



FROZEN EXPLOSIONS—This fiery ball from what the Atomic Energy Commission reservedly calls the explosion of a "nuclear device" on March 17 of this year was stopped photographically in a few millionths of a second by a super-speed camera just before it disintegrated the steel tower shown below it. The camera, called the Rapatronic, has an electronic shutter and no moving parts. A single exposure type, it was built by Edgerton, Germeshausen & Grier, Inc., of Boston.

age, and the third ever found, was caught off Madagascar.

Bacteriological warfare experts joined forces with biologists to isolate the poison with which "red tides" kill fish.

A mystery disease of young cattle, usually fatal, attacked animals in western corn belt states, and was studied in about 50 herds.

A strange disease that attacked sheep flocks in California was identified as blue tongue sickness, previously unknown outside of Africa.

The San Benedicto Island wren was rendered extinct by the birth of a new volcano on the island.

New birds, including babbler, lark and warbler, were discovered in the Arabian Sultanate of Muscat and Oman.

Genes are changed by mutation-causing agents but only indirectly through changes in the cell metabolism, it was found.

Better varieties of many vegetables and flowers became possible through development of a sterile pollen method of producing hybrid seed.

Brood X, biggest and widest-spread group of the periodical 17-year cicadas, emerged for six weeks of life spent in singing and laying eggs that will hatch in 1970.

Tiny black beetles of the family *Nitidulidae* were found to spread the fungus disease oak wilt from infected to healthy trees.

Gypsy moth caterpillars set a new record for tree damage when they destroyed the foliage of some 1,500,000 acres of trees in the New England region.

After the destruction of large numbers of animals with the "sanitary rifle," Mexico abandoned the attempt to wipe out hoof and mouth disease in this way, but later agreed to the "evacuation" of diseased animals.

A new antibiotic, oligomycin, was isolated and showed promise in the control of plant fungus diseases.

A hydrocarbon insecticide 100 times as deadly as DDT, yet non-poisonous to man and domestic animals, was developed.

Study was begun on the long-neglected horseshoe crab, sea creature that has resisted evolutionary change for millions of years.

Sharp decreases were noted in the catch of two California commercial fish species—sardines and Pacific mackerel.

Psittacosis, parrot fever, was found for the first time in turkeys.

New rules were adopted to govern the scientific naming of animals; it is hoped that they will end the confusion between European and American practices.

Australia's marsupials have been getting smaller since the Pleistocene age and the process is still going on, it was found.

CHEMISTRY-PHYSICS

Einstein Revises Gravitational Theory

A revision of Einstein's generalized theory of gravitation was published, a forward step toward finding a single theory to describe both gravitation and electromagnetism.

Experimental proof was obtained for the Nernst-Einstein relation of the mobility of electrons and holes, important in transistor research.

The spinor was suggested as the first arch of a possible bridge between Einstein's unified field theory and quantum concepts.

A thermometer sensitive to the electrical noise generated by heat in a fine platinum wire was investigated for measuring high temperatures.

The radio roof, or reflecting layer, was found to lower to the usual daytime level just as the sun begins to rise.

Hard-to-detect strains in metals were spotted by measuring minute changes in spacing between their atoms as revealed by X-ray diffraction.

Prediction was made of a new acousto-electric effect by which electrons are carried by sound when an acoustic wave passes through a semiconductor.

The exact time that an electric charge hovers over one or another of the atoms in a molecule was calculated.

New information about the meson was promised by the discovery that this fundamental particle can originate in atomic collisions of only a few billion electron volt energies.

Beams of mesons were used to measure the size of the atomic nucleus, which was found to be smaller by 15% than previously thought; a polarized proton beam was also used to study the nucleus.

More accurate evidence was obtained that atomic nuclei can be electrically excited without actually colliding.

A 60,000-kilowatt full-scale atomic reactor was designed to produce peaceful atomic energy.

A cosmic ray observatory, serviced by airplane, was established on the summit of Mt. Wrangell, a 14,000-foot peak in Alaska.

Bombardment of the earth with cosmic rays from outer space has not varied more than 20% over the last 35,000 years, it was concluded.

A new charge exchange accelerator using protons as atomic projectiles, under development at the University of California, was dubbed the "swindleton" because it "cheats" by giving two boosts of energy to the projectile for each electrical impulse.

Plans were discussed for a 15-billion-electron-volt "colossatron," a giant atomic accelerator using the new, strong-focusing principle developed last year.

The beam of a 2,000,000-volt atom smasher was pin-pointed so that it would strike only one or a very few of the genes in a living cell, contributing information on which parts of the cell would be most affected by radiation from an atom bomb.

An electron synchrotron that may later use the new strong focusing system started work at Cornell University.

The Patent Office allowed claims on a high-frequency analysis aid that gives a highly sensitive reading of molecular changes when a known chemical is added to an unknown solution.

The possibility that the hydrogen bomb can be made without using the older fission-type atomic bomb as a trigger was speculated upon. A possible trigger was forecast in exploding wire experiments in the 1920's to duplicate the temperatures of the stars.

An explosion occurred in Russia which may have been of a hydrogen superbomb; civil defense authorities assumed that Russia has a stockpile of at least 67 atomic bombs.