

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.

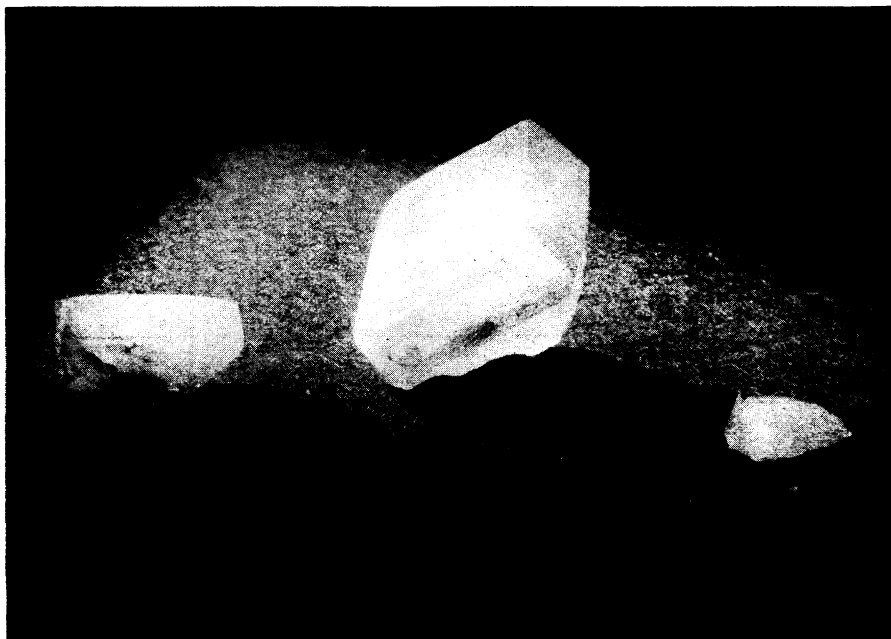
The temperature of the hottest flame on earth, fluorine burning in hydrogen at 8,000 degrees Fahrenheit, was measured by comparing its light to the sun's.

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.

Science News Letter, December 22, 1951

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.

An improved process for extracting liquid fuels from oil shale was developed, promising an ample supply of synthetic gasoline.

A magnetic logging device which measures the magnetic properties of the underground geological formations through which it is passed was developed to aid in locating oil.

A new method for recovering manganese from our low-grade ore was developed.

Radiocarbon dating showed that the last great glacier to cover North America began to melt only about 11,000 years ago.

A theory that the oceans and atmosphere had their origin in hot volatile gases escaping from the earth's interior was proposed.

Living bacteria were found in sediment cores taken from the ocean bottom six and a half miles below the surface where the pressure is more than 15,000 pounds to the square inch.

America's smallest fossil mammal, a tiny shrew, was identified from a piece of jawbone 3/16 inch in size.

A mile-high mountain was found with its top a mile beneath the surface of the Pacific.

There were 155 earthquakes of sufficient strength to record themselves on seismographs so that they could be immediately located, including two long series of damaging quakes in Formosa.

Science News Letter, December 22, 1951

ENGINEERING-TECHNOLOGY

Coast-to-Coast Television Inaugurated in September

Transcontinental home-to-home long-distance dialing of telephone calls was initiated from one city to certain others.

Coast-to-coast television was begun with the inauguration of a transcontinental radio-relay system with 107 relay towers spaced about 30 miles apart.

Relatively cold light production from flat glass plates was developed through use of electroluminescence, produced by current alternations in a luminous condenser containing a phosphor mixed with a plastic.

A tiny eraser-size cobalt-platinum magnet, extremely powerful, was made.

A crystal clutch was developed for use in high speed computers, using chemical crystals which bend when excited by direct current voltage.

Relatively new chemicals, fluorocarbons, were used as a cooling spray to increase greatly the efficiency of electrical transformers.

A tiny junction transistor, only half the size of a pea, and containing germanium, was developed to amplify electrical signals about 100,000 times.

New uses in servo-mechanisms, shock absorbers, recoil mechanisms and brakes were found for magnetic fluid clutch.

A synthetic fiber treated with 275-degree heat was made able to withstand temperatures as high as 1400 degrees Fahrenheit.

Two bonding methods were developed, one for joining metal and glass or ceramics and the other to unite silicone rubbers with steel and other metals, glass or ceramics.

A new aeronautical and engineering research center for the armed services, one of the most important applied science and testing stations of the world, was dedicated at Tullahoma, Tenn.

The feasibility was demonstrated of protecting a cobalt-bonded titanium-carbide ceramic against oxidation by the application of a ceramic-metal coating, promising better heat resistant turbine blades.



A-BOMB MANEUVERS—For the first time, picked Army troops this year participated in A-Bomb tests in the U. S. Soldiers are shown here observing from a safe distance an atomic explosion at the AEC's Nevada Proving Grounds.

An air-gravel concrete was developed for construction purposes in which the sand is replaced by tiny air bubbles produced by a resin or detergent.

A new and inexpensive method of beaming television or sweeping the sky with radar made use of a so-called "G-string antenna mast" which carries the signals along its surface to the top where they are reflected by flat plates.

A marine gas turbine engine was used for the first time in a commercially operating merchant ship.

A crystal which will amplify X-ray energy a million times was grown in the laboratory.

Science News Letter, December 22, 1951

MEDICAL SCIENCES

Control Cancer by Removal Of Both Adrenal Glands

Cancer control by removal of both adrenal glands could be undertaken successfully for the first time because cortisone is available to protect patients from death due to adrenal failure.

An anti-atom bomb substance which protects against irradiation by restoring the function of blood-forming bone marrow was discovered in "press juice" from embryonic mice and their spleens.

Infected wounds, particularly chest wounds, tuberculous abscesses and diabetic gangrene are cleaned up and heal faster when treated with two chemicals from hemolytic streptococci, streptokinase and streptodornase.

Prevention of one kind of cancer by aureomycin treatment of its precancerous stage, believed to be an infection, was reported.

For reducing high blood pressure, the following chemicals were reported: a synthetic, Amphipone B, acting through pituitary, thyroid and adrenal glands; sulfhydryl containing compounds such as BAL; methonium halides; Protoberatrine; two phthalazine compounds; and alkyl-sugar derivatives which promote diuresis.

A brain-produced chemical that may cause some kinds of high blood pressure was discovered.

First evidence that the heart can absorb a drug and break it down into other compounds was obtained with digitalis from radioactive foxglove plants.

Cretinism in dogs, giving a new approach to study of arteriosclerosis, was produced by prenatal and postnatal injections of radioactive iodine.

Large doses of radioactive iodine were reported effective in severe, intractable heart disease.

Triethanolamine trinitrate and a drug extracted from beef hearts, trade-named Myocardone, were reported effective for heart disease.

Two cyclotron produced chemicals, radioactive gallium and astatine, or element 87, were reported promising new weapons against cancer.

Thyroid gland cancer responded to treatment with male hormone for the first time in medical history.

Measuring amounts of two chemicals in blood, inhibitors of rennin and chymotrypsin, gave an index for response to treatment of leukemia and cancer.

Discovery that liver cells turn cancerous when some of their protein content is deleted by an azo dye was reported as giving a new clue to process of cancer formation.

First proof was obtained that nickel has cancer-causing properties.

Eight cancer-causing chemicals were discovered in processed rubber and carbon black.

Discovery of a new blood factor, called Jarrell, was seen giving a new approach to discovering the cause of cancer because a cancer was found the only cause of antibodies to this blood factor.

Ailments for which cortisone was reported effective: the eye diseases, phlyctenular keratoconjunctivitis, sympathetic ophthalmia, and blindness from growth of fibrous tissue in scarring wounds; toxemia of pregnancy; sarcoidosis; swelling of the larynx; severe, exhausting asthma; schizophrenia; and acute skin diseases.

Cortisone was reported capable of delaying liver degeneration due to faulty diet.

Cortisone and ACTH were reported capable of retarding the chest disease, chronic berylliosis; conquering rheumatic heart disease; saving lives in one kind of anemia and the blood disorder, thrombocytopenic purpura; and acting like a tonic for old people before operations or to get them out of bed faster after painful injuries.

ACTH was found effective as a remedy for snake bite and for keeping nerves functioning at their best.

Corticosterone, newly manufactured drug related to cortisone, proved successful in its first trials as a treatment for Addison's disease.

A blood cell test that shows how much ACTH a patient can safely take was developed.

A new synthetic pain-killing drug, more powerful and longer acting than morphine and only three steps chemically from being synthetic morphine, was announced under the trade name, Dromoran.

A faster, longer-lasting local anesthetic, 2-chloroprocaine, was reported promising for blocking pain nerve fibers regionally.