

Science News of the Year

This is a review of important science news stories of 1983 as reported in the pages of SCIENCE NEWS. The references after each item refer to the volume and page number in which the main article on the subject appeared in SCIENCE NEWS (Vol. 123 is Jan.-June; Vol. 124 is July-Dec.). Where several references exist, the news developed and was reported in more than one issue. Back issues or, when out of stock, copies of articles are available for one dollar each by writing to SCIENCE NEWS, 1719 N Street, N.W., Washington, D.C. 20036.

Anthropology & Paleontology

- Scientists studying "Lucy" and the larger *Australopithecus afarensis* fossils from Ethiopia challenged the discoverer's view that they represent a single, sexually dimorphic species (124:8). Another scientist disputed the dating of the *A. afarensis* fossils, claiming that the species was contemporary with 3-million-year-old South African hominids. 123:5

- The rare pygmy chimpanzee may be the best living model of the last common ancestor for humans and apes. 123:88

N. Bechman



- Mass extinctions occur roughly every 26 million years, the fossil record revealed, but nobody knows why. 124:212

- After years of debate, paleontologists selected a Siberian site for the Cambrian-Precambrian boundary. 123:300; 124:6

- The fossil collar bone of the oldest known hominoid from northern Africa may actually be a rib of an ancient dolphin. 123:246

- Paleontologists asserted that some land plants and animals evolved not in mid-latitudes, but in the Arctic. 124:197

- Microscopic fossils, including the earliest known centipede, indicated that the transition from aquatic to terrestrial life may have taken place 380 million years ago, much earlier than previously thought. 123:356

- Volcanic dust from the eruption of El Chichón ravaged once-dazzling pre-Columbian art. 123:46

- A 50-million-year-old skull discovered in Pakistan tied whales to their terrestrial forebears. 123:271

Behavior

- The blood of severely alcoholic men contains a substance not found in the blood of social drinkers, indicating that alcoholics may use a unique physiological pathway for the breakdown of ethanol. 124:180

- Studying narcoleptic dogs, scientists found two brain abnormalities that might help explain the excessive somnolence and abnormal REM sleep characteristic of the disease (123:292). Another scientist reported dramatic preliminary results in treating human narcoleptics with codeine, an opiate derivative. 124:126

- Beginning with reports that several junkies had developed Parkinson's disease from doses of tainted heroin, scientists succeeded in creating an animal model of the movement disorder that they are now using to study its nature. 123:276

- Two groups of scientists reported evidence that the predisposition for schizophrenia develops prenatally. One group linked the debilitating thought disorder to a range of minor physical anomalies known to develop during the first trimester of pregnancy (124:164). Another found a dramatic structural abnormality in autopsied brain tissue of schizophrenics; the cell misalignment, which could occur only in early brain development, was in the hippocampus. 123:391

- A major government study of hemodialysis treatment for schizophrenia provided no evidence that blood filtering is any more effective than a fake treatment, contradicting dramatic positive results reported six years ago. 123:214

- Scientists studying compulsive runners say that such extreme commitment may be a male manifestation of an "ascetic disorder," which in women tends to show up as anorexia nervosa, or self-imposed starvation. 123:102

- Scientists reported preliminary evidence that reading disability may be hereditary; the familial form of dyslexia is strongly associated with variability on chromosome 15, lending support to a theory that links learning problems to immune dysfunction. 123:180

- Three psychiatrists, working independently, reported evidence that "neuroleptics," the powerful tranquilizers used to treat serious mental disorders, may be causing mental and emotional problems unrelated to the original disease. 124:214

- The dexamethasone suppression test, a blood test routinely used by psychiatrists in the diagnosis of serious depression, is inaccurate and can lead to misdiagnosis and mistreatment, several groups of scientists concurred. 123:326

- Francis Crick, co-discoverer of the helical structure of DNA, described his theory that dreaming results from the brain's random firing to debug its overloaded cortex; remembering dreams, the Nobel laureate said, may be unhealthy. 124:188

- Studies of monkeys indicate that spatial memories and emotional memories are processed through distinct brain pathways; other studies suggest that some kinds of habit learning may not involve the brain's memory system at all. 124:378

- Using positron emission tomography (or PET) scanners, government scientists were surprised to find that the brains of mentally retarded young adults were more, not less, active than normal controls — suggesting that they are working hard (but inefficiently) at the task of thinking. 124:154

Biology

- Learning was given a biochemical basis by observations of changes at nerve cell junctions in sea snails. Experiments on rabbits and monkeys and studies of people with amnesia implicated specific brain areas in memory. 123:74; 124:378, 394

- Specialized antibodies for diagnosing a wide variety of medical conditions became the first major clinical application of biotechnology to reach the market. 123:296

- The first officially approved release of genetically engineered organisms into the environment was postponed after environmental groups sought court action. The organisms in question are bacteria lacking the gene that aids ice formation. These bacteria were to be used on crop plants in an attempt to prevent early frost damage. 124:132, 198

- Scientists learned for the first time the function in normal cells of a cancer-causing gene. It is a growth factor in the response to tissue injury. In other work, more evidence demonstrated that cancer is a multi-step process, that there are chemical differences between normal and malignant genes and that the change of a single subunit can distinguish the cancerous gene. 123:38, 388; 124:154, 248

- Petunia plants that produce a bacterial protein were the first announced success of botanical genetic engineering (123:277). Earlier in the year, scientists reported foreign genes expressed in plant cells growing in laboratory culture and transfer, but not activity, of yeast genes into tobacco plants. 123:68, 184

- New types of predation were identified: a parasitic fungus that shoots high-velocity projectiles into microscopic animals (123:23); large fly larvae that eat small toads (124:293); fireflies that home in on the flash pattern of other fireflies and attack them in the air (124:309); spiders that emit odors of female moths and then capture male moths on a glob of glue at the end of a silk thread. 124:389

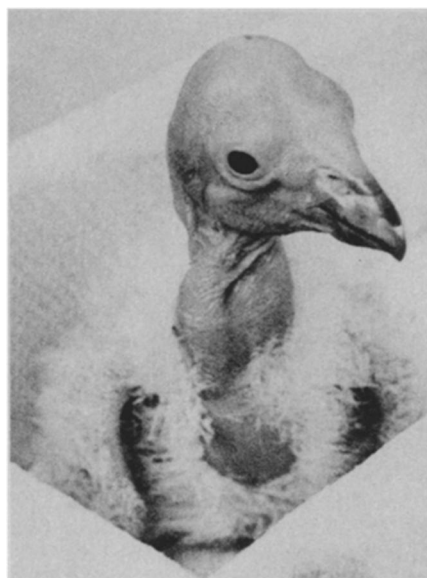
- A major division of the animal kingdom was established in order to accommodate a newly discovered microscopic marine animal that has a flexible, retractable tube for a mouth, a girdle of plates and a crown of claw-like and club-shaped spines. 124:229

- Plant scientists discovered the genetic basis of one type of herbicide resistance and are working to develop crop varieties that will grow in the presence of the powerful herbicide. 123:359

- Scientists began to analyze the thousands of genes active only in brain cells and suggest there is a novel marker segment that identifies brain genes. 124:212

- Metamorphosis of moths allowed scientists to discover a surprising flexibility in brain cell development. 123:268

- Chicks of emperor penguins, king penguins and California condors were successfully raised by biologists. 123:151, 229, 371



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- Oil from citrus peels was found to act as an insecticide. 124:231

- The five genes that control the early steps of photosynthesis in a bacterium were isolated and analyzed. 124:102

- The pandas at the National Zoo finally mated after eight years of ineptitude and produced a cub, but it died of a respiratory infection only three hours after birth. The female panda suffered later from kidney failure. 123:199, 124:68, 405

- Segments of DNA that boost the activity of nearby genes several hundredfold, first identified in animal viruses, were discovered among the genes of animal cells. 123:139; 124:117

- Mechanisms of fetal growth retardation were explored in animal as well as human studies in order to develop methods to detect and treat fetuses that are small for their gestational age. 124:250, 266

Chemistry

- Tests with "primitive" chlorophyll models suggested that photosynthesis originated earlier than previously thought, even perhaps with life itself. 123:248

- In a new method of making polymers, small molecules called monomers were inserted between an initiator and its activating group, so that the activating group repeatedly was transferred to the last monomer of the chain. 124:149

- One type of snuffle-producing virus called rhinovirus was crystalized into prisms, which scientists found intriguingly similar to polio virus crystals. 123:165

- A laser built from commercially available components produced extremely short wavelength ultraviolet light, which, developers claim, is purer and orders of magnitude brighter than similar radiation from synchrotron light sources. 124:186

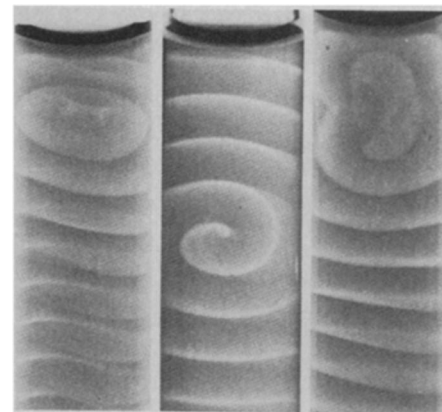
- For the first time hydrogen molecules were observed unbroken as part of a larger molecular complex (123:202). Also, laser techniques began to unravel the details of the hydrogen atom — hydrogen molecule reaction, and the resulting data sent theorists into a flurry of activity. 124:168

- The chemistry of how cigarette smoke and air pollutants affect emphysema was elucidated. 123:199

- Atmospheric chemists found evidence that molecular weight and size play a significant role in the atmospheric dispersion of vapors, contradicting classic atmospheric theories. 123:118

- Scientists found new methods of breaking the bonds of hydrocarbons such as petroleum. The methods could make it possible to manipulate the chemicals into drugs and similarly complex materials. 124:166

- Swirls of a dark liquid in a test tube provided direct evidence for the formation of three-dimensional chemical waves. 124:180

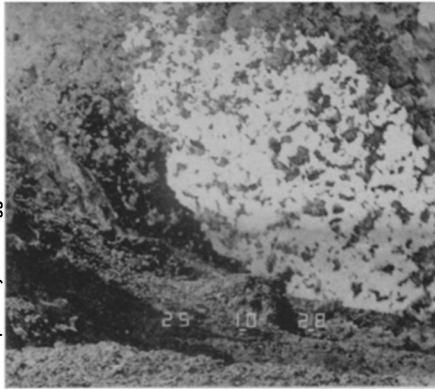


- The search for an efficient way of producing solar energy, or using sunlight to split water into hydrogen and oxygen, continued and claims of "eureka" continued to be controversial. 123:71, 286

Earth Sciences

- Earthquake swarms in Long Valley, Calif. renewed eruption fears (123:39; 124:40), while chronologies of past eruptions from nearby crater chains raised the possibility that an eruption at Long Valley might occur not from one vent but from many. 124:388

- Australians found rocks believed to be 4.1 to 4.2 billion years old, raising hopes that fragments of the earth's early crust still exist. 123:389



• Kilauea sprang stunningly to life (123:39; 124:24), while Mauna Loa geared up for its own eruption. 124:392

• The puzzling May 1983 earthquake in Coalinga, Calif., suggested to scientists that many of California's rolling hills may conceal buried faults — and their own earthquake hazards. 124:388

• CO₂ levels and climate changes were tied to marine microbes. 123:229

• Magnetite particles formed by bacteria may cause the seafloor's strong magnetic signals. 124:308

• Under the right conditions, the moon can influence earthquakes. 124:54

• Airborne scientists sought the extent and composition of the sooty "Arctic haze." 123:69, 229; 124:151

• The 1982-1983 El Niño, a warming in the Pacific of record strength, wrought havoc worldwide. 123:135, 280; 124:298

• Earthquake waves led scientists toward a view of the structure of the earth's interior. 123:280

• Observations showed that parts of California swell and subside in a gradual "breathlike" fashion. 123:164

• Osmium ratios boosted the argument that an asteroid hit the earth 65 million years ago. 124:329

• Half of Molokai, Hawaii, was sheared away in a giant landslide more than 400,000 years ago. 124:327

• Scientists wondered if old volcanoes in the U.S. are revving up. 124:135

• Evidence builds for positive lightning phenomenon. 124:245

• Groundwater studies revealed unique microbial ecosystems. 124:348

• A worrisome "seismic silence" in the Aleutian arc may end soon as the Shalugin gap primes for a great quake as large as Richter magnitude 8.6. 123:389

• Laboratory studies indicated bacteria at the deep sea vents grow at 250°C or more. 123:372

Energy

• Congress voted to stop funding the Clinch River Breeder Reactor despite industry and administration efforts to keep the project going. 124:52, 126, 329

• The Department of Energy budget aroused considerable controversy when it called for a National Center for Advanced Materials (123:87, 295; 124:52, 345). Some universities successfully lobbied Congress to get funds for new laboratories. 124:52, 329

• The Nuclear Regulatory Commission (NRC) set safety goals for nuclear reactors (123:37). Meanwhile, one U.S. Supreme Court ruling held that the NRC need not address psychological impact on residents when authorizing the restart of the Three Mile Island-1 nuclear reactor, and another held that a state could ban nuclear-plant construction. 123:279

• Research on potential geothermal energy sources revealed several promising sites and technologies for harnessing this energy source. 123:107, 153, 186



• With passage of a high-level radioactive waste bill, the Energy Department, Nuclear Regulatory Commission and Environmental Protection Agency began the complex process of building the nation's first high-level nuclear waste repository. 123:6, 24, 329

• In the area of nuclear wastes, a potential shortage of space for low-level radioactive waste storage, ocean disposal of retired nuclear submarines and salt-bed high-level nuclear waste storage all raised controversial policy issues that were difficult to resolve. 123:329; 124:104, 169, 292

• The Union Oil Co. finished building the first stage of its oil shale processing plant. 124:362

• A new liquid-junction solar cell achieved a stability and efficiency that made it a promising alternative to solid-state photovoltaic cells. 124:376

• The first large-scale fuel-cell power plant began generating reliable electric power in New York City. 124:376

• The clean-up of the damaged Three Mile Island-2 nuclear reactor continued slowly, with new studies of the core showing extensive damage. 124:183

• The U.S. Synthetic Fuels Corp. handed out price and loan guarantees to a limited number of synfuels projects (123:24; 124:104, 393). The nearly completed Great Plains coal gasification plant ran into financial troubles, leaving the project's future uncertain. 123:329; 124:329, 393

Environment

• New data suggest that even a modest strategic nuclear war could have devastating effects on the atmosphere and global climate. 124:314

• Squabbles over the politics behind toxic-waste cleanup and the enforcement of pollution laws eventually led to the resignation of Environmental Protection Agency Administrator Anne (Gorsuch) Burford and the perjury conviction of former "Superfund" administrator Rita Lavelle. William Ruckelshaus was brought in to replace Burford and to stabilize the agency's shaky reputation. 123:132, 182, 197, 299, 343; 124:393

• Despite President Reagan's announcement that acid rain was being elevated to an area "of immediate concern," little political action occurred. Research continued, however, to document effects of the environmental scourge. 123:52, 231, 332, 343, 390; 124:7, 72

• Two studies looking at the so-called "greenhouse effect" concluded that global warming was inevitable, was likely to be unaffected by political action, and was "reason for caution, not panic." 124: 260

• Times Beach, Mo., focused national attention on the problem of public exposure to dioxin—the deadliest man-made chemical. 123:54, 60, 132, 198, 262, 270, 299; 124:156, 406



• A plant's tolerance to ultraviolet radiation today may have been determined by the degree to which ozone screened out the radiation when the plant species was first evolving to its present form. 124:86

• New research suggested asbestos may not be mutagenic itself, but rather an enhancer of other carcinogens. 124:155

• An eight-year mortality study linked cardiovascular-related deaths and noise pollution from jet aircraft. 123:294

- A federal study documented the pervasive — and non-work-related — presence in human tissue of a wide range of the most toxic pesticides known. 124:199

- Animal tests linked long-term exposure to gasoline fumes and kidney cancer. 123:359

- Formaldehyde in cigarette smoke may play a role in causing respiratory-tract cancers. 123:231

- A research arm of the Congress concluded that EPA's data were insufficient to establish whether Love Canal, N.Y., was habitable. And while a federal study found no chromosome changes in residents of the area, other reports of hazards continued to surface. In October, Hooker Chemical Co. signed an agreement to compensate residents for health and property damage. 123:341; 124:29, 232, 245, 249

- Immediately following publication of a federal study indicating Paraquat was probably responsible for causing permanent lung injury to hundreds of U.S. "pot" smokers, the government began aerial spraying with Paraquat to eradicate marijuana on federal lands. But environmentalists' lawsuits quickly put an end to that. 124:55, 136, 187

Medicine

- Once a heart attack begins, a naturally occurring substance called tissue plasminogen activator (TPA) may prove useful in dissolving the blood clots that can clog coronary arteries and deprive the heart of blood. The substance can be made in plentiful quantities using recombinant DNA techniques, scientists reported. 124:340

- Smoking low-nicotine ("light") cigarettes does not lessen the likelihood of cigarette-related heart attacks, according to a Boston University study (123:150). The U.S. Surgeon General warned that cigarette smokers have a 70 percent greater death rate due to coronary heart disease than nonsmokers. Of all the ways in which the risk of heart disease can be curbed, cessation of smoking is the most powerful, he said. (124:343)

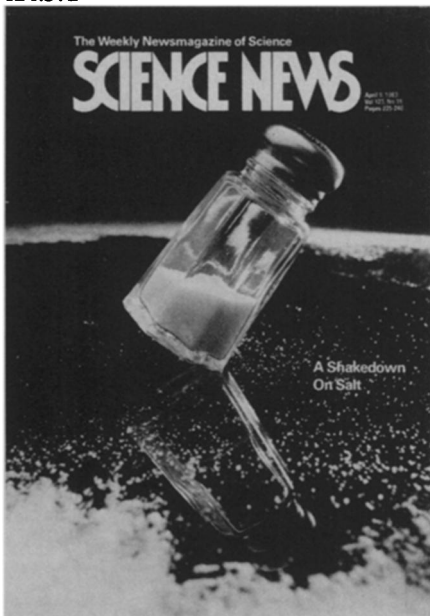
- Carbohydrate metabolism is proving to be more complex than researchers first thought. One study suggested that diabetics may be able to tolerate modest amounts of sucrose as long as the total number of calories is kept in check (124:38). An extra bit of DNA attached to the gene that codes for human insulin was implicated in preliminary studies of non-insulin dependent diabetes (123:53). Other research hinted that antibodies directed against the pancreas might play a role in disease that is insulin dependent. 123:117

- By priming the lungs of premature infants with a natural lung lubricant, physicians developed a new and effective treatment for "respiratory distress syndrome," a usually fatal problem for infants born too soon (123:310). A congenital heart defect, hypoplastic left heart syndrome (also usually fatal), was successfully corrected for the first time, using a new surgical technique. 123:39

- A tick harboring noxious bacteria was named as the prime suspect in the transmission of "Lyme Disease," an inflammatory ailment first noted in Old Lyme, Connecticut in 1975. 123:228

- Australian researchers reported the first successful pregnancy using a frozen embryo that had been fertilized in a laboratory dish (123:295), while California scientists announced the first two successful transfers of embryos from the womb of one woman to another. 124:69

- The role of ingested salt in high blood pressure was questioned, as scientists debated the effects of a low-salt diet. One group reported animal studies showing that the chloride component of salt may be a factor in high blood pressure. 123:232; 124:372



- "Cold," low power lasers proved effective in reducing pain in a preliminary study (123:100). In a second use, the lasers were found to aid the restoration of motor function and control of spasticity in paraplegics. 124:245

- Although problems still plague the 30-year-old organ transplantation field, the outlook for organ recipients has never been better, transplant surgeons report. Chief among the transplant tools: cyclosporine, a drug recently approved by the FDA for widespread clinical use in selectively suppressing the organ recipient's immune system. 123:150, 83; 124:218, 328

- "There's no question that diet is a major, if not *the* major, factor in human cancers," said Bruce Ames, the inventor of the widely-used Ames test for mutagenicity, who cataloged a long list of edible plant and animal products that alter DNA or trigger cancer in laboratory animals. 124:217

- The causes and modes of transmission of Acquired Immune Deficiency Syndrome (AIDS) continued to baffle researchers, though cellular and chemical abnormalities offered clues. 123:151, 197, 245

- A study of heart disease in animals showed that a diet low in calcium might be a risk factor in heart attacks (124:103). The American Medical Association cited evidence that suggests half the U.S. population should consider reducing the cholesterol in their diet to aid their hearts. 124:263

- Genetic engineering continued to revolutionize the understanding of the human genome and the clinical ability to treat genetic defects. Genetic markers for Huntington's disease (124:311), phenylketonuria (124:342), and Duchenne muscular dystrophy (123:42) were identified, while cells taken from a patient with Lesch-Nyhan syndrome and cultured in a lab dish were genetically altered to correct their biochemical defect (124:90). "Factor VIII," the clotting factor missing from the blood of most hemophiliacs, might be produced synthetically, said researchers who discovered and cloned a piece of the gene responsible for producing the substance. 124:372

Physics

- The Hall effect, a behavior of electrons in magnetic fields at low temperatures, was known to be quantized. It is one of the mounting number of instances that quantum behavior is possible on the macroscopic scale. Now it has exhibited quantization in fractions of the original quantum amount, and the reasons for this fractionation may be important in searches for an ideal electric conductor. 123:405

- The thermonuclear fusion experiment Alcator C at Massachusetts Institute of Technology surpassed the combination of plasma density and confinement time believed necessary for scientific breakeven, the condition of getting as much energy out of fusions as was put in to ignite them. 124:311

- An experiment at the Lawrence Berkeley Laboratory produced uranium ions completely stripped of all 92 electrons. 124:358

- A new family of organic compounds was found to be superconducting. 123:126

- The W and Z⁰ particles, which embody the forces classed under the weak subatomic interaction, and which provide an important confirmation of the unified theory of the weak interaction and electromagnetism, were found at CERN in Geneva. 123:84, 388

- The B meson, which involves the bottom quark, the heaviest known variety or "flavor" of quark, in the configuration called bare bottom, was discovered. Bare bottom renders the bottom quark's properties easier to study than other configurations in which it is found. 123:70

- The identities of neutrons and protons in certain atomic nuclei may break down, turning the nuclei into mixtures or plasmas of quarks and gluons. 124:39

- Studies using channeling radiation seemed to show that physicists don't know as much about simple crystals as they thought they did. 124:374

- The existence of anomalous, atomic nuclei that interact with other nuclei more readily than they should, seems to be confirmed. 124:20

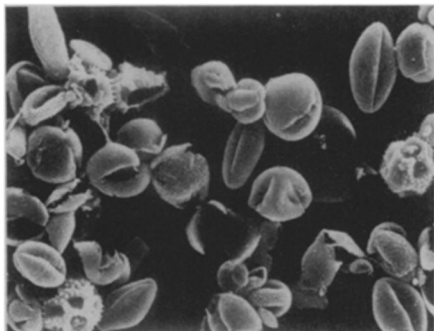
- The length of the packet of matter (de Broglie) waves associated with a neutron was measured. 123:153

Science & Society

- Partnerships between universities and industry have raised questions about whether public interest and scientific freedom are being sacrificed to commercial opportunity. 123:76

- While a United Nations panel found possible evidence of fungal-toxin residue — hinting at possible chemical-weapons use by Soviet-assisted troops — a Harvard researcher countered with claims that alleged evidence of this so-called "yellow rain" might actually be bee excrement. 123:40, 374

Meselson et al.



- A proposal to sell the nation's earth-resources and weather satellites to the private sector met considerable protest. By the end of the year, Congress had prohibited the weather satellites' sale. 123:181, 124:247, 375

- Asked to review ways to modernize the nation's strategic forces, a presidential blue-ribbon panel recommended placing MX missiles in existing silos, developing a smaller single-warhead intercontinental ballistic missile, and moving away from multiple independently targeted warheads in ballistic missiles. 123:246

- In March, President Reagan unveiled his vision for futuristic ballistic-missile defense and called upon the scientific community to "give us the means of rendering ... nuclear weapons obsolete." 123:212

- A law to guarantee federal protection to infants with severe birth defects — known as the Baby Doe rule — was formalized on March 22, and struck down by a U.S. District Court 23 days later. 123:286

- A White House-initiated review of the federal-laboratory system outlined a number of serious management deficiencies affecting both the quality and productivity of the labs. President Reagan authorized immediate implementation of many panel recommendations. 124:53

- Evidence is mounting that schools are not teaching the skills for coping with an increasingly technological society, so incentives have been instituted to recruit and keep better teachers. Recommendations were also aired for upgrading science education. 123:106, 346; 124:183

- While acknowledging that psychiatrists cannot reliably predict future violent behavior, the Supreme Court ruled that such "expert" testimony is not unconstitutional and should be permitted even when life-or-death decisions hang in the balance. 124:38

- The controversial Secretary of the Interior, James Watt, stepped down after another of his off-the-cuff comments provoked a national outcry. The highly visible and productive administrator was replaced by William Clark. 124:247, 261

- The American Psychiatric Association, in its first position statement on the insanity defense, said that insanity and criminal responsibility are legal and moral concepts on which psychiatrists are unqualified to comment. 123:68

- The conviction of a Maryland psychologist on animal cruelty charges — the first such court action ever taken against a U.S. scientist — was overturned by the state's highest court. 124:118

- Soviet psychiatrists abruptly withdrew from the World Psychiatric Association, charging their international colleagues with politicization of the scientific society; several member societies had been involved in an effort to expel the Soviets for political abuse of psychiatry. 123:116

- As the Reagan administration prepared to expand the government's use of lie detectors for national-security purposes, a congressional study reported no scientific evidence for the accuracy of such screening. 124:292

- Stanford University officials settled a dispute over the institution's military involvement by deciding that only basic-science measurements in weapons research would be permitted at the Stanford Linear Accelerator Center and Stanford Synchrotron Radiation Laboratory. 124:228

- Scientists in the United States and the Soviet Union expressed growing concern over governmental crackdowns on scientific freedom and the exchange of information between the two countries. 123:218

- President Reagan signed a bill providing tax credits to pharmaceutical manufacturers that develop "orphan drugs" — those that treat diseases that afflict relatively few people. 123:22

Space Sciences & Astronomy

- Evidence for possibly planet-sized companion objects, a few times the mass of Jupiter, in orbit around other stars was reported from astrometric measurements of the stars VB8 and VB10 (124:116), while a possible protoplanetary companion was suggested from observations of the star T Tauri. 123:342

- The first space flight by an American woman (astronaut Sally K. Ride) and the first by a black American (astronaut Guion S. Bluford) took place on successive missions of the space shuttle. 124:4, 165

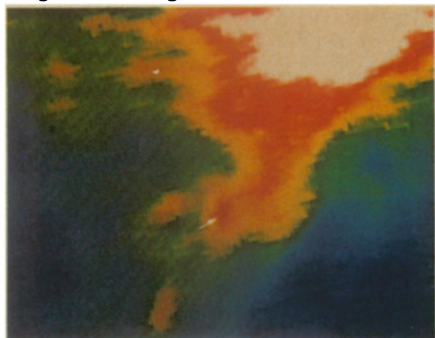
- A second U.S. space shuttle, Challenger, joined Columbia this year, with its maiden mission including the first U.S. spacewalk in nine years and the deployment of a complex Tracking and Data-Relay Satellite designed to begin taking over work from NASA's existing ground-based tracking network. 123:244

- The fourth and final shuttle mission of the year saw dozens of scientific experiments conducted aboard the European-built Spacelab research module, with the largest crew (six) ever to fly in a U.S. space vehicle, including two scientists who were the first astronauts not trained as spacecraft pilots. 124:373

- The "first direct evidence of an ocean on an extraterrestrial body" was reported by researchers describing spectra of nitrogen, presumed cold enough to be in liquid form, on Neptune's moon Triton. 124:36

- The first direct evidence of solid material (believed to be tiny particles) around stars other than the sun was found in observations of the stars Vega and Fomalhaut by the U.S.-Dutch-British Infrared Astronomy Satellite, which also conducted the first survey of nearly the entire sky at long IR wavelengths. 124:100, 324, 406

NASA



- A pair of Soviet cosmonauts spent 149 days aboard the Salyut 7 space station, but two other crews never made it, one because it had to return to earth following an unsuccessful docking attempt and the other because a launchpad accident forced the cosmonauts to make an emergency exit from their spacecraft on the ground. 124:356
- The first U.S. spacecraft sent to the moon in more than a decade was the International Sun-Earth Explorer ISEE-3, which was directed there (after first making extended measurements of earth's magnetic tail) so that the moon's gravity could aim it toward a 1985 flight through the tail of comet Giacobini-Zinner. 124:391
- The Pioneer 10 space probe on June 13 became the first man-made object to "leave the solar system," defined by its crossing of the orbit of Neptune, at present the outermost of the known major planets. 123:373
- A vast cloud of neutral hydrogen, of the sort common in the interiors of galaxies, was reported for the first time to have been detected in intergalactic space. 123:148
- Ultra-high-energy cosmic rays that seem to follow straight paths were detected, possibly the first gamma rays to be found among cosmic rays. 123:405
- A meteorite discovered in Antarctica was determined to have come from the moon, making it the first from a known "parent body" and fueling speculation that certain other meteorites may have come from Mars. 123:196
- Grains of interstellar material were reported to have been identified in a meteorite for the first time. 123:263
- Evidence that quasars evolve over time continued to mount. 124:253

- All five of the chemical bases that combine to form DNA and RNA were found in samples of the Murchison meteorite. 124:150
- Several recently identified, extremely hot stars were reported to represent a possible new class — short-lived and unstable — of stellar evolution. 124:36
- Two Soviet space probes, Venera 15 and 16, were sent to Venus and began mapping the planet's formerly unseen north polar region by synthetic-aperture radar. 124:356
- A theory has been developing of a third kind of pulsar, incorporating certain characteristics of both radio and X-ray pulsars. 123:4
- The Viking 1 landing craft, silent on the Martian surface since November of 1982 after more than six years of operation, was finally concluded to have ended its mission when six months of efforts to reactivate it proved unsuccessful. 123:340
- Europe's Ariane rocket, competing with the U.S. shuttle for launch business, recouped from the 1982 failure of its first operational firing by successfully launching two satellites on its next mission in 1983. One of the payloads ended up in an unplanned orbit when it was apparently struck from behind by the rocket's third stage, from which it had just separated. 124:87
- When NASA's plans to Search for Extraterrestrial Intelligences (SETI) by monitoring radio signals from space seemed forestalled by budget limitations, a similar but smaller SETI receiver was privately funded by the Planetary Society and placed in full-time operation this year. 123:149

Technology & Computers

- The National Bureau of Standards unveiled its vision of the factory of the future: a novel combination of robots, computers and machine tools that looked more like a computer room than a traditional factory. 124:341
- Reports of unauthorized entries into bank, military and other computer systems raised new concerns about computer security. 124:294
- New materials research brought glass-cable telephone networks closer to general use (123:330; 124:103). A fiber-optic telephone line linked New York and Washington, D.C., while undersea optical-fiber cable tests continued. 123:119, 166,

- The Department of Defense initiated an extensive program to improve military computer systems. One project focused on reducing software errors (123:312), but the newly evolving mathematical theory of "chaos" showed that computers may suffer unpredictable, unavoidable failures. 124:76
- The introduction of laser-read compact digital audio disks brought true digital sound reproduction closer. 123:170
- The University of California at San Diego and Carnegie Mellon University established centers for magnetic recording research. 123:248; 124:22
- An IBM Corp. researcher invented the quiteron, a superconducting transistor (123:101), but later IBM announced the end of its superconducting-computer research program. 124:345
- Fears that government efforts to control the export of militarily critical technology and information would unduly hamper scientific research continued to surface. 123:218, 310, 357; 124:329
- The shooting down by the Soviet Union of a straying Korean Air Lines passenger jet raised worries about electronic navigation systems. 124:196
- CRAY BLITZ won the world computer chess championship, upsetting defending champion Belle. 124:236, 276, 303
- Two promising techniques may help preserve prematurely aging books. 123:154



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- TRW Inc. produced and tested the first "very high-speed integrated circuit" (VHSIC) chip as part of a major Defense Department research program. 123:203
- The tunneling of electrons through materials became the basis for a new microscope for studying surfaces. 123:213