

Science Strides Forward During 1929

General Science

Heavens, Air, Earth and Sea Yield Their Secrets

In the air, under sea and on the surface of the earth, man's searchings into the mysteries of the universe have progressed during 1929.

The earth was circumnavigated by airship for the first time. Airplanes flew in the antarctic, one of them reaching the South Pole. The depths of the sea yielded new secrets. Telescopes reached farther and more searchingly into the depths of the universe. Less spectacular but perhaps more important to posterity were investigations on life, chemistry and the constitution of matter conducted in quiet laboratories.

Some of the most important and most interesting events in science during 1929 were:

Aeronautics

The famous plane, "Question Mark," made a record refueling flight of 150 hours, 40 minutes, and 15 seconds, only to lose it to the "Fort Worth" when the latter flew for 172 hours, 32 minutes and one second; then to a Buhl cabin sesquiplane flying 246 hours, 44 minutes; then to the "St. Louis Robin" flying 420 hours, 21 minutes, or over 17 days.

Flying Officer H. R. D. Waghorn won the Schneider Trophy Race at the Isle of Wight, England, when he attained an average flying speed of 328.63 miles per hour, and later established a world's speed record of 357.7 m.p.h. with the same plane.

Lieut. Apollo Soucek attained an altitude of 39,140 feet, setting a world's record for land planes, and the same month the record was broken by Willie Neunhofer, a German, when he reached 42,123 feet.

Commander Richard Byrd and an airplane party flew to the South Pole and back from his base in the antarctic where his expedition spent the antarctic winter after earlier exploratory flights.

Capt. Sir Hubert Wilkins and Lieut. Ben Eielson made exploratory airplane flights in the antarctic that showed that Graham Land is an island separated from the main antarctic continent.

An all-metal dirigible, the "flying tin can," or more properly the ZMC-2 was completed for the U. S. Navy.

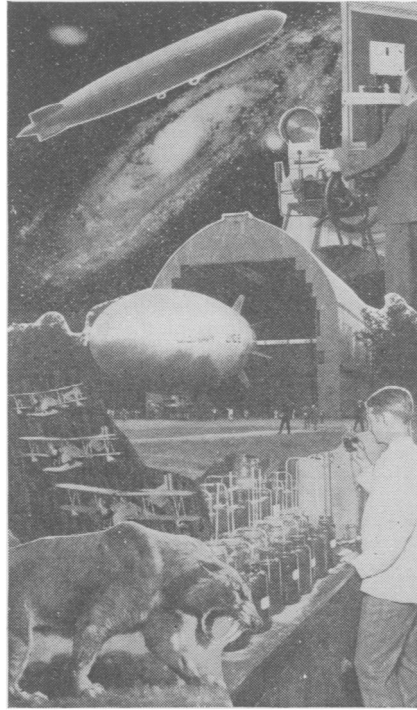
The possibility of flying safely in fog was demonstrated by Lieut. James H. Doolittle for the Daniel Guggenheim Fund for the Promotion of Aeronautics, when he made a flight and successful landing depending entirely upon instruments.

A record for passenger-carrying in aircraft was made by the German giant, "Do X," a Dornier seaplane which carried 169 persons over Lake Constance.

The British airships R-100 and R-101, the largest dirigibles now in existence, were completed and given several test flights.

The construction of the world's largest airship, the ZRS-4, was begun at Akron, Ohio, on November 7.

Successful flights were made with an airplane powered with an American built light-weight Diesel aircraft engine.



A radio beacon was used to guide a pilot flying "blind" in a fog in an experiment to test the device conducted by Dr. J. H. Dellinger, chief of the radio section of the U. S. Bureau of Standards.

The Bureau of Standards discovered that a coating of pure aluminum on duralumin protected the latter from corrosion, making it much more useful in aircraft.

The Guggenheim Safe Aircraft Competition was closed and many interesting devices for promoting air safety were proposed.

The application of ethylene glycol for the cooling of airplane engines made possible the improvement of liquid-cooled engines.

An endurance flight record for women was set by Miss Bobbie Trout when she flew for 17 hours and 5 minutes, but it was soon to be superseded by the flight of Mrs. Louise McP. Thaden, lasting 22 hours and 3 minutes, and by the solo flight of Miss Elinor Smith which lasted 26 hours and 20 minutes.

An altitude record for seaplanes was set by Lieut. Apollo Soucek when he reached 38,560 feet.

An unofficial altitude record for women was set by Mrs. Phoebe Omlie who reached 25,400 feet.

Pilot charts of the upper air over the North Pacific Ocean were published monthly for the use of aviators by the Hydrographic Office.

Airplanes were used to study the flight habits of the pink boll worm moths, suspected of flying into this country from Mexico.

The first round-the-world flight by dirigible was accomplished by the "Graf Zeppelin," with Capt. Hugo Eckener in command.

The Junkers "G 38," said to be the world's largest land plane, completed a successful flight; it is a close approach to a "flying wing," having engines as well as passenger accommodations within the wing.

A rocket-propelled airplane, the invention of Fritz von Opel, was successfully flown in Germany.

A new "rescue vest" was invented, to prevent drownings when airplanes or parachutes fall into the water and trap aviators.

Plans were made for a 1930 flight over arctic regions by the Graf Zeppelin carrying a scientific exploratory party headed by Nansen.

An hourly weather broadcast for aviators along the leading airways was inaugurated by the U. S. Weather Bureau, with a half-hourly service between certain terminal points.

Anthropology and Archaeology

Two human skulls and other bones were found associated with the remains of American camel and other Ice Age animals in Conkling Cavern, N. M., raising the question of whether the men and animals were contemporaries.

Relics of the oldest known prehistoric ancestors of the Eskimo were dug out of the frozen soil of St. Lawrence Island in the Bering Sea by an expedition of the Smithsonian Institution.

Preservation and scientific study of the earthen mounds built by prehistoric Indians in the middle west were urged at an archaeological conference especially called by the National Research Council.

New Mound Builder cultures, indicating that some of the mound-building Indian tribes had customs not heretofore recognized, were unearthed at Quincy, Illinois, by an expedition from the University of Chicago and near Joliet by George Langford.

Discovery of ruins showing the type of house built by the Basket Maker Indians who preceded the Pueblos in the Southwest was reported by Dr. F. H. H. Roberts, Jr., of the Smithsonian Institution.

Traces of Indian culture of the Basket Maker type were found for the first time as far east as Oklahoma, Dr. E. B. Renaud of the Colorado Museum of Natural History reported.

Dr. A. E. Douglass, astronomer of the University of Arizona, and Neil M. Judd of the National Geographic Society determined the age of Pueblo Bonito and other pueblo ruins by means of tree-ring counts on beams used in the buildings.

The Chumash Indian village of Muwu, near Los Angeles, was excavated by a Los Angeles Museum field party, revealing important relics of primitive prehistoric life along the West Coast.

Col. and Mrs. Charles A. Lindbergh, cooperating with the Carnegie Institution of Washington, made air surveys over southwestern canyons and over tropical jungles once inhabited by the Mayas, in order to demonstrate usefulness of aviation as an aid to American archaeology.

The Aztec pyramid at Tenayuca, pronounced the most (*Turn to next page*)

important Aztec site known in Mexico, yielded cremation burials with pottery, ornaments and weapons, as the Mexican Direction of Archaeology completed its work there.

A terrace decorated with stone skulls was found by Mexican archaeologists at Chichen Itza, Yucatan; it may prove to be the long-sought burial place of the Maya kings.

An expedition was sent out from Harvard University and the Carnegie Institution of Washington to investigate the possibility that some disease wrecked the Mayan civilization of Yucatan.

Excavations at three ruined cities of the Mayas in British Honduras were conducted by the Field Museum, yielding new knowledge of burial customs, pottery types, and dentistry of this vanished culture.

Discovery of an Incan cemetery, containing graves of Indian nobility with many unusual pottery vessels, tools and copper and stone and some gold ornaments, was reported from northern Chile.

Gerrit S. Miller, Jr., of the U. S. National Museum, published a paper questioning the position of Java Man and Piltown Man as true ancestral forms of existing human races.

The first Neanderthal skull to be brought to the United States, an infant's skull from Le Moustier, France, was added to the collections of the Field Museum of Natural History at Chicago.

The existence of men in Ireland as far back as the late Pleistocene period of the Old Stone Age was demonstrated by E. K. Tratman of the University of Bristol.

The bones of the famous medieval scholar Erasmus were discovered at Basel, Switzerland.

Excavations at the Roman fortress at Caerleon, in Wales, progressed to a point at which the fortress can be tentatively dated as built between 70 and 80 A. D., and its career traced down to the fourth century.

Progress on the excavation of a complete Swedish Stone Age village in the swamps of Dag was announced, with evidences of road building, defense plans, and home life discovered.

Ruins of the Church of St. John of the Studium, most ancient of Christian churches in Constantinople, were excavated by a British expedition.

A Russian expedition, excavating at Samarkand, unearthed in the deepest level touched some clay objects suggesting contact between the Roman Empire and this eastern center.

Relics of men who inhabited Czechoslovakia between 3,000 B. C. and 300 A. D. were unearthed by a joint expedition of the University of Pennsylvania Museum and the Peabody Museum of Harvard.

Ancient Roman colony of Buthrinto, in Albania, excavated by an Italian expedition with the discovery of a temple to Esculapius, a Greek theater, and art works.

Draining Lake Nemi exposed a sunken Roman galley, believed to have been a pleasure ship of the Emperor Caligula.

A Logan Museum expedition to North Africa found utensils and skeletons indicating the presence of a people closely related to the Mediterranean race during the Aurignacian period of the Old Stone Age.

Excavations at Kish by the Field Museum-Oxford University Joint Expedition to Mesopotamia penetrated to virgin soil, and enabled the field workers to trace seven stages of history at Kish, which they estimated to extend from 4200 B. C.

Renewed excavations at Beth-Shan by an expedition from the University of Penn-

sylvania Museum revealed a great brick-covered altar and other evidences of worship at the Temple of Mekal, 3,500 years old.

A new death pit containing the bodies of 45 sacrificial victims was unearthed at the royal cemetery of Ur of the Chaldees by the archaeological expedition of the University of Pennsylvania Museum and the British Museum.

Evidence that an Assyrian colony at one time occupied the site of the Mound of Alishar was unearthed by the Hittite Expedition of the Oriental Institute, and two cuneiform tablets taken out of the level of Assyrian occupation are expected, when deciphered, to date the discovered objects.

Royal tomb of an unknown dynasty, of about the thirteenth century B. C. was excavated in northwest Syria by an expedition from the Institut de France, and while robbers had long ago plundered the place, the furnishings which remain are rich and the discoveries shed light on relations between ancient kingdoms of the Near East.

Retiring President 1929



DR. HENRY FAIRFIELD OSBORN, who was President of the American Association for the Advancement of Science during 1928.

The archaeological and paleontological work of the American Museum of Natural History in Asia was suspended because of interference by Chinese authorities.

Remains of a temple dedicated to Rome and Augustus were discovered during excavations at Ostia, the port of Rome, and some statuary of Hadrian's time revealed.

Astronomy

Four comets were discovered during the year: by Schwassmann and Wachmann, in Germany; by Neujmin, in Russia; by Forbes, in South Africa; and by Carpenter, in Arizona. All were new comets, with the possible exception of the last, as only one observation was obtained of it and its orbit could not be computed.

An eclipse of the sun was visible in southeastern Asia on May 9, to which astronomers travelled from all parts of the world. Cloudy weather largely interfered with the plans, though a party from Swarthmore College to Sumatra had ex-

ceptionally good fortune and secured a number of good photographs.

Preliminary work was begun and a tentative design accepted for the giant 200-inch telescope for the California Institute of Technology, an instrument twice the size and ten times the power of the present world's largest at the Mt. Wilson Observatory.

A fifty foot interferometer was installed at Mt. Wilson Observatory and during the coming year is expected to allow the measurement of the diameters of more gigantic stars.

A 60-inch reflecting telescope for the South Africa station of the Harvard Observatory was finished by J. W. Fecker of Pittsburgh; it will be the largest in the southern hemisphere.

The ultraviolet radiation from the sun was found to be increasing with the increase in the number of sun spots by Dr. Edison Pettit of the Mt. Wilson Observatory in California.

A number of elements hitherto not known to exist on the sun were demonstrated spectrographically by Dr. Charles E. St. John of the Mt. Wilson Observatory, California.

Dr. Harlan T. Stetson, astronomer of Ohio Wesleyan University, and Dr. G. W. Pickard, Massachusetts radio engineer, announced the results of studies showing that reception of Chicago radio broadcasts in Boston was worse as the number of sun spots increased.

Though the sun spot maximum was supposed to have passed in 1928, Dr. Harlan T. Stetson predicted a still greater display in the autumn of 1929. A great cluster of spots in November and December verified this prediction.

A daily change of latitude in a place on the earth, dependent upon whether the moon is rising, setting, or in the middle of its passage across the sky was discovered by Dr. Harlan T. Stetson, possibly indicating that the moon causes a deviation in the path of the earth.

Using special plates that are made sensitive to infra-red light by a dye called neocyanin, Harold D. Babcock, Mt. Wilson Observatory physicist, succeeded in photographing spectra of the sun twice as far beyond the visible red end of the spectrum as before.

The temperature of the moon was measured by Dr. Seth B. Nicholson of the Mt. Wilson Observatory during an eclipse, and it was found to vary from 265 degrees Fahrenheit in the sun to 196 degrees below zero when not illuminated.

Measurement of the speed with which the moon cooled during an eclipse resulted in the discovery by Dr. Paul S. Epstein, of the California Institute of Technology, that that planet consists of some very porous material similar to volcanic ash on the earth.

Experiments with an "artificial planet" consisting of a glass bulb filled with gas and some reflecting object, indicated to Prof. John Q. Stewart and Serge A. Korff that Mars may have more oxygen than has been supposed.

Strange bead-like spots appeared on the surface of Jupiter, indicating some immense turbulence on the planet.

The use of a calculating machine to compute the positions of the moon for many years to come was begun by the British Nautical Almanac Office, under the direction of Dr. L. J. Comrie.

The solar system is speeding toward the constellation Draco, or the Dragon, Prof.

Dayton C. Miller of the Case School of Applied Science announced.

The fastest known thing in the universe, a spiral nebula traveling away from the earth at the speed of 2,348 miles a second, was discovered by Dr. Milton L. Humason.

Our galaxy of stars has probably developed from a system of "super-universes," or galaxies of galaxies, Dr. Harlow Shapley concluded as a result of his astronomical studies at Harvard College Observatory.

Progress was made toward a consideration of the international adoption of a thirteen-month year, with months of 28 days each.

Biology

The Mediterranean fruit fly, one of the most destructive of all insect pests, was discovered in Florida in April; over \$4,000,000 has already been spent in an effort to eradicate it and an appropriation bill for \$15,000,000 more is now before Congress.

The past year was the worst forest fire year since 1910; the damage to National forest land was about \$5,000,000, and more than 22 fire fighters lost their lives; but due to improved methods of fire control the area burned over in the National forests was kept down to about 937,000 acres or less than half that burned in 1919.

That evolutionary changes may be due to the action of radiations from the earth on the germ cells of organisms was suggested by Dr. E. B. Babcock and Dr. J. L. Collins of the University of California.

Mutations, or sudden evolutionary changes, occur in organisms exposed to X-rays in proportion to the number of negatively charged electrons reaching the organisms, in experiments performed by Dr. Frank Blair Hanson of Washington University, St. Louis.

Through a study of 111 pairs of twins, Dr. Madge Thurlow Macklin, of the University of Western Ontario Medical School, found that one of a pair might be born with defects such as Mongolian imbecility, while the other was normal, showing that such defects are probably not due to prenatal conditions.

Experiments on pigeons conducted by Dr. Oscar Riddle of the Carnegie Institution of Washington established the fact that abnormally sized glands can become hereditary.

Arrangements were completed for the establishment of an ape colony in Florida to permit the study of these animals under conditions as nearly natural as possible.

Charles Darwin's house at Down, England, was dedicated as a scientific shrine.

The Thirteenth International Physiological Congress met in Boston during August.

Living specimens of an almost extinct and very valuable species of rubber tree, *Euphorbia intisy*, were brought back to the United States from Madagascar; they are being grown in the greenhouses of the Department of Agriculture in Washington and in the Southwest.

A new wilt disease which causes cotton plants to lose leaves and bolls was reported by Dr. O. D. Sherbakoff of the Tennessee Agricultural Experiment Station.

Larch canker, a serious disease threatening several valuable conifer timber species, was discovered in Massachusetts and Rhode Island; the U. S. Forest Service destroyed all discoverable traces of it before the end of the year.

A joint expedition of Yale University and the Carnegie Institution of Washington went to Belgian Africa to study the mountain gorilla.

Geranium flowers and leaves were found to be a deadly poison to the Japanese beetle by Charles H. Ballou of the U. S. Department of Agriculture.

Corn borer research conducted by the U. S. Department of Agriculture cost the Government \$100,000.

A live okapi was successfully transported from Africa to Belgium by a missionary.

A joint expedition of Columbia University and the American Museum of Natural History went to Africa to study gorillas and the unshod feet of the natives.

A new record in long-distance bird flights was established by the finding of a fledging Arctic tern in Natal, South Africa, whither it had flown from Labrador.

Legislation aiming at the conservation of whales was passed by Norway, the leading whaling nation.

Chemistry

The Nobel prize in chemistry for 1929 was awarded to Dr. Arthur Harden, of

of the research laboratory of the General Electric Co.

The third award of the American Chemical Society's "Priestley Medal Award" was given to Francis P. Garvan for the work he has done to further chemical research.

The International Committee of the Red Cross at Geneva offered a prize of 10,000 Swiss francs for a practicable means for detecting minute amounts of mustard gas in the air.

An isotope, or chemical twin, of the element carbon was discovered by Dr. Arthur S. King of the Mt. Wilson Observatory and Dr. Raymond T. Birge of the University of California.

Two isotopes, or chemical twins, of oxygen were discovered by Prof. W. F. Giaque and H. J. Johnston of the University of California.

Hydrogen was proved to exist in two molecular forms, orthohydrogen and parahydrogen, by a young German chemist, Dr. K. F. Bonhoeffer.

A new helium production plant near Amarillo, Texas, brought about the conservation of the largest helium-bearing natural gas field known and the assurance of ample supplies at half the former cost of this rare non-inflammable gas for the operation of military dirigibles.

The respiration ferment, described as ruling the organic world, was made artificially in the laboratory by Prof. Hans Fischer of Munich, this being one of the most important contributions ever made in biochemistry.

A semi-commercial factory for the extraction of xylose from cottonseed hulls was built and put into operation by the U. S. Bureau of Standards in cooperation with the Alabama Polytechnic Institute, the University of Alabama and the Federal Phosphorus Co. of Anniston, Ala.

A conference was held in Washington by the National Fire Protection Association in cooperation with the Departments of Agriculture and Commerce to study the problem of spontaneous combustion; the theory was advanced by Dr. Charles A. Browne that the mysterious phenomenon was due to both chemical and biological processes.

A compound about 300 times as sweet as sugar was evolved from corn cobs by Dr. Henry Gilman and A. P. Hewlett, organic chemists at Iowa State College.

A blow-torch of the oxy-hydrogen type, but using powdered aluminum instead of a combustible gas, was invented by Dr. Frank M. Strong of Syracuse University.

The cause of "winter damage" to fabrics laundered in the winter was discovered by the U. S. Bureau of Standards to be the presence in the atmosphere of sulphur dioxide from winter fires, and the use of calcium bicarbonate in the final rinsing water materially reduced the loss.

In tests made at the Department of Agriculture's full-size gas-producing unit it was demonstrated that gas produced from straw may be used for lighting and heating and as a motor fuel.

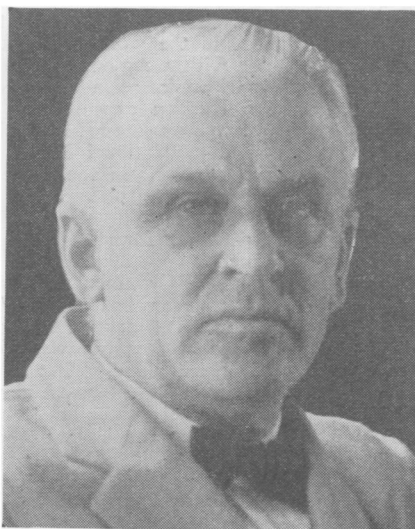
Engineering

The largest earth-filled dam in the world, on the Saluda river, South Carolina, neared completion.

Foundation work was begun on a 17,710-foot vehicular bridge across Hell Gate and East river at New York to consist of four main spans over navigable waters, one being a 1,380-ft. suspension, and to have outlets in Manhattan, Bronx and Queens.

America's longest (*Turn to next page*)

President 1929



DR. ROBERT ANDREWS MILLIKAN, who is President of the American Association for the Advancement of Science for the Des Moines meeting.

London University, and Prof. Hans von Euler, of the Stockholm High School, for their work on yeasts and sugars.

The Royal Society's highest honor in chemistry, the Davy Medal, was awarded Prof. G. N. Lewis of the University of California for his contributions to classical thermodynamics and the theory of chemical valence.

A paper on "Light Structural Alloys" presented several years ago won for Bradley Stoughton the Grasselli Medal for 1929.

Dr. Herbert H. Dow, for achievements in the fields of bromine, alkalis, magnesium and magnesium salts, and phenols, was awarded the Perkins Medal for 1930 by vote of a committee representing the Society of Chemical Industry, the American Chemical Society, American Electrochemical Society, American Institute of Chemical Engineers, and the Societe de Chimie Industrielle.

The medal of the Charles Frederick Chandler Foundation was awarded to Dr. Irving Langmuir, president of the American Chemical Society and assistant director

railroad tunnel, eight miles in length, was opened on January 12 in the Cascade range of mountains, about a hundred miles east of Seattle, Washington.

The successful operation of the "telephone typewriter," a printing machine working over a telephone circuit, was reported by R. D. Parker of the Bell Telephone Laboratories.

Construction between Detroit and Windsor, Canada, of America's third great subaqueous vehicular roadway with a length from portal to portal of 5,135 feet and involving the application of engineering principles new to this country, got well under way.

The German liner "Bremen," fastest merchant ship afloat, went into service; completion of her sister ship, the "Europa," was delayed by fire.

The opening of the Monte Oro Tunnel at Lake Garda, Italy, marked the completion of one of the most difficult engineering feats in the history of hydro-electric engineering. The 3½-mile shaft will convey the waters of Lake Garda through the solid rocks of the Alps to provide electric power for a large part of the rich industrial district of northern Italy.

Plans were begun for a vehicular tunnel under East river at 38th street, New York City.

Construction rapidly advanced on the 90,000 kilowatt Diablo Canyon hydroelectric plant in Washington, a part of the Skagit river development, which will ultimately be one of the two greatest water power projects in America.

Work progressed on the huge suspension bridge across the Hudson river from New York City to the Palisades, which will have a central span 3,500 feet long.

A 208,000 kilowatt, cross compound turbine generator, the largest of its type so far constructed, was installed in the State Line power plant, Indiana.

Construction advanced on the new Kill van Kull bridge between New York City and New Jersey, which will have a 1,675-foot steel arch, the largest in the world.

U. S. Army engineers pushed work on great flood control construction in the Mississippi valley.

The announcement of the details of the new 11-inch-gun German "surprise ships" of the Ersatz-Preussen class created a sensation in naval and engineering circles.

The choke coil, used for many years to protect electrical transmission systems from lightning, was found to be of little value.

Geology and Geography

The "Carnegie," non-magnetic yacht of the Carnegie Institution of Washington, was destroyed by fire following a gasoline explosion while lying in Apia harbor, Samoa; her commander, Capt. J. P. Ault, was killed.

The force of gravity over the Caribbean Sea, Gulf of Mexico and South Atlantic was measured through the utilization of the U. S. Navy submarine S-21 by scientists of the Carnegie Institution of Washington and Dr. Vening Meinesz of Holland.

Over forty earthquakes of sufficient severity to be recorded at a number of seismograph stations occurred during the year and the epicenters were located immediately by Science Service, collaborating with the U. S. Coast and Geodetic Survey and the Jesuit Seismological Association.

An earthquake centering under the sea south of Newfoundland on November 18 shook the coast as far south as New York, broke transatlantic cables in 22 or more places, and caused the loss of 26 lives and

several million dollars of property by tidal wave.

Two severe hurricanes and over 165 tornadoes brought distress during the year.

A disastrous storm struck England and the Continent in early December, killing more than a hundred, stranding a number of ships and producing the lowest atmospheric pressure recorded in Europe in half a century.

Mt. Pelee, on Martinique, was in eruption for the first time since the great outbreak that destroyed hundreds of lives in 1902.

Santa Maria volcano in Guatemala erupted, causing the loss of many lives and the destruction of a number of towns.

A minor eruption of Vesuvius occurred, and a large lava flow poured forth from a side crater of Etna.

The volcano Kilauea broke into spectacular eruption on February 20, while later in the year several volcanoes in the Aleutian Islands erupted.

Giant crystals of beryl, 12 to 14 feet long, were discovered in a quarry in Maine, and an effort is being made to preserve them as a natural monument just as they stand.

Verchojansk, in Siberia, long reputed to be the coldest place in the world, now has to share that honor with a region Oimekon, near the Sea of Okhotsk, as a result of studies made by a Russian expedition.

A geyser museum was opened at Old Faithful, in Yellowstone National Park.

A Scottish National Park in the wildest part of the Highlands was planned by a group of Scottish societies.

A great new petrified forest was discovered in Montana.

A number of previously unknown features of the Pacific ocean bed were discovered by the "Carnegie," several on the voyage to Samoa, when the ship was destroyed. These included three ridges, the highest 9,800 feet above the surrounding ocean bed; two deeps, the deepest 28,400 feet deep; and two peaks, the highest 9,800 feet high.

Medicine

A poisonous sugar, the only sugar known that has a toxic reaction, was discovered in tuberculosis bacilli by Dr. R. J. Anderson, Yale University chemist.

A lifeless compound, extracted from mass cultures of tuberculosis germs, produced bodily changes like those of tuberculosis in experiments conducted by Drs. Florence R. Sabin, Charles A. Doan and C. E. Forkner, of the Rockefeller Institute for Medical Research.

Dried hog stomachs were discovered by Drs. C. C. Sturgis and Raphael Isaacs of the University of Michigan and Dr. E. A. Sharp of Parke, Davis and Co., to have the same effect in the treatment of pernicious anemia as the raw liver now widely used.

The Imperial Cancer Research Fund reported that they could find no connection between malignant growths and dietetic deficiencies.

An explosion at the Cleveland Clinic caused the death of a number of patients by nitrous oxide from stored photographic negatives; and in consequence, hospitals and clinics all over the country took steps to eliminate the hazard in stored X-ray negatives and regulatory legislation covering this matter was initiated in various cities and states.

Pepsin, the digestive enzyme, was crystallized and isolated by Dr. J. H. Northrop of the Rockefeller Institute for Medical

Research laboratories at Princeton, N. J.

Prof. John J. Abel, who was the first to isolate pure crystalline insulin, made the discovery that only a part of the complex insulin molecule is necessary to combat diabetes.

That liver contains a substance which will reduce the concentration of sugar in the blood, as insulin does, was reported by Drs. Harry Blotner and W. P. Murphy of the Peter Bent Brigham Hospital, Boston.

During the winter of 1928-1929 there occurred an epidemic of influenza which, though mild as compared with the epidemic of 1920 and the pandemic of 1918-19, reached most of the countries for which mortality statistics are available.

An abnormally large number of cases of cerebrospinal meningitis occurred in the United States, the outbreak was traced to an origin in the Orient.

An outbreak of smallpox occasioned considerable alarm in England during the spring.

The work on the regular decennial revision of the U. S. Pharmacopoeia was begun.

Dr. Oliver Kamm, research director of Parke, Davis and Co., was awarded a prize of \$1,000 by the American Association for the Advancement of Science for his research in isolating the hormones of the pituitary gland.

The Nobel Prize in medicine for 1929 was awarded to Prof. Christian Eijkman of the University of Utrecht and to Sir Frederick Gowland Hopkins of the University of Cambridge for their researches on the vitamins.

Plans were made, committees were formed and work begun on "the most sweeping study of child welfare that has ever been made in all the world," the results of which will be presented at the White House Conference on Child Health and Protection in 1930.

Mme. Marie Curie, co-discoverer of radium, visited America to attend scientific functions and to receive a gift for the purchase of a gram of radium for the Warsaw Cancer Hospital.

The International Society for the Prevention of Blindness was formed at a conference at the Hague in September.

A department of the history of medicine, the first one in this country, and the allied William H. Welch Medical Library were dedicated at the Johns Hopkins University.

The Wilmer Ophthalmological Institute of the Johns Hopkins University, the only such center in the country having its own building for treatment, research and teaching in diseases of the eye, was dedicated at Baltimore.

The narcotics division of the U. S. Public Health Service was established in February.

Report was made by Dr. Isadore S. Falk of the University of Chicago that he had isolated a group of micro-organisms that he believes were the causative agents of influenza during the 1928-29 epidemic.

A method of immunizing dogs against distemper by double inoculation was developed by Drs. P. P. Laidlaw and G. W. Dunkin of London.

Physics

The Nobel prize in physics for 1928 was awarded to Prof. O. W. Richardson of King's College, London, for his researches in the branch of physics which he christened "thermionics." The 1929 physics prize was awarded Prince Louis Victor de Broglie, of Paris, for his studies in wave mechanics.

Artificial lightning (*Turn to page 400*)

Science Strides Forward—Continued

of 5,000,000 volts was produced in the experimental lightning laboratory of the General Electric Co. at Pittsfield, Mass., by F. W. Peek, consulting engineer.

A new kind of structure within the crystals of metals and other substances, intermediate between the molecule and the crystal structure, was postulated theoretically by Dr. Fritz Zwicky of the California Institute of Technology and verified experimentally by Dr. Alexander Goetz of the same institution.

Cosmic rays from outer space twice as penetrating and half the length of those previously discovered were announced by Dr. R. A. Millikan of the California Institute of Technology.

Prof. A. S. Eddington, astronomer at Cambridge University, developed a theoretical formula for the charge of the electron, which is expected to have important results.

Albert Einstein brought out his "Unified Field Theory."

Preliminary work was started on a trans-Atlantic cable to carry telephone messages, as a supplement to the radio telephone service. This is made possible by a new cobalt steel alloy, called "perminvar" and a new insulating material called "paragutta," both developed by the Bell Telephone Laboratories.

Photoelectric cells were used for measuring colors in the way they will affect the human eye by Dr. Clayton H. Sharp, of the Electric Test Laboratories in New York.

A clock of extreme accuracy was developed by Dr. W. A. Marrison of the Bell Telephone Laboratories; it uses an electrically driven vibrating quartz crystal in-

stead of the conventional pendulum for regulating its motion.

The broadcasting of weather maps by the Fultograph process was begun in Europe.

Motion picture film twice the ordinary width, making possible a screen picture the full width of an ordinary stage without loss of detail, was introduced by the Fox Film Co. Several other producers were experimenting with similar film.

A special research laboratory for the study of sound motion picture problems was opened by the Bell Telephone Laboratories.

A method of making stereoscopic motion pictures that seem to possess depth from any position and not requiring any special viewing apparatus between the subject and the screen was described by Dr. Herbert E. Ives of the Bell Telephone Laboratories.

A film phonograph that records sound on film as in the talking movies, and will play for several hours on a single roll of film, was demonstrated by Dr. G. H. Hewlett, of the General Electric Co.

Psychology and Psychiatry

Experiments in the progress of human development conducted with twin babies at the Yale Psycho-Clinic indicated that babies do not begin to practice new activities until their nerve structures are ripe for them.

No particular section of the cerebral cortex has a particular duty so far as the learning process or the retention of habits is concerned, was demonstrated by experi-

ments with rats conducted by Prof. K. S. Lashley of the Institute of Juvenile Research.

Emotional states of an individual may be charted in cycles, Rex. B. Hersey, of the University of Pennsylvania, reported.

First-born children are more likely to be problem children than are others in the family, Dr. Curt Rosenow of the New York Institute for Child Guidance concluded as a result of his studies.

A psychological test designed to eliminate applicants for medical courses who would fail was experimentally tried on students at twenty-two medical schools and proved more predictive of ability than present methods of choosing students, Dr. Fred A. Moss, of George Washington University, reported.

The Ninth International Congress of Psychology met at New Haven in September.

A "Psychological Register," containing not only the names and addresses of prominent psychologists throughout the world but also a bibliography for each, was published by the Clark University Press.

Yale University broke ground for a \$2,000,000 Institute of Human Relations, which will provide a setting for the study of children and adults from mental, social and physical angles.

A National Institute of Psychology for the study of basic problems in psychology was organized in Washington under the

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leadership of Dr. Knight Dunlap of the Johns Hopkins University.

Evidence of the effect of physical disease on the mind was presented by Dr. C. A. Neymann, of Chicago, who found that temperaments of tuberculosis patients undergo changes.

Mental tests given to drug addicts by Prof. R. W. Paynter, of Long Island University, showed that such individuals do not go to pieces mentally and nervously if suddenly deprived of the drug, as has generally been believed.

The Thomas W. Salmon Memorial, in honor of the eminent psychiatrist who died in 1927, was organized in the form of a series of lectures to be given annually.

Radio and Television

The Federal Radio Commission assigned special bands, each 100 kilocycles wide, for radio television, and a number of stations made regular broadcasts.

Television in colors was demonstrated at the experimental laboratories of the Bell Telephone Co. in New York.

A new television receiver that paints its picture on a fluorescent screen with a weightless pencil of cathode rays was demonstrated by Dr. Vladimir Zworykin, Westinghouse engineer.

Regular broadcasts of radio television were begun in England.

Radio waves of ordinary broadcasting lengths can penetrate at least 300 feet of rock, tests at Mammoth Cave showed.

Ship-to-shore wireless telephony on the Leviathan was inaugurated commercially in December.

Science News-Letter, December 28, 1929

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