

A "wind tunnel" lacking wind but consisting of a vacuum simulating conditions 50 to 70 miles above the earth made possible study of supersonic flight conditions at extremely high altitudes.

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ANTHROPOLOGY-ARCHAEOLOGY

Find Stone Age Skeletons Are Definitely Modern Man

Three Old Stone Age skeletons that were definitely Modern Man were found, with animal bones and flint and stone tools, beneath layers of New Stone Age and Iron Age remains, in Hotu Cave, northeastern Iran.

Search continued for the oldest American: the forgotten bones of Natchez Man were found to be 11,000 years old by fluorine analysis, radiocarbon dating accorded an antiquity of 11,000 years to Tepexpan Man and 10,000 to Folsom Man.

Remains of a 12,000-year-old camp site were found in northern Alaska together with lamellar flakes and burins like those made by Stone Age Man in the Old World.

A link between the Stone Age people of Japan and ancient Americans was found in a collection of pottery from Japan strikingly similar in shape and surface treatment to that of early American Indians.

Remains of the world's first known farmers, who grew grain and raised animals for meat, clothing and milk some 8,000 years ago, were discovered in Iran.

What may be the first tree felled by man, a birch cut down 9,000 to 10,000 years ago, was dug up in England.

Three of America's oldest houses, probably more than 3,000 years old, were unearthed in California.

A baby's horoscope, cut into the plaster wall of the house in Dura where he was born in 176 A.D., enabled archaeologists to date the house.

Excavations were started at Timna in the Western Aden Protectorate, southern Arabia; two large bronze lions (1500 B.C.) were found.

Ruins of a 36-room palace built by Herod the Great (37-4 B.C.) or his son Archelaus, were unearthed at Jericho.

A very rich tomb, that of Mentemhet, Prince of Thebes, was re-excavated near the Valley of the Kings at Luxor, Egypt, with mural inscriptions revealing his career.

An ancient double pottery jar, that whistles as liquid is poured from one side to the other, was interpreted as indicating cultural interchange between ancient people of Peru and Middle America.

The fingerprints of men who sealed some jars of oil about 3,500 years ago were found still clear on the jars when they were unearthed in Mycenae, Greece.

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ASTRONOMY

Microwave Radiation Tells of Hydrogen Gas Between Stars

First direct evidence that the space between the stars is filled with hydrogen gas was obtained when its microwave radiation was picked up by radio telescopes.

Locations of planets Jupiter, Saturn, Uranus, Neptune and Pluto were calculated for the next century with large digital computing machines.

Measurement of the radial velocities of external galaxies more distant than any heretofore

recorded showed that nebulae are speeding away from our solar system at one-fifth the velocity of light.

Six new cameras, designed exclusively for tracking meteors and capable of photographing 40 times as many "shooting stars" as are now caught with sky cameras, were installed or neared completion.

Hydrogen nuclei (protons) in the aurora borealis (northern lights) were found to travel up to 2,000 miles per second.

Microwave radiations from four of the brighter spiral galaxies were detected with radio telescopes.

A "radio telescope" 50 feet across, world's most versatile, was installed for listening to microwave radio signals from the sun, moon and stars.

216 new variable stars were discovered in the so-called Sculptor cluster, wide-open spherical galaxy.

The light from only a few of the stars in the Pleiades, it was found, is polarized.

A new satellite of Jupiter was discovered, bringing to 12 the number of moons circling that giant planet.

Eighteen gigantic variable stars, each almost a billion miles across and thus so enormous they would overflow the orbit of the planet Jupiter, were detected in the southern skies.

Four important novae or "exploding stars" were seen to blaze forth—two in the constellation of Sagittarius, the archer; one in Aquila, the eagle; and one in the Small Magellanic Cloud.

New comets discovered include Pajdusakova, Arend-Rigaux, Kresak, Wilson-Harrington, Arend and Harrington.

Element 43, technetium, found on earth only by atomic bombardment was almost certainly identified in the solar spectrum.

Forty-four new white dwarf stars were reported, raising the known number of these peculiar stars to about 150.

Giant dust cloud relatively near the solar system was reported in some instances to cut

off all except 0.20% of the light from stars beyond it.

The Persid meteor shower was created forty thousand years ago, or 343 revolutions of Tuttle's comet ago, when it approached the big planet Jupiter, calculations indicated.

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BIOLOGICAL SCIENCES

Discover Key Mechanism for Changing Sunshine into Food

Discovery was made of the key mechanism by which the green plant converts the energy of sunshine into food and in which a single quantum of light is effective.

Wheat stem rust threatened the whole crop but was held in check by a severe drought.

An efficient method was developed for growing algae commercially, possibly paving the way for the production of algae for food and organic raw materials.

Antibiotics such as aureomycin and terramycin, added to the food of poultry and pigs with vitamin B-12, greatly increased their rate of growth.

A conventional high-powered microscope used in combination with a color-sensitive television camera provided an effective technique for the study of living cells.

How plants are made poisonous to insects by spraying with systemic insecticides was revealed through tagging the insecticides with radioactive elements.

For the first time silver salmon returned to artificial spawning grounds.

A new method was developed for treating difficult plants, such as onions, with colchicine in order to make polyploids, paving the way for bigger and better plants.

A missing chromosome mystery developed with the discovery that chromosomes in human cells from different tissues show a random deviation from the expected number of 48.

A chemical missing link joining animal and plant life at the very beginning of evolution was suggested by discovery of a pigment, protoporphyrin isomer 9, which gives rise to both the hemoglobin of animal blood and the chlorophyll of green plants.

A new blood type, Jka, the tenth human character for which the manner of inheritance is known, was discovered.

Oldest fertile seeds of scientifically established antiquity were found by radiocarbon dating to be some ancient Manchurian lotus seeds over 1,000 years old.

The war against DDT-resistant flies continues with the development of new insecticides and by combining DDT with other chemicals.

A weedkiller known as CMU was developed; it attacks both grasses and broadleaved weeds, leaving only bare soil in its wake.

Five live cahows, oceanic bird believed extinct since 1625, were found in Bermuda; an ancient murrelet was found for the first time in the interior of Oregon.

A powerful fungicide was found in the root system of some banana plants.

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CHEMISTRY-PHYSICS

Probe Nature's Secrets by Study of Cosmic Rays

An anti-proton or negative counterpart of the heart of the hydrogen atom was suggested



FAST-GROWING CHICKS — Antibiotics combined with vitamin B-12 have been shown to speed considerably the growth of baby chicks.

by collisions in cosmic rays.

Evidence was offered indicating the existence of a massless fundamental particle, an electrically positive equivalent to the neutrino.

Primary cosmic radiation high above the earth's surface was found to consist of nuclei of the elements from hydrogen to iron and heavier, with hydrogen dominating.

Discovery of a new cosmic ray particle, called the K meson, was reported.

The two heaviest atoms, berkelium 245 and californium 246, were manufactured in the laboratory.

Softly penetrating gamma rays from the rare earth metal thulium were used for inspection of light alloy castings.

New 1,000-curie sources of intense gamma radiation were made of cobalt 60 and tantalum 182 isotopes from the nuclear reactor.

An atomic energy reactor was established near Oslo, Norway, as a joint Dutch-Norwegian project.

Construction began on the billion-dollar reactor complex along the Savannah River in Georgia.

The experimental breeder reactor at Arco, Idaho, designed for long-range testing of the theory of "breeding" fissionable material, went critical.

Three new particle accelerators were placed in operation: an 86-inch cyclotron at Oak Ridge National Laboratory, a 60-inch cyclotron at Brookhaven National Laboratory and a synchrocyclotron at the University of Chicago.

A new method of analyzing lead to determine the quantities of various isotopes in a sample made it possible to calculate the age at which sample rock was formed; this lead-uranium "clock" improved the accuracy of measurement of lead isotopes.

A "chronotron," an instrument which measures the masses of heavy nuclei more accurately, was developed.

Experience in the Eniwetok tests of atomic weapons demonstrated definitely that lingering radiation need not delay rescue and recovery work after bombing by high air burst.

Theoretical feasibility for nuclear-powered flight was declared established; development studies were initiated.

A technically feasible process was developed for extracting uranium from phosphate rock as a by-product of fertilizer manufacture.

A high-altitude laboratory, second highest in the country, was under construction on White Mountain, Calif.

It was theorized that the sun's energy comes mainly, not from the "carbon cycle," but from the reaction of proton upon proton.

Stable solid crystalline substances were formed when argon and other inert gases were trapped in a lattice of quinol.

The temperature of the hottest flame on earth, fluorine burning in hydrogen at 8,000 degrees Fahrenheit, was measured by comparing its light to the sun's.

New estimates for the speed of light were 186,283½ miles per second, obtained by Shoran surveying, and 186,280, calculated with a cavity resonator.

Zirconium, useful as a structural material for atomic furnaces, was obtained by separating it from hafnium through use of the fluorine-containing organic chemical, thenoyl trifluoroacetone.

First total synthesis of a complete steroid was announced.

Adrenal gland hormone called compound F, of potential value as an anti-arthritis medicine, was synthesized.



CRYSTAL TRAP—Enlarged clathrate crystals, containing argon trapped in a quinol lattice, have the form shown in this photograph. The actual length of the center crystal is approximately one-quarter of an inch.

Cholesterol, important body chemical, was synthesized.

Final steps in synthesizing cortisone from four substances abundant in nature, ergosterol, diosgenin, stigmasterol and cholesterol, were accomplished.

Practical method of making cortisone from a wild Mexican plant root instead of from ox bile was developed.

Cathode rays were used to initiate polymerization in the manufacture of plastics, causing them to change from liquid to solid.

An improved electrolytic method for producing ozone of high concentration was reported.

Use of concentrated liquid ozone for rocket fuel was proposed.

Helium 3 was solidified by subjecting it to pressure of 600 pounds per square inch at 457 degrees below zero Fahrenheit.

Protection of metal objects against corrosion was achieved by use of vapor from the crystals of a volatile inhibitor inside a paper wrapping.

A new class of chemicals, organosiloxanes, of potential industrial use was made combining silicones with older type carbon compounds.

Sugar beet molasses was fermented into butylene glycol, a chemical promising for industrial uses, and butanediol, source material for synthetic rubber.

A new process was developed by which nitric acid can replace some of the scarce sulfuric acid in making superphosphate fertilizers.

Finest glass fibers yet made were used to make paper for filtering dust and particles that would result from atomic bomb explosions.

The Nobel Prize for Physics was awarded to Sir John Cockcroft, Cavendish Laboratory, England, and Dr. E. T. S. Walton of Ireland, for their work on transmutation.

The Nobel Prize for Chemistry was awarded to Drs. Edwin M. McMillan and Glenn T. Seaborg, of the University of California, for their

discovery and creation of the transuranium elements.

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EARTH SCIENCES

Nation Suffered Most Disastrous Flood Yet

Heavy rains in the Midwest produced the most disastrous flood in the nation's history, in Kansas and Missouri.

The Southwest suffered another year of generally below normal rainfall.

Larger than usual drops of water which make up clouds are often formed on relatively large particles of salt, it was found.

Exposure to sunlight will change the shape of silver iodide particles, thus probably destroying their supposed rain-making power, it was found.

Radar was used to record rainfall in great detail over a 50-mile effective radius.

The extremely fast and sharply defined wind current known as the "jet stream" is probably associated with masses of cold and warm air flowing side by side.

Clear air turbulence (turbulence not associated with convective clouds) was observed in the vicinity of the jet stream.

The first mathematical forecast of upper air wind patterns involving use of modern high speed electronic computers was made.

At heights of about 30 miles the change in the air temperature from winter to summer was found to be larger than at the surface, contrary to former belief.

Gulf Stream has eddies and it wanders back and forth, oceanographers discovered.

Sonar revealed details of lake and ocean coastline bottoms in new, quick and less costly method of sounding.