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COVER: This U.S. Air Force fighter runs through a practice gas attack in Rhein Main AB, Germany. U.S. State Department officials recently reported that they have evidence of real gas attacks; specifically, they believe the Soviet Union may be supplying chemical weapons to Southeast Asia and Afghanistan. Others are not convinced by the State Department's evidence. See page 250. (Photo courtesy of SSgt. James Pearson/U.S. Dept. of Defense)

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SCIENCE NEWS OF THE WEEK

Nobels in Medicine and Economics

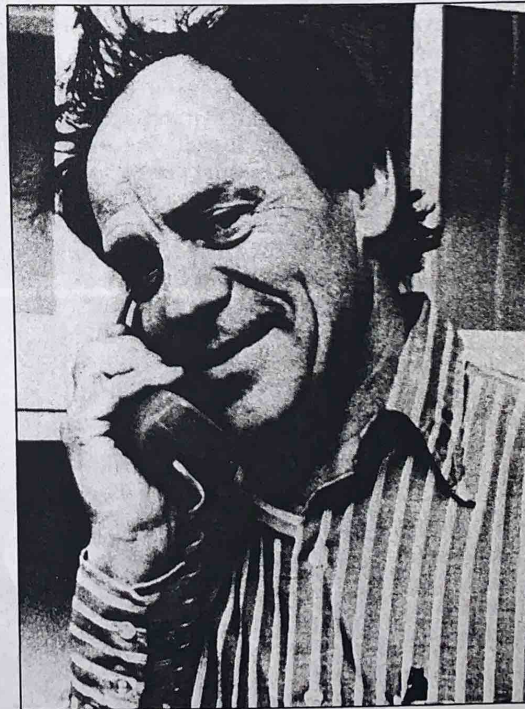
It is Nobel prize time again, and as of this writing two have been awarded. The Nobel Prize for Physiology or Medicine is being shared by Roger W. Sperry of the California Institute of Technology and by David H. Hubel and Torsten N. Wiesel of Harvard University for providing major insights into how the brain is organized and functions. The Nobel Prize for Economics has been awarded to James Tobin of Yale University for his analysis of financial markets.

Sperry receives half of the \$180,000 Nobel in medicine because, according to the Nobel awards committee of the Karolinska Institute of Medicine in Stockholm, he has "brilliantly succeeded in extracting the secrets from both hemispheres of the brain and in demonstrating that they are highly specialized and also that many higher functions are centered in the right hemisphere." Sperry began his split-brain experiments in 1954 on animals in which the connective fibers between

David H. Hubel and wife Ruth after learning he has won a Nobel in medicine.



Roger W. Sperry, who shares the prize.



Torsten N. Wiesel — the third co-winner of the 1981 Nobel prize for medicine.

Photos: Wide World

the two cerebral hemispheres had been surgically separated, then subsequently performed similar experiments on epileptic patients who had had the two hemispheres of their brains severed as a form of treatment. In both his animal and clinical studies he demonstrated that the two sides of the brain are independent regarding learning and retention. He then started mapping various areas of the brain and their functions and showed that the left hemisphere is the more aggressive, executive brain half, dealing with, among other things, logical thought processes, speech and writing. In contrast, the right hemisphere is the more passive brain half, handling, primarily, spatial relations, musical and artistic functions and holistic thought processes (SN: 4/3/76, p. 218).

According to Herbert Pardes, director of the National Institute of Mental Health, which has funded Sperry's research for 23 years, Sperry's "demonstrations that the left hemisphere contains the primary speech capacity while the right is involved in short-term memory are paramount to understanding brain function both normally and in abnormal states such as autism and Alzheimer's disease. His current studies exploring the capacities of the left and the right hemisphere to function in sustained attention and mental concentration will undoubtedly in the future have implications for the understanding of such illnesses as schizophrenia and depressions."

Hubel and Wiesel share the other half of the Nobel in medicine because of their discoveries concerning "information processing in the visual system." Before they started their joint research 20 years ago, it was thought that messages reaching the brain from the eyes were transmitted point by point, projecting the image on the cerebral cortex as a movie is projected onto a screen. Thanks to their experiments on cats and monkeys, it is now known that a complicated hierarchy of cells is involved in vision. In fact, due to their efforts, the primary visual cortex is the most thoroughly mapped area of the brain in terms of cell functions and organization (SN: 11/25/78, p. 372). The Harvard neurobiologists have also found that normal functioning of the cells involved in vision requires stimulation in the early stages of development, showing the importance of correcting visual problems such as strabismus (crossed eyes) early in life.

Tobin has been cited by the Swedish Academy of Sciences, which awards the Nobel Prize in Economics, for a broad spectrum of economic research, specifically for "his analysis of financial markets and their relations to expenditure decisions, employment, production and prices." According to the academy, he has greatly contributed to the portfolio selection theory, which explains how households and firms determine makeup of their assets.

Did a comet hit the sun?

For most of its lifetime, a comet is just another lump in space, a frozen ball of ice, dust and perhaps rock hurtling through the darkness. As it nears the sun, however, the growing warmth vaporizes the more volatile components and frees the trapped dust grains, generating the spectacular tail or tails by which comets are so familiar. Once past the sun, as the cold of space returns, the comet returns again to its dormant state—assuming, of course, that it survives the ordeal.

Comets are fickle. Swinging around in their orbits, they fragment, or vaporize to nothingness, or simply fail to reappear for reasons unknown. Or they can meet a much more emphatic end: Satellite photos have now revealed what Naval Research Laboratory scientists call the first positive evidence of a comet colliding with the sun.

Since the late 17th century, astronomers have observed perhaps a dozen comets passing extremely close to the sun, on occasions within a few tens of thousands of kilometers. One such comet, in fact, was seen in 1945 prior to its close solar encounter but not afterwards, although the limited number of observations prevented a true determination of its fate.

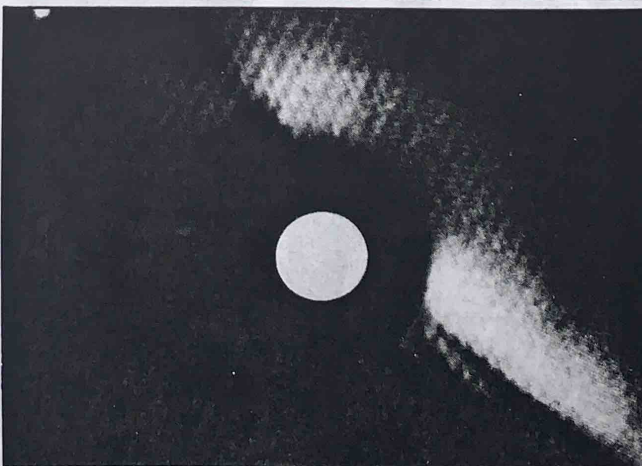
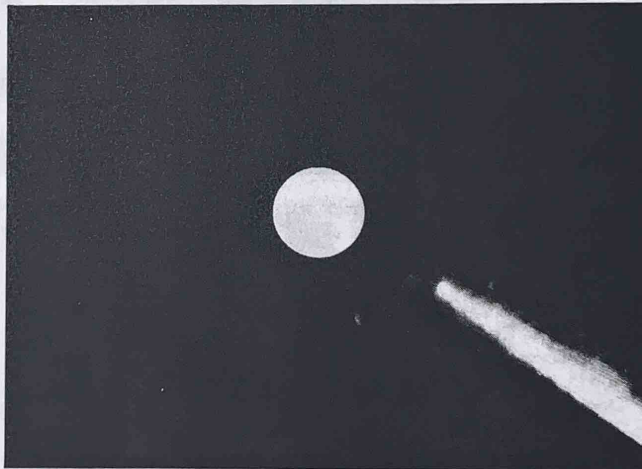
On Feb. 24, 1979, the Defense Department's P78-1 research satellite was launched, including in its payload a

coronagraph for studies of the sun. It is in photos from that instrument that Donald J. Michels and his NRL colleagues believe they have documented a previously unknown comet's final death-plunge. (It is also believed to be the first comet discovery by a satellite.)

The discovery came from a group of recently analyzed images made on Aug. 30, 1979. A series of frames show the head and tail of the comet as it approaches the sun, which is hidden by the coronagraph's occulting disk (used to eclipse the sun artificially for studies of the solar corona). Then the comet's head is seen right at the edge of the disk; then only the tail shows, then nothing.

Later frames show another phenomenon—an evolving halo of bright material around the occulting disk. The impression from the photos is almost that of a huge "splash," although the comet would have been minuscule compared to the sun. Instead, suggests Brian Marsden of the Smithsonian Astrophysical Observatory in Cambridge, Mass., perhaps the sun is illuminating material from the comet's tail that has simply come into range. In fact, he notes, the halo itself is not necessarily proof that the comet actually collided with the sun. The evidence for that is essentially the comet's failure to reappear from behind the disk.

The NRL researchers are hoping to contact other observers who may have detected the comet, but so far to no avail. Past observations of sun-grazing comets have been primarily visual rather than photographic (the 1945 comet was one exception), however, so even the NRL photos alone provide a valuable study tool. Further analysis may provide additional insight into the event. □



Top: Comet approaches the sun (hidden by occulting disk) on way to apparent collision.

Bottom: Halo of presumed cometary material shows around sun 11 hours after calculated collision.

PHOTOS: NRL