ENGINEERING

Giant Centrifuge Tests Mines And Bridges In New Research

America's First School of Mines, Columbia's School Of Engineering, Celebrates Anniversary with Exhibit

A WHIRLING merry-go-round of science is the latest testing machine for determining how bridges can be built and mines can be drilled safely.

At Columbia University's School of Engineering, celebrating its 75th anniversary, this centrifuge method of engineering testing was demonstrated publicly for the first time.

Prof. Philip B. Bucky of the Columbia School of Mines and his engineering students have built an enormous centrifuge in which can be placed models of the underground workings of a mine or models of bridges built to scale using transparent Bakelite plastic.

These structures are whirled faster and faster in the centrifuge merry-go-round and as they whirl the centrifugal force stresses them and thus tests them.

A force of 2000 times gravity is created.

In the case of the mine structure, the problem is to find just how far miners can go in cutting holes in the rock they are mining. Holes might cause the rock to smash to bits under the thousands of tons of other rock pushing down from above. The stress built up in the centrifuge substitutes for the real stress that might be encountered under actual working conditions. The miniature block of rock collapses when the speed is high enough, just as the real mine would under the force of gravity.

Prof. Bucky can thus tell the mining engineers in a real mine how far they dare have the miners go with safety.

Light is used to measure the stress in the whirling bridge models. Polarized light, light that vibrates in one direction only, from a powerful mercury arc lamp, is flashed on and off so rapidly in exact synchronism with the centrifuge that the transparent model bridge is seen as though it were standing still. Bands of light and dark move through the model and these photo-elastic fringes enable the Columbia engineers to calculate just how and where a real bridge of that same design will be stressed in actual service.

Science News Letter, November 18, 1939

A NEW laboratory device to test the lubricating properties of oil films only one-tenth of one-millionth of an inch thick has been invented by William Claypoole, first holder of a fellowship in the Columbia School of Engineering established by the Texas Oil Company of New York for lubrication research.

The device measures the friction encountered when diamonds and sapphires are rubbed over polished and thinly lubricated surfaces of steel, gold, platinum and rhodium.

The jewel point is pressed on the test surface with a force which can be as great as 100,000 pounds to the square inch. The lubricant under study is spread over the test metal and the latter is slowly rotated. The rounded jewel point is attached to a lever system which detects slight displacements due to friction.

In operation the investigator watches a recording meter and adjusts the pull necessary to balance the friction so that the pointer on the face of the dial stays at zero position. The adjustments are thus a measure of the friction which, in turn, depends on the lubricating qualities of the oil under investigation.

Platinum into Gold

THE ancient alchemists used to talk of transmuting base metals into gold but in results accomplished little. Scientists of Columbia University, as a demonstration stunt, achieved a transmutation of the elements which results in gold. The starting point was not base metals but precious platinum.

The modern alchemists were Dean George B. Pegram of the Columbia Graduate Faculties and Prof. John R. Dunning of the Department of Physics.

The method was to place platinum for some hours near a long glass tube containing a small amount of radium which emitted atomic particles that, by bombardment, turned platinum of atomic weight 195.25 into gold of atomic weight 197.2. The radioactive gold in turn emitted particles which alone made possible the detection of the transmutation.

Other demonstrations included:

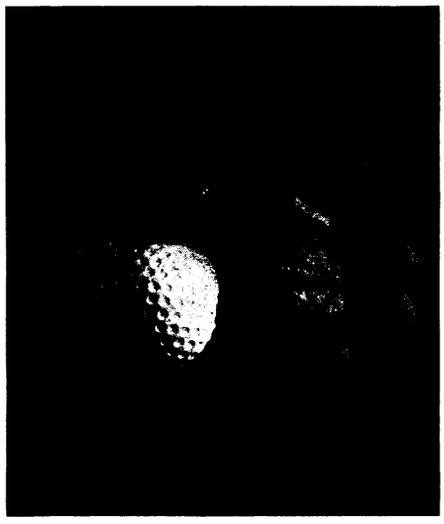
The detection of radioactive sodium in the human body and its circulation by the blood.

The crushing of an eight-foot brick masonry pier in the compression testing machine of the school of engineering.

The demonstration of water seepage under power dams and through various types of soil structures.

A demonstration of the manufacture of isotopes by Prof. Harold C. Urey.

Science News Letter, November 18, 1939



SMALL BUT MIGHTY

This tiny photoflash bulb gives nearly a million lumens at peak.

PHOTOGRAPHY—ENGINEERING

New Midget Flash Bulb Has Million-Lumens Peak

IT USED to be that night and inside photography meant puffs of bothersome smoke, singed eyebrows, perhaps a burnt thumb or worse in the days of flashlight magnesium powder. Photoflash bulbs banished all that, but these have been bulky, the size of standard electric lamp bulbs, stretching pockets.

To the rescue on the 10th anniversary of the photoflash lamp debut comes a midget photoflash billed by General Electric's sales promotion as Mighty Midget, the World's Smallest Practical Photoflash Bulb. It is smaller than a golf ball, 24 to a suit pocket, a peewee lamp with actinic wallop, nearly a million lumens at peak flash. Peculiarities: Bayonet-type base like auto headlamps. It won't work with focal-plane shutters.

Science News Letter, November 18, 1939