

An atomic accelerator was under construction in Australia, and the Japanese advanced plans to replace a cyclotron destroyed by American occupation troops.

Paper was made of glass fibers to filter out radioactive dust.

Ion exchange plastics in membrane form were developed to desalt sea water continuously and perform other extractions of chemical substances from liquids.

Elusive V-particles, produced when a cosmic ray proton or neutron strikes the nucleus of an atom, were routinely photographed daily on top of Mt. Wilson, Calif.

A new subatomic zeta neutral particle, which lives for less than ten quadrillionths of a second and decays into two pi mesons of opposite sign, was discovered on photographic plates exposed at altitudes over 12 miles.

The theory that "empty" space is filled with an all-pervading ether was revived by Dirac as being in harmony with new electrodynamics ideas.

The theory that creation of matter in the universe is a continuous process was advanced.

The energy expended by an average thunderstorm was computed and found to equal that of 50 Hiroshima-type atomic bombs.

Radioactive tritiated stilbene was used as a constant light source to standardize phototubes.

The transistor, tiny germanium crystal device, was adapted to function at very high frequencies and so can be used in television or FM apparatus.

Six new compounds were found to serve as superconductors at extremely low temperatures.

Impure silicon shows an electronic specific heat at very low temperatures which can be removed by neutron bombardment, but which reappears upon subsequent heating.

Water can be purified by high frequency, high intensity sound and by radiation from atomic furnace wastes, it was announced.

The complete synthesis of morphine was accomplished, but it is not a commercial process.

Total synthesis of cortisone was achieved in a single, uninterrupted series of 30 steps.

Microbiological synthesis of cortisone from progesterone and other available steroids was achieved.

The chemical structure of the antibiotic, terramycin, was found to consist of carbon, hydrogen, nitrogen and oxygen atoms with four rings of six carbon atoms each fused into a bar pattern.

The structural formula for aureomycin was worked out, showing the drug to be amphoteric and high in oxygen content.

For the first time nucleic acid was isolated in its whole, pure state.

First direct evidence that proteins are built in a succession of steps from simple to more complex compounds was found.

An organic arsenic substance, called A-42, was synthesized and found to be extremely effective against insects while being relatively harmless to human beings and animals.

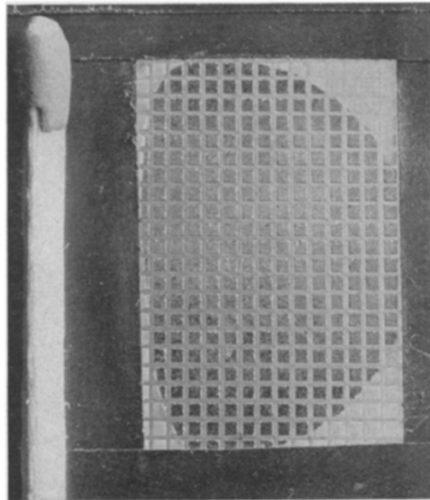
The origin of petroleum was illuminated through discovery by radiocarbon dating that hydrocarbons are accumulating in tidelands at the present time as debris from marine life.

Giant single nucleic acid molecules, such as present in chromosomes and genes, were seen for the first time, with the aid of the electron microscope.

Development of new types of fertilizer containing phosphoric acid promised to relieve the shortage of sulfuric acid and at the same time to aid in by-product uranium recovery.

Radiochemical methods were developed for the detection of trace quantities of minerals through use of neutron irradiation.

A method for detecting underground deposits of uranium and vanadium was developed through study of the kinds of plants growing



**WAFER FOR TRANSISTOR**—A match indicates the actual size of this germanium wafer used in producing transistors, tiny devices that can do the work of vacuum tubes.

on the surface and chemical analysis of their leaves.

Synthetic rubber was made more resistant to exposure to ozone by blending with a polythene.

Polyacrylonitriles were produced which change the structure of clay, making it porous and suitable for growing plants.

The Nobel prize for physics was awarded to Drs. Felix Bloch, Stanford University, and Edward M. Purcell, Harvard University, for independent work on use of amplified radio frequencies to study the structure of the atomic nucleus.

The Nobel prize for chemistry was awarded to the British biochemists, Dr. Richard L. Millington Syngé and Dr. Archer J. Porter Martin for developing the process of chromatography.

#### EARTH SCIENCES

### Predict Weather by Electronic Calculator

A method of predicting the weather 24 hours ahead by use of an electronic calculator which works on a step-by-step, hour-by-hour basis was announced.

Winds of more than 1,100 miles an hour in the extremely thin air 65 to 100 miles up in the sky were measured by radar-like instruments; average wind velocity at that height was found to be between 150 and 200 miles an hour.

Scientists suggested that steady monsoons, striking constantly against the Himalaya mountains and air masses over Asia, are the cause of seasonal changes in the position of the North Pole.

The Air Force established a permanent weather station on an "ice island" close to the North Pole.

Tracking of jet streams, 200- to 300-mile-an-hour air currents about 30,000 feet above the earth, was begun, using jet planes.

Accurate forecasts of flood crest five to 15 days before occurrence, and general warnings issued more than a month before were responsible for an estimated \$100,000,000 saving along the 1,600-mile length of the Missouri River from North Dakota to Missouri.

Thirty-five major sea mountains, from 3,500 to 12,400 feet high, were found to rise from the floor of the Gulf of Alaska.

Oilmen pushed the method of increasing oil production by pumping water into seemingly exhausted wells; water injection into a central well drives oil to the pumping wells, adding greatly to the efficiency of oil extraction.

Study of Alaskan weather records for a 50-year period seems to indicate that Alaska has slowly warmed up; once ice-bound ports are now open for short periods in the summer.

Primary uranium ores were located in New Jersey, the first indication that primary uranium might be found in the Appalachians.

Extensive deposits of monazite, a thorium-bearing mineral, were discovered throughout a 700-mile area in the southeastern states.

Prediction was made that the Williston Basin of the Dakotas and Montana may be one of the major oil fields of America.

A deposit of an extremely rare mineral, nasonite, was discovered in California; the only other known place that nasonite occurs is in New Jersey.

Paracutin, the volcano that dramatically and unexpectedly burst forth from a Mexican cornfield, was declared dead this summer after nine years of intense activity.

Crater Elegante, huge hole in the earth's surface in Mexico, was caused when a volcano collapsed some 25,000 years ago, it was reported.

Ash Heap Crater, long believed extinct, erupted; this is its first known volcanic eruption in historic time.

Scientists determined that a particular parcel of air will scatter and diffuse into an area 1,000,000 times its original size in as short a time as two hours.

Fossil pollen studies of lake sediments in Mexico and New Mexico provided a continuous record of climatic changes extending back into the glacial period.

Earthquakes of the year included serious shocks in California, Japan, Argentina and Kamchatka.

#### ENGINEERING-TECHNOLOGY

### Atomic Cannon Is Put in Production

A 280 mm cannon with double recoil mechanism that can fire either conventional or atomic projectiles was put in production.

A four-mile-long bridge over the Chesapeake Bay, longest continuous steel structure over water in the world, was opened to traffic.

"Scatter sounding," a technique for informing a radio operator of how well his signals are received in remote places, was developed.

An electronic digital computer was put into mass production.

The life of jet engines was greatly increased by coating with chromium glass the heat-resistant molybdenum metal used in them.

An electromagnetic pump, ancient instrument, was revived for use in the AEC breeder reactor for pumping "hot" metals.

A new medium tank, with one-piece cast hull that affords a poor target for enemy shells, was announced.

A mixture of blackstrap molasses and bunker fuel or asphalt was used to make beach sands hard enough for heavy military equipment.

A device for preventing an explosion when a bullet strikes an aircraft fuel tank was developed; it releases carbon tetrachloride to stop fuel gases from building up explosive pressures.

Logarithm tables accurate to 23 places and useful for numbers up to 99 sextillion were published.

Synthetic motor oils that lubricate truck and