PHYSICS

New Cosmic Ray Device Nears Completion at U. of Chicago

Giant 12-Ton Magnet in Wilson Cloud Chamber Serves To Bend Rays So Their Energies Can Be Calculated

MORE powerful than any other similar apparatus in the world is the new cosmic ray equipment now nearing completion in the laboratory of Prof. Arthur H. Compton, Nobel Prize scientist of the University of Chicago.

Heart of the device—a Wilson cloud chamber—is a giant 12-ton magnet whose strong field will bend cosmic rays and the atomic electrified debris so that their energies can be calculated. The magnetic field generated by the new Chicago magnet will be 40,000 times as powerful as that of the earth. The magnet was designed by Prof. Compton and his research associate, Haydn Jones.

The equipment will be used, states Prof. Compton, in a new series of experiments by which it is hoped further data can be obtained on high energy particles to see if the known laws of electricity apply to them.

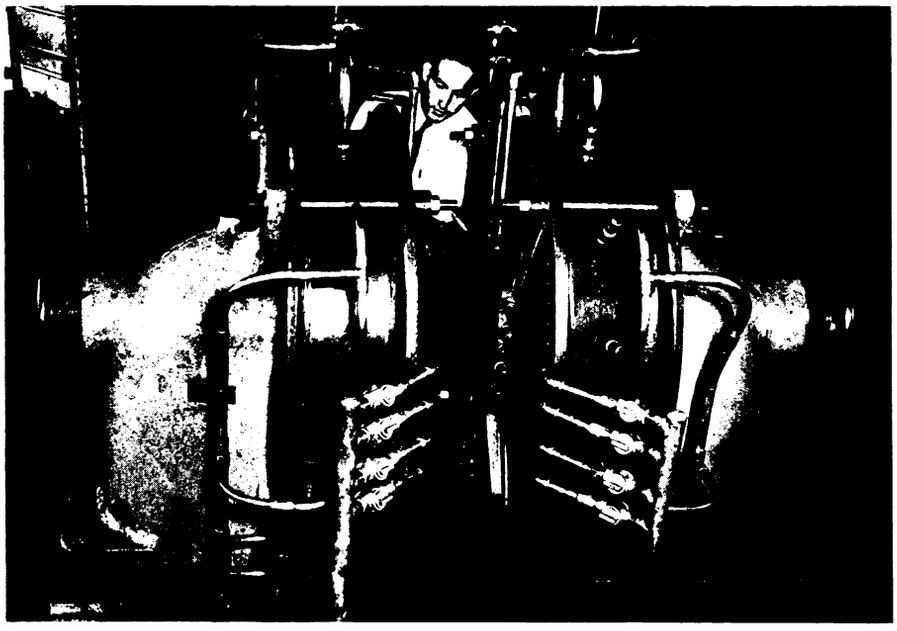
As cosmic rays pass through the moist gas of the Wilson cloud chamber in the field of the magnet, they will leave a fog trail which is automatically photographed. Prof. Compton estimates that there should be one cosmic ray entering each second and about one out of fifteen will be moving in the proper direction for photographing.

Curve Reveals Charge

The magnetic field will bend the paths of the cosmic rays. Very high energy particles are less susceptible to deflection than are those of lesser energy, in somewhat the way that a baseball is harder to curve than is a pingpong ball. Because the magnetic field will curve the tracks of the paths of particles of high energy to a less extent than it will those of low energy, Professor Compton will be able to judge the energy, and determine if the particles are positively or negatively charged.

Previous experiments have measured energies up to 20 billion volts, but Professor Compton hopes to extend the measurement with his magnet to energies of 40 billion volts.

Science News Letter, August 22, 1936



FOR COSMIC RAY STUDY

The giant 12-ton magnet with which Prof. Arthur H. Compton, Nobel Prize scientist of the University of Chicago, will launch new studies of cosmic rays. Haydn Jones, Dr. Compton's research associate, is shown examining the magnet which will be a part of Wilson cloud chamber equipment that will enable photographic determination of cosmic ray impacts to be taken. It is hoped that cosmic rays with energies as high as 40,000,000,000 volts can be studied by the device. The previous energy record was twenty billion volts.

AGRICULTURE

Agricultural Prospects Very Dark for 1936

IN COLD, neatly-typed figures, the Crop Reporting Board of the Bureau of Agricultural Economics announced on August 10 the black agricultural prospects of the nation for 1936. Even if rains now come, they will do little good.

Corn production estimates are only 46.8 per cent normal and the crop is the worst since 1881. Spring wheat is only 32.8 per cent normal and with the exception of 1934 is the worst on record. Oats are 55 per cent normal and of all the edible grains only rice at 86 per cent is anything like normal yield.

The potato crop at 59.8 per cent normal is the worst on record since 1863.

Cotton, unlike most other crops, has had favorable weather during July and the yields are expected to be above average in all states except Virginia and the Carolinas.

Affects Livestock

The reverberation of the report, covering the period up to August 1, in the livestock market will be widespread. Particularly affected will be hogs, which are most dependent of all animals on corn for fodder. Hay consuming animals will be better off than in the drought year of 1934. Hay supplies are 20 per cent greater than in 1934 and the number of animals is 3 per cent less. Heavy marketing of grain-consuming livestock and a lessening of winter rations for this stock are in prospect.

Crop conditions improved only locally during the week ending 8 a.m. Aug. 11, states the weekly weather and crop bulletin summary issued by the U. S. Weather Bureau (Aug. 11).

Showers of the week were confined mainly to the region east of the Mississippi River, while the great drought area of the central plains had abnormally high temperatures (110 de-

grees and over) with only scattered local rains as compensation.

The drought, already called the most severe in the history of the nation, "has been intensified and where rains occurred they afforded only temporary relief, except locally," states the newest report.

Science News Letter, August 22, 1936

PSYCHOLOGY

"Blanks" Occur in Mind Several Times a Minute

YOUR mind "goes blank" several times every minute. During these blank periods you involuntarily stop work for a couple of seconds. If you are tired, the stops occur oftener—maybe eight or ten times each minute—and they may last twice as long.

This automatic putting on of brakes by the brain was discovered in experiments conducted at the psychology laboratory of the University of Chicago, under the direction of Prof. Arthur G. Bills. The "blocks," as Prof. Bills calls these blank periods, are not complete, he explains. The individual does not lose track of what is going on, but he must stop mental work on the task at hand.

Blocks partly account for the "er-r-r" and "ah" which public speakers put between words. These blanks are particularly conspicuous when a person is doing rapid calculating. Every so often, he is unable to proceed and stalls. Fatigue increases both the frequency and the duration of the blocks, causing bunching of responses or spurts of work.

Stutterers Block Often

Stutterers block about twice as often as normal persons and their blocks last longer, it was found.

"It is safe to assume that there is a common neurological basis between blocking and stuttering," Prof. Bills concluded.

Mental blocks are enforced resting periods, he explained. They may account for the fact that continuous mental work does not impair mental efficiency to nearly the same extent that muscular work impairs muscular efficiency, he believes.

By giving his subjects artificial rest periods timed to coincide with their blocks, Prof. Bills found that he could practically eliminate the blocks. He also found that most errors occur just before or just after a block; and that when the tasks are more tiring, the number of blocks is greater.

Science News Letter, August 22, 1936

ASTRONOMY

Tiny "Nearest" Planets Are Given Classical Names

THE TWO tiny planets, or asteroids, which approach closer to the earth than any other known body except the moon, have now been given names to honor two mythological characters who have so far been omitted from the sky. According to the Astronomisches Recheninstitut in Berlin, the one discovered in 1932 by Dr. Karl Reinmuth of the Neu-Babelsburg Observatory of the University of Berlin, has been named Apollo, after the ancient god of the sun, who also concerned himself with prophecy, song, and music.

This little body, probably about a mile in diameter, can come within as little as 3,000,000 miles of the earth.

The second asteroid was found in February of this year by Dr. E. Delporte of the Belgian National Observatory near Brussels. On Feb. 5 it was only 1,376,000 miles away, within 75,000 miles of the closest that it can ever possibly approach. This has been named Adonis, after the beautiful youth who was beloved of Aphrodite.

It has tentatively been called Anteros in the United States, after the god who was opposed to Eros, the god of love. This name was appropriate, because formerly an asteroid called Eros had held the honor of making the closest approach—about 14,000,000 miles. Still another, called Amor, also a discovery of Dr. Delporte, in 1932, comes closer than it, reaching a minimum distance of 10,000,000 miles.

Science News Letter, August 22, 1936

PHYSIOLOGY

An Athlete's Knee Is His Most Vulnerable Spot

IN ACHILLES, it was the heel. In the modern athlete it is the knee.

On athletic fields more injuries occur to the knee than to any other part of the player's anatomy, Dr. Marcus H. Hobart, who for twelve years has been handling athletic injuries at Northwestern University, finds. He presents (*Journal, American Medical Association,* Aug. 15), a review of his experiences, with detailed statistics on the injuries that have occurred in that university in the last five years.

Football, as might be expected, has the longest casualty list of any sport. Dr. Hobart thinks this only natural for "probably five or six times as many students play football as any other sport."

Next to football in frequency of injuries comes wrestling, and after that basketball, baseball, track, swimming, water polo and boxing. Other sports are too safe to merit consideration.

The knee takes the brunt of the punishment for several reasons. Its position is exposed, it can be affected by both direct and indirect force, and since the ankles are well protected and do not give way, the strain is transmitted to the knee. Dr. Hobart thinks it might be better not to strap players' ankles so tightly.

Next in frequency to knee injuries come those to the fingers and toes, ankles, shoulders, nose, face, elbows, back and legs, and feet.

Athletic injuries are either in a class by themselves or in a class with war injuries, the idea being to return athlete or soldier to team or trenches quickly and fully recovered. So that a student may be returned to practice or play only when it will do him no damage, Dr. Hobart states that a physician should be in full charge of the physical side of the team, as the head coach is in charge of the athletic side.

Fractured bones, in Dr. Hobart's athlete cases, are almost always put in a cast rather than a splint, as the cast cannot be easily removed. The general rule, he says, is to use a cast for fractures in children, athletes, idiots and doctors.

Sprains are the most common injuries in athletics, followed by contusions and concussions, fractures, cartilage injuries,