

PHYSICS

Understanding the Atom

► CLEARER KNOWLEDGE of a ghost particle in the atom's nucleus, or core, will come within six months, predicts Dr. C. N. Yang of the Institute for Advanced Study, Princeton, N. J., one of the winners of the 1957 Nobel Prize in Physics.

The experiments that will produce this breakthrough are already underway at Brookhaven National Laboratory on Long Island. Scientists there are using the giant 30 billion electron volt atom smasher for these new nuclear studies. An important product is ever-increasing knowledge of a mysterious subatomic particle, the neutrino.

Known as the ghost particle, the elusive neutrino has a vanishingly small mass and is without electrical charge. The neutrino is shot out of the nucleus at the speed of light when atoms split due to their radioactivity. It is so small that one billion trillion trillion neutrinos (one followed by 45 zeroes) could fit into a square inch of

space. Neutrinos can, on the average, penetrate 50 trillion miles of lead.

Dr. Yang said that the neutrino experiments at Brookhaven will help to determine how many different types of neutrinos exist. He made his comments to SCIENCE SERVICE by telephone in answer to a question concerning what progress has been made in nuclear physics since finishing his book, "Elementary Particles," published by Princeton University Press. (See SNL, 81:12, Jan. 6, 1962)

The book is a short history of some discoveries in atomic physics, with particular emphasis on the so-called strange particles found when atomic nuclei disintegrate. The book's jacket, in a dramatic way, illustrates the contribution to physics made by Dr. Yang and Dr. T. D. Lee, now also at the Institute for Advanced Study, for which they were awarded the Nobel Prize.

• Science News Letter, 81:34 January 20, 1962

SPACE

New Type Echo Balloon

See Front Cover

► A NEW TYPE green-tinted inflatable Echo balloon, seen on this week's cover, is intended for use in communications satellites, the National Aeronautics and Space Administration reported in Washington, D. C.

The 235-foot diameter sphere inflates at an altitude of 950 miles when 600 miles down range from Cape Canaveral, Fla.

The new Echo balloon's rigid "skin" is made of two thin layers of aluminum foil laminated to a Mylar plastic film. The weight of the sphere is 500 pounds. Each side of the skin is coated with the chemical, alodine, for controlling the temperature of the balloon. The alodine coating gives the skin its green tint.

The new Echo balloon is launched folded in a canister as was its sister sphere, the 100-foot Echo I satellite, launched Aug. 12, 1960. The Echo I satellite is still circling the earth and reflecting radio signals. Echo

I was made of Mylar plastic covered with vapor deposited aluminum. The satellite is now only 40% as effective as when first launched because its non-rigidized surface is not smooth any more.

When released from its canister, the new Echo balloon inflates from a sublimating powder, acetemide, inside the sphere before it is packed in the canister.

Once inflated, the balloon is rigidized mechanically by stretching the skin beyond its elastic limit. This causes it to "forget" its former folds and creases so it retains its smooth spherical shape.

A television camera allows scientists at Cape Canaveral to follow the ejection of the canister and the inflation of the balloon. A motion picture camera takes pictures of the sphere and is then ejected for retrieval. The two cameras are expected to give scientists new data on canister opening and balloon inflation not possible before.

A rigidized Echo satellite is planned for launch later in 1962.

• Science News Letter, 81:34 January 20, 1962

TECHNOLOGY

Plan Electronic Highways

► MULTI-MILLION-DOLLAR electronic highways spanning the continent may come sooner than highway planners had imagined.

At the Highway Research Board meeting in Washington, D. C., A. E. Johnson, executive secretary of the American Association of State Highway Officials, reported on the projects to be undertaken by the new Research Activities Committee, one of

which is the investigation of electronic guidance systems.

The new committee was evolved by a consensus of 46 states to pool resources to study highway problems. It will set up projects and spend \$2,500,000 each year for research. In the first year under the new plan, \$400,000 will be spent for improving traffic capacity and safety, including the study of electronic highways.

RCA has offered to furnish electronic controls for testing under the program. Michigan, Ohio and Massachusetts have offered 100-mile sections of highways to compete with the test areas now in existence in Nebraska. The Nebraska tests have included 300- or 400-foot intersections for electronically controlled braking and steering systems as well as speed control.

Some of the possible avenues of research include the use of fully controlled systems, speed controls, electronic warning devices in the vehicle to warn drivers of danger, the design of more effective signal lights, electronic signals to allow cars to pass when intersections are clear and the use of portable controls on toll roads only.

Electronic devices now available can control the direction and speed of the vehicle. Cost and assurance of reliability are the only factors which have not been overcome.

The Board will hold a seminar with leaders of universities and research centers to decide what problems will be undertaken. These projects will then be placed in the hands of groups across the country that will experiment with the engineering design of techniques and devices to increase safety on the nation's highways.

• Science News Letter, 81:34 January 20, 1962

EVOLUTION

Evolution of Birds; Chicks Grow Scales

► BECAUSE SHE found that feather-producing areas of chick skins when grafted would produce scales, but not the reverse, Dr. Mary Rawles of the Carnegie Institution of Washington's Department of Embryology, Baltimore, suggests that this is evidence for the evolution of birds from reptiles. Feathers are believed to have promoted the survival of birds, risen from the reptiles, as warm-blooded animals.

• Science News Letter, 81:34 January 20, 1962

GEOLOGY

Meteoritic Dust Found Buried in California

► METEORITIC DUST particles about 100,000,000 years old have been found deep in the earth layers in California.

During routine inspection of well cores with a microscope, grains of a dark, heavy, metallic quality which resembled weld spatter were discovered. In checking other drilling samples, scientists discovered that similar particles were recovered in many areas of the state.

After refinement of the rock, the rare spheres were identified by the use of magnet and microscope as being meteoritic in origin.

The rocks which contained the particles are Cretaceous, Miocene and Pleistocene in age, the oldest of which is approximately 100,000,000 years. They were found in the Sacramento, San Joaquin and Ventura basins of California, Dr. H. Skolnick of the Spanish Gulf Oil Company reports in the Geological Society of America Bulletin, 72:1837, 1961.

• Science News Letter, 81:34 January 20, 1962