

GENERAL SCIENCE

Science Review for 1948

Supersonic flights, penicillin pills for gonorrhea prevention, and man-made mesons are among the most important achievements 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 26 and also the issue which will appear next week, Dec. 25).

By SCIENCE SERVICE STAFF

► TOP achievement for 1948 is man's physical conquest of his environment: Flight of piloted jet planes faster than the speed of sound.

Top medical achievement: Prevention of gonorrhea by swallowing a single penicillin pill a few hours after exposure.

Top atomic event: Artificial creation of the meson, fundamental particle, by intense cyclotron bombardment, which promises better understanding of the atomic nucleus or heart.

The future may tag the year 1948 with other advances, such as the first operation of the 200-inch telescope on Mt. Palomar.

Discovery of aureomycin, golden drug to combat some diseases due to rickettsia and viruses, ushers in conquest of more diseases. Another promising antibiotic is polymyxin, and there are new sulfa drugs.

Chemists rejoice over the synthetic production of glycerine from petroleum, a new acrylonitrile fiber rivaling nylon, and "cold rubber" synthetically made at near-freezing temperatures that is better than the natural material.

Atom smashing with atomic bullets of three to seven billion electron-volts—rivaling the immense punch of cosmic rays—will be possible in three to five years because the Atomic Energy Commission in 1948 authorized two giant particle accelerators, one at Berkeley, Calif., and the other at Brookhaven, N. Y.

There are hints of cancer conquests to come. A new high speed X-ray camera technique promises to discover earlier more cases of stomach cancer. And there is hope that cancer-blasting radioactivity can be worked into chemicals that will travel to particular parts of the body where cancer is found to exist.

The neutron (particle that triggers the atomic bomb) was used to probe the structure of crystalline matter, surpassing the results of similar electron and X-ray diffraction.

Man's fight on the insects was reinforced by methoxychlor, chemical that kills insects untouched by DDT yet is harmless to

people and animals. A mysterious X disease attacked American cattle.

AERONAUTICS

Piloted Plane Flew Faster Than Speed of Sound

Speed of sound was surpassed many times following report that an Air Force pilot had achieved sustained horizontal supersonic flight in a piloted plane.

New official world record of 670.98 miles per hour was set by an Air Force test flyer with a fully armed standard jet fighter, the North American F-86.

Jet engine for aircraft, capable of producing approximately 5,000 pounds thrust, was installed in the North American F-86A.

Giant bomber, the Air Force's B-36, completed a 6,000-mile test flight with a gross weight of 300,000 pounds, heaviest load ever carried by an airplane.

Super-supersonic wind tunnel for testing guided missiles and aircraft has a perfectly-controlled flexible throat that permits quick changes in the supersonic flow of air.

Two supersonic wind tunnels many times larger than any others in the world, were completed, with a third, largest of all, nearly completed at government aviation laboratories.

Experimental development was begun on the world's largest helicopter, to be equipped with a detachable, bus-sized capsule.

Construction was begun on the world's largest warship, a 65,000-ton aircraft carrier without the familiar "island" superstructure.

Interchangeable hulls, radically new development, on a light-weight Navy amphibian plane underwent extensive flight and landing operations to determine the best design.

Floating drydock 103 feet long and nearly 40 feet wide, designed to permit repair work on giant seaplanes without hoisting them aboard seaplane tenders, successfully passed tests.

Charts for use of pilots were issued showing the airspeed limits within which nine types of transport and cargo planes of various weights can be most safely operated in thunderstorms.

Slope-line system for approach-lighting to a runway was developed; it also provides a glide path.

Periscope for airliners combined in one delicate instrument the periscope and bubble sextant, enabling navigators to determine their positions by the stars without the customary viewing bubble projecting above the plane surface.

New nylon fabrics for parachutes, dubbed rip-stop material, added safety in jumping from planes by its strength and ability to stop tiny rips before they spread to make the parachute useless.

First self-contained, air-borne, self-starter

system for jet and turboprop aircraft was revealed.

Molybdenum nozzles on ram-jet engines were protected from gas temperatures ranging up to 3,000 degrees Fahrenheit by several ceramic coatings.

Refractory porcelain blades showed promise for use in high temperature turbo-jet engines.

All conditions of flight of which a plane is capable were reproduced by a huge electronic-mechanical device, complete with an accurately simulated flight deck, developed to aid pilot training.

Radically new plane with channel wings replacing the customary straight wings underwent taxi tests.

Experimental wing for airplanes had a suction slot through which part of the boundary layer of air is drawn away.

Drag caused by ordinary projecting airborne antenna for planes and rockets was eliminated by unique notch antenna that lies flat on the flying object's surface.

Tiny experimental wind tunnel with a test section only one inch square duplicated actual pressure conditions up to an altitude of over 45 miles.

Motors with their rotating part outside and stationary part inside were built for testing missiles in wind tunnels.



WORLD'S BRIGHTEST LIGHTS
—Pictured here is the 69-light system being installed at the Landing Aids Experiment Station, Arcata, Calif., for test by the Air Force. The krypton "flash" unit the workmen are handling can produce flashes of more than three billion candlepower—enough to penetrate 1,000 feet of fog. Lights like the one being installed here will help guide pilots flying the Berlin airlift.

"Sweat-cooling" system which operates in somewhat the same way as the body's perspiring was found to increase the efficiency of turbo-jet engines.

Clothing ventilated by piping air through tubing to all surfaces of the body kept pilots comfortable at temperatures ranging from 30 degrees below zero Fahrenheit to 180 degrees above.

Two-color viewing screens were developed for airport radar scanners.

Radio navigation system showed on a meter the exact position of a plane at any time and place during flight.

Military and civil aviation joined hands in a billion dollar 15-year program to make all-weather flying a reality in the United States.

Navy helicopter featured all-metal rotor blades; hollow steel blades were perfected for airplane propellers.

Auxiliary power system of compressed air was invented to set rotors of helicopters and autogiros spinning without excessive expenditure of fuel.

Blowing air over models of radiators cast in naphthalene and noting rate of evaporation at different points, proved a simple technique for testing radiator designs.

Ground-based device for measuring the velocity of high frequency sound waves accurately determined the speeds of fast-traveling airplanes.

Light thin paneling with remarkable nonconductivity of heat was made of two extremely thin sheets of carbon steel with cellulose acetate plastic between.

Ram-jet-like device called an afterburner, attached to the exhaust of a jet-engined airplane, was found to give special spurts when needed; combination piston-jet engine was developed which uses its exhaust gases for supplementary jet power.

Carburetor ice detector was developed to warn of dangerous ice in the engine fuel induction system.

First carrier-based jet fighter, Grumman XF9F-2 Panther, with short square-tipped wings which fold for shipboard storage, made successful flight tests.

First jet-propelled airliner made a successful 20-minute test flight in England.

Construction was started on the "N" blimp, world's largest non-rigid airship.

Four-jet fighter, the Blackhawk, designed to be usable under extreme weather conditions, passed extensive tests.

Caroline Mars, largest flying boat in active service, passed rigid tests carrying a payload of 35,000 pounds.

Fast, tiny, jet fighter-plane, small enough to be carried within the belly of a giant bomber, was developed.

Carrying plane was built to fly with or without a large, detachable compartment for troops or cargo carried under its belly.

Hydro-flaps installed on the belly of a plane's fuselage promised safer forced sea landings by land-based patrol planes.

Lengthened hull for flying boats improved materially their performance.

Amphibian airplane, the Navy 61-foot XJR2F Albatross, equipped with boat-shaped fuselage and wing floats for rough-water operations, made successful test flights.

British helicopter, having normal plane tail with twin rudders and stub wings, made its first flight; British-built helicopter with three rotors was designed to carry 24 passengers or three tons of cargo.

All-metal cargo glider plane, capable of carrying four tons of freight in addition to its two-man crew, was completed.

Endless belt conveyor system in five seconds dropped 12,000 pounds of cargo from plane rear during flight.

Radar, developed for use in foggy weather, successfully guided planes through dust storms.

ANTHROPOLOGY AND ARCHAEOLOGY

Believe Man-Like Apes May Have Been Ape-Like Men

Man-like apes of South Africa, Pleistanthropus, may have been ape-like men instead, since restorations of brains to fit their skull cavities show brains bigger than those of modern apes; an upper right leg bone found in South Africa was latest link in evidence that man-ape walked erect.

Bones of ancient African apes indicated that the animals got about by walking and running instead of swinging from branch to branch.

Huge near-human beings twice the size of modern gorillas but much more man-like lived in South Africa, discovery of a lower jawbone containing a large number of enormous teeth showed.

Pre-human race of pygmies who weighed about 100 pounds, lived in caves, and used fire was indicated by broken piece of skull with definite human characteristics found amid bits of charcoal in a South African cave.

Actual footprints made by prehistoric man 15,000 to 20,000 years ago were found in a cave in France.

New-found stone implements indicated that the Egyptians were in Sinai from the earliest development of their civilization in the Nile valley; the peninsula was inhabited

successively by Neandertal and Cro-Magnon men of the Old Stone Age, tribes of Neolithic or New Stone Age date, and a people of the transition period between Neolithic and beginning of Age of Metals.

Neandertal hunters prowled North Africa during the Ice Age of Northern Europe, human teeth and part of an upper jaw discovered in a cave near the Strait of Gibraltar showed.

Beautifully flaked weapons of flint indicated that a race of prehistoric hunters, named Atarians, hunted elephant, rhinoceros and giraffe in North Africa some 75,000 years ago.

Polished stone implements of Late Stone Age men were found together with fossil animals in the Faiyum Desert near Cairo, making it possible to reconstruct the life and conditions of this period.

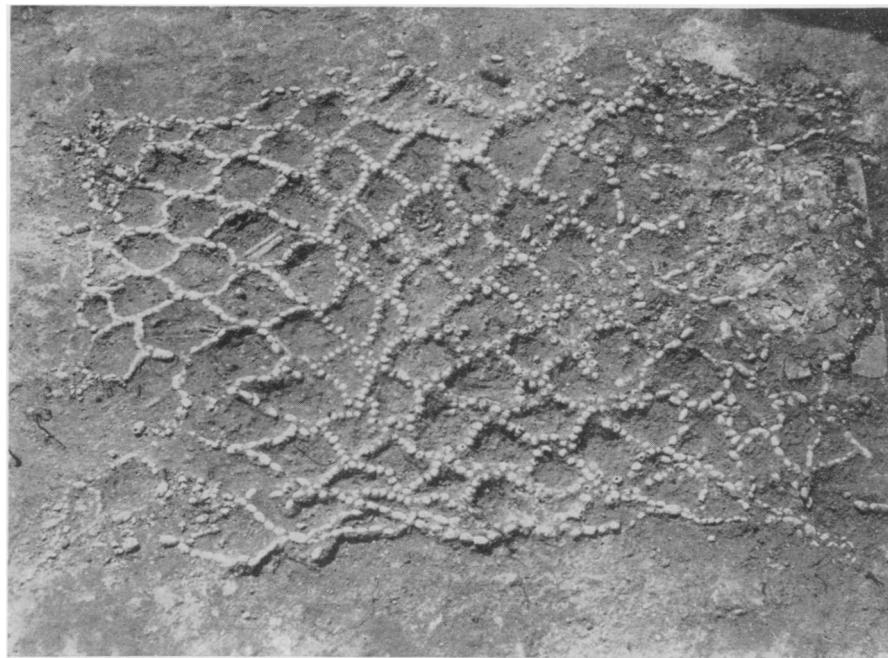
Two Stone Age skeletons, first found in the area, and tools were recovered from the west side of Lake Rudolf in Turkana Province, Africa.

Pottery fragments tempered with fiber, apparently representing the birth of ceramics among Indians of southeastern United States, were uncovered along the Savannah river in Georgia and South Carolina; traces of more than 150 Indian habitation sites, from prehistoric moundbuilders to pre-Columbian Creeks, were found in the area.

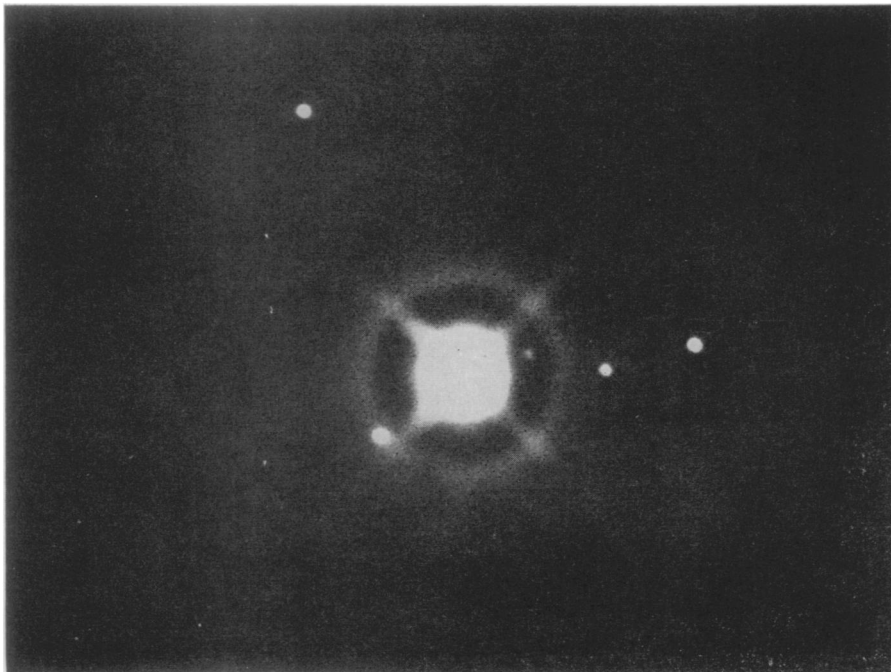
An enclosed rectangle of post-holes discovered near Little Lake in Inyo County, California, was believed to represent America's oldest house, with a possible age of 10,000 to 3,000 years.

Temple of inhabitants of England 2,500 years ago is apparently a small wooden replica of the basic design of temples in far-off Greece, it was reported.

Prehistoric Indian baby blanket, extensively decorated with over 1,500 beads, was discovered near Frankfort, Ohio.



EARLY BABY BLANKET—Heavily beaded with small shells, the miniature blanket is the work of prehistoric Indians.



URANUS AND FIVE MOONS—At top left are Oberon with Ariel below; Umbriel and Titania are at the right. The new, fifth satellite, of 17th magnitude, is shown close to the planet, inside the halation ring. The fifth moon is at a mean distance of 81,000 miles from the planet Uranus. Dr. G. P. Kuiper, of Yerkes Observatory, discovered this moon with the 82-inch McDonald reflector at Fort Davis, Texas. This picture was taken March 1, 1948, with an exposure of $3\frac{1}{2}$ minutes.

Excavations at Eridu, probably the oldest city of ancient Babylonia, yielded extensive remains of the Ubaid period, most important being a series of temples which proved the existence of monumental architecture early in the Chalcolithic age.

Megalithic tombs in the Mysore state of India were for the first time associated with datable cultural remains in a town site, and can now be safely dated to about the last three centuries B. C.

Shield of hammered bronze with hundreds of various-sized indentations forming 21 systems of ornamentation, estimated to have been made some 2,700 years ago in northern Italy, was uncovered on the island of Falster, Denmark.

Buried ruins of a temple of Dionysos, ancient Greco-Roman wine-god, were uncovered near Cologne Cathedral, Germany.

Crosses and inscriptions in both Hebrew and Greek on burial caskets found near Jerusalem were interpreted as the earliest records of Christianity.

Well-preserved manuscripts found in northern Palestine proved to be complete text of the book of Isaiah, commentary on the book of Habakkuk and manual of discipline of some sectarian Jewish group, all dating around the beginning of the Christian era.

Pit-houses with cupboards cut into the earthen walls and decorated utensils discovered in New Mexico closed the gap between A.D. 500 and 900 in the known history of the long-vanished Mogollon Indians of the Southwest.

An immense key to the main gate, hammer of unique design and pair of well-preserved iron handcuffs were unearthed in

the ruins of a Danish castle gutted with fire more than 600 years ago.

Skeletons of six deaf Indians who lived in California a few hundred years ago were recovered along with thousands of artifacts such as fishhooks, harpoons, awls, mortars and pestles.

Outlines were located of the fort built in 1587 and then mysteriously deserted by Sir Walter Raleigh's "lost colonists" at Roanoke Island, N. C.; it has bastions on the sides of the basic square rather than on the corners.

Testing for radioactive carbon the ashes of a person who died anywhere from 900 to 30,000 years ago was reported to be an accurate method of dating ancient archaeological sites.

Ancient Babylonian cuneiform inscriptions were made legible by baking the ancient tablets for a day at a temperature of 1,400 degrees Fahrenheit.

Descendants of Europe's first farmers look much like their ancestors who came to Greece from Asia Minor 6,000 years ago, comparison of skeletal remains discovered in the region with head and body measurements of local farmers showed.

Blood study of the Basques of northern Spain indicated that they have nearly pure Rh negative blood, which means that they are racially not mixed with other European peoples that carry the Rh positive gene.

Cannibalistic Carib Indians of the West Indies were reported to have had different languages for the two sexes, women using the "man language" when speaking to the men.

ASTRONOMY

Heavenly Bodies Studied With Radar and VHF Waves

Radioastronomy, new branch of astronomy, used radar and other high frequency waves to study meteors, the sun and distant stars.

Giant 200-inch telescope was formally dedicated, conspicuous advances made in its final adjustment, and peeks were taken deeper into cosmic space than ever before possible.

Fifth moon of the planet Uranus, that completes its path around Uranus in 30 hours, was discovered well within the orbit of the planet's four previously known satellites.

Nine white dwarf stars were discovered, bringing to 100 the number of superdense and degenerate stars.

Brilliant meteors, called fireballs, exploded over Alabama, over Kansas and neighboring states.

Gigantic stony meteorite fragment weighing over 2,000 pounds, discovered in Norton, Kansas, following an intensive search due to the Kansas fall of Feb. 18, is the largest known aerolite and largest meteorite of any type ever observed to fall.

Fluctuations of a star's magnetic field were estimated to account for hitherto unexplained intensities of certain spectral lines in some white stars.

New comets discovered include Mrkos, Wirtanen II, Keuskamp, Pajdusakova-Mrkos, Honda-Bernesconi, Wirtanen III, Ashbrook-Jackson, Johnson, Wirtanen IV, 1948 I, Bester V and Honda III; periodic comets Forbes and Neujmin were rediscovered.

Small amounts of ammonia and methane, and two separate isotopes of carbon dioxide, were detected in the earth's atmosphere, the sun being used as the light source.

Infrared heat-light reflections from Mars indicated possibility that mosses and lichens exist on that planet.

Rings of Saturn and the planet's inner satellites were pictured as consisting of a thin layer of hoar-frost covering a very cold surface, perhaps solid ice, following discovery that the spectra of Saturn's rings and inner satellites resemble that of a thin sheet of ice.

Photoelectric photometer was made more sensitive to light in near infrared region of sun's or star's spectrum by cutting down the circuit capacity.

New minor planet was found to be one of only three or four asteroids known to have come within the earth's orbit.

A "nova" or new star was found in the constellation of Cygnus the swan, and two were reported in the constellation of Serpens the serpent.

Variable star of the Beta-Cephei type was found through use of the photoelectric photometer to increase suddenly one magnitude in brightness, then fade to normal in 15 seconds.

Fifteen of the brightest blue stars in the Pleiades cluster were found to rotate with velocities averaging 102 miles per second, one having at its equator a speed of 136 miles per second.

The moon was reported to have a small but detectable effect on the degree of ionization of the earth's upper atmosphere.

Clouds of ionized air were found to be

drifting during the night at the height of the low-level layer which is uniformly ionized in the daytime.

Meteors ionize the earth's atmosphere in thin sheets, radio observations showed.

Point in the direction of the constellation Cygnus, broadcasting 1,500 times more energy to the earth than any point in the surrounding area, was found to send noise of constant intensity at about 100 megacycles frequency and above, noise of varying intensity at frequencies below 100 megacycles.

Multiple expeditions to Burma, Siam, China, Japan, Korea and the Aleutians observed annular eclipse of the sun of May 8-9 to secure data for more accurate determination of shape and size of earth.

Abundance of the isotopes of the rare element gallium in a sample separated from a meteorite was found to be the same as in ordinary gallium.

Parent planet from which meteorites were formed was born less than 60,000,000 years ago, study of uranium and thorium in meteorites indicated.

New commissions on microwave research, close binaries and astronomical history were set up by the International Astronomical Union at its first session in ten years.

Nebulae were reported as possibly lighted by clouds of gas bumping into interstellar dust.

Small, red stars embedded in a dust cloud were stated to grow fat on dust particles falling into them from the cloud, while luminous blue and white stars in the dark nebula repel the dust by outward pressure of their strong light.

Interstellar matter was reported to have the same relative abundance of elements as normal stars.

BIOLOGY

Human Eggs Were Fertilized in Test-Tubes

Human ova or eggs were fertilized in a test tube with human spermatozoa, and fertilization, demonstrated by initiation of cell division, took place in at least four of the ova.

A rat egg can be fertilized when less than one hundred male sex cells are present; rabbit ova need a thousand spermatozoa, experiments of importance for artificial insemination in the livestock industry showed.

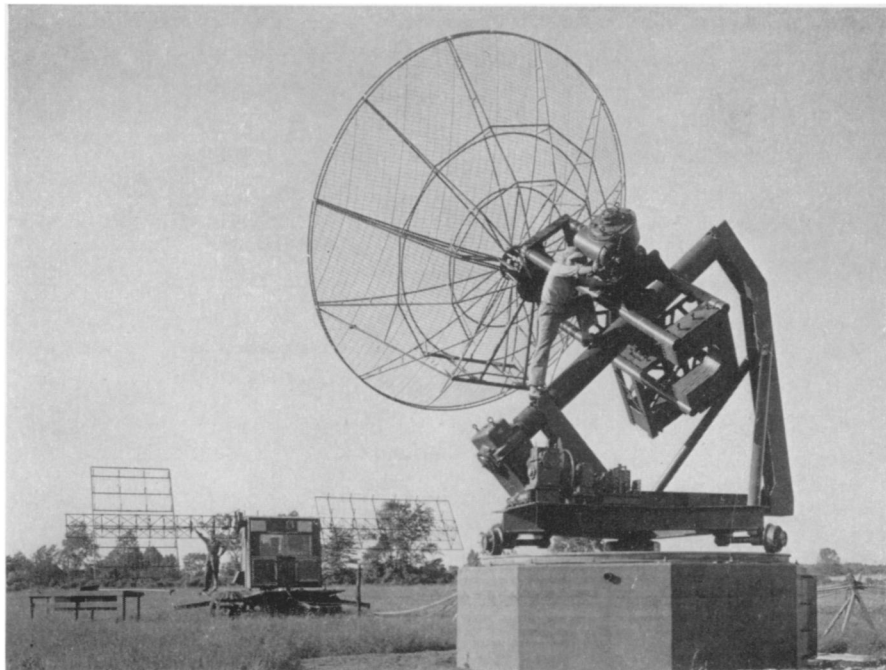
Eggs started in the body of one hen were transferred to another, fertilized, and finally laid and hatched.

Progesterone, hormone long supposed to be found only in mammals, was detected in hens.

Chicken and turkey eggs hatched, and fertilized mammalian ova developed into normal embryos after hours of chilling at near-freezing temperatures.

Heavy water and salt tagged with radioactive sodium showed that a newborn baby is 74.6% water, a little more than half of this water being in the blood and the cells that make up the body, while the rest lies between and about the cells and in the body spaces.

Radioactive elements showed that sodium in the salt of blood and other tissues is



RADIO TELESCOPE—This eight-ton machine, with its 17-foot saucer-shaped antenna, is nearing completion at Cornell University. It will follow the sun automatically to record solar "noise" which interferes with radio reception at ultra-high frequencies.

supplied before birth in superabundance across the placental membranes; by the twelfth week of prenatal life, the fetus receives 160 times as much sodium as the growing tissues require.

Animals' stomachs are able to digest food long before birth, experiments proved.

Sex evolution, found through study of "sexless" cells, was reported to proceed in four steps: nuclear division in the cell without the cell itself dividing, evolutionary changes in the two that rendered each less efficient without the other, halving of the chromosome numbers within the body cells, and union of the two incomplete cells.

Between 20,000 and 42,000 of the heredity-determining units called genes were estimated to exist in each of the tiny cells which form a person's body.

Upholders of neo-Lamarckian doctrine scored official triumph over Mendelian scientists in the USSR.

Use of radioactive carbon as a tracer element identified the last two intermediate compounds prior to sugar formation by green plants as phosphoglyceric acid and triose phosphate, itself a simple sugar.

Radioactive carbon revealed a mysterious Factor B, unidentifiable as any known chemical, as the first material manufactured by living plants through the energy of sunlight; it showed that green leaves can add together the two simple sugars, glucose and fructose, to form cane sugar.

Cousin to DDT, methoxychlor was developed that does not poison man and animals, yet slays insects untouched by other insecticides.

DDT in meat was found not to be destroyed by cooking.

DDT-resistant flies were raised in the laboratory through more than 30 generations.

Houseflies that survive standard doses of DDT but are killed by other insecticides were found in nature.

New viral agent, BFS-867, was reported to be a "stem" virus from which are descended other sleeping sickness viruses, such as western equine and St. Louis encephalitis viruses.

Strange virus disease producing arthritis in chickens before they are hatched was reported in the eastern states.

Growth hormone, obtained as a pure substance from the pituitary glands of slaughtered cattle, built both bones and muscles of rats to more than twice normal size.

Small amounts of poisonous carbon monoxide are converted into harmless carbon dioxide in the living body, experiments with frogs and mice showed.

Laboratory world free from radioactivity was created for highly pedigreed mice, rats, rabbits and guinea pigs.

Germ-free chicken hatched from germless laboratory egg produced by mating of germ-free parent birds marked the first time that germ-free life in birds was carried into the second generation.

Success was reported in making such "impossible" grafts as sweet clover on sunflower, cowpea on tomato, and tomato on geranium.

Discovery of a tomato plant that is unable to shed its pollen simplified hybridizing these plants.

Strains of hybrid corn with high content of niacin, the pellagra-preventing vitamin, were produced.

Certain concentrations of the highly potent insecticide gammexane, or 666, were found to cause sudden hereditary changes in the plants it protects unless meso-inositol, member of the vitamin B group, is used

along with it.

Seedcorn and cotton seed exposed on the decks of target ships to atom-bomb rays released by first Bikini burst produced plants with many abnormalities.

Evolutionary changes were produced in fruitflies by low concentration of formaldehyde, in wheat and barley by radioactive phosphorus, in both plants and flies by ultrasonic sound waves.

Weed-killer 2,4-D caused roots to grow from infant leaves inside a garden bean.

Vegetables sprayed with a dilute solution of a growth-control chemical related to 2,4-D stayed fresh after lying in the open for more than a week.

Presence of the weed-killer 2,4-D in extremely small amounts was detected by chemical test using a few crystals of chromotropic acid.

Building blocks of proteins were found to be just as valuable foods as the proteins themselves by feeding rats both a natural protein extracted from milk and a mixture of the natural amino acids of which it is composed chemically.

Rabbits and guinea pigs fed an exclusive diet of powdered milk failed to grow and developed cirrhosis, or gin-drinker's liver.

Dogs in the United States, Britain and Sweden suffered from a new and highly fatal disease caused by a virus.

Mysterious X disease of unknown origin attacked cattle in all sections of the United States, causing them to lose weight, give less milk and drop calves prematurely.

Nest of the bristle-thighed curlew, never previously seen, was found near Mountain Valley in southwestern Alaska.

Hibernation through eight months of the

year by Alaskan ground squirrels was reported.

Leaf-hoppers were found to carry western elm disease virus that kills many trees in the Midwestern and Southern states.

Outbreaks of Dutch elm disease were reported far to the west of Ohio, long thought to be its western limit.

Improved live virus vaccine was reported not only to protect hens against Newcastle disease but also to give their chicks immunity.

Experiments proved that all living things accumulate radioactive carbon, C^{14} .

Report that worms spread the germs of at least three animal diseases—blackhead of turkey, salmon poisoning of dogs and influenza of swine—may help clear the mystery of how some diseases spread.

Ammonia is preferred to straight nitrogen from the air by nitrogen-fixing bacteria that live in root nodules of clover, beans and other leguminous plants, experiments with the rare stable isotope of nitrogen showed.

Yeast that produces large amounts of fatty material was found.

New antibiotic named actidine, from the same fungus that produces streptomycin, was found deadly to some of the fungi that cause plant diseases.

Antibiotic of the same family as penicillin and streptomycin was obtained from *Bacillus larvae*, germ that produces the serious disease of infant bees known as American foulbrood, either by direct extraction of the "scale" which it causes or by culturing on a nutrient medium.

Cancer cells were transformed to normal cells by transplanting a cancer from a frog

into the limb of a salamander.

Living cells do not have to be intact for protein synthesis to be carried on, research with broken-down walls of living liver cells and radioactive glycine showed.

Radioactive cobalt compound given to a cow showed that a fraction is used in making new blood, the rest rapidly eliminated.

Chemical called trichothecin, produced by a fungus, stopped the spread of other fungi by preventing them from reproducing.

Human saliva prevents some seeds from germinating and checks the growth of those that do sprout, experiments demonstrated.

Weevil infestation in wheat was detected by soaking samples of suspected grain for a few minutes in a dye containing acid fuchsin.

Penicillin was shown to paralyze the general protoplasm of bacterial cells rather than stop nuclear division; sodium penicillin was found to imprison germs in an impenetrable layer of colloid, keeping them from foraging for food or multiplying.

Scales that cause wool fibers to cling together consist of at least a double layer, according to a new, simple technique for "fingerprinting" wool.

Campaigns against rats, carried on with increased vigor this year, were credited with decline of typhus fever cases and saving precious grain.

ANTU, drastic rat poison, was reported literally to drown rats in their own body-fluids by causing lungs to become filled with watery liquid.

Seed of China's recently discovered "dawn redwood" were brought to the United States.

Use of new strains of hybrid corn developed for Mexico made that country independent of foreign import in 1948.

CHEMISTRY AND PHYSICS

Artificial Meson Was Created for First Time

Elusive cosmic-ray particle, called both meson and mesotron, was created artificially for the first time by accelerating hearts of helium atoms to energies of 400,000,000 electron-volts in a cyclotron.

Tracks of heavy nuclei in cosmic radiation were captured by photographic plates carried aloft by balloons.

Electron tracks about two thousandths of an inch long were captured in a special photographic emulsion.

Special photographic emulsion, containing eight times as much silver bromide as older emulsions, was developed to photograph the path of mesons.

Alpha particles given off from radioactive elements made stars with two to five rays in special photographic plates left in contact with the flat surfaces of rocks, indicating that the amount of uranium and thorium in rocks may be estimated photographically.

New subnuclear particle, bearing a magnetic charge instead of the more familiar plus or minus electrical charge of the proton or electron, was predicted; while not yet observed it is needed to explain why all electrons carry the same unit amount of negative charge.

Through use of rocket-carried Geiger counters, intensity of cosmic ray bombardment was found to be constant from 30 to



PHOTOGRAPHS PRINTED IN GLASS—This is done by a new process that uses an ordinary negative and ultraviolet light, then heat, to create a positive permanent picture. Dr. Donald S. Stookey of Corning Glass Works is shown examining a negative and a piece of photosensitive glass before he inserts them into the printing frame on the table.

100 miles above the earth's surface.

World's first samples of metallic technetium, chemical element number 43, were isolated.

Chemical compounds, such as certain acids and alcohols, containing atoms tagged with radioactive elements were offered for sale by the U. S. Atomic Energy Commission.

World's greatest atom smashers were planned, including two gigantic synchrotrons to operate at up to seven billion electron volts and a linear accelerator, capable of hurling electrons with a billion volts of energy.

Microwave spectroscopy, using waves of the same length as radar, detected tiny amounts of chemical elements in the body without use of hazardous radioactive isotopes in those cases where the element ended up in the skin, hair, nails or other detachable area.

Heavyweight hydrogen, also called tritium, the only radioactive isotope of this element, and lightweight helium, each with the atomic weight of three, have been produced in quantity for the first time in the atomic pile.

Sixth isotope of oxygen, radioactive O^{14} , was produced by atomic bombardment.

Production and measurement of radioactive properties of hitherto missing $4n-1$ mass type radioactive family, named neptunium family, was accomplished.

New radioactive series of protactinium was produced by deuteron and helium bombardment of thorium.

New types of electrical semiconductors were produced by bombarding pure germanium metal with deuterons and other particles accelerated to 10,000,000 volts.

Chlorophyll, green pigment in plants, comes in almost ultra-microscopic little disks or wafers, held together in groups of 40 to 60, electron microscope studies showed.

Talc was produced in the laboratory by heating a mixture of magnesia silica and water to 1,300 degrees Fahrenheit under pressure of 30,000 pounds per square inch; several other naturally occurring silicates were produced experimentally.

Quartz crystals more than an inch long were produced by placing silica and a small quartz crystal in an alkaline solution inside a steel bomb, then heating to 750 degrees Fahrenheit at a pressure exceeding 15,000 pounds per square inch.

Synthetic resins were improved so that they purify water by simultaneously removing both acid and alkali chemicals.

Use in respirator apparatus of a higher oxide of potassium, with the ability to absorb carbon dioxide and moisture and give off life-sustaining oxygen, enabled a man to carry his own atmosphere along with him.

Synthetic glycerine was made directly from petroleum, making its production independent of the supply of fat available.

First completely synthetic varnish was prepared through several chemical steps from propylene gas, abundantly available from cracking oil.

Varnish composed of alizarine-calcium rosinate and linseed oil, with turpentine as the solvent, was reported to duplicate that used on famous old violins.

An acoustical interferometer, consisting of two quartz crystals with gas confined between them, was developed to detect invisible infra-red light by means of sound

too high-pitched for the ear to hear.

Infra-red wavelengths up to 39 microns were measured by means of a prism made of thallium bromide and thallium iodide.

Color "staining" with light waves was made possible by new developments in phase microscopy, permitting living cells to be observed without killing them.

Living viruses of parrot fever and smallpox vaccine, and *Leptospira*, tiny organisms which cause some types of jaundice and the swamp fever of eastern Europe, were examined with a phase microscope.

New method of cementing lenses, and in some cases filters, to light-sensitive cells made possible more accurate light and exposure meters.

Device invented to measure atomic radiation by changing it into light consists of a simple box containing fluorescent matter and a photo-electric cell surrounded by dry ice.

Method was developed by which neutrons could be used to photograph the positions of atoms in crystal lattices.

Hydrogen atoms restlessly jump from one position to another in the crystal structure of a piece of ice, photographs of a stream of neutrons scattered by passing through an ice-crystal showed.

Electrical charges on their particles were found to enable certain soapy chemicals called detergents to prevent the curdling of paint, cosmetics and other preparations.

Atoms are pushed out of place in smashed metal, measurement of the amounts of X-ray energy scattered by the atoms in deformed and normal metals showed.

Super-tops, suspended in vacuum by magnetic force, were made to spin 633,000 turns a second.

Movements of as little as a hundred-thousandth of an inch were detected by use of a "transducer," new instrument consisting of a coiled spring whose turns separate one by one when the ends of the spring are pulled apart.

Development of a super-strong wire, produced through heat treatment and exceptionally long and exacting cold working, made possible an octave above middle "C" on the tenor banjo or tenor guitar.

Compound of phosphorus and tungsten known as phosphotungstic acid showed where in the cell the greatest concentrations of proteins occur by making the parts opaque to X-rays.

Low temperature of five one-hundredths of a degree above the unattainable absolute zero of 459 degrees below zero Fahrenheit was reached through use of a magnetic cooling device.

Chemical compound which forms a third link in the chain leading to production in the body of the pellagra-preventing vitamin was discovered and synthesized.

Urushiol, blistering compound of poison ivy, was successfully imitated for research purposes in a synthetic compound that resembles the natural product not only in basic chemical structure but in physiological effects.

Five to eight times more protection against sunburn than that given by any compound now in use was promised by ethyl-p-diethylaminobenzoate and methyl-p-dimethylamino-benzoate, compounds that can be applied in lotions, ointments or solutions.

Nobel prize in physics was awarded to Prof. P. M. S. Blackett of Britain's Manchester University for discoveries in the

field of cosmic radiation; in chemistry to Prof. Arne Tiselius of the Institute of Physical Chemistry, Uppsala University, Sweden, for new methods of separating, detecting and analyzing colloids.

EARTH SCIENCES

125 Major Earthquakes Recorded on Seismographs

There were 125 earthquakes of sufficient strength to record themselves on seismograph instruments so they could be immediately located; death and destruction were caused by severe earthquakes in the Philippines on Jan. 24, in southern China on May 25, and in Japan on June 28.

Supposedly extinct geyser erupted in Yellowstone Park.

An erupting volcano on the tiny Philippine island of Camiguin sent thousands of persons fleeing.

Volcanoes roared in northwestern India 250,000,000 years ago, it was indicated by discovery of the split half of a volcanic bomb in the same slate formation as fossils formed during the geologic period following the Coal Age.

Specimens of therapsida, a "missing link" between reptiles and mammals, were unearthed in South Africa.

Criteria were set up for determining the anatomical characteristics and general appearance of any extinct animal on the basis of its fossil tracks alone.

Sixty-million-year-old fossils, dating back to the last days of the dinosaurs, were turned up in quantity by scientists surveying areas to be permanently flooded by a series of more than 100 dams planned and under construction on the Missouri River and tributaries.

Whale ancestors, meat-eaters that were slenderer and smaller than modern whales, were recovered near Cairo in the region of the Faiyum Desert, floor of the ancient Tethys Sea.

Two 50,000,000-year-old fossil skulls of lemuroid animals, relatively near the bottom of man's family tree, were found in Wyoming; large eye-sockets directed almost straight forward indicate they were night-prowlers.

Giant fossil turtle with a shell seven feet long and four and one-half feet wide, was dug from between two layers of lava flows representing the bottom of a lake in Africa existing about 25,000,000 years ago.

Bikini atoll has been a-building for more than 20,000,000 years, holes drilled over 2,550 feet into the submerged coral-covered mountain showed.

Determination of the amount of heavy oxygen in the fossil skeletons of squid-like animals was reported to indicate the temperatures of the ancient seas in which these animals lived.

Mountain systems were reported created by atomic energy, working slowly through millions of years, that bulge the earth's crust up into immense blisters, which subsequently collapse, with vast magma flows.

When much of the earth was covered with ice about 50,000 years ago, California was inhabited by some sort of human beings, remains of fires, tools and discarded shells indicated.

Fossil pollen in 185 bogs in northeastern North America indicated alterations of warm, dry and cool, moist climate since the

last great advance of the Wisconsin Ice Sheet.

Enormous pile of bison bones discovered near Heart Butte, N. D., may have resulted from an old Indian method of slaughter by driving a whole herd of bison over a cliff.

The gravel deposits were discovered in the Grand Canyon area 3,500 to 4,000 feet above the present river level.

Ancient waterfall, at least 150 feet high, found in the Connecticut River Gorge was reported to have served as an outlet for water from a huge lake which 20,000 years ago covered much of the modern river valley.

Great canyons four to five thousand feet deep were found in the sea floor off the coast of New Guinea; a tremendous under-sea cliff about two miles high was discovered in the Antarctic.

Gulf stream, considerably narrower and swifter than supposed, meanders like a great river, use of the radio-navigation aid Loran showed.

Photographs of the ocean bottom were taken 3.5 miles beneath the water's surface.

Storm centers thousands of miles away were detected and their speeds and directions analyzed by an instrument that sorted out and analyzed the large and small ocean waves they created.

Plentiful supply of titanium minerals was located in inland Clay County, Florida, where it can easily be mined.

Single-cell helium-filled plastic bag was developed to carry 70 pounds of self-recording scientific instruments 20 miles above the earth's surface to record temperatures, atmospheric pressures, cosmic ray intensities and solar radiation.

More accurate meteorological data were provided from high above the ground by an improved radiosonde tracked in flight by a ground-based automatic direction finder.

Temperatures of 260 degrees Fahrenheit at a distance of 100 miles above the earth's surface, 150 degrees below zero 45 miles up, 70 degrees above at 35 miles altitude and 75 degrees below zero eight to 20 miles high were estimated by means of one of the world's largest explosions, that of 5,000 tons of TNT.

Death Valley in California was verified as the hottest spot on the North American continent, with a temperature of 180 degrees Fahrenheit on the desert floor one day in every seven years, and a top temperature of 134 degrees at five feet above the ground.

Annual iceberg "census" was for the first time made from the air.

Additions to the U. S. Weather Bureau's daily weather map included extension of the main map up to latitude 55 degrees, enlarged inset map showing previous day's conditions for the entire North American continent, and new inset map to show altitudes at which an atmospheric pressure of 700 millibars exists.

ENGINEERING AND TECHNOLOGY

Magnetic Oil Particles Used in New Fluid Clutch

Oil containing millions of tiny particles of iron powder or other magnetic material made possible a new fluid clutch consisting of only three parts—driving shaft with a



SMELL-PROOF ROOM—Testing for odors, Dr John V. Haralson of Cornell University sniffs an isolated odor from an "olfactory stimulator" while the long glass tube carries off his exhaled breath. The fiberglas envelope in which he is garbed and the equipment in the chamber were designed by Dean Foster, at left.

plate at its end, driven shaft and plate, and iron-saturated oil between.

Bit of semi-conducting germanium metal that amplifies current without the complexity of plates and filaments made possible more stable and durable radios, television sets and electronic devices.

Vacuum tube using cesium metal both as coating for the hot cathode and as current-carrying vapor was developed for changing alternating into direct current.

Electric current shot at a diamond chip was amplified as much as 500 times by new method based on discovery that electric currents produced by beams of electrons hitting an insulator may be increased several hundred times.

"Cold" rubber was synthesized at almost freezing temperatures, giving better wear to the rubber.

Fiber to supplement nylon, made from acrylonitrile and trade-named orlon, was announced for early commercial production.

Carefully controlled experiments to produce precipitation artificially from winter layer-type clouds by seeding with dry ice pellets generally were unsuccessful; rain was not produced unless already occurring naturally within 30 miles of the seeded area.

Man-made snow was produced on a continuous basis in sufficient quantities in climatic test chambers to test military equipment under simulated Arctic conditions.

Vapors in a laboratory changed hexagonal snow into four different, recognizable shapes.

Silver iodide smoke particles, created by fire in special burners, was tested as a tool for making artificial snow and rain.

New type of dry battery used oxygen from the air instead of from chemicals within it.

Tiny cells that interlock automatically to form a miniature dry cell battery, eliminating the need for wire connections and the necessary soldering, were revealed.

Flawless glass was produced by heating with an electric current passed through the glass.

New type of glass that can be heated to 1,800 degrees Fahrenheit and rapidly cooled without breaking consisted almost entirely of silica.

Depth of fine film on liquid surface was determined by an instrument which measures the minute distortion of polarized light reflected off the surface.

Surface layers of metal less than a quarter-millionth of an inch thick were studied by an electron diffraction instrument that shoots beams of electrons through the thin sheet of metal.

Four tiny, hollow silver balls measured direct and reflected heat to show how really hot a person gets in summer.

Instrument using the positive ion emission from a hot platinum surface operating in air detected certain classes of invisible vapors and air-borne particles, including some without odors.

Monitoring device using a new type of electronic circuit detected a difference of five electrical impulses in a million, checked up on amplitude of broadcast waves and power being transmitted.

Electrical meter of the watt-hour type, requiring little checking, was made with its rotor suspended in air by magnetism.

Impurities in a metal, as little as one part in a million, were detected and weighed by a mass spectrometer set to record an impurity with a specific atomic weight.

Detector for poisonous lead in the air warned of atmospheric contamination in a manner similar to a Geiger counter.

Camera shutter capable of operating at a rate of 100,000,000 frames per second was revealed.

Camera that develops moving photographic paper or film four seconds after the picture is snapped was developed.

Photographs were printed in, not on, glass by using ordinary negative and ultraviolet light, then heat, to create a positive permanent picture.

Exposure time for taking X-ray pictures was cut in half by use of a new high-speed X-ray intensifying screen.

Completely dry process for taking pictures and printing, called xerography, uses static electricity and dry powders instead of chemical solutions.

Pictures taken with a camera installed in a V-2 rocket showed how a great part of the western United States and Mexico looks from some 60 miles above the earth.

Water-cooling of carbon arcs was found to make possible a steady arc of high brilliancy with lower carbon consumption.

Three separate color images were produced on a single layer of standard black-and-white film from three color separation negatives by a new process.

Television, radio relays, facsimile and photography were combined in a new communication system called Ultrafax that reproduces at television speed a full page of printed matter with illustrations.

Sixteen-inch receiving tube for home television sets, made largely of metal, was manufactured on a continuous production basis.

Permission was requested of the Federal Communications Commission for a television relay station nearly six miles above the earth, "stratovision" having been successfully demonstrated.

Twice as many radio-telephone stations operated without interference by use of radically simpler single-sideband radio transmitter.

Automatic telephone accounting system which records the number of the sending phone, the receiving phone and length of the conversation was revealed.

High speed weaving machine, in which light-weight steel gripper shuttle replaces wooden shuttle and steel guides keep the shuttle from touching the warp yarn, produced cloth 2.66 times as fast as conventional machines.

Hard, white ice in a continuous column was produced by a new ice-making machine that first freezes the center core of water, then forms successive layers of ice around it.

Fluorine and chlorine make up by weight four-fifths of a new plastic that is an unusually stable, high-temperature, chemical-resistant material.

Alkyd molding compound, a new mineral-filled plastic, was used on electrical conductors and switch units.

Oil from tobacco seed was found a better ingredient for rosin varnishes than the established linseed oil.

A 75% yield of paper pulp was obtained from hardwoods by treating the oak, hickory and other trees with soda ash and sulfur dioxide; melamine-formaldehyde was found to give needed strength to paper made from such trees as poplar, beech, and birch.

Combination fungicide and shoe dressing for leather goods protected it from mildew

and other fungi.

Chemical process developed for tanning leather consisted of first treating the prepared hide with a compound of the dialdehyde type, then with resin-forming agents.

A thousand numbers were stored in a pint of mercury, "memory" unit developed for high-speed electronic computers.

Up to 1,600,000 sheets of paper were counted in one second by a simplified electronic counter.

Jellied gasoline was used to crack rock thousands of feet underground to permit the flow of oil to the well-holes; modified bazooka was used to perforate oil well casings to increase petroleum flow in partly exhausted oil wells.

Radio signals of very high frequency were amplified by an electron wave tube that projects stream of electrons down a tube inside a spiral conductor.

Threads of screws, nuts and bolts were standardized by agreement signed by United States, Canada and Britain.

Improved seismic method of locating probable underground oil was revealed which uses overground shaped-charge technique, eliminating the cost of drilling shot holes.

MEDICINE

Penicillin Pill Found To Prevent Gonorrhea

Announcement was made that gonorrhea could be prevented by swallowing a single pill of penicillin a few hours after exposure.

Laboratory animal experiments indicated that cancer-destroying radioactive iodine could be tagged to a chemical which goes directly to the part of the body desired, the kidney in this instance.

Development of a technique for taking photographs of living body cells under ultraviolet light held out hope for an improved way of telling a cancer cell's composition.

A new high-speed camera which requires one-twelfth the exposure to X-rays necessary with older equipment was reported as showing promise of saving victims of stomach cancer by making mass X-ray detection studies possible.

Cancer-causing chemicals were found to produce the sudden evolutionary changes known as mutations, and the opposite possibility was suggested, that mutation-causing chemicals may cause cancer.

Radioactive cobalt for low-cost cancer treatment underwent tests at four institutions.

Preparations of radioactive yttrium, zirconium, columbium and lanthanum were made for use in selective radiation treatment of certain tissues and organs, such as liver, spleen and bone marrow.

Treatment of cancer with high frequency sound waves was investigated.

New operations for heart disease patients were: creation of a new artery leading off the aorta; cutting off the top of the heart to prevent clots plugging blood vessels elsewhere in the body; and wrapping the aorta in plastic to prevent its bursting.

Experiments with rats revealed that the body may be able to manufacture some vitamins from proteins if it does not get enough vitamins from food.

Two of the most vital centers of the brain controlling breathing and blood circulation were discovered in the medulla or bulb.

Radiocardiography, technic for studying the heart and blood circulation by injection of radioactive chemicals whose course through the heart is traced by an ink-writing Geiger-Muller counter, was developed.

Flies were definitely proved to be diarrhea carriers.

A common cold-causing virus, named V14A, was isolated.

Discovery of the deadly effect on germs of a relative humidity of 50% gave hope of a weapon against influenza, pneumonia, strep. sore throat and perhaps other diseases.

Chlorine dioxide was accepted officially as a flour bleach to replace nitrogen trichloride (agene) which had been found to cause fits in dogs.

The World Health Organization began full scale activity and the United States became a member.

More reliable syphilis blood test was made possible with the discovery of a new testing chemical, called cardiolipin, obtained from beef heart.

An X-ray telescope which gives doctors a 500 times clearer view than previously possible of the patient's internal organs was developed and showed promise of becoming a weapon for fighting stomach cancer.

Discovery that sputum or spit protects tubercle bacilli from streptomycin may be a clue to why the antibiotic fails against lung TB.

A long-range program during which some 15,000,000 children were to be vaccinated against tuberculosis with BCG, largest mass vaccination undertaking in history, got under way in 11 European countries.

Isolation of a blood chemical, serotonin, twice as powerful as adrenalin for fighting shock, was announced.

Asparagus was found to contain a substance called quercetin which stopped the poison production of the botulinus organism in test-tube experiments.

Penicillin-sensitivity was restored to resistant disease germs by briefly associating them with germs of another family.

A penicillin preparation that lingers in the body at an effective germ fighting level for four days after a single dose was made.

Streptomycin, given in conjunction with potassium iodide, was found more effective in the treatment of a late type of TB, fibrocereous tuberculosis, in guinea pigs.

Radioactive iodine was reported to have a curative effect on toxic goiter.

A lethal dose of radiation was found to convert the blood system to an embryonic state.

An improved method for extracting proteins such as albumin and globulin from blood, which also eliminates the risk of transmitting jaundice virus in plasma, was developed by removing salts from the blood with ion exchange resins and pasteurizing the blood.

Method of safely injecting fat into the veins, designed for sick people who cannot eat much, was developed.

A new principle in the treatment of disease was suggested by the discovery that an anti-vitamin can interfere with the activity of a female sex hormone.

Handkerchief was found to be the most

important single agent for spreading germs with the possible exception of bed-making, and common aerial disinfectants did not appear to kill these germs.

Lead to possible prevention of diabetes in man came from rat experiments which showed that there is a pre-diabetic period without symptoms after the pancreas is removed.

Good results with inhalation of penicillin and streptomycin dust were reported in treating colds, chronic sinusitis and bronchitis, and in the prevention of lung infections following surgery.

A new protein was discovered in blood which is the fifth factor in clotting and has been named ac-globulin.

Evidence was presented that brucellosis, also called undulant fever and Malta fever, can be transmitted through the air.

Q fever germs were recovered from raw milk indicating that this may be one mode of spreading infection.

New diagnostic test for hookworm and fluke-caused sickness called schistosomiasis was devised to give a quantitative estimate of the number of eggs discharged by the worms and flukes.

Radioactive iodine and fluorescein dye were combined to make diiodofluorescein, successfully used in brain tumor detection.

Yellow jaundice puzzle was partly solved with the discovery that there are two kinds of virus, IH causing infectious hepatitis and SH, homologous serum hepatitis.

Discovery of an enzyme in the body, named insulinase, which rapidly destroys insulin, was linked to the cause of diabetes.

Common male frogs were found as good as more costly tropical ones in detecting early pregnancy in women.

First cure by streptomycin of a rare nose disease called rhinoscleroma was reported.

A test for a curable high blood pressure, caused by tumors which release adrenalin into the blood, has been devised with the new drug piperidylmethyl benzodioxane, or 933F.

Two new vitamins, B₇ which may have an anti-anemia effect and B₁₂ believed to control pernicious anemia, were discovered.

A new vitamin in wheat which increases natural resistance to infection in mice was announced.

A ten-year national health program was announced, at the core of which was national health insurance for all people.

Galactose, a special sugar found in milk sugar, helps the body utilize fats, research with rats revealed.

A change in the structure of a body chemical called a lipid during the development of skin cancer in mice was announced.

Germs of infantile paralysis and several other diseases were found to get into the drinking water by back-siphonage in the plumbing system and to survive there from one to seven days even when the water is chlorinated to the extent most city drinking water is.

Indication that there is no danger of "poisoned water" from an atomic bomb burst in or near the city water supply after the water has gone through a modern filtration plant was made.

Giving tocopherol, or vitamin E, to diabetic patients was reported to reduce their insulin requirements.

Globulin which agglutinates sensitized sheep red blood cells was found in the serum

of patients suffering with active rheumatoid arthritis; this may supply a test for activity of the disease and also for differential diagnosis.

Level of urates in the blood of relatives of gouty people was found to be elevated and to be due to an inherited dominant characteristic.

The following new drugs were announced:

Aureomycin, cousin to streptomycin, for Rocky Mountain spotted fever, urinary tract infections, staphylococcus eye infections, Q fever, a virus-caused venereal disease called lymphogranuloma venereum, and virus pneumonia.

Bacillomycin, from a strain of the organism, *Bacillus subtilis*, for fungus infections.

Decapryn, an antiallergic agent, for hay fever, urticaria, angio-neurotic edema and bronchial asthma.

Dibromo procaine, from radioactive bromine, for a local anesthetic.

Dihydroergocornine, from ergot, for high blood pressure.

Khellin, extracted from a Middle Eastern fruit called *Amni visnaga*, for heart disease and bronchial asthma.

Parpanit, belladonna-like drug, for patients with shaking palsy following an attack of the brain disease encephalitis.

Phenosulfazole (trade name Darvisul) for infantile paralysis.

Phenurone, synthetic compound from phenobarbital, for epilepsy.

Phthalylsulfacetimide, a sulfa drug, for cholera, dysentery and other intestinal infections.

Polymyxin, from a bacillus commonly found in soil and water, to check germs causing plague, undulant fever, tularemia, certain types of meningitis and of blood poisoning and wound infections, bacillary dysentery, typhoid and paratyphoid fevers and many types of urinary tract infections.

SKF 538-a, synthesized complex quinine, for killing pain.

6257, sulfa drug, for cholera.

Trimeton, antihistaminic drug, for hay fever, bronchial asthma, allergic skin reactions, hives, and angioneurotic edema.

The Nobel prize in medicine was awarded to Prof. Paul Mueller of Basel, Switzerland, for his discovery of the insecticidal value of DDT.

PSYCHIATRY AND PSYCHOLOGY

Sleep Induced by Gases Relaxed Mental Patients

Mental patients became more relaxed and better able to face their problems after sleep induced by inhaling carbon dioxide mixed with oxygen.

Topectomy, operation cutting away certain areas of the frontal lobes of the brain, was reported to restore to health 20 out of 24 otherwise helplessly sick mental patients.

Ten-minute brain operation, transorbital lobotomy, combined with electro-shock was reported successful in treating some cases of schizophrenia and involutional depressions.

Dibenamine, a sympatholytic drug, was found to ameliorate the clinical condition of patients with marked anxiety states.

Delusions were banished and some mental patients helped to recovery by histamine, chemical believed to play a part in hayfever suffering.

New light was thrown on the fundamental nature of mental ills by studies indicating that patients have a defect which blocks messages from the brain and nervous system to the glandular system.

Operation of the adrenal glands in response to stimulation by the pituitary was found to be impaired in schizophrenics, a discovery which may lead to development of a physiological method of treating this mental disease.

Operation involving the removal of one of the convolutions of the frontal lobes of the brain (gyrectomy), sometimes used for epilepsy, was found to reduce the patient's general intelligence, particularly ability to define words.

Diet deficient in vitamin B complex produced slow and delayed mental abnormality in mental patients; changes due to more drastic reduction of vitamin B intake were more severe but recovery was more rapid than when the deficiency was more moderate.

Mental patients who undergo the brain operation lobotomy were reported to have impaired their ability to solve a maze puzzle.

International Congress on Mental Health projected plans for world wide reduction of mental disturbances which prejudice peace and sanity.

Inspection and rating system was set up to improve conditions in mental hospitals.

Ants were made neurotic by frustration when presented with a problem too difficult for them.

A brain wave was discovered that is apparently really a thought wave because it appears during mental work.

Real leaders of action in a democracy were found to be picked by common consent of their neighbors, not by election votes; they number about one to each 20 of population.

Psychosomatic illnesses such as stomach disorders, skin ailments and some kinds of heart trouble were found prevalent among criminals and traceable to friction in the home.

Sex criminals are more prejudiced against minority groups than are other criminals, study of the hostilities of inmates of a state prison showed.

That the intelligence of human mental defectives may be increased by glutamic acid was confirmed, but intelligence of rats was not improved by feeding them the drug.

Longevity is inherited, also ability to stay in good mental and physical health during old age, study of 2,000 twins over 60 indicated.

Reading ability of military officers was speeded up by special training from an average of 250 words a minute to approximately 600 words a minute, while comprehension remained the same.

Vision is blacked out for three-tenths of a second when a person winks, experiments revealed; most people have vision blacked out completely 11% of the time and at least partly blacked out about 20% of the time.

Man is able to wink some six months before birth, even though the wink serves no immediate practical purpose, studies on the human fetus showed.

Dark adaptation of the eyes of old men was found less than that of young men, but individual differences in loss are great

and independent of obvious structural defects.

Intermittent noise was found less effective than continuous noise as a mask for other sounds.

Noise of escaping steam heard at moderate loudness in one ear was found to make conversation heard with the other ear seem louder and more distinct.

Salt may taste salty, bitter or sweet, depending upon the mobility of its ions rather than upon its composition as a salt, it was observed.

An odor-free double glass house was constructed for testing a person's ability to detect smells, the observers being required to bathe and dress in an odorless envelope before entering.

Time was slowed by suggestion during a hypnotic trance so that within a few seconds incredible tasks were accomplished in the mind.

An automobile driver was put into a hypnotic trance, induced by monotony while at the wheel, indicating that some accidents may be caused by drivers hypnotized

by the monotony of the highway.

A cringing dog, smallest and most submissive of the litter, was made to assert himself by giving him a dose of alcohol.

Behavior while tracing a maze seen only reflected in a mirror was found to reveal emotional instability.

Males were found to be more emotional than females.

Rhythm of the heart beat is affected by emotional disturbances, so that it seems to skip a beat, graphic tracings of the electric current produced by the heart's contraction showed.

Pigeons were taught to be "superstitious," or to repeat meaningless rituals they happened to be engaged in when given food in a hungry state.

Fish were found capable of remembering which way to turn for food even after the food had disappeared from their sight, and of differentiating between the scents of underwater plants and various samples of water.

Science News Letter, December 18, 1948

GENERAL SCIENCE

Ten Top Science Advances

➤ THE TEN most important science advances made during 1948, as picked by Watson Davis, director of Science Service, are:

1. Creation artificially in world's largest cyclotron of subatomic particles, called mesons, that may unravel mystery of composition of matter.

2. Achievement by jet plane of speeds well beyond the barrier of the speed of sound, opening a new air age.

3. Demonstration that a single penicillin pill, swallowed a few hours after exposure, can prevent one of the two major venereal diseases, gonorrhoea.

4. Synthesis of glycerine from petroleum, making its commercial production independent of fat supply.

5. Discovery of aureomycin and poly-

myxin, drugs effective against diseases unconquered by sulfa drugs and other antibiotics.

6. Completion of the 200-inch world's largest telescope on Mt. Palomar, Calif., seeing deepest ever into cosmic space.

7. Authorization of two gigantic atom smashers, to produce three to five years hence sub-atomic "bullets" rivaling cosmic rays of three to seven billion electron-volts, vastly extending scope of nuclear physics.

8. Commercial production of "low-temperature" rubber, giving chemical rubber superiority over natural rubber.

9. Discovery of the fifth moon of the planet Uranus, with 30-hour orbit.

10. Use of neutrons to explore the structure of matter by production of diffraction pattern photographs.

Science News Letter, December 18, 1948

PHYSICS

Zero Isn't Freezing Point

➤ WATER does not freeze at freezing-point but at a considerably lower temperature. Really pure, clean water, free of particles that might serve as nuclei for starting-points of freezing, does not begin to crystallize into ice at zero Centigrade but at zero Fahrenheit or a little below it.

This upset of one of the standard "facts" of all physics books comes as the result of a series of very carefully conducted experiments in the research laboratories of the General Electric Company.

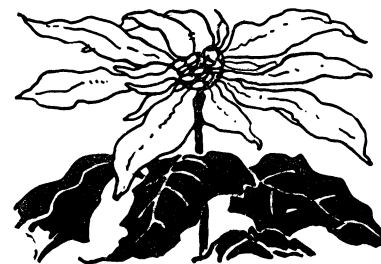
They are reported in *SCIENCE* (Dec. 10) by Dr. Robert Smith-Johannsen.

Carefully prepared, absolutely clean water was chilled in a specially built apparatus, and the first formation of ice was detected

through the use of polarized light. Four sets of experiments produced first ice at temperatures ranging from 18 to 20 degrees Centigrade below the traditional freezing-point, or from about one-half degree to four degrees below zero on the Fahrenheit scale.

Various powdered substances, ranging from graphite to pepsin, were added to the water as freezing nuclei. Even then nothing was found that would cause water to freeze at the "freezing-point." Most of the powders did raise the freezing temperature of the water, but none got it closer than about seven degrees below zero Centigrade, or approximately 20 degrees above zero Fahrenheit.

Science News Letter, December 18, 1948



Poinsettia

➤ CHRISTMAS wreaths and greens are appearing in the shops, and florists are displaying poinsettias. Odd, exotic flowers, from warm lands far removed from the Germanic traditions of our typical Christmas celebrations, nevertheless their bright red flower-heads and shining waxy-green leaves have captivated popular imagination and established themselves as part of the modern Christmas scheme.

To anyone who looks at all carefully at a flower, the poinsettia must be a rather puzzling object. The structure is not at all like that of the flowers we are used to, but looks more like a group of brightly colored leaves on top of a closely-branched twig. As a matter of fact, that is exactly what it is. The red objects that at first look like petals are simply red leaves, very little different, except in color, from the green leaves of the rest of the plant. The real flowers are the tiny, nubbing, club-shaped objects clustered at the center. The poinsettia, then, is a whole group of small flowers surrounded by a collar of red leaves.

The poinsettia is not the only member of its family that does this sort of thing. Its tribe, the euphorbias, rather make a specialty of surrounding their inconspicuous flowers with showy leaves. The old-fashioned ornamental called "snow-upon-the-mountain", with its striking white-striped leaves at the top of the plant, is another euphorbia.

There is an old-world euphorbia that is prominent in the Christmas tradition of England. This is the famous Glastonbury thorn, reputed to be the staff of Joseph of Arimathea which he planted on the site of the Glastonbury Abbey, and said to blossom only at Christmastide. This is a thorny euphorbia that is plentiful in Palestine and elsewhere in the Mediterranean region.

Science News Letter, December 18, 1948