PHYSICS

Shooting Around the Moon

If men from the earth were ever able to reach the moon, by the methods of Jules Verne or H. G. Wells, they could engage in warfare in a way unprecedented on the earth, for the ordinary 75-millimeter field gun would shoot three times as far there as did the German long range gun that bombarded Paris during the war. Though the range of the 75 is about 13,000 yards on the earth, on the moon this would be about 250 miles, Dr. Fred E. Wright, petrologist of the Geophysical Laboratory of the Carnegie Institution of Washington, said in a recent lecture at the Institution.

With the long range gun that bombarded Paris from a point about seventy miles away, and had a muzzle velocity of about a mile a second, the lunar gunner could fire nearly halfway around the moon, nearly 3,400 miles. If the gun were pointed directly upward, its shell would reach a height of a thousand miles above the lunar surface. At a muzzle velocity of a little less than a mile and a half per second, which is not beyond the realms of possibility, the projectile could be fired completely off the moon, at the earth or some other planet if desired. For a projectile to leave the earth, it would have to be fired with a velocity of 18 miles or more per second; or at nearly 7 miles per second, if the earth had no atmosphere.

Dr. Wright has made these studies of the diminished force of gravity and lack of an atmosphere on the moon's surface in connection with the work of a Carnegie Institution committee of astronomers, mathematicians, and geologists who are collaborating in an effort to learn more about the earth's satellite.

"The geologist, accustomed as he is to working with conditions as they exist on the earth's surface, finds himself in a different kind of world when he studies the moon," said Dr. Wright. "The force of gravity to which he is accustomed, being so much less, many phenomena would be different. For example, volcanoes on the earth throw rocks only a short distance, so that they often fall back into the crater from which they came. But moon volcanoes would throw such material much farther. The result would be that the inside floor of the volcanic craters would be lower than the outer surface, just the opposite of the earthly volcanic conditions. Also the craters would be much larger than any on the earth. Telescopic obser-

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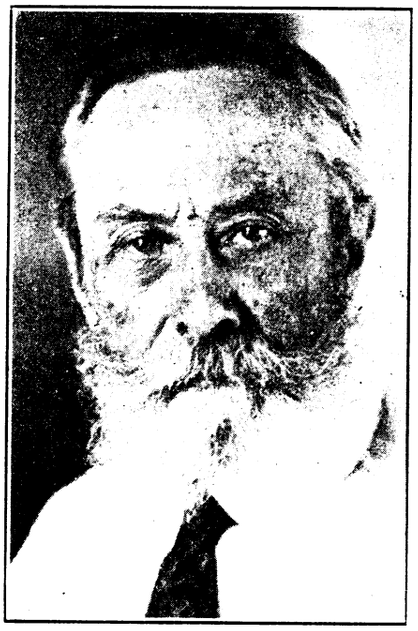
GEOLOGY



BAILEY WILLIS

Collector of Earthquakes

Some men collect rare books, but Prof. Willis is a collector of earthquakes, for if he knew where the next important shock was going to occur, he would hasten to the spot! In 1925 he was fortunate enough, from his viewpoint, to be staying in Santa Barbara when the earthquake occurred there, and his observations were of considerable scientific value. Though he is now a resident of California, he doesn't mind discussing quakes that occur there, and he is now active in a campaign to install a chain of delicate seismographs in various parts of the state.

Such a program could also be carried out to advantage in other parts of the country, in his opinion, for to a lady in New England who wrote him to inquire whether her daughters would be in danger of earthquakes in a visit to San Francisco, he replied: "We know something about earthquakes which occur in the Bay country, and I think I can safely say there is no immediate danger of a severe earthquake here. I wish I could say the same about New England!"

Prof. Willis was born in Cornwall, N. Y., on May 31, 1857, and since his graduation from Columbia as an engineer in 1878 has held many geological posts, including various official positions in the United States Geological Survey. In 1915, he went to Stanford University, in California, as professor of geology, becoming professor emeritus in 1922.

PHYSICS—CHEMISTRY

Nobel Prize Awards

The University of Gottingen claims the distinction of harboring two of the latest Nobel prize winners. Prof. Richard Zsigmondy, who has received the 1925 chemistry award, did important work in the development of the ultramicroscope which he utilized in determining the size of the minute suspended particles of collodial gold.

The work for which Dr. James Franck, now at the University of Gottingen, and Dr. Gustav Hertz, of the University of Halle, who divided the 1925 physics prize between them, are best known in scientific circles, was performed while they were associated at the University of Berlin. This was the first proof of the validity of the quantum theory, which was proposed originally by Max Planck and has caused a revolution in physical science in recent years, by proposing that light and other forms of radiation are not continuous wave motions, as was formerly thought, but consist of separate bundles, or "quanta," of energy.

Franck and Hertz presented their now historic paper before the Berlin Physical Society in 1912. They found that if an otherwise evacuated tube contained a small amount of vapor of mercury, and that if two pieces of metal or electrodes were sealed within so that the atoms of the vapor could be bombarded by rapidly moving electrons, or particles of electricity, a line corresponding to a certain wave length of light appeared when the glow of the tube was analyzed with the spectroscope. But this only occurred when a definite voltage was applied, which meant that unless the electrons were moving with a certain minimum speed, the particular wavelength of light was not given off from the glowing mercury vapor. At the time, Prof. Fritz Haber, greatest of German chemists, is said to have remarked that "this paper will be fundamental in the progress of physics," a prediction which has been amply fulfilled.

Dr. Svedberg, recipient of the 1926 chemistry prize, is an outstanding figure in the realm of colloid chemistry. He recently came to the United States to attend a symposium on colloid chemistry at the University of Wisconsin. He has since returned to the University of Upsala in Sweden.

Prof. Jean Baptiste Perrin of the Sorbonne University at Paris and winner of 1926 physics prize, is well known to scientists for work done on

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Nobel Prize

(*Continued from Page* 131)

the Brownian movement, the name given to the rapid oscillatory motion of minute particles suspended in liquids. Prof. Perrin developed ingenious methods for measuring this movement which showed that the tiny particles behave in the same way scientists have assumed that molecules would act in accordance with the kinetic theory of gases. He has been more recently concerned in studies to show the effect of light on chemical reactions.

Science News-Letter, November 27, 1926

Large arrows pointing north have been painted on 13 lighthouses on the east coast to guide aviators.

Holes drilled by earthworms form innumerable tunnels through which air and water penetrate the earth.

Business letters sent 4,000 years ago were inscribed on clay tablets and put in envelopes also made of clay.

Out of 1,200 employees in a Pittsburgh store, 95 per cent were found to be suffering from correctable defects.

Moles are not blind, but their sight is very poor.

A fleet of about 50 fire boats patrol ports along the United States coast.

The house mouse came to this country from the other side of the world.

The water of the Dead Sea has about 70 times the bromine content of ocean water.

A schoolroom in an English town has been fitted with window panes through which ultra-violet light can penetrate.

Statistics indicate that cancer deaths have increased 47 per cent for males and 21 per cent for females in the past 15 years.

Plans for new buildings at Walter Reed Hospital for disabled soldiers at Washington call for installation of radio equipment.

The ancients valued glass because of its brittleness, and the Roman Emperor Tiberius beheaded an artificer who said he could make glass malleable.

Shooting Around the Moon

(*Continued from Page* 131)

vation shows that both of these conditions actually occur. Another point of marked difference is the lack of erosion forms on the moon. While so many of the earthly surface features are the result of weathering by wind and water, the moon is without atmosphere and moisture and these forms are absent."

Dr. Wright has also been investigating the force of gravity of the earth and is developing a new form of apparatus for measuring its intensity. The standard way of doing it is with a very accurate pendulum, but the method is complicated and a week or more is required to set up the apparatus at any one place and make the readings. The new instrument, which measures the twisting of a spiral tungsten spring due to the earth's attraction, gives promise of permitting readings comparable in accuracy with the pendulum to be made in a few hours.

Science News-Letter, November 27, 1926

A pound of radium gives off as much energy in its lifetime as 400,000 pounds of high grade coal do when burned.