

GENERAL SCIENCE

1956 Science Review

Menace of radiation realized by world, while big question is whether anything will be done about it, such as stopping bomb testing.

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 30, and also the issue that will appear next week, Dec. 29.) If you want more information about any item in the summary, send 25 cents to help cover answering costs for each item about which more information is requested.

By SCIENCE SERVICE STAFF

► **THERE WAS** a growing awareness during the past year throughout the world that mankind may be poisoning the heredity of the human race through insistence upon testing even more devastating atomic and hydrogen bombs.

This danger, subject of national and international concern and inquiry, played a role in the presidential election campaigns.

Two major scientific reports, one in America and the other in England, considering the possibilities, and the whole matter of radiation from sources other than bombs as well, were brought to scientific and public attention.

What is done about it in the coming year and after may determine whether 1956 was a turning point in handling this potential danger.

Although considered probable in past years, the year 1956 gave greater hope that the immense power of the H-bomb reaction can be harnessed for the peaceful uses of power to give the world the possibility of overcoming virtually forever the danger of a famine of harnessed energy.

The methods of confining and using the conversion of deuterium, which is relatively plentiful in the sea, and other light elements, into energy, with control of immense temperatures and energy output, were most explicitly discussed as the result of Russian research.

Hidden by America's atomic secrecy, we can be confident that equivalent or greater progress is being achieved in the United States.

In man's conquest of matter and its fundamental particles, the anti-neutron was discovered, and the discovery of the neutrino reported previously was confirmed.

The whole concept of an anti-universe, opposite in sign to the matter around us and of which we are composed, received added support. Scientists speculated on another cosmos made of anti-matter, or on great galaxies of anti-matter stars that would clash in tremendous explosions if they should ever come close to our part of the universe.

As to the universe seen by powerful tele-

scopic tools for light and radio capturing used by astronomers, the rate at which it is expanding may be slowing down at the most distant points visible to us. There is, however, fresh evidence from radio frequency shifts that the universe is expanding.

The latest indication of the expanding universe is from the collision of two galaxies a hundred million light years away that signal this by a change in the frequency of the radio waves received on earth.

A device for increasing the effectiveness of telescopes, called the image multiplier, which applies electronic methods to telescopic light-gathering, came closer to realization. It promises to make existing telescopes more powerful by many, many fold.

We learned a little more about the planets of the solar system. Radio waves were picked up from Mars and Venus just as many other heavenly objects are now known by their radio emissions.

Tested upon ordinary telephone lines was a device that in a few years may allow you to see over your telephone, point to point, the way you use long distance. This outgrowth of TV was proved practical on transcontinental circuits.

In medicine, large scale research was accelerated on a chemical agent for treating cancer, but no drug or virus of outstanding promise was announced.

The particular place in the nervous sys-

tem that is hit in multiple sclerosis was discovered to be the glial cell, a possible step toward a new attack on this disease.

In important research on viruses, two viruses were crossed and a hybrid produced, an achievement that has implications in understanding and combating such disease-causing entities.

The widespread program for exploring the earth that takes the form of the International Geophysical Year accelerated as the beginning date of July 1 of next year approached.

There was announced a chemical test for schizophrenia, and the evaluation and production of tranquilizing and other drugs for mental illness continued.

Modern man has existed for more than 50,000 years, possibly for 100,000 years, it was indicated by dating of glaciations by chemical methods.

An admitted 2,100 miles per hour and an altitude of 126,000 feet resulted in the loss of the U. S. X-2 experimental plane, as man pushed upward and faster.

How fast, far and high missiles travel is secret, due to defense considerations of our armed forces, but immense effort and financial support are being expended.

Science News Letter, December 22, 1956

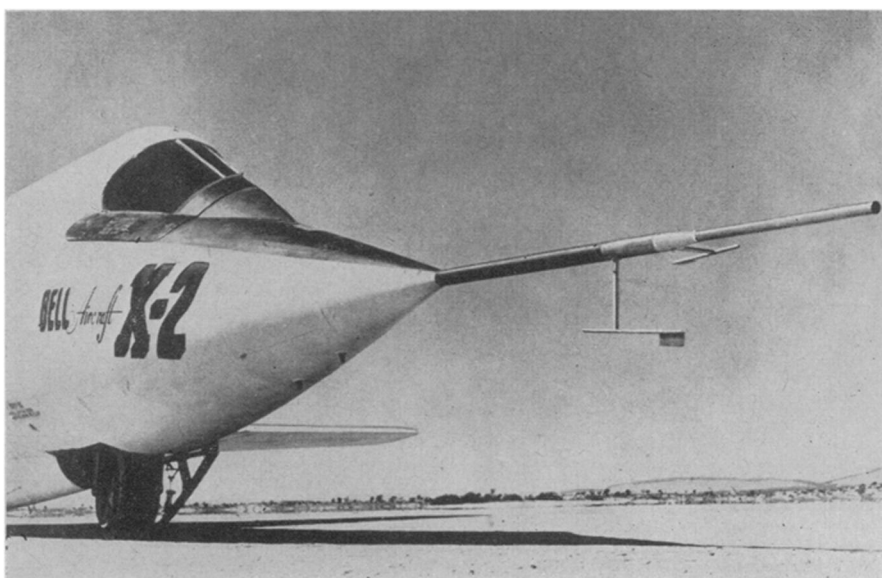
AERONAUTICS

Plane Sets Speed and Altitude Records, Crashes

Unofficial speed and altitude records at 2,100 miles per hour and 126,000 feet were set by the experimental Bell X-2 before it crashed.

A wind tunnel that can test full-scale jet engines, rockets, airplanes and other flying structures at up to 2,400 miles per hour under conditions up to 100,000-foot altitude was put into service at the N.A.C.A. Lewis Flight Propulsion Laboratory, Cleveland.

A new wind tunnel with speeds up to Mach 5



X-2 EXPERIMENTAL PLANE—This aircraft set a new speed record on the flight that resulted in its destruction. The Bell X-2 was designed to crack the thermal barrier, and was reported unofficially to have reached a speed of 2,100 miles per hour and an altitude of 126,000 feet before it crashed.

(about 3,500 miles per hour) and with 4 x 4 foot test sections was put into use at the N.A.C.A. Langley Aeronautical Laboratory.

A wind tunnel capable of 11,000 miles per hour, at 15,000 degrees Fahrenheit and pressures of 20,000 pounds per square inch for a hundredth of a second, was tested at the Air Research and Development Command's Arnold Engineering Development Center, Tullahoma, Tenn.

A four-stage research rocket launched from the N.A.C.A.'s Wallops Island, Va., field station has climbed over a million feet high and reached Mach 10.4 or 6,864 miles per hour at the altitude achieved.

An official speed record was set at 1,132 miles per hour by a British jet.

A giant Skyhook balloon reached an altitude of 76,000 feet, breaking the record for manned balloons, before plunging out of control.

The delta-winged B-58 Hustler, America's first supersonic bomber, was test flown.

"Flap blowing," a system for giving lift to a plane at take-off with a jet of air from the engine to the wing's rear edge, successfully passed tests.

A new altimeter, much more accurate than any previously in use, made it possible to decrease the vertical distance required between Air Force aircraft in flight from 2,000 to 1,000 feet.

A chemical rain repellent of silicones and waxes made mechanical windshield wipers on jets unnecessary.

A mathematical formula was developed that can detect the cause of dangerous nosewheel shimmy in aircraft.

A program was launched that is aimed toward automatic control of all air traffic by electronic computer.

A method for computing by machine the best possible flight path between two points under existing weather conditions was developed.

Better radar "visibility" of aircraft in bad weather was insured by using both vertically and horizontally polarized radar in combination.

Data obtained when chickens were shot at windshields at speeds up to 1,000 miles per hour resulted in development for jet-powered aircraft that travel 500 to 700 miles an hour of windshields to withstand impact of birds in flight.

Tests were begun of high-altitude air traffic control and communications, using a jet-powered bomber.

ANTHROPOLOGY-ARCHAEOLOGY

Find Teeth of Man's Early Pliocene Ancestor

Two teeth of what is believed to be an ancient ancestor of modern man dating from the early Pliocene or late Miocene were reported found in Russia.

Dating of the four major glaciations by radiocarbon and other chemical methods indicated that modern man has lived on earth for more than 50,000 and possibly 100,000 years; the Australopithecines lived between 300,000 and 350,000 years ago.

A nearly-extinct people formerly believed legendary were found to exist in Thailand.

A comprehensive study was made of a mountain people in Peru and evidence was found that they have been living on a bare subsistence level possibly since prehistoric times.

The Mesopotamian portion of what is now Iraq was found to have been inhabited for many centuries by people of a single or very similar racial type, this conclusion being attributed to pollution of the Euphrates River that strangers could not survive.

The people of a large area of inland Asia

were found to be surprisingly uniform in body build, and this was attributed to population movements and short occupation spans that prevented adaptation to local climatic conditions.

Every anatomical trait used to distinguish races, including skin color and hair texture, were found to be changed by influence of environment.

Survey of the microscopic quality of ancient and modern human teeth showed that formation of poor dentin and poor calcification dates back to the Old Stone Age.

Evidence of the habitual use of cleaning agents was found on the teeth of ancient, prehistoric skulls as well as evidence of cavities and pyorrhea.

A group of pygmies still practicing the customs of the Stone Age, who know nothing of agriculture or how to make fire, were reported living on Little Andaman Island.

A group of pygmies only a few millimeters taller than the smallest people in the world were visited and studied by an anthropologist in Aiom Range of mountains in New Guinea.

Success was attained in unrolling two of the Dead Sea scrolls that were badly deteriorated, one on leather and the other on copper, revealing apocryphal Bible stories and directions for finding hidden treasure.

Climaxing a lifetime of work, Sumerian tablets discovered at the turn of the century in Nippur were pieced together when access to fragments in Communist East Germany was permitted.

Thorough archaeological survey of Nagev, desert region of Israel, revealed sites of hundreds of ancient settlements.

The ancient Israelite city of Gibeon, including its famous pool, was explored and positively identified by inscriptions.

A clear molded glass bowl and pebble-mosaic floor found in the ancient Phrygian city of Gordion were judged the earliest known examples of these two kinds of work, 200 years older than their first appearance in Greece.

A built-in bathtub with a system of drain pipes and also terracotta chimney pipes were found in the 3,000-year-old palace of King Nestor in Greece.

An ancient Greek city, 20 centuries old, was explored in Sicily.

Oldest evidence of man in the Grand Canyon area was found in the form of tiny 3,500-year-old wooden animals made by the split-twig technique.

ASTRONOMY

See Evidence Universe Expansion Rate Slowing

Indications were found that the rate at which the universe is expanding may be slowing down at the most distant visible points.

Fresh evidence that the universe is expanding was found in the shift in the frequency of radio waves received on earth from the collision of two galaxies a hundred million light years away.

Objects in the heavens can be studied individually by their absorption of certain energy bands in the radio spectrum, it was found when it was discovered that emission nebulae absorb radio waves.

The existence of an anti-cosmos, an unseen twin of the known universe, was proposed as necessary to complete the symmetry of nature.

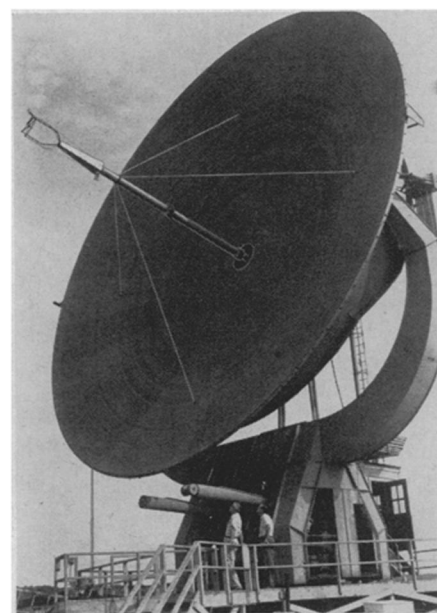
The possible existence of galaxies of negative matter was proposed and clashes of matter with such anti-matter were suggested as the cause of radio waves from space.

Based on the present proportions of the isotopes of uranium 235 and 238 on earth, the date of the formation of the Milky Way was estimated to be 7,500,000,000 years ago.

The close approach of Mars to the earth stimu-

lated considerable study of that planet; radio waves from Mars were picked up for the first time; a huge yellow cloud was spotted, believed to be the largest ever seen. the surface of Mars was reported to have a roughness between that of the moon and the earth.

The discovery that light from the Crab Nebula is almost 100% polarized confirmed the theory that it results from streams of electrons moving in a magnetic field.



RADIO WAVES FROM MARS—
This 50-foot radio telescope of the Naval Research Laboratory, Washington, was used to detect radio waves, at a wavelength of three centimeters, from Mars.

Radio signals from Venus were received for the first time and they indicated the planet's temperature is higher than that of boiling water.

Southwestern United States was selected as the site for the proposed national astronomical observatory.

A site was selected in southeastern West Virginia for a national radio telescope.

The 40-inch telescope of the U. S. Naval Observatory station at Flagstaff, Ariz., went into operation.

Cold spots in interstellar space, with a temperature close to absolute zero, were calculated mathematically to be the birthplace of stars.

Prototypes were tested for electronic devices to be applied to the 200-inch telescope to make it do the work of a 2,000-inch instrument.

Radio waves broadcast by hydrogen atoms were picked up for the first time from a cluster of galaxies.

Night sky radiation in the far ultraviolet was detected for the first time.

Studies of the permanent markings on Venus indicated that the planet always keeps the same face turned toward the sun, but observation of radio waves broadcast by the atmosphere of Venus might suggest that the planet rotates once every 22 hours.

Radio waves from Jupiter were found to be related to a red spot on that planet.

Jupiter's mass long ago was 20 times greater than now and the excess was lost gradually through evaporation, it was proposed.

The "twinkling" of radio stars was found to be caused by movements in two different layers of the ionosphere.

Explosions on the sun were proposed as the probable origin of radio waves in the audio frequency range and at a different frequency from those traced to lightning.

A "window" in the earth's atmosphere through which radio waves from outer space can penetrate to the earth's surface was found to admit waves of one to ten megacycles.

Miniature "galaxies" were made in a laboratory by firing chunks of ionized matter at each other at speeds up to 140 miles per second.

The formation of the tiny fragments picked up on earth as meteorites could be accounted for by chemical heating process in meteors, it was found.

It was confirmed that the sun is a dwarf star with a surface temperature of about 11,500 degrees Fahrenheit.

Confirmation was obtained that the North Star has two stellar companions.

A record prominence that burst forth from the sun with the violence of 100,000,000 hydrogen bombs was photographed with a coronagraph.

A new definition was adopted for the second as a 31,556,925.975th part of the tropical year.

A 60-foot radio telescope, the largest dish-shaped antenna in the United States, was dedicated.

To explore the sun's chromosphere, a microwave spectroheliograph consisting of 32 radio antennas in the form of a cross was erected in California.

The earth's radius at the equator was found to be 420 feet less than thought previously.

BIOLOGICAL SCIENCES

Fruit Fly Strain Will Breed True Indefinitely

Production was reported of a genetically pure strain of fruit fly that will breed true indefinitely.

Application of gibberellic acid caused rare-blooming and non-blooming plants to flower.

Treatment with gibberellic acid and extracts from the young seed of certain plants thought to contain gibberellin-like substances was found to reverse the dwarfing effect of gene mutation.

A tiny reddish-yellow ant, missing link in ant evolution, was found in Ceylon.

Fish, walking on strengthened fins, not amphibians, were the first creatures to walk the dry land, it was proposed.

The finding of arteriosclerosis in a variety of animals such as dogs, horses, elephants and gorillas seemed to indicate that all mammals are subject to it.

Piperazine citrate was found to be a simple and safe preventive and cure of animal worm parasites.

The sounds made by the manatee were recorded for the first time.

A hitherto unknown species of fish that looks like a swimming pine cone was caught off the coast of Chile.

Two cases were reported of tigers born with diaphragmatic hernia or "upside-down stomach."

Bats were found to be important reservoirs of rabies in the United States.

The chemical structure was found for sesamol, which increases the killing power of pyrethrum 31 times.

Ten nations joined in scientific warfare against hordes of locusts in the Near East.

Knowledge of its dietary needs made possible future control of the migratory grasshopper of alfalfa fields by using weed killers to wipe out weeds necessary for the insect's best growth and development.

A new poison was found successful in controlling the sea lamprey pest.

Soft-shelled ticks were found to be carriers of tularemia, or rabbit fever.

A new sense organ, the tambour organ, which detects changes in pressure, was found in mosquitoes and closely related flies.

Time required for digestion in the mosquito was found to vary between 31 and 48 hours.

Mosquitoes use the same enzyme as do flies to detoxify DDT.

Lady beetles were imported into Florida from India and Pakistan to war on aphids, mites, scale insects and other citrus and vegetable pests.

A new invasion of Florida by the Mediterranean fruit fly (Medfly) touched off an intense campaign by Federal and state governments to wipe out the pest; another destructive citrus pest, the citrus blackfly, often confused with the Medfly, was reported in record numbers in Texas.

Boll weevils were reported in record numbers from the cotton belt.

Representatives from seven states called on the Federal government for help in battling the tree-killing gypsy moth.

Strains of hens were developed that lay eggs with thick shells.

Cows give vitamin B-12 in their milk, regardless of breed or diet, provided they get enough cobalt.

The movements of populations of fish and marine life engaged the attention of scientists; a census was begun of underwater life, a newly created Ocean Research Laboratory undertook the study of the ups and downs of fish populations, albacore tuna were found to reappear off the Oregon coast, and the New England fish, the tomcod and sea herring, were found in Chesapeake Bay.

Many big game animals in the new nations of Africa and Asia were reported threatened with sudden extinction.

The cattle egret, seen in Florida for the first time in 1942, has now multiplied sufficiently to become established.

Australia's friendly bird of the bush, the laughing jackass or kookaburra, was reported to be threatened with extinction.

A new nesting ground of the rare trumpeter swan was found near the mouth of the Copper River in Alaska.

An elderly cat does not suffer from presbyopia, tests of a 15-year-old animal (equivalent of 75 to 90 years in a human) revealed.

The insect-borne disease equine encephalitis (horse sleeping sickness) was reported in several states.

An enzyme chemical, pancreatic dornase, helped wounds in animals to heal quickly.

A European fungus disease, downy-mildew of crimson clover, was found to have invaded Mississippi.

The soybean cyst nematode, plant pest of Japan and Manchuria, invaded North Carolina and was found infesting some 700 acres in one county.

Treating cotton seed with a systemic insecticide was found to protect the emerging plants for from three to seven weeks.

Two groups of chemicals were reported that will control grassy weeds in fields of broad-leaf crops.

Lindane sprayed on cucumbers was found to give an off-taste to some potatoes grown in the same fields in later seasons.

Sprays to keep fruit from dropping cut pre-harvest losses of apples and pears from 20% to less than six percent.

Two fungus diseases of vegetables were experimentally controlled with streptomycin.

Two fungus organisms that can manufacture rubber were reported.

Dextrans were found useful as soil conditioners, producing marked increases in plant growth and seedling emergence.

Cancer in a tree was traced back to the exact single cell in which it originated 60 years before.

A "flying-spot" television microscope was developed that can make detailed pictures of living cells in ultraviolet light.

First photographic evidence was obtained of how protein, basic stuff of life, may be manufactured in the cell.

Government permission was granted for use of Aureomycin to preserve uncooked poultry, first approval of such use of antibiotics on food.

CHEMISTRY-PHYSICS

Halting H-Bomb Tests Was Widely Discussed

Halting tests of hydrogen bombs was widely discussed pro and con, reports of the National Academy of Sciences on the biological effects of atomic weapons and of the British Medical Research Council on the hazards of nuclear radiation being most often cited to show possible genetic effects and dangers of radioactive strontium 90 replacing calcium in bones, particularly in children; tests of both atomic and hydrogen bombs by the Russians, British and United States continued, however.

The so-called "pinch effect," the contraction occurring in a gas carrying an electric charge due to its own magnetic field, was suggested as the mechanism to control thermonuclear reactions for peaceful purposes, and also to account for solar flares.

Viruses which had been taken apart into their chemical constituents and put back together were found to breed true to form.

Conversion of atomic radiation directly into chemical energy was approached by bombarding boron and lithium with slow neutrons and using the resulting alpha particles in chemical experiments.

High-energy gamma rays were made visible by photographing the bubbles formed when they penetrated a xenon-filled chamber.

The anti-neutron was discovered.

Discovery of the elusive particle, the neutrino, was confirmed.

Hydrogen-bomb-type reactions occurring in the hot interior of the stars could account for the creation of all known elements of matter, it was announced.

Charged particles of mass as high as nitrogen atoms were used to bombard such heavy elements as uranium to build up new elements.

A method was announced for trapping free radicals in solids at temperatures 200 degrees below zero centigrade so that they can be studied and the possibility was suggested of storing large amounts of energy in this way for later release as needed.

Plans to build a 6,000,000,000-electron-volt electron accelerator and a 3,000,000,000-electron-volt proton accelerator were announced.

The Russians put finishing touches on a ten billion-electron volt atom smasher, which will be the most powerful operating in the world, and announced plans for constructing a 50 Bev machine.

Stellar temperatures of 15,000 degrees centigrade were generated in a shock tube after a diaphragm separating gases under extremely high and low pressures was broken.

Fallout from hydrogen bomb tests was found to be world-wide.

Experiments with animals showed that premature aging is one of the permanent effects of radiation.

A Congressional committee investigated the effects of restricting flow of scientific information.

A new yardstick was devised for describing colors, based on thousands of color matches.

A simplified X-ray microscope, using the principle of field emission of electrons, was designed.

A device was developed that takes X-ray photographs in as little as a millionth of a second.

An ion microscope was produced for photographing atoms and observing atomic structure.

The first U. S. privately owned peacetime reactor designed solely for industrial research and without security restrictions went into operation.

Welding of graphite pieces was an achievement of great value for the assembly of nuclear reactor moderators.

The world's first large-scale atomic power station started feeding electricity into Britain's grid system.

A revised version by Einstein of his generalized theory of gravitation was made public.

A new value, very close to that found by other methods, was determined for the velocity of light by clocking the time it takes to travel an accurately known path.

The U. S. standard meter bar was taken to Paris and checked against the international standard and found unchanged.

A new transistor that operates at frequencies three times higher than others was reported.

Production was begun on the Lumicon, a device to amplify low-level light as much as 40,000 times.

Announcement was made of an electric method, similar to the process of chromatography, which will separate organic acids from amino acids.

A method for combining olefins derived from petroleum with silicon to form a whole new series of products similar chemically to the silicones was announced.

A solar energy trap was constructed of a sheet of copper electroplated with nickel, zinc and sulfides.

A new type of chemical bond, linking, bridge fashion, one atom with several others, was found in spectroscopic studies.

Automatic warning devices were developed for detecting nerve gas and related poisonous gases.

A method was developed for tagging organic compounds with tritium merely by sealing the tritium gas in a container with the compound to be tagged.

A biological method was found for producing heavy water as a by-product of malting barley.

Rare minerals such as might exist in nature only at great depths of 40 to 100 miles were made in the laboratory.

A number of the poisons that cause dermatitis such as the rash of poison ivy were synthesized from chemicals.

Synthesis of coffinite, newly discovered uranium mineral, was accomplished by a hydrothermal process.

Radioactive carbon 14 in the form of an acetate was introduced into latex from the bark of the Hevea tree and served as a clue to trace the formation of natural rubber.

Twenty rare natural minerals were duplicated in the laboratory, producing compounds with the same filtering properties as those dug from the earth; in addition 14 new minerals of similar type were produced.

A second kilocurie source of radioactive cesium was prepared.

Twenty-nine new short-half-life radioisotopes ranging from antimony 122 to yttrium 90 were offered for sale by the Atomic Energy Commission.

Americium substituted for plutonium in an alloy with beryllium resulted in a strong neutron source.

A technique was developed for purifying sili-

con so that it has only one part of contaminants in 6,000,000,000 parts of the element.

A technique of carefully-controlled burning in incinerators proved an effective method of disposing of bulky radioactive wastes.

Fibrous proteins were found to have a characteristic pattern under the electron microscope and this can be used to identify them at sight.

Palustric acid is another valuable commercial chemical isolated from pine rosin.

The centennial of the discovery of mauve, first synthetic dye, was celebrated.

It was discovered that deadly silo gas is formed from nitrates by the action of bacteria.

A chemical needed for muscle contraction, myokinase, was isolated and crystallized for the first time from muscle tissue.

Irradiation of silicone gum with high energy electrons produced better rubber faster.

Rubber, exactly like that produced by nature, was synthesized in minute amounts.

The Nobel Prize in Chemistry was awarded this year to Sir Cyril N. Hinshelwood of the University of Oxford, England, and Prof. Nikolai N. Semenov, founder and permanent director of the Institute of Chemical Physics, Moscow, for studies of chemical reactions.

Invention of the transistor, tiny replacement of the bulky and delicate vacuum tube, brought the Nobel Prize in Physics to Drs. John Bardeen of Champaign, Ill., Walter Brattain of Murray Hill, N. J., and William Shockley of Mountain View, Calif.

ENGINEERING-TECHNOLOGY

Seeing Telephone Tested Successfully

The forerunner of a commercially practical telephone that enables you to see the person talking to you operated between Los Angeles and New York.

A technique was devised for predesign of alloys to have a needed set of properties, and an extremely strong alloy, resistant to high temperatures and vibration, was produced by the technique.

A voice-operated typewriter was developed which will type direct from dictation.

Hydrogen peroxide was used to power a British submarine, eliminating tell-tale bubbles from the exhaust.

A new type of light was developed that combines in one screw-in bulb three light sources — incandescent filament, quartz mercury vapor discharge and fluorescent phosphors.

Improvements in design and filament structure resulted in an increase of light output for incandescent bulbs of up to 15%.

The first underwater telephone cable linking England with the United States and Canada was opened to public service.

A revolutionary monorail railway, capable of 220 miles per hour including allowances for stops, was put into operation in Germany.

The nation's first mobile gas turbine power plant was developed for operation in two railway cars.

A gas turbine bus was designed capable of traveling 125 miles per hour.

Freons, gases used in domestic refrigerators, were found successful in lubricating machinery at high temperatures.

Midget electronic "brains," that would work at temperatures close to absolute zero, were foreseen through the use of cryotrons.

Use of a honeycomb device of metal and glass with 500 holes to the inch would make possible smaller electronic computers with larger memories, it was found.

Electronic computers were equipped with

automatic devices to process experimental data directly without its having to be coded by humans.

An engineering model of a computer that will automatically process streamflow information was tested.

A computer facility was planned by the National Science Foundation, to house one large and two smaller electronic "brains."

With a high intensity electric arc, with temperatures close to those of the sun, it was found possible to extract manganese and other vital metals from low-grade American ores.

A new magnetic material, manganese-bismuth that is virtually 100% pure, was developed, promising to revolutionize the use of permanent magnets.

A device was invented that will transmit Morse code automatically as letters are typed on a standard typewriter keyboard.

A wireless thermostat was devised that controls a heating system by radio signals.

A new process was developed for dyeing nylon yarn that permits the nylon to be washed in hot water near boiling.

An electronic "seeing eye" for radar was invented; it automatically scans a radar screen and when an object is spotted lets out a wail.

A prototype safety car was built with special features designed to protect driver and passenger in case of a crash.

Hafnium can be rolled successfully if heated to 932 degrees Fahrenheit, it was found, and this makes it possible to find uses for this rare metal, by-product of the increasing production of zirconium.

A new hypervelocity gun which shoots missiles the size of golf balls at speeds over 7,000 miles per hour was revealed to the public by the U. S. Naval Ordnance Laboratory.

A new television tube was developed that can operate a screen 21 inches square and can be used in a wall-hanging set resembling an ordinary picture frame.

An all-solid, completely dry midget capacitor which cannot boil, freeze or leak was developed for use in guided missiles and earth satellites.

Industrial fly ash from power stations was added to cement to give it added strength.

A self-adjusting gun camera that works like the human eye was developed and used to record the effects of gunfire and the maneuvers of planes.

A train was developed for use in the Arctic with 16 powered wheels that use tires 10 feet high and four feet wide.

A giant telescopic tracker was developed that can follow missiles 300 miles away and show them on a screen in natural color.

A translating machine that would work on a sentence-for-sentence basis with most of the output grammatically correct was under study.

A fountain-pen-size electronic eye was developed for the use of the blind; it signals changes in light intensity with a change in pitch in an earphone.

A tiny electronic eye was devised to fit on a finger tip and enable a blind person to operate a private telephone switchboard.

A rectangular sail with a lifting action was designed for small racing boats to be safer and faster.

An instrument was developed that can measure differences of only a ten-millionth of an inch.

The most powerful radar, capable of spotting a plane 400 miles away and with a cathode that can operate at temperatures up to 3,100 degrees Fahrenheit, was revealed to the public by the Navy.

Electronic devices and circuits were developed that can operate at 900 to 1,500 degrees Fahrenheit.



SATELLITE ROCKET TEST—The rocket engine that will furnish the initial push for launching the earth satellite during the International Geophysical Year is watched from a bunker house as it goes through trial runs at Schenectady, N. Y. The General Electric X405 burns a hydrocarbon fuel and liquid oxygen.

The largest shovel in the U. S., 147 feet high and weighing 5,500,000 pounds, began work as an earth mover.

A shopping center in Minnesota was the first major building to use a heat pump to heat and cool it, automatically adapting to changes in occupancy load and weather conditions.

Plastic piping for water was found to be both safe and weatherproof.

A very precise gyroscope, hundreds of times as sensitive as conventional gyros, was developed and used to measure wind-caused vibrations in the Empire State Building.

A new method of food preservation was developed combining sterilization with high gamma radiation and refrigeration.

A formation of hydrocarbon mineral called Uintaite was discovered and an attempt was made to adapt it to fuel use.

GEOPHYSICS

Earth Satellites Boosted By Three-Stage Rocket

The earth satellites to be launched during the International Geophysical Year will be 20-inch spheres shot from the third stage of a rocket boosted to orbital height of about 300 miles by two other rockets sent up from Florida.

The radio "hams," visual observers, astronomers and radio experts who will track the earth satellites were organized, plans for equipment were announced, and U. S. and foreign observation sites were selected.

The earth's first artificial satellite will be twins, the instrumented 20-inch sphere and the burned-out rocket that boosted it into orbit, it was predicted.

Use of the earth satellite to test Einstein's general theory of relativity, to receive radio waves from outer space, and to measure the

brightness and color of the extragalactic sky was planned.

The research teams who will winter in Antarctica during 1957 departed from the 12 nations that will conduct intensive experiments during the International Geophysical Year; a U. S. group of 17 men were landed at the South Pole.

Russian scientists confirmed that they were preparing to launch earth satellites.

New instruments developed for use during the International Geophysical Year included an automatic aurora recorder and a special device to trace airglow.

A special research unit was set up to develop and test numerical weather prediction methods for periods longer than three days in the future.

Dishpan models of the atmosphere showed that weather patterns tend to repeat themselves every 2,000 days and are probably not directly caused by bursts of solar radiation.

In spite of the small number of hurricanes, only one of which struck the United States, the Weather Bureau started an intensive research attack on such tropical storms.

Evidence was reported that hurricanes tend to follow the ocean's tongues of warm water and that in their early stages they will swerve away from cold ocean areas.

The light-absorbing properties and life span of negatively charged atoms of hydrogen and oxygen, occurring rarely in the earth's atmosphere, were accurately measured in the laboratory.

Test operation started for an automatic device that sounds an alarm when conditions favorable for severe local storms and tornadoes exist.

A new record for the heaviest recorded one-minute rainfall, set in Iowa when the rate of fall was 0.69 inch per minute for 1.4 minutes, was reported.

Evidence was reported that rain from summer-

time clouds often results from giant chemical particles in the air, either salt or sulfates, rather than solely from ice particles as had been thought.

The President's Advisory Committee on Weather Control reported that precipitation can be increased somewhat by throwing silver iodide into certain kinds of clouds, but their results apply only to specific Pacific Coast mountain areas.

A twinkle telescope measuring the twinkling of stars was used to determine wind velocities at 40,000 feet, the altitude at which jet planes fly.

A method was developed for determining the vertical distribution of ozone from a ground station, information that will be used to trace both vertical and horizontal movements of air masses.

A mathematical model of the Gulf Stream was tested out on an electronic computer and produced a flow pattern much like the real Gulf Stream.

Mathematical methods, it was found, can be used to calculate probable air pollution patterns and the relative contributions of each pollution source to the concentration at each location.

A new instrument for detecting and analyzing smog was tested and it revealed a chemical missing link in smog formation identified as peracetyl nitrite.

A dense fog lasting just over two days was blamed for killing almost 1,000 persons in Greater London in January.

The interior of the earth was reported possibly to be slowly churning over in giant blocks due to radioactive heating at great depths.

The number and kind of cosmic rays smashing into the earth's atmosphere were found to be controlled by the sun's radiation.

Ionized trains of meteors were used for short-duration transmission of radio messages over long distances, at least up to 1,000 miles.

Study of deep-sea sediments showed that a world-wide temperature change occurred about 11,000 years ago.

By radiocarbon dating it was found that the last big ice advance, 10,700 years ago, covered a region from Duluth, Minn., across the Great Lakes to Lake Champlain in New York.

The world is between two Ice Ages and another glacial advance can be expected within a few centuries, it was reported.

The research schooner Action was commissioned to measure the exchange of energy between the atmosphere and the ocean's surface, important in weather forecasting.

Measurements of the magnetism of the Appalachian rocks indicated that when these mountains rose from the ocean floor, only the shallow sedimentary rock near the surface was affected.

Study of the composition of gases trapped in bubbles in icebergs off the Labrador Coast indicated that the ice might have been formed as long ago as 1,000,000 years.

Study under a lamp which gives off only two wavelengths of light provided a new technique for locating and identifying rare earth minerals.

Surface signs of oil deposits were described as including location on the most level side of a large basin, presence in the area of sandstone or carbonate rocks and folds in the ground called anticlines.

Radiocarbon dating of the top portion of a core sample of ancient pollens buried in a now-dry New Mexican lake bed showed that one glacial episode occurred between 18,100 and 21,300 years ago and another between 23,800 and 32,000 years ago.

Attractive forces between aluminum ions in montmorillonite were found to be responsible

for the network formation that causes it to soak up waste fission products for safe disposal.

A severe earthquake off the coast of Greece in an area which ordinarily does not have much seismic activity was responsible for a very destructive tidal wave.

The violent volcanic eruption in 1912 attributed to Mt. Katmai was found to be really due to a neighboring mountain, Mt. Novarupta.

Fifty glaciers out of 73 measured in the Cascade and Olympic Mountains were found to be advancing at present and the rest are increasing in thickness.

A new mountain range and a new route to the South Pole were discovered when the Ferrar Glacier in the Antarctic was climbed.

Using nylon rope, the Government research ship *Calypso* anchored in a 24,600-foot-deep trench in the Atlantic Ocean, the deepest anchorage yet attained.

Fossil bones of three new species of kangaroo-like animals were found in New Guinea, providing the oldest evidence of marsupials in the South Pacific, some 10,000,000 years old.

A bird's nest containing 13 unidentified 40,000,000-year-old fossilized eggs was found near Crawford, Nebr.

Discovery of the fossil skeletons of lizard-like Coal Age reptiles helped fill a gap in our knowledge of evolution.

MEDICINE

Find Exact Site Hit By Multiple Sclerosis

Exact site in the nervous system hit in multiple sclerosis was pin-pointed for the first time as the glial cell, rather than myelin as previously thought.

Vaccines against cold-like respiratory diseases known as AD, APC, RI and ARD viruses were developed and found effective in Navy and Army recruit training camps.

A virus hybrid was produced for the first time by crossing viruses.

Pure crystals of a virus of the Cocksackie group were obtained for the first time, making the second animal virus ever obtained in pure crystalline form and the first ever obtained from muscle tissue.

Discovery of a new group of viruses that may be the cause of croup in babies was announced.

The virus causing "shipyard eye," or keratoconjunctivitis, was isolated and successfully grown in tissue cultures.

A virus that for the first time consistently causes leukemia in adults as well as infant mice was discovered.

Material extracted from brains of leukemia patients caused leukemia in one strain of mice.

Existence in well persons of some kind of immunity or natural resistance to cancer was shown by the sloughing off with vigorous rejection reaction of living cancer cells injected under the skin of prisoner volunteers in contrast to the growth and spread of cancer cells implanted under the skin of far-advanced volunteer cancer patients.

Potential anti-cancer and anti-leukemia agents reported, though none was called a cure, were: viruses, the fruit fly's growth hormone, antibiotics, B-3-thienylalanine, 6-diazo-5-oxo-L-nor-leucine and 2-chloroethyl methane sulfonate.

Cocksackie virus, cause of a mild polio-like sickness, completely obliterated a human tumor growing in the rat after five or six passages of the virus, an effect considered promising enough to warrant human trials.

A 70,000,000-electron-volt synchrotron, largest X-ray machine in the world designed for cancer treatment, started operation.

A cell examination test for detecting cancer of the uterine cervix was found to be 40 times as effective as previous methods.

"Radiation surgery" of the pituitary gland with the high energy beam of the 184-inch cyclotron was done in limited experiments to determine its usefulness as a substitute for removal of the gland.

Radioactive yttrium pellets were surgically implanted to irradiate and destroy the pituitary gland in animals and humans suffering from cancer.

Perfect microscopic-sized spheres of fused inert clay containing various radioisotopes proved useful in studying control of deep-seated inoperable brain tumors.

Radioactive cesium was used to treat tumors by sewing into the tumor mass extremely thin tubing through which the cesium flowed.

Evidence that animal and hardened vegetable fats in the diet increase the level of potentially artery-hardening cholesterol in the blood and that vegetable oils will reduce cholesterol levels was reported.

Exercise was found a means of stimulating sprouting of new artery branches in hearts of animals with narrowed coronary arteries.

Measurement of large fat molecules in the blood was found not to have the unique value previously claimed for diagnosing tendency to heart disease.

Large daily doses of nicotinic acid were reported to decrease cholesterol in the blood.

Signs of the dangerous artery disease, atherosclerosis, were produced in rats, a species naturally immune to the condition.

Inborn deficiency of the fat transport enzyme lipoprotein lipase was reported likely cause of excess fat in the blood leading to artery trouble and heart disease.

Life-threatening clots in the pulmonary artery can be destroyed by plasmin, enzyme from blood plasma, it was found.

A portable heart monitor powered by flashlight batteries was reported potentially useful for detecting life in civil accident or war casualties.

Pills for diabetics were made from sulfa drug relatives and given wide clinical trials in which they showed promise of controlling diabetes without insulin in some patients but one of the drugs gave undesirable reactions in some patients leading to its abandonment.

Success in species cross-grafting bones from rats, cows and humans to dogs was accomplished by treating the bones with ethylenediamine in special apparatus followed by absolute alcohol treatment.

Successful and safe transplantation to human patients of bones sterilized by high intensity gamma radiation from radioactive cobalt was announced.

Cross-transfusion of bone marrow from a rat to a mouse was achieved, the rat bone marrow proving able to protect the mouse against otherwise lethal radiation.

A sex difference in mutability, with males being responsible for more non-radiation caused genetic changes than females, was discovered in fruit flies.

Radiation damage to unborn offspring was found greater from small repeated doses than from a single dose of the same total amount.

Brains of unborn babies would suffer most from massive radiation attacks such as A- or H-bombs, it was reported.

A possible antidote to radiation injury was reported in commercially available trypsin inhibitor from soy beans.

Blood plasma freshly drawn from spleen and spleen cells was announced as protective against radiation.

Discovery of a powerful antidote to nerve gases, 100% effective in mice, named PAM,

short for 2-pyridine aldoxime methiodide, was announced.

A chemical test for detecting very small amounts of nerve gases in public water supplies was announced.

Human and monkey pituitary growth hormones were isolated for the first time.

The first experimental animals of known hereditary background to suffer muscular dystrophy were discovered and showed that the muscle defect is caused in mice by a single mutant autosomal gene.

Rheumatoid arthritis was induced in pigs, the first non-human animal in which the disease could be produced.

The earliest and smallest human embryo, consisting of two cells and aged no more than five days, was obtained.

First successful grafting of arteries to replace the main artery of each kidney was achieved.

Synthetic form of the pituitary gland hormone oxytocin was created.

Intermedin, pigmentation hormone of the skin, was isolated in pure form and its chemical structure determined.

Profound changes in body chemistry involving an enzyme that removes a methyl group and transforms it to formaldehyde and which explain tolerance to narcotic drugs were discovered for the first time.

A potent pain-killer, anileridine, with few undesirable side-effects, was synthesized by re-modelling N-allylnormorphine.

Sharp rise in blood platelets was reported to coincide with ovulation, promising a better method of determining a woman's most fertile period.

Discovery of a drug, polybrene, that reverses the anti-blood-clotting effect of heparin was announced.

A chelating chemical, ethylene-diamine tetra-acetic acid, was announced as a potential remedy for gas gangrene.

Existence of blood group specific substances in human corneas was discovered.

Sex chromatin in the nuclei of cells in amniotic fluid tells the sex of an unborn baby although sticking a needle into the sac surrounding the baby to get the fluid constitutes a risk to the unborn child.

The cell nucleus chromatin test can be used to tell the sex of a human embryo before it has developed to the point where sex organs have differentiated.

The cell nucleus sex chromatin test was reported useful for determining sex in criminal cases, sex being determinable after death from small fragments of mutilated tissue and human hair.

Blood ready for discarding by blood banks after three weeks of storage can be held another five weeks and revived for transfusion by treatment with guanosine.

Frozen blood can be stored in liquid nitrogen for an essentially infinite period, it was reported.

Discovery of a new clotting factor in human blood was announced.

A way was found to break down partially the anti-clotting drug heparin which has resisted analysis since its discovery in 1916.

An enhancing substance which breaks the barrier to transplantation of tissues from one body to another was discovered.

"Pencils" rolled from the amnion, innermost tissue that surrounds the baby in the womb, have been grafted into legs of patients suffering with painful, disabling intermittent claudication to start new blood vessels and improve circulation.

Ovaries, adrenal gland cancers and horse testes can transform male hormone into female hormone in the body.

Anti-anemia vitamin B-12 was found in the

liver in abundance, this organ showing ability to supply the body for up to three years in cases of impaired absorption of the vitamin.

Neomycin, an antibiotic, and the amino acids arginine, ornithine and citrulline, were found effective in reducing toxic accumulations of ammonia in some cases of liver diseases, heart trouble and shock.

Allocations for Salk polio vaccine were lifted because of plentiful supplies, while estimates of 50% reduction in paralytic polio in 1956 over 1955 in spite of a severe outbreak in Chicago were given.

Germ-stopping action of penicillin was found due to blocking of the germ's production or use of adenosine triphosphate.

The year's new antibiotics included oleandomycin, so named because it contains a sugary chemical of the oleander bush; Bryamycin from organisms in Hawaiian soil; a team of tetracycline and oleandomycin; and tritium-tagged streptomycin for study.

The collecting ducts of the tubular portion of the kidney were found to have also the function of producing ammonia for excretion.

A chemical, n-hexadecane, added to tuberculosis germs was reported to make possible creation of an effective killed germ vaccine against tuberculosis.

Lack of an enzyme that converts galactose, one of the sugars in milk, into glucose was discovered to be the cause of galactosemia, disease of babies causing blindness, mental defect and death.

Mice, guinea pigs and monkeys showed no health damage from cosmic rays in flights above 90,000 feet.

A lung operation was done on a hypnotized patient for the first time.

Drinking of large amounts of salt and soda solution was found to be a handy and effective emergency treatment for shock caused by severe burns.

President Eisenhower underwent an operation for ileitis.

The U. S. Food and Drug Administration celebrated its fiftieth anniversary.

Development of heart catheterization for study and diagnosis of heart, circulation and pulmonary conditions in health and disease won the 1956 Nobel Prize in Medicine and Physiology for Dr. Werner Forssman of Germany and Drs. Dickinson W. Richards and Andre Cournand of Columbia University, New York.

PSYCHIATRY-PSYCHOLOGY

Mentally Sick Persons Use Less Oxygen

An abnormality in brain chemistry of mentally sick persons, a lower than normal rate of oxygen use, was discovered for the first time.

Man's brain, in contrast to that of lower animals, was found to be as highly differentiated chemically as it is intellectually.

A new technique for studying the organization of the brain and specific functions of various parts was found when hormones were injected into specific areas.

A center for pleasure and one for pain or discomfort were located in the brain of the monkey.

A particular brain center that controls the recognition of melodies was found in auditory cortex of a cat.

Experience with tranquilizing drugs included: good results reported for two new ones, meprobamate and promazine hydrochloride; large scale use and evaluation of the drugs undertaken by the Veterans Administration and Public Health Service; unpleasant side effects of the drugs controlled in certain instances by Cogentin which

stops finger trembling and by better manipulation of the dosage.

A substance was discovered in the blood serum of schizophrenics that seems to produce characteristic schizophrenia symptoms when injected into normal persons.

The heart muscle can be conditioned to respond in a certain way to angering or frightening stimuli and the tranquilizing drugs can lower blood pressure by modifying or reducing such conditioned responses, it was found.

Experience with a new kind of intelligence test which involves neither the use of words nor manual dexterity but tests ability to form or deal with concepts, suggested that conceptual instruction may raise the intelligence level of subnormal children.

It was found that intelligence does not reach a plateau as early in life as has been thought and some intellectual abilities may continue to increase slowly up to the age of 50 or later.

The more frequently a slot machine pays off, the quicker the player will give up after it stops rewarding, it was found.

More intelligent individuals were observed to be more distracted by conflicting background situation when they are learning a new task.

A simple test of accurate and rapid finger and hand movements was found to show how a man will react under serious stress such as parachute jumping.

A measure of temporal acuity, or ability to perceive rapid stimuli as separate, was found useful in distinguishing patients with nervous disorders from those with psychoses.

A new visual pigment, visual gold, was found in the eyes of deep-sea fish, caught in the Bay of Biscay, that swim at a depth of about 500 yards.

When men in the 24-hour Arctic winter nights were allowed to sleep whenever and for as long as they wanted to they averaged just under eight hours a day.

Persons were found to be more suggestible when sleeping lightly than when under hypnosis.

Alcohol, in spite of its effect on equilibrium, does not affect perception of up and down.

Most frequently used words are the best recognized in very noisy surroundings.

Stimulation of the sympathetic nerve supply to the skin was found to make touch sense receptors over sensitive.

The ugliness or beauty of the room in which judgments are made were found to affect the judgment of faces.

The length of exposure time in which you can observe an object was found to affect perception of its shape and brightness.

Rhodopsin was found to be the visual pigment in all vertebrates from the primitive lamprey to man.

The emotional shock of the sight of a mutilated person was found to affect perception of bizarre appearance through distorting lenses.

Shifting attention from tasks involving perception of visual signals to auditory signals caused no reduction in speed but did cause increase in errors.

Standardized mental tests were found to work on baby monkeys and the possibility of rating their mental age was predicted.

Experiments with "automats" indicated that the effects of inflation on human beings can be assessed by tests of chimpanzees.

The simple miniature "brain" in a lobster heart was found to serve as a model for study of the infinitely more complex human central nervous system.

Use of a light as an artificial sun showed that fish are able to navigate by the sun.

Opportunity to play with, or manipulate, a ball was found to be sufficient reward to produce learning in a kitten.

Pigeons, it was found, can learn to match color samples even when the sample is removed from sight before the other colors are presented for selection.

A new apparatus made it possible to measure the sense of smell in a rat, a very difficult scientific task with lower animals.

Conditioning young trout to avoid the sound of a splash on the surface was found to reduce loss of the young fish when they are planted in trout streams.

The lowly earthworm was found capable of learning to find its way through a simple maze and also capable of latent learning.

Although a monkey does not reach full intellectual maturity until it is two or more years old, it was found capable of conditioning at less than one week and able to manipulate its surroundings at 20 days.

Even fish may become neurotic when faced with too hard a problem, experiments showed.

Ten primary factors in the personality of puppies were isolated by mathematical techniques.

Evidence was found pointing to a link between mental illness and anti-vitamins and anti-amino acids in the diet.

The eye was found to respond to a mild electric current as though it were seeing vague clouds, providing a new research tool for studying dark adaptation and vision in very dim light.

A relatively simple chemical test for diazo-coupling compounds in the urine was found to diagnose schizophrenia correctly in more than 80% of newly admitted patients.

Brain wave changes while under the influence of alpha-chloralose were found in 48 out of 65 mental patients but not in normal persons.

An objective measure of fine differences in behavior between mental patients was developed, using reaction to a slot machine.

A pioneering nursery school workshop was instituted to define methods for adjusting a deaf child to a hearing group of preschool children.

The mental and emotional effect of complete isolation was explored when a psychiatrist had himself suspended in a tank of water of body temperature with a mask on to black out all sight.

By applying the mathematical decision theory, it was found possible to predict gambling behavior.

Science News Letter, December 22, 1956

PALEONTOLOGY

Find 13 Fossil Eggs In Prehistoric Nest

► A BIRD'S NEST in Nebraska yielded 13 fossilized eggs laid about 40,000,000 years ago.

They are the same size as hen's eggs, but the creature responsible for the prehistoric eggs is not known.

To see if any of the eggs contain embryos, which might indicate size and shape of the ancient bird, X-rays will be taken. Bits of shells and a fragment of a bird leg bone, embedded in the claystone rock with the eggs, may also help.

The eggs were unearthed by Donald E. Savage, Lester R. Kent and Malcolm C. McKenna of the Berkeley Museum of Paleontology. Their work was initiated by Harold J. Cook, a geologist-paleontologist, on whose ranch near Crawford, Nebr., the eggs were found.

Science News Letter, December 22, 1956