



ATOMIC BIG BERTHA

An entirely new principle is involved in the operation of this "straightaway" atom-smashing apparatus at Cornell University.

PHYSICS

## New Atom Smasher Uses Short Wave Radio Generator

**A**N ATOM smasher of new type, producing high speed particles at relatively low voltages with safety to the operator, promises a further understanding of the structure of the nuclei of the atoms and the forces holding them together. Completion of this new tool of science was announced recently at Cornell University.

It is an eight-foot glass tube, six inches in diameter, with a radio short wave generator providing an alternating potential which changes ten million times each second. Operating very much like the distributing system of an automobile where the spark plugs ignite each cylinder in rotation, the short wave generator of the new atom smasher alternately charges the segments of the tube through which the particles have to pass on their way to the target.

In contrast to the well-known cyclotron, which speeds up its atomic bullets in a merry-go-round motion, the new atomic gun accelerates the projectiles in a line. It is called a linear resonant accelerator by its designer, Dr. Lloyd P. Smith, professor of physics at Cornell. With Dr. Paul L. Hartman, of Reno, Nev., Prof. Smith has completed his machine at a cost of about \$7,000 and it is now in successful operation.

Advantages claimed for the new tool are: 1. Greater accessibility of the ion source and the target and absence of danger from electrical shock; 2. Ability to accelerate heavy atoms more successfully than the cyclotron; 3. The resonant property of the system serves to select out the atom desired as a bullet thereby saving the target from unnecessary bombardment; 4. A vacuum for the tube is produced by a simpler process and can provide a greater beam density of accelerated particles than the cyclotron.

An original voltage of 50,000 to 70,000 volts is stepped up to about a half million volts and the tube produces ions of higher intensity otherwise available only by use of voltages running into the millions.

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PHYSICS

### Scientific Side of Skiing Studied by Physicists

**S**KIING has achieved wide recognition as a thrilling sport and as one of the most graceful of the kinetic arts. But there is more to it than that. It is a branch of applied physics, and as such it has received serious scientific attention.

Not, as might be imagined, in Norway, the land of its birth. The physicists who have devoted close and exact study to the physics of the wood-winged feet bear the utterly un-Norse names of Uki-tiro Nakaya, Motoiti Tada, Yataro Sekido and Tamakiti Takano. They are members of the faculty of science at The Hokkaido Imperial University, and they conducted their researches in the pearly powder-snow on the slopes of Mount Tokati on the northernmost of Nippon's principal islands.

First of all they studied the physics of the snow itself. Powder-snow, they found, forms from the tiny, starlike snow crystals by the double process of sublimation (evaporation without thawing) and re-deposition of the vapor as ice on the flat sides of the crystals. This converts them into rounder, denser pellets—something more nearly approaching the conditions of particles in a true powder.

They found also that even without partial thawing and refreezing, deep falls of snow have a layered or stratified structure, due probably to differences in rates of fall as influenced by changes in the wind. These obscure strata could be demonstrated by digging a wide hole in the snow and building a blazing fire at its bottom.

When a ski passes over a snow mass it causes a packing down of the snow directly beneath it. The degree and depth of packing can be studied by means of the stratifications just mentioned.

Above this packed zone, there is a depth of several inches of loose snow that is carried forward by the thrust of the sloping ski. The Japanese scientists were able to obtain graphic curves representing this zone of displaced snow by cutting a narrow slot in the snow with a pane of glass, filling this with a colored powder, charging over it on skis, and then cutting a vertical section along the ski-track to photograph and measure the curve.

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BOTANY

### Two Monkeys Trained to Collect Treetop Flowers

**T**WO monkeys have been trained as assistant collectors of botanical specimens in high trees, by E. J. H. Corner, Acting Director of Gardens, Straits Settlements. The animals are of the species known locally as "berok." They understand twelve words of Kelantanese, a native language, and can thus be instructed to pick only the twigs which their owner, on the ground, directs them to take.

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