

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.

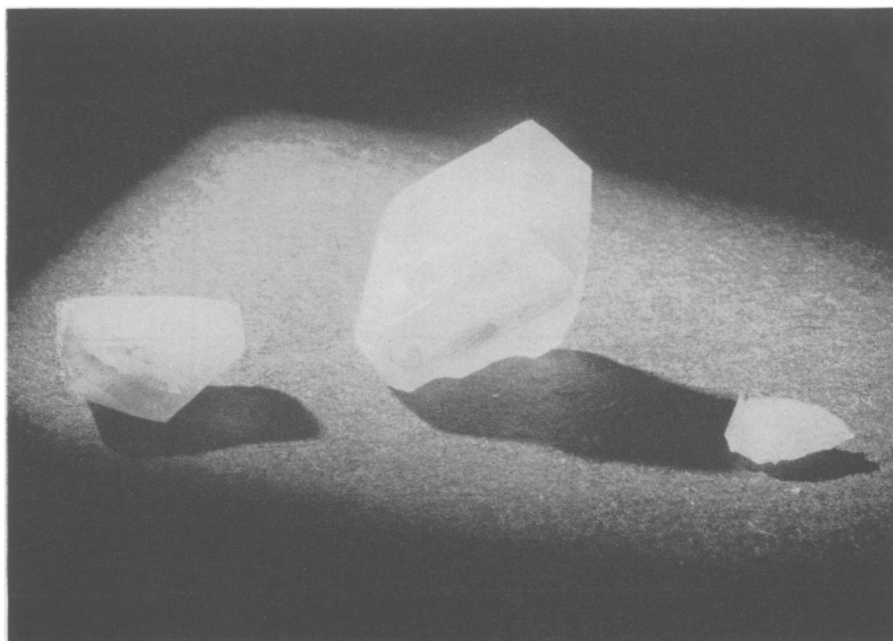
The temperature of the hottest flame on earth, fluorine burning in hydrogen at 8,000 degrees Fahrenheit, was measured by comparing its light to the sun's.

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.