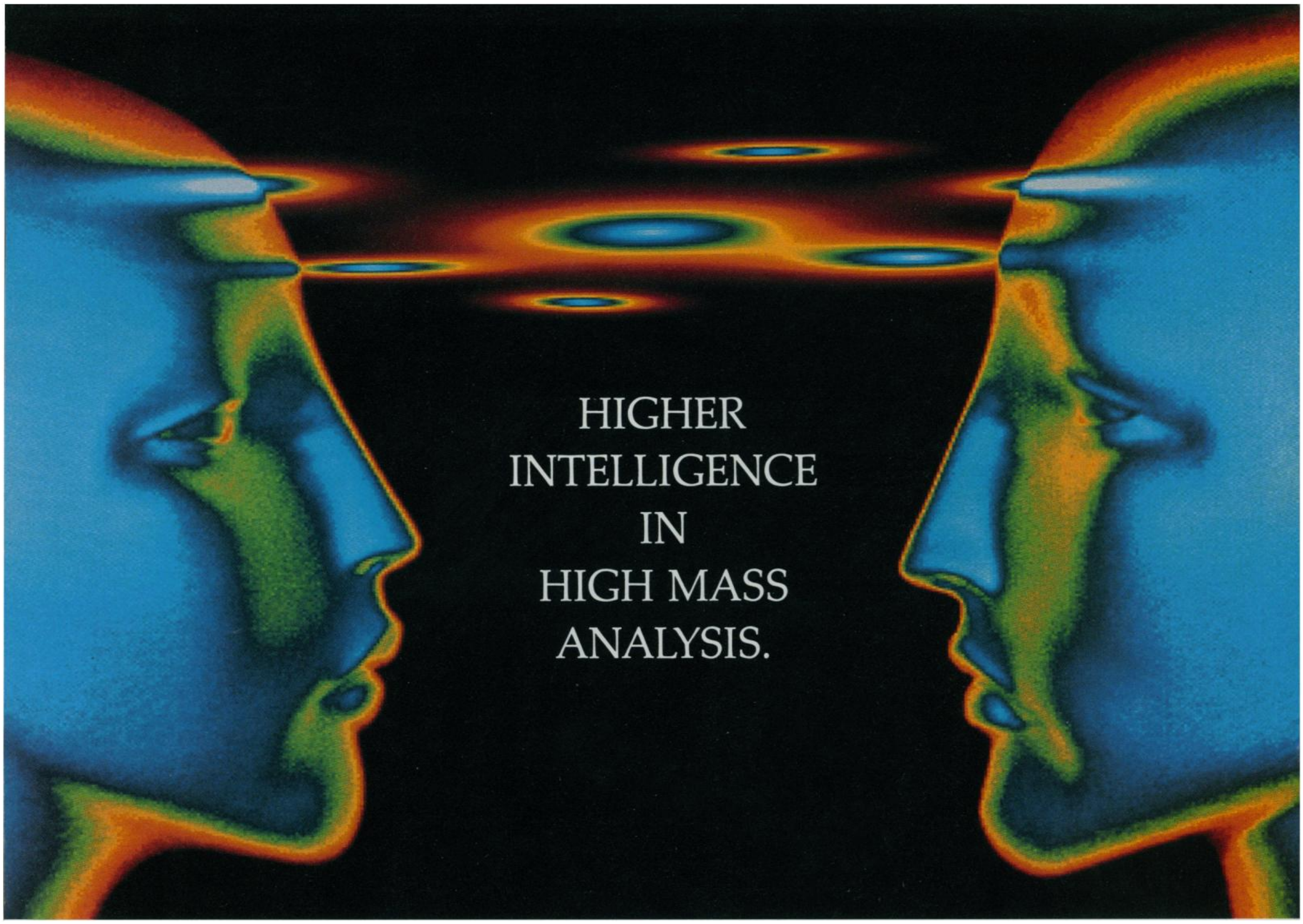
Cell cycle complexes

Complexes containing several regulatory proteins are implicated in the control of the cell cycle. The oncoprotein encoded by the adenovirus early region 1A (E1A) interacts with the retinoblastoma protein (pRB) (a tumor suppressor) and p107, a cellular protein that is similar to pRB. Also associated with E1A are $p33^{cdk2}$ and cyclin A, two proteins that interact to form a protein kinase that is likely to function in regulating progression through the cell cycle. Faha *et al.* (p. 87) show that p107 associates with cyclin A in the absence of E1A or pRB. Ewen *et al.* (p. 85) report that although p107 and pRB bind to similar sets of cellular proteins, cyclin A interacts only with p107. Cyclin A binding requires a discrete sequence of p107 distinct from the domains shared with pRB at which E1A and other proteins appear to bind.

Intended movements

Movement of the eye shifts the position of images of stationary objects on the retina; Duhamel *et al.* (p. 90) show that single neurons in the parietal cortex of the monkey can use information about intended movements of the eye to maintain the accuracy and continuity of visual representations. The receptive field of some parietal neurons shifted before an eye movement occurred, and almost all of the parietal neurons responded when eye movement brought the site of a previously used stimulus into the receptive field, even though the stimulus itself was absent. The shift in the receptive field updates the coordinates of remembered stimuli to maintain a dynamic link between successive retinal images.

EDITED BY PHILLIP D. SZUROMI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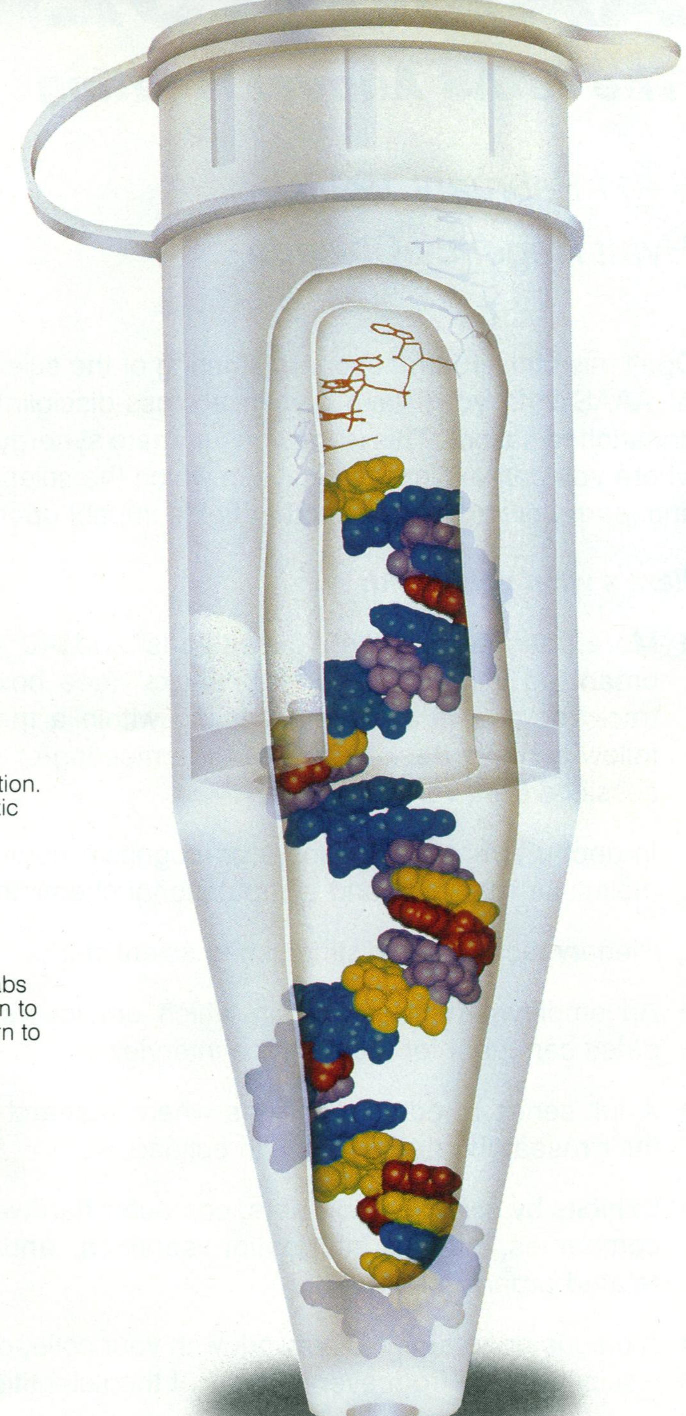

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Journals

1. I. N. Tang, *Atmos. Environ.* **14**, 819 (1980). [one author]
2. J. C. Smith and M. Field, *Proc. Natl. Acad. Sci. U.S.A.* **51**, 930 (1964).
3. J. C. Cheeseborough III, S. Trajmar, J.-T. Yang, *EMBO J.*, in press. [three to five authors]
4. G. Sunshine *et al.*, *Lancet* **i**, 711 (1975). [more than five authors]
5. M. Schmidt, *Sci. Am.* **251**, 58 (November 1984). [journal paginated by issue]
6. J. Brown, ibid., p. 67.

Technical reports

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