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What's New In Science And Technology

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IN science and technology 1977 will be remembered as a year of important advances in biology, energy, medicine chemistry; physics; space technology environmental studies and measures, and technological innovation.

The major developments in biology were in the field of genetic engineering. The promise of recombinant DNA (manipulating the basic material of the genetic "code) began to come true as yeast genes were shown to function in bacterial cells rat insulin genes were inserted and reproduced in bacteria and—finally bacteria were forced to produce the human hormone Somatostatin by following direction of a chemically synthesized gene.

Medical advances in 1977 were highlighted by successful use of drugs and vaccines in treating and perventing a number of diseases.

An ant-viral drug called adenine arabiniside, or ara-A became the first successful treatment of herpes encephalitis a disease that destroys the brain. It has been described by specialists as a major advance in the fight against serious viral illnesses.

Small doses of the drug indomethacin used on an experimental basis were found to be very effective in repairing certain heart defects in newborn infants. Conducted by cardiologists at the University of California Medical Centre in San Francisco, the experiments showed that indomethacin can either close or keep open the blood vessel that keeps blood away from a baby's lungs before birth—and lets it through after birth—thus avoiding the need for surgery in cases where these circulatory functions are not properly performed.

A vaccine to protect infants against a form of meningitis often fatal to them was proven conclusively to be effective. Developed by American researchers and tested in Finland on 70 000 children as young as three months during a 1977 epidemic of the Group A meningococcal infection, the vaccine

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prevented all of the inoculated children from contracting the disease.

Another vaccine was demonstrated as effective protection against pneumonia in both children and adults. In another area of medical science researchers at the Stanford University Medical School succeeded in the spring of 1977, for the first time, in recording electrical signals from within nerve cells of the human brain.

The new development according to the scientists, will pave the way for study of single nerve cells to increase understanding of brain disorders. Advances in the field of chemistry during 1977 included: The discovery of a definite link between serious medical disorders in humans and a chemical mix-up in Michigan in 1973 in which a ton of flame retardants (PBB) was substituted for a cattle feed supplement.

— Quick bacterial tests to identify chemicals that may cause cancer pinpointed a flame retardant Tris-BP, used in the manufacture of children's pajamas. The chemical was later banned.

— Although many groups argued against a U.S. Food and Drug Administration (FDA) ban on saccharin, evaluation of bacterial animal and human studies indicated that the artificial sweetener or its contaminants are weak cancer-causing agents (carcinogens).

— Screening tests for carcinogens were modified to test urine and feces thus checking on the effects of chemicals as they are processed by the body. Urine from smokers but not from nonsmokers caused genetic changes in the test bacteria.

— New organic solids with metal-like properties were synthesized and investigated in pursuit of novel semiconductors highly conducting materials and substances with unusual and potentially useful characteristics.

— Scientists demonstrated that ancient clays may have selectively bound and linked simple chemical segments into the first complex, biological molecules.

In physics, Science News magazine lists the following advances among its 1977 highlights: Discovery of the heaviest subatomic particle yet the upsilon resonance, with a mass of 9,500 million electron-volts.

— Reported evidence for the existence of fractional electric charge i.e. a possible free quark.

— Discovery of dibaryon resonances, also known as quark molecules (composed in one case of two D mesons and in the other of two protons).

American space efforts during 1977 were dominated by the space shuttle and several interplanetary spacecraft.

The space shuttle took to the sky for the first time in a series of unpowered descent-and landing tests, all of which were successfully carried out.

The Vovager 1 and 2 spacecraft were launched toward Jupiter and Saturn with the second probe possibly also bound for Uranus and Neptune.

The two Viking orbiters and two landers continued to study the planet Mars throughout the year.

A joint American-European space venture using satellites known as International Sun-Earth Explorers (ISEEs), began in October 1977, with the launching of ISEE-1 and ISEE-2. Together with a third probe (ISEE-3), which is to be launched this summer, the two spacecraft will study the earth's magnetic field and will attempt to confirm one of the two equally plausible theories about our planet's magnetosphere.