American Association for the Advancement of Science

SCIENCE

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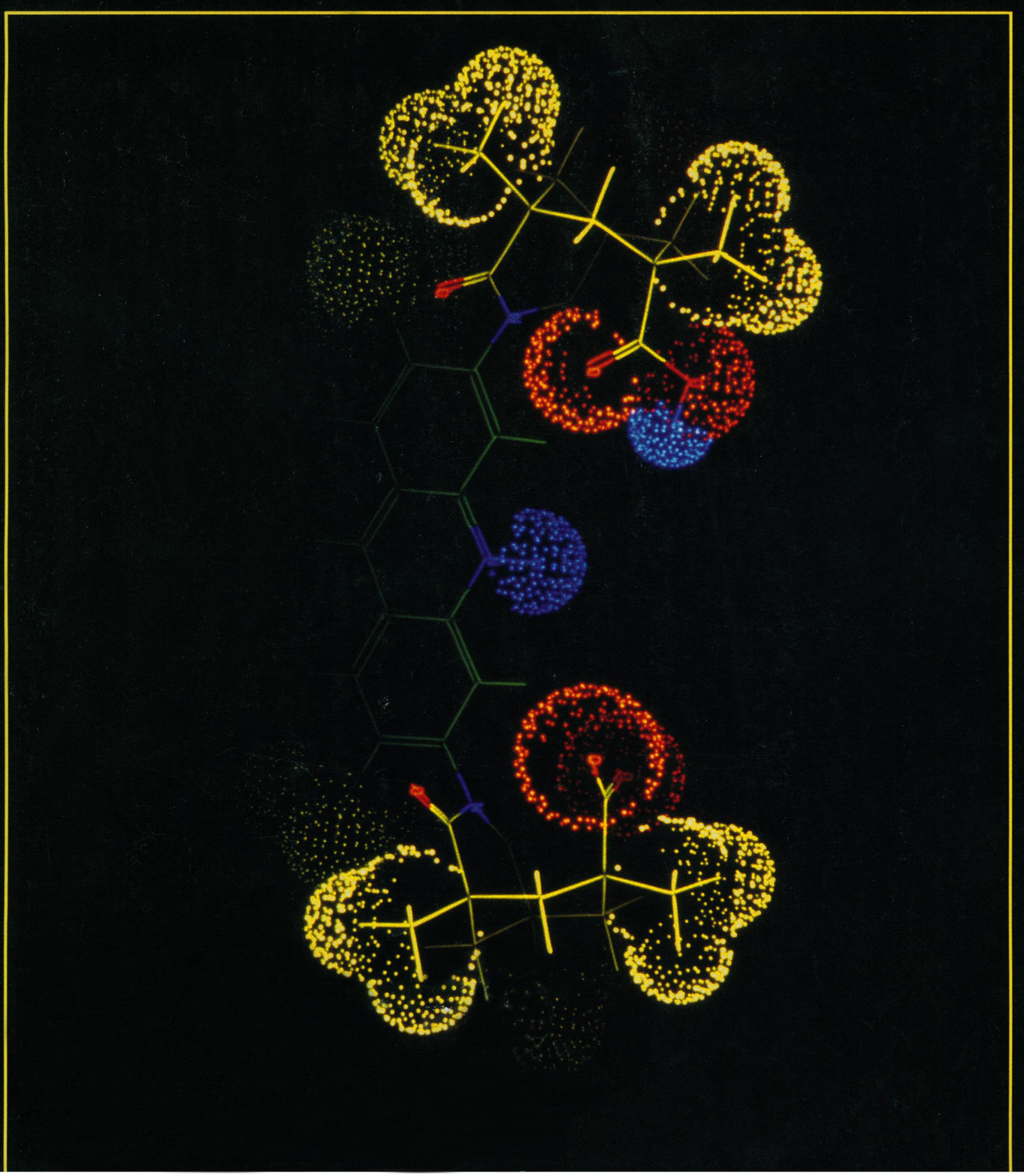

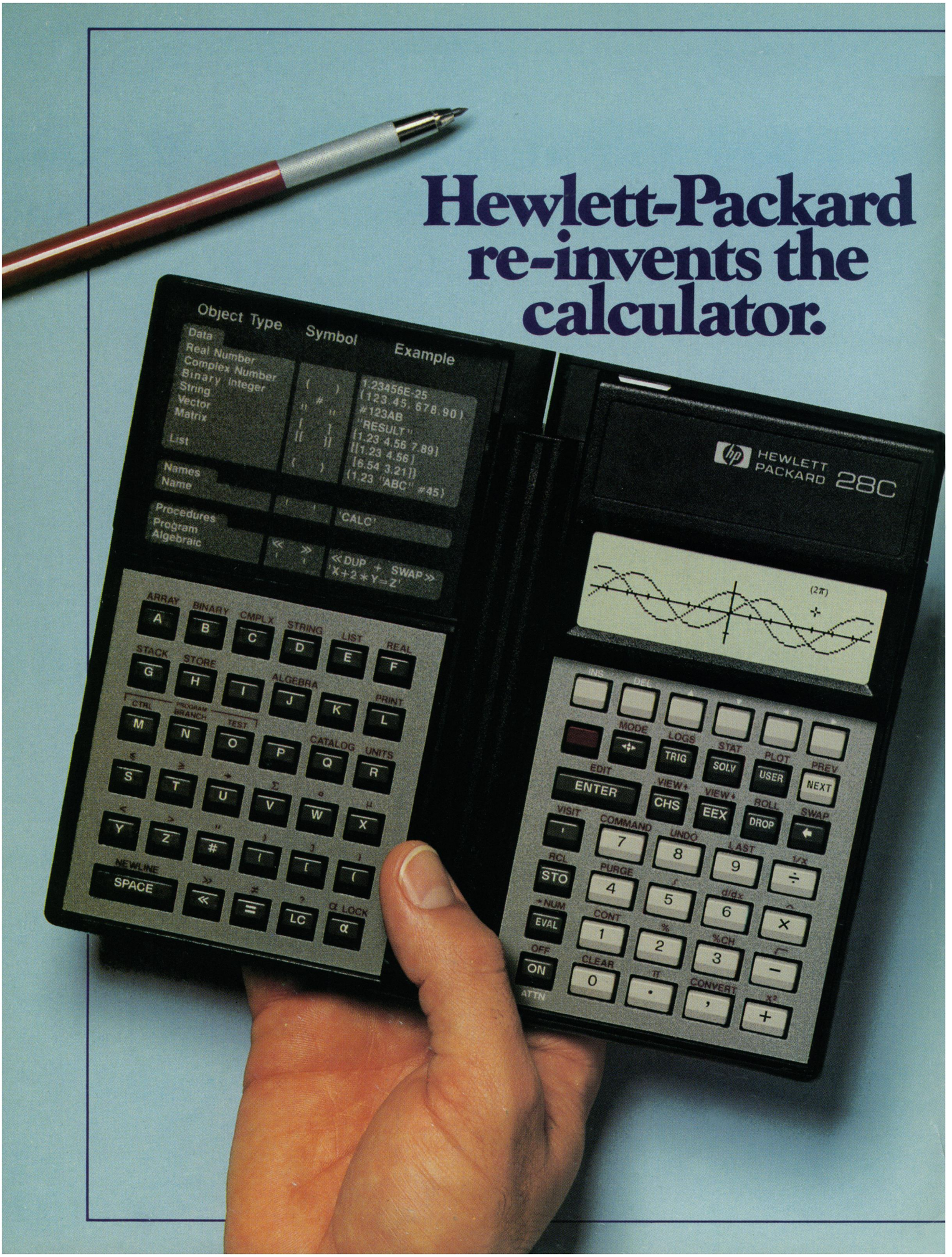
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Symbol
Example
Data
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List
1.23456E-25
(123.45, 678.90)
#123AB
"RESULT"
[1.23 4.56 7.89]
[[1.23 4.56]
[6.54 3.21]]
{1.23 "ABC" #45}
Names
Name
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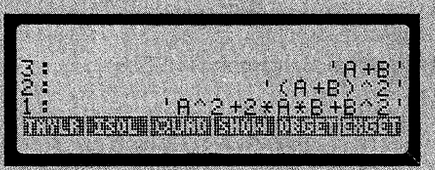

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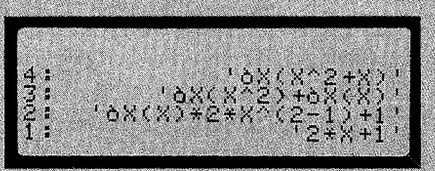

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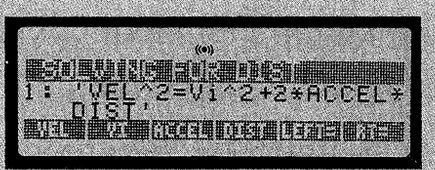

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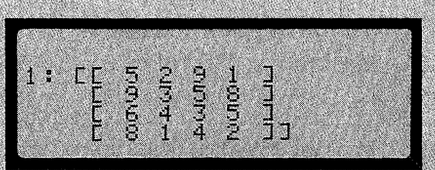

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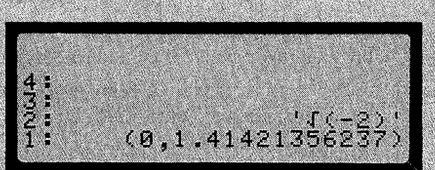

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			PG12611		SEE NOTE

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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 Domains of a synthetic molecular cleft. Regions of high polarity (red and blue) in the lining of the cleft combine with hydrophobic methyl groups (yellow) and an aromatic acridine nucleus (green). These domains provide surfaces for binding smaller molecules of complementary size, shape, and functionality in studies of molecular recognition. See page 1478. [W. C. Still, University of Pittsburgh, Pittsburgh, PA 15260]

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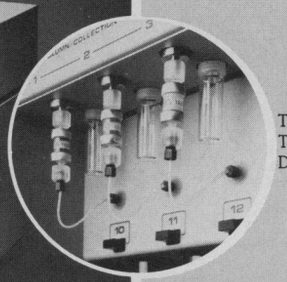

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Energy crisis

SOMETIME in the 1990s the United States is likely to experience another energy crisis (page 1467). Oil production in Saudi Arabia increased dramatically in 1985 and, by 1986, this caused a plunge in prices in the world oil market; the exploration and production capabilities of the high-cost U.S. oil and gas industries were then dramatically compromised and have now reached a new post–World War II low. The looming crisis could be slowed or reversed if oil import fees and oil import quotas were imposed, tax incentives were given for domestic exploration and production, renewed efforts were made to identify and substitute alternative energy sources for oil and gas, and available resources were better conserved. Hirsch argues, however, that it is unlikely that such measures will be instituted in time to avert a crisis, because the U.S. government and the oil and gas industries are oriented toward short-term and cheap answers to problems that need time, money, and sophisticated solutions. The U.S. dependence on foreign oil will soon exceed 50%. In the absence of ameliorative steps, U.S. energy security will continue growing weaker; energy security then becomes vulnerable once again to being hostage to the will of the OPEC nations, as they seek to regain control of world oil markets.

Guest stars and gamma-ray sources

GUEST stars, as Chinese observers called them, occasionally appeared in the sky in ancient times; today, such objects are called supernovae (page 1485). Where once there was only a star, a startlingly bright object (sometimes a million times as bright as the original star) appears for a brief time and then fades. Written accounts uncovered in ancient Chinese documents—one on an oracle bone and the other in a dynastic record—chronicle the appearance of guest stars in the 14th century B.C. and in A.D. 1230; the approximate position in the sky was recorded for each of these guest stars. In recent times, evidence has been mounting that supernova explosions can leave behind neutron stars that emit gamma rays, some of which may pulsate (pulsars). Twenty-five sources of such gamma rays have been detected in the cosmos by the European satellite COS B, and two are near the recorded locations of the ancient guest stars. Wang therefore speculates that these two gamma-ray sources may be neutron stars that were left behind by the ancient supernova events.

Octanucleotide enhances gene transcription

A string of eight nucleotides with an unvarying sequence (ATTTGCAT) assists in the transcription of certain genes into messenger RNA molecules (page 1498). This octanucleotide has been found in the DNA regions that promote expression of genes for immunoglobulin light chains, small nuclear RNA, a specific nuclear protein, a histone, and immunoglobulin heavy chains (where its orientation is inverted). Rigid conservation of this sequence in the diverse species and cell types in which it is found indicates that this octanucleotide is carrying out a crucial function. Parslow *et al.* report that the octanucleotide is also found in the promoter region of the gene for thymidine kinase in herpes simplex viruses. Plasmids were constructed that contained promoter sequences having or lacking the octanucleotide and enhancer sequences from various sources; an indicator enzyme (chloramphenicol acetyltransferase of bacteria) signaled when gene expression had occurred. Octanucleotides worked in concert with kappa immunoglobulin light chain enhancers to promote gene transcription; transcription was not increased when octanucleotides were juxtaposed with an unrelated enhancer. Thus, one of the octanucleotide's functions may be to help specific pairs of enhancers and promoters to work coordinately.

Antibodies to reverse transcriptase in AIDS

SOME asymptomatic carriers of the AIDS virus develop antibodies that neutralize the activity of an enzyme, reverse transcriptase (RT), that is made by the AIDS virus; later, when these individuals show signs of AIDS or AIDS-related complex, this antibody activity can no longer be detected (page 1501). Laurence *et al.* noted the inhibitory effects of the antibody by measuring RT activity in a standard enzyme assay. Homosexual men who were being evaluated clinically for several years retained RT antibody while healthy; the antibodies disappeared when disease symptoms appeared. Whether a causal relation between this antibody activity and control of the virus exists remains to be seen; nevertheless, this antibody may serve as a tool for following and possibly predicting steps in disease progression.

Parasite life cycle moves at snail's pace

PARASITES can have profound effects on their hosts and can make them behave in unusual ways (page 1509). Curtis found that snails (*Ilyanassa obsoleta*), which live on sand flats along the Delaware shore, will crawl upward onto sandbars and beaches during the high tide if they are infected with trematodes (*Gynaecotyla adunca*); snails that are not infected stay on the flats. Induction of snail movement onto the beach may be a mechanism by which infecting parasites have solved one of the problems they face in carrying out their complete life cycle—the need to shift from an aquatic to a terrestrial host. The snails apparently release the larval forms of the trematodes that next encyst in intermediate hosts such as beach hoppers and fiddler crabs. Later shorebirds may eat these intermediate hosts and, within the birds, the trematodes attain sexual maturity. Eventually trematode eggs are released by the birds and the cycle can begin again.

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Nominations:
Nominations are to be made by a letter that outlines briefly the work and major contributions to the field. The nomination is to be supported by the candidate's curriculum vitae and bibliography (citing the major publications), at least two letters of support from outside the candidate's institution, and at least three reprints of major contributions. All material is to be submitted in octuplicate, and no individual will be considered unless the supporting documentation is complete. Any other supporting documents and letters will be reviewed provided they are also submitted in octuplicate.

Nominations will be solicited from medical schools, Veterans Administration hospitals, and major clinics and research centers in this country.

There will be no more than three co-awardees for the Alton Ochsner Award in any one year. Nominees not receiving the Award will be considered for two additional years providing those who nominate the candidate request this in each of the two successive years.

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Deadline for Nominations: Nominations must be postmarked by April 15, 1987.

Presentation of Award:
The Award will be presented in person, October 27, 1987 at the Annual Assembly of the American College of Chest Physicians in Atlanta, Georgia.

Mail nominations to: Edward D. Frohlich, M.D.
Vice President for Academic Affairs
Alton Ochsner Medical Foundation
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New Orleans, Louisiana 70121

SCIENCE

20 MARCH 1987
VOLUME 235
NUMBER 4795

Nature, Nurture, and Behavior

The recent reports of the chromosomal localization of genes related to Alzheimer's disease and manic depression are major discoveries that bring promise of help to those suffering from these dread mental illnesses. These advances also contribute important information to the continuing argument about the roles of nature and nurture in behavior.

Many of the news stories that accompanied the description of the manic-depressive gene mentioned this new discovery as a watershed in this traditional debate. Although the recent finding in manic depression is a major advance, it was not a surprise to those who have followed developments in neurobiology. Seymour Kety's classical study following parents and their adopted and biological children in Scandinavian countries provided evidence that schizophrenia has a hereditary component; he also provided a methodology that has been used to study other behavioral disorders. These studies, however, met with major resistance, not only from a large segment of the public but also from many scientists and doctors who maintained that such behavioral disorders must be due to stress.

In retrospect it is easy to ask how anyone could have doubted the mounting evidence. The brain is, after all, an organ, like the kidney, the heart, or the liver, and organs are known to fail because of hereditary factors as well as environmental ones. The answer is probably that to many people the brain is much more than an organ: it is the center of the poetry, the sophistication, the special qualities that make human beings an order of magnitude more complex than the closest related species. To believe that the brain is merely a series of chemical reactions is to denigrate free will, to remove humans from the responsibility for their actions, to eliminate the relation between sin and guilt. Moreover, the recent findings are just the beginning; many other behavioral characteristics have been analyzed by studies of adopted children and identical twins and by biochemical approaches. Those who dread complexity will try to reduce the new evidence to the old confrontation of extremes: chemistry versus free will, heredity versus environment, fate versus responsibility. In fact, the neurobiological evidence indicates that part of the brain is "hard-wired" in advance of birth and part is designed to be plastic and learn from experience.

The relation of nature and nurture in manic depression is probably typical of what we can expect to discover about other behavioral disorders. Some individuals who have normal genes become overwhelmed by adversity in their environment, sink into depression, and attempt suicide. At the other extreme, some who have loving parents, ideal schooling, and a stress-free life are overwhelmed by their internal chemistry and also succumb to depression and suicidal intentions. Still others are pushed into depression by stresses that are easily surmounted by individuals with different genetic components. Some of these people will be helped by drug therapy (in the manic-depressive case, lithium is a highly effective drug with minimal side effects). Some will be helped by counseling, and some by a combination of the two.

This picture may seem obvious to a scientist, but our judges, journalists, legislators, and philosophers have been slow to learn this lesson. When children do not behave, parents or schools must be at fault. If prisoners are not rehabilitated, prison programs must be inadequate. If suicides are not prevented, stress must be excessive. Equally simplistic is the contention that there is no crime, only disease; no guilt, only a bad combination of genes. The truth is that we are dealing with a very complex problem in which the structure of society and chemical therapy will play roles. Better schools, a better environment, better counseling, and better rehabilitation will help some individuals, but not all. Better drugs and genetic engineering will help others, but not all. It is not going to be easy for those without scientific training to cope with these complicated relationships even when all the factors are well understood. It will be even harder while the scientific research is still unfolding. However, the debate on nature and nurture in regard to behavior is basically over. Both are involved, and we are going to have to live with that complexity to make our society more humane for the individual and more civilized for the body politic.

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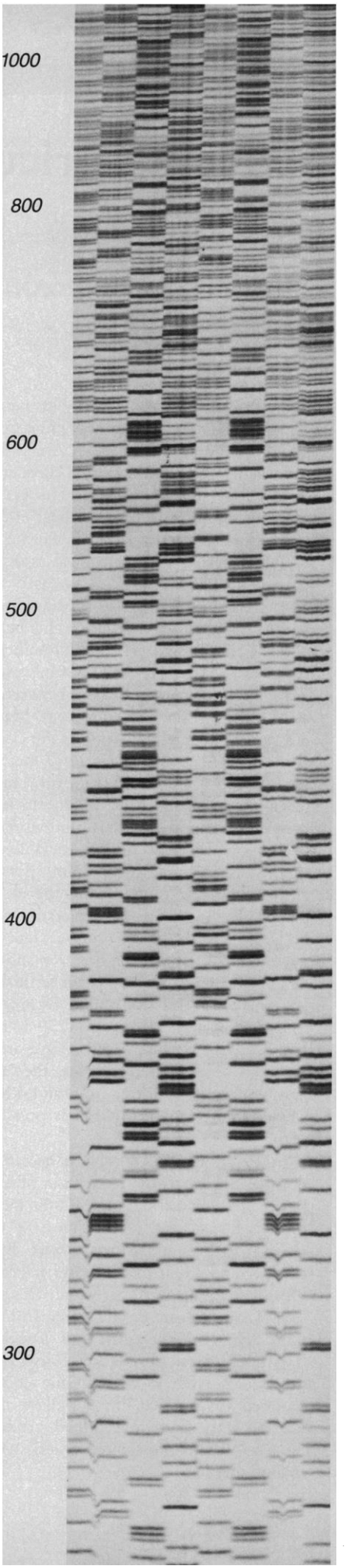

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