GENERAL SCIENCE

Science Review for 1949

Russia's atomic explosion, cortisone and ACTH for arthritis treatment and giant accelerators are among the top science highlights of the year.

This summary of the year's happenings in the world of science is limited by space to just the highlights. Most of the events are described in detail in the pages of SCIENCE NEWS LETTER *for the current year. If you wish to refer to any particular report, you may find it readily through the index. (See SNL, June 25 and also the issue which will appear next week, Dec. 31).*

By SCIENCE SERVICE STAFF

➤ THE atomic explosion in Russia, if it set the world stage for war, is the top research development of 1949, expected though it has been. Consequences of Soviet conquest of atomic energy may wreck our civilization and major scientific progress if the Russians use it for aggression. If, as claimed, they intend to use atomic explosions for peaceful engineering purposes only, then another explosion is unimportant.

Top achievements in health for the world are: Demonstration that cortisone and ACTH, glandular products, treat arthritis effectively and promise aid in other diseases, notably mental ills. Anti-allergy drugs, antagonistic to histamine, promise to relieve symptoms of colds—one of the great causes of human discomfort and loss of working time. Another related drug, dramamine, was found to relieve the discomfort of sea and air sickness and other nausea.

Jet and rocket developments for war and peace, although largely secret, probably lead the aviation research progress, but the non-stop circling of the globe by an Army plane is a reminder of our shrinking world.

Top chemical achievements are: progress in fluorocarbons which promise improved materials such as lubricants, and the synthesis of chloromycetin, first antibiotic to be so produced commercially.

Two classes of giant machines of the laboratory, accelerators and electronic computers, brought us closer to greater control over matter. The accelerators—cyclotrons and the like—are building and going into service to probe the very nature of matter and its fundamental particles. The giant "electronic brains" are starting to solve a variety of problems including flight of guided missiles and use of other weapons as well as industrial and scientific developments.

Evidences of men in Alaska older than any previously found in America and contemporaneous with the Cro-Magnon in Europe were unearthed and added to our pre-history.

There was increasing research on capturing the energy of the sunshine, with one tack the use of algae and yeast to produce food and chemicals and the other fundamental investigation of the process of photosynthesis in the plant in order to duplicate it in the factory.

AERONAUTICS

"Sky Compass" Is Useful In Polar Regions

A "sky compass," making use of polaroid and cellophane, and useful during twilight periods in polar regions, was developed.

An informal record was set by the airplane "Lucky Lady II" when it flew non-stop around the world in 94 hours and one minute, being refueled in the air.

Achievement in supersonic speed was recognized with award of the Collier Trophy to John Stack, research scientist of the N. A. C. A., Lawrence D. Bell, president of Bell Company, maker of supersonic plane, and Capt. Charles E. Yeager, pilot of the plane on its first supersonic flight.

The Delta-wing airplane, with radically different design of sweep-back wings, reached the test stage.

A slow plane that can land on a tennis court was developed.

A helicopter with ram-jet engines on the tips of its lifting rotary blades was under construction; one —"The Little Henry"— was flown.

A rocket motor utilizing liquid hydrogen for fuel and liquid oxygen as oxidizing agent was successful in experimental use.

Mid-air refueling was demonstrated to be practicable for commercial and military planes by a round-the-world non-stop flight and by a jet fighter which remained in the air for 12 hours.

Flight service in bad weather was facilitated by two new airport lighting systems, one using krypton lights, and the other with variable intensity lights regulated at request of incoming pilot.

The CAA-developed Instrument Landing System and the radar-radio system known as Ground Controlled Approach were approved as standards for world-wide use.

FIDO, the fog-dispersing system, was installed for the first time commercially, at Los Angeles Airport.

A stall-proof automatic pilot capable of flying in all sorts of weather and of making instrument landings was tested.

Wing-tip domes in bomb-like casings, called "radomes", for housing radar equipment and antennas, were successfully tested.

Cross-wind landing gear, which permits safe landings regardless of the direction of the wind, was certified for use with DC-3 planes.

An oxygen converter system was developed that permits the use of oxygen in liquid form for airplane crews and passengers.

A prone-position pilot bed to lessen flying fatigue in a jet plane and prevent ill effects from acceleration was developed.

Location of new type radio antennas under the skin of airplanes, saved up to 600 horsepower for propulsion purposes in some of the larger planes.

A new wind tunnel for testing models of missiles, attained the highest recorded air velocity, ten times the speed of sound.

The world's largest supersonic wind tunnel, with test section measuring six by eight feet, and which will accommodate a full-scale jet engine under actual operating conditions, was put in operation and found capable of speeds up to twice that of sound.

A new type wind tunnel, a straight-through type with air current provided by a standard turbo-jet engine, was developed.

Two new guided missiles, No. 774 and NATIV, were fired successfully.

A program was started to recover instruments in rocket warheads by parachute.

"Flying boom" in-flight refueling system utilized telescoping pipe.

A Joint Long Range Proving Ground was established at Banana River, Fla.

Camp Forrest, Tenn., selected as site of an Air Engineering Development Center.

ANTHROPOLOGY-ARCHAEOLOGY

Stone Age Alaskan Linked With Cro-Magnon Man

Burins, evidence of an Old Stone Age culture similar to that of Cro-Magnon Man in Europe, were unearthed in Arctic Alaska in the dwelling sites of what were probably America's first inhabitants.

Additional evidence that the first Americans migrated from Asia were mesolithic stone implements like some previously found in the Gobi Desert.

Traces of habitation of some of America's

PILOT BED—H. T. Hertzberg, chief of the Anthropometric Unit, demonstrates the prone position pilot bed which eliminates flying fatigue common with the ordinary sitting position and increases tolerance of pilots to gravitational pull.

oldest inhabitants, Folsom Man, were unearthed in Virginia and northern North Carolina.

Evidence was found indicating that although Yuma man lived in America before Folsom man he continued throughout the Folsom period, making them contemporaries.

Metallographic study of ancient iron objects found in prehistoric sites in Virginia and Ohio provided evidence that iron may have been worked in America in pre-Columbian days.

An ancient "lost city" which had been a flourishing city of about 100,000 population at the time of the Crusades and is still remarkably well preserved, was found in the Seistan area of Afghanistan.

Man's earliest realistic portrait was found in the form of a 12,000-year-old stone work of art making use of painting, engraving and sculpture, discovered in a cave at Angles-sur-l'Anglin, France.

Newly discovered ape-men of South Africa were shown to have crushed baboon skulls caused by animal bones serving as clubs.

The buffalo grass growth on the Great Plains was due to the Indian custom of periodic burning off to keep the country open, it was reported.

Famous Piltdown man, long considered one of mankind's oldest ancestors, was found to be no more than 10,000 years old instead of 100,000 to 500,000 as previously thought.

Early Stone Age tools found at the former sites of beaches in Portuguese East Africa gave information of ocean and sea level changes in the region.

Animals hunted by Old Stone Age man are portrayed by lines engraved on a large rounded pebble found in a rock shelter in eastern France.

A group of Indians, descendants of the Maya, were found to have lost nearly two inches in height in the course of two centuries.

Evidence of a gambling place used by pre-Columbian Indians was found near the California-Nevada boundary.

Ancient bone ax-heads believed to be prototypes for Neolithic man's stone ax-head were discovered on the west bank of the Nile.

Drawing of a whale hunt on a 500-year-old snow knife found in the Canadian Arctic provided evidence of a vanished people and of changes in ice conditions and altered ocean currents.

ASTRONOMY

Minor Planet Found To Pass Closest to Sun

A minor planet or asteroid was found to have a path which apparently takes it closer to the sun than any previously charted, promising to give important data for the studies of the solar system.

A second satellite of Neptune was discovered.

Demonstration was made of the absence of a lunar eclipse effect when observations are made by radar in wavelengths of 1.25 cm., indicating that the moon is covered with a non-conducting layer of dust.

Discovery of bright line radiation in the spectra of objects previously identified as globular clusters showed that they are apparently Pleiades-like groups composed of stars and nebulosity in the Andromeda Nebula.

Dim stars broadcast to the earth a short-wave radio noise that was received with special antenna.

Construction was begun on a 50-foot radio mirror which will be used in connection with a sensitive radio receiver to pick up cosmic static.

Two cooperating institutions began a survey of the brightest stars of the Milky Way up to a distance of 32,000 light years, photographing fields of stars through an objective prism used with the Schmidt telescope.

Great clouds of matter in the space between the stars are relatively uniform in composition, it was indicated by the uniformity of H and K spectrum lines of various stars.

Three novae were reported, one in the constellation Cetus and thought to be our second nearest star neighbor in space, another in Scorpius, and the third in Scutus; one discovered nine years ago was confirmed.

Twenty millionths of an inch of glass hampering the big glass eye of Palomar had to be polished away before the giant eye could have another try at probing the great unknown; the 48-inch Schmidt telescope helped to lay the groundwork for the 200-inch Hale telescope.

The giant, 98-inch glass mirror for the largest telescope in the world outside of the United States was presented to Britain's Royal Greenwich Observatory by the McGregor Fund of Detroit.

The Radcliffe 74-inch reflector at Pretoria, South Africa, started operation.

Purchase was made by Lick Observatory of a 120-inch glass blank for a new 120-inch reflecting telescope.

Six new comets were discovered.

Some clusters of stars in the Milky Way galaxy were reported to be disintegrating while others were becoming denser and more strongly clustered than ever.

Low-frequency radar was used to detect fast-moving meteors.

A photographic study of meteors was begun, showing as one of the first results that the density of the atmosphere 45 miles or so above the earth increases in summer and decreases in winter.

Yellowish lemon-shaped stars were reported to be possible planetary ancestors of other planetary systems.

A noisy zone millions of miles deep was advanced as the mechanism whereby giant red stars with intensely hot centers are able to exist.

A new electronic plate-measuring machine to help discover what makes up the stars was announced.

The latest theory on the origin of the earth stated that the earth was once a pancake of gas and dust rotating around the sun.

The theory that comet heads were formed from the melting of various ices of common gases, starting in the outer reaches of the solar system and mixed with meteoric particles was proposed.

A photographic survey of the sky using the 48-inch wide-angled Schmidt telescope, of which the plates are to be utilized in the production of a sky atlas, was begun.

A "vacuum ultraviolet" emulsion useful for studying the sun from rockets sent high into our atmosphere was developed.

BIOLOGICAL SCIENCES

Algae Were Studied as a Substitute for Food

A freshwater alga, Chlorella, as well as yeasts and seaweed were studied as possible substitute foods for man and animals to avert future famines.

Fertilized ova from artificially inseminated pedigreed cows were successfully implanted in the bodies of scrub cows.

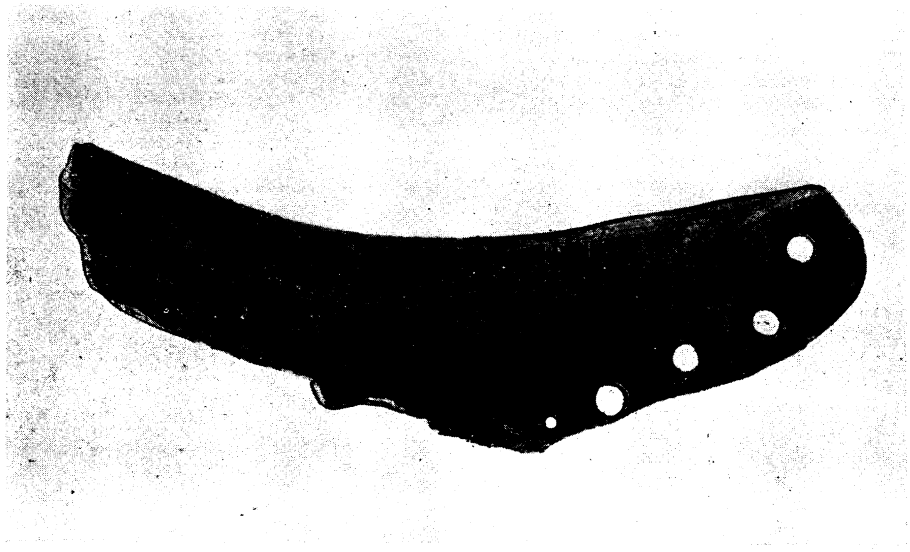
Virgin heifers and barren cows were induced to give milk by burying tablets of the synthetic female hormone diethylstilbestrol under their skins.

Treatment with a female sex hormone, stilbestrol, with iodinated casein or thyroxin, made pigs into bigger porkers on less feed.

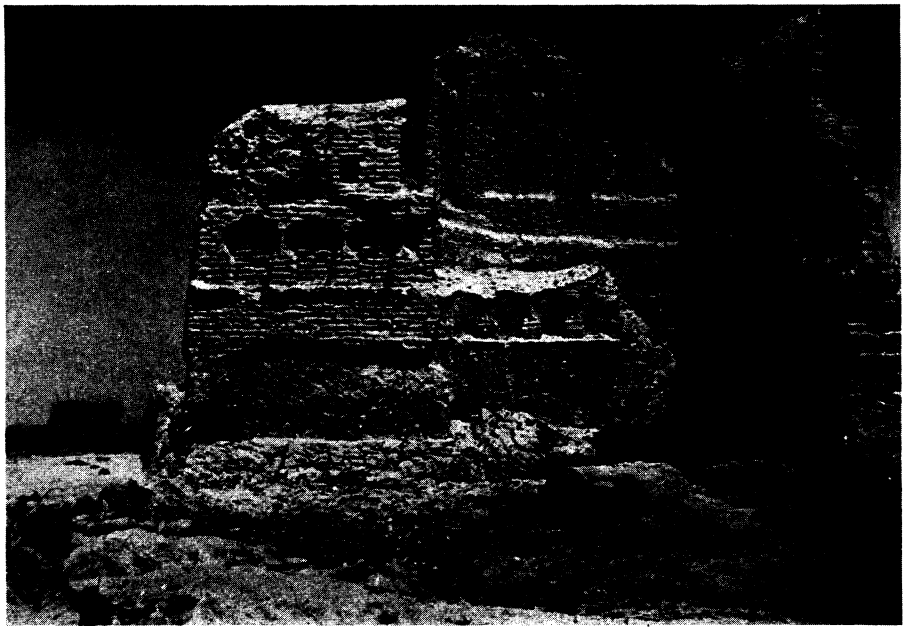
A blood group in dogs, which, like Rh in humans, may cause jaundice in the young through incompatibility with the mother, was found and named Do.

Early-stage embryos of mice with cells containing three times the basic number of chromosomes were obtained, the first ever reported in mammals.

The cause of swine enteritis, which produces runt pigs, was found to be deficiency of B



CLUE TO VANISHED PEOPLE—The drawing made on a snow knife shows five men in a typical Eskimo boat on a whale hunt. The drawing was made by an unknown artist some 500 years ago and points to the fact that once a vanished people lived on Cornwallis Island in the Canadian Arctic Archipelago.



CITY DISCOVERED—A "lost city" in the remote desert region of Afghanistan was found. The deserted city is believed by scientists to have flourished in the twelfth century.

vitamins; it was cured by vitamin injection.

A female sex hormone was found in fresh young spring grass, which may account for the larger milk yield of cows at that time of year.

Amino acids from urea can be produced in the rumen of cud-chewing animals, it was found.

A cheaper vaccine for the protection of livestock against foot-and-mouth disease was made by culturing the virus on the lining of the rumen.

Hornets were found to be useful in tracing radioactive leaks because of their trait of accumulating barium in their bodies; periodic killing and analysis of some of the insects reveals pollution of the plants of the neighborhood.

Proof was found that mosquitoes carry the virus of eastern equine encephalomyelitis.

An inbred strain of corn that produces no pollen was developed, making it possible to grow hybrid seed corn without the laborious and often injurious detasseling process.

Use of hormone sprays reduced the dropping of apples before harvest.

Coconut milk was found to contain a still-unidentified substance which stimulates plant growth.

The seaweed Laminaria produces a growth-control substance in much the same manner as higher plants, it was found.

High aroma, low nicotine "Turkish" type tobaccos have been successfully grown in the United States.

Carbon black was successfully used to raise soil temperature by increased heat absorption from the sun.

Uranium in the form of its nitrate salt was found to cause hereditary changes in widely different kinds of fungi.

Two new insecticides, benzene hexachloride and gammexane, or 666, were found to cause hereditary changes in plants through multiplying the number of chromosomes.

DFDT, apple-scented German cousin to DDT, was found to be a better killer of houseflies than DDT and less toxic to warm-blooded animals and fish.

Pyrethrum was synthesized for insect sprays with more killing power than the natural product.

The aquatic plant pest, water hyacinth, can be controlled by spraying with 2,4-D, it was found.

DDT-resistant strains of flies were found to require 50 times the normal dose of DDT to kill them.

DDT resistant strains of flies and mosquitoes were found.

TCA was found to be effective in eradicating quack-grass and Johnson grass as well as prickly-pear cactus, but causes a temporary soil sterility.

Compound 42, chemical relative of dicoumarol, was found in field tests to be an effective rat killer, causing fatal abdominal bleeding.

Sudden reduction of osmotic pressure kills certain viruses by "osmotic shock," leaving them "ghosts," that is, empty head membranes with tails attached, it was found.

Actidione, antibiotic derived from the same fungus that produces streptomycin, was found effective against plant-disease fungi.

"Caesarian" operations saved valuable hybrid plant embryos, removing the immature embryos from abnormally developing seed capsules.

Micrografting was used to save valuable hybrid plants so weak they couldn't break through the seed-coat normally, attaching them to the stems of stronger, related plants and protecting them in a gelatine capsule.

The seed-pod of the cascalote tree of Mexico was found to rival the South American quebracho as a source of leather-tanning tannin and as an oil-drill lubricant.

A starch substitute for sizing textiles was found in a wild onion of India.

Seedless figs were produced in half the usual time, by dispensing with wasp pollination, and by spraying instead with the synthetic hormone, 2,4,5,-T.

Plants with large, deep root systems, like corn, make less use of fertilizer phosphorus than do plants with more limited root systems like potatoes, experiments with radioactive phosphorus showed.

Phony peach disease was found to be carried by four related species of leaf hoppers.

The elementary particles, or molecules, of cellulose, consisting of small equal-sized rods, were discovered with the aid of the electron microscope.

A new method of spreading chromosomes for photography under the electron microscope brought the genes one step nearer to positive identification.

A micro-analysis apparatus was developed which measures the minute quantities of various chemicals present in a cell nucleus.

The virus of mosaic disease in tobacco showed up as tight sheaves of needle-like particles in electron microscope photos.

New preparation techniques enabled biologists to study the nuclei and flagella of bacteria cells under the electron microscope.

The first international congress of biochemistry was held in August at Cambridge, England.

The giant African snail, a plant pest, was detected in 15 shipments at American ports, and was destroyed in all cases.

More flavorful fruit juices were made possible by development of a process for extraction through distillation of the "essence" of the fruit.

Elephant seals, once thought extinct, are increasing in numbers off the coast of Mexico.

Hutias, big rodents thought to be extinct, were found living in Haiti.

CHEMISTRY AND PHYSICS

New Atom Smashers Were Completed This Year

Several new atom smashers were completed or under construction during the year: among them a 6,000,000-electron-volt bevatron, model of larger machine planned; a 300,000,000-electron-volt synchrotron at the University of California; a 70,000,000-volt synchrotron at the U. of C. Medical School devoted to medical research; another 300,000,000-electron-volt nonferro-magnetic synchrotron at General Electric Company; a 50,000,000-volt betatron for the National Bureau of Standards to develop standards for X-ray dosage; a 300,000,000-volt betratron for the University of Illinois; a 300,000,000-volt synchrotron for Purdue University; a 3,500,000-electron-volt electrostatic accelerator for Brookhaven National Laboratory; a baby 9,000,000-electron-volt betatron for Holland; and an "in-between" 125,000,000-electron-volt synchro-cyclotron for Harvard.

News was received in the United States of an atomic explosion in Russia.

An instrument for detecting air-borne contaminants was developed, consisting of a jet through which air samples are drawn and their particles deposited on a revolving glass disk.

Creation of mesons by radiation in the 300,000,000-electron-volt synchrotron was first direct evidence that these cosmic ray particles can be made from electromagnetic radiation, as well as by high-speed alpha particles.

Immense explosive showers of atomic fragments a mile across, each thought to be caused by a single atomic bullet from outer space, were discovered in the earth's atmosphere.

Nearly a third of the total mass of the projectiles in the cosmic rays from outer space consist of hearts of heavy atoms ranging from carbon to molybdenum, stripped of their electrons.

Superballoons of welded polyethylene plastic

were developed to carry scientific apparatus weighing as much as two men to new heights above the earth.

A new magnetic iron-nickel alloy, Orthonol, proved superior for use in magnetic amplifiers instead of the delicate electronic tube.

A method for making shadow photographs under the electron microscope of the direction and strength of the fields of minute "atomic magnets" within magnetic materials provided a new tool for fundamental research in physics.

The idea was proposed that space between the stars may be filled with tiny, magnetic needles of iron in giant magnetic fields.

Radio microwaves were used to find the dimensions and spin-rate of certain molecules in gases by the absorption of the rays passed through the gas.

Zirconium was found to be suitable as a structural material for building atomic energy piles.

Small-lot production of titanium metal was applied commercially.

A ten-minute warning that an atomic bomb will drop can reduce the casualties of a normal city ready for atomic attack from 100,000 to 10,000, it was estimated.

A new atomic particle, the negative proton, was predicted.

The Nobel Prize in physics was awarded to Dr. Hideki Yukawa who predicted the existence of the meson three years before it was found in experiments with cosmic rays.

Platinum with mass 190 was discovered and two other stable isotopes were predicted: tellurium 118, gadolinium 150.

A polarizer for infra-red rays in sheet form was invented.

A supermicroscope that "sees" with mirrors made possible use of infra-red rays for spectral analysis and identification of chemicals; plans were made for the manufacture of this instrument in the United States.

A radiation detector for disaster use in bombed areas where amount of radiation would swamp a Geiger counter was put into commercial production.

An atomic clock which tells time by the movements of atoms in molecules of ammonia was put in action.

A new theoretical approach was proposed for reconciling the relativity theory of Einstein with quantum mechanics, emphasizing position in the case of macroscopic worlds and velocity inside the atom.

The "scintillation counter" is a new device developed for detecting radioactive radiations.

Soft X-rays were found in the upper atmosphere by V-2 rocket exploration and believed responsible for the ionosphere.

Radioactive elements do not speed plant growth, it was established.

Methods of disposing of dangerous atomic wastes by having bacteria absorb them and by incorporating them in concrete were developed.

New use was found for the atomic furnace, or chain-reacting neutron pile, in measuring the amount of chemical element in an unknown material through the activity induced.

New semiconductors were produced by irradiation of germanium in the atomic pile with slow neutrons, thus creating a predictable number of impurity centers in the material itself.

An ultraviolet microscope was developed which makes photographs in color, making possible contrast effects without the use of chemical stains.

A new technique was developed for thin slicing for preparations for the electron microscope which makes slices so thin that 4,000 would be only the thickness of a human hair.

Several theories were advanced to account for the birth of cosmic rays: one that great clouds of dust in interstellar space create magnetic fields in which a particle may gain energy; another that the energy comes from tremendous explosions of supernovae.

Molten zirconium at a temperature near 6,500 degrees Fahrenheit provides the light in a new lamp developed for use in photography, projection and television.

The Neg'ator, a mechanical spring that resists less the more it is deformed, was developed.

A new method of taking photographs by use of a screen coated with specially prepared phosphors, and called thermo-radiography, was developed.

Better synthetic rubbers were produced which are resistant to extreme heat and Arctic cold and which will not deform materially under the weight of vibrating machines.

By international agreement, the name of the element tungsten was changed to wolfram, columbium to niobium, and agreement was reached on what to call other elements going by different names in different countries.

An unexpected source of chemical energy was found present in the atomic piles when potassium chloride was changed to potassium sulfate, a highly oxidized material capable of reducing other substances.

New facilities for the production of plutonium were put into operation at Hanford, Wash.

A new method of making acetylene from methane, making use of electric current, was announced.

Quartz crystals produced synthetically were found to be better than the natural ones.

The all-synthetic fiber, dynel, the short staple form of vinyon, was announced.

Orlon, a new synthetic yarn from natural gas, oxygen and nitrogen from the atmosphere was developed and found to be resistant to sunlight, moisture, fungus and insects.

A new process was developed for making metal films, so thin that they can be used as supporting membranes for electron microscopic studies.

Crystals of calcium tungstate were made synthetically in water-white pure form.

The Nobel Prize in chemistry was awarded to Dr. William F. Giauque, world pioneer in low temperature research.

New detergents called morpholinium alkyl sulfates which not only cleanse but kill germs were produced.

Higher gasoline yields, lower butane and gas yields, and somewhat lower gasoline octane numbers were obtained with silica-magnesia cracking catalyst.

A wool-like synthetic fiber was made from cottonseed protein.

Thermoluminescence was found to be a sensitive test for radioactivity in rocks of the earth.

It was made possible to re-use photographic wash water over and over by a water purification method using ion exchange.

Starch was converted into sugar by polarized infra-red light.

A new lubricant of unprecedented stability and a chemically inert plastic were applications made of a new family of organic chemical compounds, the fluorocarbons.

Synthetic seaweed fibers were used to weave light delicate fabrics from which the seaweed-like fibers are removed by washing out.

An isotope of nitrogen with mass 12 was discovered by bombarding carbon with high energy protons from a linear accelerator.

Spectrographic study revealed in the upper atmosphere two kinds of carbon dioxide; one composed of two atoms of oxygen to one of heavy carbon; the other composed of one atom of ordinary carbon to one of ordinary oxygen and one of heavy oxygen.

Infra-red studies revealed that long heat waves can pass blocks of purest germanium of considerable thickness.

EARTH SCIENCES

Fuel Was Obtained from Unmined Coal

A process was developed for obtaining fuel gases from unmined coal by sending an electric current through it.

A one-step method for getting high-grade gasoline from low-grade crude oil without use of high pressure was devised.

The theory that the earth's magnetic field may be due to the gravity pull of the earth as it spins on its axis was advanced.

A one-pound Geiger counter was developed in Canada for uranium prospecting.

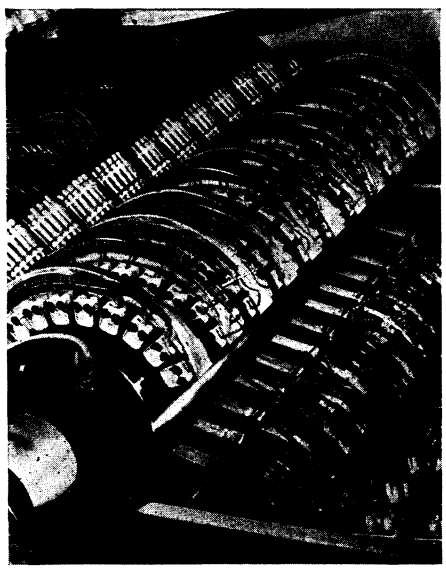
An industrial seismograph was devised; it is about the size of a box camera and used to measure vibration in machinery.

In carefully controlled experiments to produce precipitation by seeding cumulus type clouds with dry ice, the most obvious result was dissipation rather than rain-producing development.

A new cloud analyzer which measures the height of a cloud at its summit as well as at its base and indicates the density, was developed.

Fossils of three different races of ape-men were found in South Africa; one of giants two and one-half times as big as today's average human being; another a race of small, gracefully built ape-men weighing about 100 pounds each; and a third type more nearly human than some of those previously found.

Measurement of the heavy oxygen present in fossils from upper Cretaceous chalk deposits of England and comparison with that in the sea water showed that a hundred million years



HARVARD MARK III—The magnetic drum memory organ of this computer has many pick-up heads and wires that are the electric nerves leading in to the rest of the computer.

ACTH SOURCE—The pituitary gland from which ACTH is made is encased in a bony structure at the base of the hog's skull. To remove the gland which is the size of a grain of corn, the operator uses a power-driven knife to split the skull. The indentation in the knife avoids injuring the pituitary or the brain.

ago the ocean off western Europe was warmer than it is now.

Discovery of fossils of ancient shark spines in South America set back the estimated age of rock formations by 100,000,000 years.

Skeleton of a 150,000,000-year old phytosaur, crocodile-like animal, was found.

Fossils, 75,000,000 years old, of ancient animal life five or more times the usual size were found in Mississippi.

Radioactive carbon was found to be effective in measuring the age of anything that has been alive within the past 20,000 to 25,000 years.

A "blister" hypothesis of mountain formation suggested that slow-working atomic energy pushed up the earth's crust.

The Hawaiian volcano Mauna Loa erupted unexpectedly but harmlessly.

There were 120 earthquakes of sufficient strength to record themselves on seismographs so they could be immediately located; one in Ecuador was extremely destructive to life and property and other destructive quakes occurred in Chile and Washington, the latter being the worst quake in the history of the Pacific Northwest.

A new scientific organization, the American Geological Institute, was formed.

Using samples of air collected by V-2 rockets, it was determined that the composition of air 42 miles above the earth is the same as that at the surface.

The Atlantic ocean bottom was determined to be about 500,000,000 years old, more than seven times older than previous estimates.

The earth's magnetic field was revealed to have remained practically the same for at least 100,000,000 years.

ENGINEERING AND TECHNOLOGY

A Rubber Road Surface Underwent Tests

A road surface of powdered natural rubber in asphalt was tested.

Plastic foam, the world's lightest solid, made by heating a molasses-like synthetic resin, was developed for heat insulating.

A new synthetic fiber, a metal-carboxy-methl-cellulose from wood or cotton, was developed for textile use.

America's first gas turbine-electric locomotive entered actual railroad service.

Cheap softwoods were made into hardwood by a heat-pressure process utilizing the natural lignin in the wood as the cementing agent.

The magnetic fluid clutch found application in a new servo-mechanism used for power steering of airplanes and other mechanisms.

New developments in electronic computers were the application of the electronic brains to problems of present day civilization ranging from economics to supersonic flight; a faster smaller computer for office work; a computer featuring a "memory system" capable of storing 64,000 digits; and a machine capable of playing chess which helped in solution of engineering problems.

UNIVAC, an electronic computing machine, could be utilized as a fail-safe librarian machine with "probability coding", it was reported.

A high-speed camera made pictures in one twenty-millionth of a second by the use of high voltage passed through the electrodes of a cell which in conjunction with polarized light acted as an electrical shutter.

A heat treatment gave quartz crystals, essential in radio and television, a long life without deterioration.

A rotating carbon disk replaced the conventional negative rod in a new type of arc lamp which gives greater life and brilliancy.

High-quality coke briquettes and gases that could be converted into gasoline and diesel oil were produced from non-coking coal by a new electrical process.

Cotton and rayon fabrics were flame-proofed by treatment with a chemical solution of titanium and antimony salts.

Only five seconds were required to temper a metal surface by an electronic heating process.

A silica substance which acts as a nearly perfect diffuser of light gave promise of replacing the inside-frosted electric incandescent bulb.

The soybean yielded a tight-sticking glue called Gelsoy which can also be used for food.

Quartz crystals which produce "silent" sound waves were utilized in a new laboratory ultrasonic generator.

Plastics which are good insulators were made into effective conductors of electricity.

Air-cooling of motion picture films in use resulted in higher screen illumination.

Television reception was improved by the new television carrier synchronization method which eliminates frequency difference.

Higher power for radio broadcasting was obtained by a system which combined two transmitters with one diplexer to form a single unit.

Long-range radio transmission was aided by the discovery that the ionospheric characteristics at any point on the earth are almost identical with those at a point on the other side of the earth directly opposite.

A radioactive barium isotope was used as a tracer to show the progress of oil as it traveled through hundreds of miles of pipeline.

New high voltage rectifier tubes with thorium-tungsten filaments which are used in X-ray equipment promised a service life 50 times that of the ordinary rectifier tube.

Television receivers in the mid-West were able to pick up programs on the Atlantic Coast by means of coaxial cable and relays.

A bright reflective finish was given to metals without mechanical polishing by merely dipping in a mixture of acids, operated at ordinary room temperature and up to 200 degrees Fahrenheit.

New developments in television were: an all-electronic system of color television in which three primary colors are sent and received on the television scope at the same time; a television receiver which will pick up color broadcasting of all proposed systems and also the present black-and-white broadcasting programs.

MEDICAL SCIENCES

Cortisone and ACTH Gave Relief to Arthritics

The synthetic adrenal gland hormone, cortisone, and an adrenal cortex stimulating hormone from the pituitary gland, ACTH, brought dramatic relief to sufferers from rheumatoid arthritis, showed promise in rheumatic fever; allergies and drug sensitivities; the muscle weakness condition, mysthenia gravis; certain cancerous diseases affecting lymph glands; aging processes involving collagen tissues of the body; but extreme scarcity restricts use of these hormones until new raw materials or synthetic processes can be developed.

Discovery of a new blood separation technique in which fibrinogen, a blood-clotting factor, is added to the blood made possible large scale, fast separation of red and white blood cells and blood platelets from each other and from the liquid part of the blood.

Dramamine, a new anti-allergy drug, was found to give relief from motion sickness, radiation sickness, migraine headaches, nausea following electric shock treatments, and nausea and vomiting in expectant mothers, but pilots were cautioned about its sleep-inducing effect.

Synthesizing of chloromycetin marked the first time in history that disease-curing mold chemical, or antibiotic drug, had been synthesized on a practical basis.

Aureomycin, mold remedy which can be given by mouth, has been reported effective against amebic dysentery, shingles, pemphigus, whooping cough, undulant fever acquired from goats, and is being tried against syphilis.

A new antibiotic cousin of streptomycin, christened neomycin, was discovered which is active against tuberculosis germs not checked by the former drug.

Pills containing anti-histamine compounds to ward off colds were released for sale over the counter without prescription.

Lead to chemical treatment of leukemia and other cancerous conditions was discovered in folic acid vitamin antagonists among which are Aminopterin, An-Fol-A, and Amino-An-Fol.

A method was developed for large scale preparation of the "master substance of muscle," adenosine triphosphate, believed potentially valuable in conditions of dysfunction of muscles, particularly heart and artery muscles.

A chemical found in the nuclei of cells, desoxyribonucleic acid, was shown positively to be a constituent of genes.

Pearly white opalescence of blood within 24 hours after exposure to radiation was found to be a sign of impending death in rabbits and may be applicable to humans.

Dry silverpermanganate coated upon a suit-

able carrier was found to prevent carbon monoxide poisoning.

A new type of high blood pressure disease, for which the name Schroeder's syndrome was suggested, and a sweat salt test for detecting it were discovered.

Method for producing amino acids for vein feeding cheaply on a mass scale was developed.

Accidental jaundice infection from the blood of donors was established as a new compensable occupational hazard for technicians or blood bank workers.

Evidence that sickle cell anemia may be the world's first molecular disease was presented.

Zirconium proved an antidote for plutonium poisoning in experiments with rats.

Rat experiments revealed that lithium chloride, salt substitute, causes death by its inhibitory effect on the breakdown of glucose to lactic acid.

Lead fiberglas clothing was developed as protection against radiation.

Tests of a new vitamin, called B_{14}, isolated from human kidney excretions, showed its ability to check reproduction of cancer cells but increase production of red blood cells in bone marrow.

Promise of safer blood and plasma transfusions followed the discovery that nitrogen mustard gas destroyed the jaundice virus.

Directing high-energy particles produced by the cyclotron into the center of a cancerous mass well below the skin in mice fulfilled hope that greater ionization and cancer tissue-destroying effect would result.

Animal experiments led to the first discovery that a chemical in cancer cells is responsible for disturbance of a generalized metabolic function in the thyroid gland.

First use of the atom-smashing betatron in the treatment of a human cancer patient was announced.

New tests for detecting cancer were: looking for anti-enzyme activity of the blood; comparing the clotting rate of heated blood to which iodoacetic acid has been added with that of normal blood; detecting electrical differences between cancer tissue and normal tissue.

New factor discovered in human blood, which endangers infants when their mothers lack it, has been named Cellano factor after the woman who was found without it.

Isolation of a virus which produces symptoms similar to the non-paralyzing form of polio was announced.

A new vitamin factor, called biocytin, was isolated from yeast.

Seasonal factors in growth were demonstrated in a study of muscular strength; gains in weight tend to be greater in the fall, but gains in height, skeletal maturity and strength are greater in the spring.

The Nobel peace prize was awarded to Lord Boyd Orr, Scottish nutrition authority.

The Nobel Prize in medicine was awarded to Dr. Egas Moniz, who discovered the sanity-restoring brain operation, and Dr. Rudolph Walter Hess, for his discovery of the role of the brain stem in inducing sleep.

PSYCHIATRY AND PSYCHOLOGY

Psychiatry Taught to Hospital Attendants

A new school was organized to teach psychiatry to mental hospital attendants.

Roland J. Brand, attendant at the Milwaukee, Wis., County Asylum was given a new award, "Psychiatric Aide of the Year."

Histamine was found to be effective in treatment of the mentally ill, alone or in combination with electric shock.

Failure of the adrenal glands to respond to stimulation by ACTH from the pituitary was found to lead to inadequacy of the stress-response mechanism; this may be a factor in the production of schizophrenia.

Good results were reported in the trial of electroshock treatment for prevention of a return of mental illness in recovered patients.

Death rate from cancer is lower among mental patients than in the general population, it was found, incidence of hay fever is also less.

The $1,500 Lester N. Hofheimer Research award for outstanding accomplishment in the field of psychiatry and mental hygiene was awarded to Dr. Benjamin Pasamanik for his study demonstrating the role of environmental factors on mental development.

A link was found between the alpha rhythm brain waves and voluntary muscular movements; action tends to take place at the time of the peak of the alpha rhythm.

Kappa brain waves—those electric signals from the brain itself that are associated with thinking—are most active when you are recalling imperfectly learned material and come in bursts as the solution of a problem is found.

In general, pain shows up in brain waves as a decrease in amplitude, it was found.

The newly founded American Academy for Cerebral Palsy inaugurated a brain registry where brains were accepted for neuropathological studies of cerebral palsy.

On the basis of animal experimentation, regressions and fixations were explained as resulting from early learning too strongly stamped in by excessive motivation or frustration, believed also to account for unreasonable hatred of outsiders.

Definite and substantial relation was found between an individual's regard for himself and his prejudice against others; both could be altered by psychotherapy.

In many cases crime has its roots in bickering, nagging and other forms of tension in the home, psychological study of the families of juvenile delinquents and criminals revealed.

On the average infantile paralysis does not leave pronounced after effects on the nervous habits or behavior of child patients, it was observed.

Children highly prejudiced against foreigners or minority groups tend to have a biased or distorted memory of things that happen and of stories read to them, it was found.

First study was completed in 10-year program of research on effects of different kinds of groups on the way people act; it was found the highest production occurs when the individuals feel identified with their work.

Failure of the pre-election polls in the fall of 1948 was found to be due to failure to improve techniques to keep step with advances in psychological science.

The ear was found to have an automatic means of reducing its sensitivity to noise made by the same animal.

A temporary loss of sensitivity to sound was found to occur during exposure to sound at all intensities.

A ten-year systematic investigation of the growth of visual functions in relations to the total make-up of infant and child was completed, defining a new field of developmental optics.

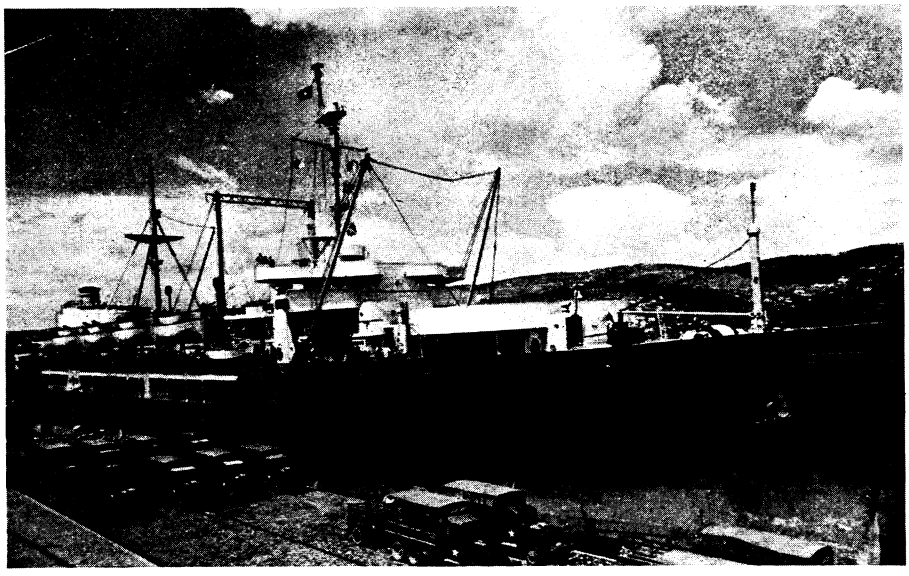
The most sensitive index point in the center of the eye was mapped and measured accurately for the first time.

Glutamic acid helped some children with mongoloid mental deficiency to improve in intelligence.

If a nursing mother's diet lacks thiamine, her baby may later be sub-normal in ability to learn, experiments with rats disclosed.

Techniques developed for the selection of men for hazardous behind-enemy lines work during the war were applied to research on the pesonality factors that lead to unusual success in living.

Science News Letter, December 24, 1949



"OPERATION SEASICKNESS"—Dramamine was under investigation on the voyage of the U. S. Army Transport General C. C. Ballou across the North Atlantic between Nov. 27 and Dec. 7, 1948. The Ballou was carrying 1,366 replacement troops en route from New York to Bremerhaven, Germany, on this extremely rough crossing which provided ideal conditions for a controlled study of motion sickness at sea.