

This is a review of important science news stories of 1973 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. 103 is Jan.-June; Vol. 104 is July-Dec.). Where no reference exists, the news developed and was reported in several different issues. Back issues or, when out of stock, copies of articles are available for 50 cents each by writing to SCIENCE NEWS, 1719 N Street, N.W., Washington, D.C. 20036.

## MEDICAL SCIENCES

- An immunologist found that tissue and organ transplant rejection can be overcome if tissues and organs are cultured before they are transplanted. 104/4
- Scientists identified a high-protein variety of sorghum—a grain that is a staple for millions. 104/212
- For the first time, animal experiments showed that stress causes electrical derangements in the heart beat; such derangement is a major factor in sudden deaths from heart attacks. 104/326
- X-rays were taken of the brain in thin cross sections, giving unprecedented insights into brain disorders. 104/134
- Scientists found that protein assays could be successfully used for early diagnosis of cancer in people. 103/367
- For the first time, enzyme therapy worked in a patient. 103/268
- A British study showed that babies born to mothers who smoke during pregnancy have a 30 percent higher death rate than babies born to nonsmoking mothers. 104/168
- Inadequate prenatal care emerged as a crucial factor in America's high infant mortality standing. 104/21
- Severed limbs and fingers were widely and successfully replanted in the People's Republic of China. 103/388
- Charged particles were developed to a point that they started to challenge X-rays in medical diagnosis and treatment. 104/234
- For the first time, babies were treated during birth. 104/74
- Brain hormone manipulation, immunization and bioengineering showed promise as new methods of birth control. 103/93
- Evidence accumulated that slow-acting viruses trigger fatal human diseases. 103/245
- Acupuncture relieved arthritis; nerves and humoral factors (blood and lymph) appeared to allow acupuncture to relieve pain. 103/372, 388
- Some cases of male infertility were found to be caused by bacteria. 104/182

- The class of antibodies that causes allergies was switched off for the first time. 104/294
- Two studies linked coffee drinking with heart attacks; one study found no link. 103/10; 104/55, 286

## BIOLOGY

- A gene with the potential to function detectably within a living cell was synthesized for the first time. 104/132
- A gene that codes for a protein was sequenced for the first time. 103/12
- A human egg, fertilized in the test tube, was implanted in a woman and survived nine days. 104/168
- Test tube reproduction and embryo transplantation promised to save endangered wildlife species. 103/124, 179
- Vitamin B<sub>12</sub> was synthesized after a decade-long effort. 103/22
- The three-dimensional structure of transfer RNA was determined and confirmed. 103/36, 74
- The atomic details of nucleic acids were visualized for the first time. 103/267
- Expression of C-type RNA viruses was found, in animals, to invariably lead to cancer later in life. 103/352
- Evidence that memory is contained in brain molecules continued to build and to spark controversy, especially in view of electrical evidence for memory. 103/180, 210, 268; 104/218
- A virus enzyme was shown for the first time to inhibit the function of a host cell. 104/3
- DNA in human chromosomes was determined with a precision not before possible. 103/166
- Evidence accumulated that viruses cause human cancers. 103/121
- An intermediary for human growth hormone was isolated for the first time. 104/245
- Experiments indicated that proteins might have evolved on the early earth without the intervention of amino acids. 104/148
- Phenylketonuria (PKU), the most

- Immunotherapy emerged as a promising, yet controversial form of cancer treatment. 103/408
- Interferon again popped up as a promising treatment for colds and flu. 103/208; 104/68

- common amino-acid metabolism disorder in people, appeared to be due to a structural defect in an enzyme needed to break down phenylalanine in the body. 103/150
- Human cancer cells appeared to make more genetic mistakes than normal cells do; a cancer virus was the suspected culprit. 103/84
- The reverse transcriptase enzyme, thought to be a hot lead to the cause of cancer for several years, seemed less important but still cancer-implicated. 104/148
- Evidence that cancer is infectious continued to build but doubts still exist. 104/206, 358
- A protein repressor was found to bind to gene operators sequentially, not all at once. 104/342
- Olfactory nerves were regenerated in mammals, suggesting that such regeneration might be possible in people as well. 104/310

## BEHAVIORAL SCIENCES

- Behavior modification continued to establish itself as a force to be reckoned with in education and mental health. 103/260
- The American Psychiatric Association issued a task force report admitting that behavior therapy is at a stage of development where it has much to offer to psychiatry. 104/106
- Researchers suggested that a slow virus may be a cause of some forms of schizophrenia. 104/59
- Researchers reported success in treating schizophrenics via psychotherapy, as opposed to drugs. 104/150
- Physical isolation was found to cause changes in brain chemistry and, therefore, behavior. 103/141
- Noise and hypoglycemia were

linked to human aggression. 103/272, 73

- Biofeedback was used effectively by epileptics to control brain-wave patterns and, therefore, epileptic seizures. 104/132

- Transcendental meditation was reported effective in making prisoners less compulsive and more sociable. 104/152

- Simple forms of tool use were reported in blue jays and baboons. 103/370, 71

- Megavitamin therapy or orthomolecular psychiatry was attacked

## ANTHROPOLOGY AND ARCHAEOLOGY

- Tools carved from animal bones were found near the Old Crow River in the Yukon. Radiocarbon dates indicate the bones are between 25,000 and 32,000 years old. This find suggests human habitation of North America 10,000 years earlier than previously confirmed. 103/55

- At a site in Ecuador a human skull was found that has also been dated at 32,000 years ago. 104/110

- Geological dating of artifacts unearthed in Cobleskill, N.Y., indicated human habitation of the Americas 70,000 years ago. 103/337

- Dendrochronologists calibrated the known age of bristlecone pines with radiocarbon dates and published correction factors for the radiocarbon calendar. 104/196

- Using geological evidence, researchers have devised a method for determining the original opening date of some African caves. These dates indicate the earliest possible time hominids could have had access to such caves. The opening date for the cave in which the Taung skull was found is estimated to be 800,000 years ago. This came as a surprise to anthropologists who thought the Taung skull was 2 million years old. 104/310

- Cranial evidence was presented indicating that Neanderthal peoples did not have the physical ability to speak. Perhaps, researchers suggest, the Neanderthals died out for this reason. 104/170

- In Iran the ancient city of Anshan was unearthed. This lost city was the capital of the Elamite Kingdom 6,000 years ago. 103/220

- Researchers in East Africa discovered what are believed to be the oldest tools fashioned by humans. The chipped volcanic rocks are 2.5 million years old. 104/380

by establishment psychiatry. 104/59

- Psychosurgery, attacked in the courts and Congress, lost much of its Federal funding. 103/310

- Researchers reported progress in the development of a vaccine to counteract the effects of marijuana and a test was developed to detect marijuana in the blood of users. 104/8, 90

- Researchers turned up a new narcotic antagonist and pinpointed the receptor sites of heroin in the brain. 103/357, 167

- The long suspected fact that

## ENERGY AND ENVIRONMENT

- The energy crisis sprouted and finally came into full bloom. President Nixon first removed oil import quotas and encouraged offshore oil drilling to meet the country's dwindling petroleum supply. 103/269 As the crisis worsened and the Arabs declared existing trade agreements "dead," the President ordered relaxation of Clean Air Act standards and increased use of coal. 104/163 After war in the Middle East practically eliminated that share of American energy, Nixon asked Congress for sweeping powers to cut energy use and institute rationing. 104/308

- John Love was appointed head of a White House Energy Policy Office to advise the President on energy matters; Charles DiBona was named his assistant. 104/5 After a bureaucratic squabble, Love and DiBona left, to be succeeded by William E. Simon and John Sawhill, who were to head a new Federal Energy Administration. 104/357

- With half the nation's oil resources already used, and petroleum furnishing over half U.S. energy needs, the Government began to look to shale oil, the Alaska pipeline and increased offshore drilling for possible alternative sources of petroleum. 103/343

- Increased coal production was seen as a medium-range solution to the energy crisis, but only with severe environmental impact through strip mining and increased pollution. 104/10

- Stringent pollution standards for new cars encouraged development of several new engine systems, particularly a stratified charge Honda model and the rotary Mazda. 103/267

- The clear-cutting controversy continued to rage as a paper shortage developed in the country while

some alcoholic mothers may give birth to deformed children was verified. 104/6

- Amphetamines were again cited as dangerous and addictive and were linked to growth and learning deficiencies in children. 103/73 Accordingly, the Department of Justice had production of amphetamines cut back to about 10 percent of what it was two years ago. One researcher, however, reported that coffee as a form of medication can replace amphetamine as suitable treatment for hyperactive children. 104/27

export of logs continued; new methods of forestry clashed with environmentalists' desire to retain forests in close to their natural state. 104/139

- With introduction of legislation to help states study the impact of urban development and industrialization on land, environmentalists and developers continued to clash over how land should be used. 104/267

- The peregrine falcon has virtually disappeared from the eastern United States, but the Cornell University ornithological laboratory has a program to rebuild the population. 104/158 Meanwhile peregrines in the western part of the country are nearing extinction. 104/296

- A National Academy of Sciences committee concluded that auto manufacturers had chosen the least efficient method for controlling auto pollution by planning to use catalysts rather than modifying basic engine design. 103/118

- EPA Administrator William Ruckelshaus provided a new set of interim standards for automakers to meet in 1975, after delaying imposition of the pollution emission standards set forth in the Clean Air Act. 103/252

- EPA Acting Administrator Robert W. Fri, after succeeding Ruckelshaus, issued a stringent set of traffic regulations to reduce auto-caused smog in leading American cities. 103/400 After much discussion, the regulations were modified to allow individual cities to exercise "responsible local leadership" in doing what they could to meet ambient air quality standards. 104/71

- The Great Dismal Swamp land owned by Union Camp Corp. was donated to the Federal Government as a wildlife refuge. 103/132

## PHYSICS

- The total cross section for proton-proton collisions showed an unexpected rise at high energies. 103/100, 165, 242

- Neutral-weak-current interactions were observed, lending support to unified theories of weak and electromagnetic fields. 104/164

- Superconductivity was observed in a niobium-germanium compound at the highest temperature yet recorded, 22.3 degrees K., making possible for the first time use of liquid hydrogen as a coolant. 104/179

- Theory and experiment promised the possibility of getting energy out of the fusion of boron-11 and hydrogen followed by fission. 104/292

- Helium-3 was found to be a possible superfluid. 103/90

- The rho-prime meson, one of the intermediaries in interactions between photons and hadrons, was discovered. 103/86

- Evidence began to mount against Weber's claim of discovery of gravitational radiation. 103/338

- Plasma of minimum density for fusion was contained in a tokamak. 104/36 A plan to use 10 lasers to induce thermonuclear fusion was announced. 103/369

- More evidence for the decay of the k-zero-long meson into two muons was found, theoretically necessary to save the unitarity principle. 104/9

- The edge of an atomic nucleus was found to be a "halo" of neutrons. 103/288

- A theory comparing particles with rotating relativistic strings was developed. 103/304

And a chemistry story:

- Anomalous water, thought to be a strange new form of the substance, turned out to be ordinary water mixed with impurities. 104/133

## ASTRONOMY

- The first estimate of interstellar deuterium abundance indicated that the density of the universe is too small for it to be closed. 104/101

- The first measurement of redshift in a radio spectral line indicated that quasar redshifts may be cosmological. 104/101

- Quasars with redshifts of 3.40 and 3.53 (farthest objects in the universe) were discovered. 103/237, 384

- A possible anisotropy in the Hubble constant was found in observations of Scl galaxies. 104/114

- Evidence for antimatter in the universe was found in studies of the gamma-ray background spectrum. 103/286

- Evidence of possible expansion of our galaxy was discovered from proper motions of stars. 103/304

- Bursts of gamma rays from an unknown source in the universe were recorded by Vela satellites. 103/369

- Wobbles in the motions of Epsilon Eridani indicate it has a planet several times the size of Jupiter. 103/91

- Apparent erosion features on Mars lead to the belief there was

once water on the planet. 103/156

- Some material in the Allende meteorite was found to be older than material from the moon. 103/255

- Some carbonaceous chondrite meteorites show material that appears to be from outside the solar system. 104/276

- An atmosphere was discovered on Jupiter's satellite Ganymede. 104/212

- The Tunguska event of 1908 was described as the possible collision of a tiny black hole with the earth. 104/180

- A theory was developed that describes the Jovian planets (Jupiter, Saturn, Uranus, Neptune) as "failed" stars. 104/149

## SPACE

- The skylab orbiting workshop and observatory, with its three three-man crews, headlined the year in space, even though it began with a limp when a heat shield and a large solar panel were torn away during launch. Missions of 28, 59 and a planned 84 days produced invaluable photographic studies of the sun and of earth's natural resources. They also indicated that the effects of weightlessness seem to level off, and later reverse themselves on earth, even after prolonged exposure.

- Pioneer 10 became the first man-made object to approach Jupiter when it flew by the giant planet on Dec. 3 to study its radiation belts, atmosphere, gravity and other mysteries after successfully traversing the supposedly hazardous asteroid belt between Mars and Jupiter. 103/104, 116, 327; 104/356 Its successor, Pioneer 11, was launched on a similar route April 5. 103/406

- On Nov. 3, Mariner 10 blasted off towards the inner planets, carefully aimed so that the gravitational pull of Venus will swing it around on a path that should make it earth's first emissary to Mercury. 104/220

- A fortuitous observation by Czech astronomer Lubos Kohoutek early in March gave scientists and sky-watchers an almost unprecedented eight months to prepare for the winter visit of Comet Kohoutek, whose brightness and close passage to earth inspired anticipations of seeing "the Comet of the Century." 104/24

- The most detailed radar map ever made of the surface of Venus showed a dozen large craters from 21 to 100 miles across in a 910-mile-wide area on the equator. 104/72

- Two space-suited Soviet cosmonauts spent two days in space aboard Soyuz 12, redesigned from the shirtsleeve-environment version in which a three-man crew suffocated during reentry two years before. 104/214

- Within less than three weeks of July and August, the Soviet Union sent four unmanned space probes to Mars, including flybys, orbiters and even landers, all due to arrive in February and March of 1974. 104/55, 69, 103

- A second unmanned moon-rover, Lunokhod 2, was guided by remote control from the Soviet Union as it explored a region just north of the 1972 landing site of Apollo 17. 103/53

- The first rocket-powered flight of the wedge-shaped X-24B lifting body was made. 104/171

- IMP-10, final satellite in the Interplanetary Monitoring Platform series, was launched Oct. 25, climaxing a program designed to study the sun throughout an 11-year cycle of solar activity. 104/248

- Weather satellite information became even more readily available with the Nov. 6 launch of NOAA-3 equipped with a device to let users receive temperature profiles of the atmosphere directly from the satellite instead by relay from a distant central processing facility. 104/293

## EARTH SCIENCES

- Seismologists found that the velocities of P-type seismic waves in the earth change in the months prior to some earthquakes. A new theory incorporating this fact and other precursors led to new hopes for earthquake prediction. 103/37; 104/201

- The first scientific deep drilling ever conducted in the waters off Antarctica produced evidence that the continent has been glaciated much longer than previously estimated—for the last 20 million years. 103/204

- As much as 100 billion tons of glassy fragments were discovered to have fallen over the entire region from Texas to Georgia to the Caribbean in a single event. The small tektites fell about 35 million years ago. 104/92

- The oldest sedimentary rocks in the world ( $3,760 \pm 70$  million years) were found at Isua in western Greenland. 104/213

- Meteorological studies showed that much of the rainfall pattern of the world appears to be moving southward, changing local climates and causing the droughts in parts of Africa and India. 104/197

- Analysis of upper air data in the northern Canadian Arctic confirmed that temperatures have become markedly colder during the past two decades as a result of changes in atmospheric circulation across the area. Increased glaciation seemed inevitable if the trend continued. 104/58

- Evidence for the southernmost glaciation ever found in the eastern United States was discovered in the form of numerous grooves on rocks on a mountain in North Carolina. 103/205

- Analyses of manganese-rich rocks dredged from the median valley of the Mid-Atlantic Ridge indicated that metal-concentrating processes in the ocean basins are many times more efficient than previously believed. 104/75

- Scientists in the bathyscaphe Archimede made the first descents to the Mid-Atlantic Ridge and witnessed first-hand direct evidence for the processes of sea-floor spreading. 104/104, 181

- Deep drilling by the Glomar Challenger showed that the floor of the Philippine Sea is 40 million years younger than the ocean bottom immediately to the east—evidence confirming that the Mariana

Trench is thus the junction of two major crustal plates. 104/104

- Cores drilled in the Pacific Ocean helped produce the most accurate date yet for the opening of the South Atlantic Ocean: from 125 to 130 million years ago. 104/278

- The oldest sediments ever recovered from the Indian Ocean—about 136 million years old—were recovered by the Glomar Challenger northwest of Australia. 103/106

- The Moho—the boundary between the earth's crust and man-

tle—was found to be not a simple bordering layer but a complex, stratified transition zone several kilometers thick. 103/120

- Evidence from volcanic rocks indicated that the boundary between the Miocene and Pliocene epochs should be dated about 4.9 million years ago rather than 12 million to 13 million. 103/106

- Government scientists issued their first official quake prediction—of a moderate quake in the Hollister, Calif., region in the following few months. The quake did not occur. 103/206, 418

## GENERAL SCIENCE

- The White House Office of Science and Technology was abolished, and its role was transferred to the National Science Foundation, amid a mixture of criticism that the move represented a downgrading of science. H. Guyford Stever was named the President's science adviser, while remaining director of NSF. 103/52

- A hold-the-line Federal R&D budget of \$17.4 billion was proposed by the Government, and many sciences continued to operate under tight financial restrictions that meant termination of certain programs, reductions in others. 103/68

- The United States and the Soviet Union announced plans to conduct joint research into accomplishing thermonuclear fusion, exchange information on agriculture and transportation, protect endangered species and cooperate in saving the oceans. 103/207

- The annual report of the National Science Board reported that the United States, while still pre-eminent in most fields of science and technology, is slowly losing its international competitive edge. 104/214

- A survey of public attitudes toward science commissioned by the National Science Board showed in general a strongly positive view, despite some concern about present applications. 104/151

- The long-awaited Office of Technology Assessment, created to serve Congress, finally received \$2 million to get started. Emilio Q. Daddario was appointed director;

Sen. Edward M. Kennedy was chosen chairman of the Technology Assessment Board, which oversees its activities. 104/295

- Science education is turning from trying to train professional scientists of the future to educating future citizens about the importance of science and technology in their daily lives. New techniques, including computer instruction and "discovery through experimentation" are being widely used; but funding is low. 103/186

- Rapid drops in enrollments of students majoring in engineering and science led to predictions of manpower shortages in some professional fields in as little as three years. 103/188

- The National Academy of Sciences and the Smithsonian Institution cooperated in celebrating the 500th anniversary of the birth of Nicolaus Copernicus. 103/236, 284

- After a one-year hiatus, the National Medal of Science was given to 11 scientists and engineers in ceremonies at the White House. 104/247

- The first meeting of the American Association for the Advancement of Science outside of the United States was held over a two-week period in Mexico City, devoted to the theme Science and Man in the Americas. 103/416

- Narrowing the communications gap dividing sciences from the humanities and scientists from the lay public was recommended as the main goal for the participation of science and technology in the 1976 American Bicentennial. 104/165