Eli Lilly and Company of Indianapolis, to be given annually to an eminent investigator selected by the Association.

To diagnose radium poisoning, Dr. Evans uses a sensitive radiation detector called a screen-cathode quantum counter which detects the presence of minute amounts of radium's deadly gamma rays. Treatment of the condition consists essentially of a process of rinsing out the radium-contaminated calcium and replacing it with fresh pure calcium. The rinsing out is done by giving parathyroid gland hormone which depletes the calcium in the bones. To make them hard again, more calcium must be given in the diet or as medicine. The method depends on the fact that radium and calcium are very similar in chemical properties and consequently any radium taken into the body tends to accumulate in the same structures—the bony framework—where calcium accumulates.

Science News Letter, July 17, 1937

METEOROLOGY

Long Range Forecasts Unlikely to Be Attained

HOPEFUL but uninitiated people who envision long range forecasting of the weather as providing detailed information on a given day and hour and place are doomed to probable disappointment.

Hurd C. Willett of the Daniel Guggenheim Aeronautical Laboratory of the Massachusetts Institute of Technology took the "Almanac" type of forecast out of the realm of long range weather predicting at the meeting of the American Association for the Advancement of Science in Denver.

Accurate, short-range forecasts predicting local conditions can only be obtained when the full knowledge of widely distributed meteorological conditions are available both from ground stations and from aloft. This full knowledge is necessary, Mr. Willett pointed out, because the specific air masses are continually forming and disintegrating.

But, he added, "It seems rather improbable that the detailed development of [air mass] systems yet unborn can ever be forecast."

Long range forecasting, on the contrary, is based on the known fact that frequently pronounced weather abnormalities may persist over considerable areas for weeks, months and even years. The approach to the problem has been by two methods: the statistical method, using past records of weather and correlating them with an almost endless variety of variables; and the synoptic method, using synoptic charts or weather maps.

The weakness of the statistical methods, said Mr. Willett, lies in the fact that they are empirical shortcuts which have no concern at all with physical causes of the weather. Studying weather maps, carefully prepared daily, however, furnishes a current picture of general circulation of weather over large areas. By studying this general circulation pattern it should be possible to see the influence of the pattern on contemporary weather conditions. A second aim would be to detect, if possible, empirical clues as to the future state of the weather circulation from its current state and tendencies.

For the past year, Mr. Willett indicated, meteorologists at Massachusetts Institute of Technology have been making such daily weather maps and studying them. They have found that during the colder half of the year the principal centers of weather action are the high pressure areas in Siberia and North America and the low pressure areas over Iceland and the Aleutian Islands. Important too are the subtropical high pressure areas over the Pacific and the Atlantic.

Last winter the abnormal warmth in the eastern states through December and most of January appeared due to the westward extension of the Atlantic high. Where this high met the cold mass over the continent there were heavy rains. In the Ohio Valley this led to floods.

In the West last winter's weather was marked by the abnormal disappearance of the customary Aleutian Island low pressure area and its replacement by a persistent high pressure area. This led to persistent cold air masses over the west and the usually warm mild Pacific air went north over the ocean instead of over the west coast of the United States. The western severe winter resulted.

Science News Letter, July 17, 1937

FAST BALL

Wesley Ferrell, crack mound ace of the Washington Senators, shows how he holds his fast ball. On the facing page, see how a pitcher's hand looks to the eye of the X-ray camera.

PSYCHOLOGY

Brain Waves Like Human's Found in the Guinea Pig

BRAIN waves, those electric impulses that are detected in the human brain itself, are probably not associated with the higher thought processes of man.

The same sort of brain rhythms have been obtained from the brain of the humble guinea pig, it is reported (*Journal of Experimental Psychology,* July), by Drs. H. H. Jasper, C. S. Bridgman, and Leonard Carmichael of The Bradley Home, Brown University and the University of Rochester.

This brain wave pattern, known to scientists as the "alpha rhythm," is not outstandingly characteristic of the electric messages ordinarily sent out by the guinea pig's brain, the investigators said, but it is possible to record from the guinea pig brain, electrical variations which in frequency, regularity and continuity, present the same nature as a good record of alpha rhythm from the human cortex.

"The findings of well-developed alpha rhythms in the guinea pig would lead one to believe that this phenomenon is connected with some basic neurological mechanism, rather than with any higher elaboration of nervous function found only in the primates," the psychologists conclude.

Science News Letter, July 17, 1937

ASTRONOMY

Meteor "Speedometer" Tells Velocity of Shooting Stars

Sky-Patrol Cameras Located 24 Miles Apart, Trained On the Same Point in Space, Used to Plot Their Orbits

NEW proof that many of the brightest meteors that blaze through the atmosphere are not aimless cosmic "tramps" but are in reality minute rock planets traveling, like the earth, in orbits around the sun, was reported by Dr. Fred L. Whipple, of Harvard Observatory.

A feature of Dr. Whipple's investigation, it was revealed, has been the successful use of a "meteor speedometer" in recording the terrific speeds of these shooting stars during the few seconds when they blaze out against the friction of the upper air.

The complexities of computing the meteoric orbits also required the Harvard observers to undertake the intricate task of photographing the fiery paths of these bodies simultaneously in two widely separated telescopes.

In fifteen months of sky patrol, six of the bodies were "caught" by the two cameras, and data secured from which the distance, height, direction of motion, speed, and orbit, could be determined, Dr. Whipple said.

Computing the masses of the meteors through measures of the braking effect of the earth's atmosphere on them, as shown in his "speedometer," Dr. Whipple found that the bodies observed ranged from several pounds for the slowest meteor to an ounce for the fastest. Their speeds in the atmosphere varied from nine to fifty miles per second.

Orbital computations have been completed for five of the observed bodies, Dr. Whipple reported. Four of these, he found, had been moving in small elliptical orbits about the sun, and were therefore members of the solar system. The fifth body had been moving in a hyperbolic orbit, indicating an origin in interstellar space outside the solar system.

The hyperbolic meteor was calculated to have a speed of twenty miles per second before it came into the sun's gravitational attraction. This speed is only slightly greater than the average speed of the stars, Dr. Whipple pointed out.

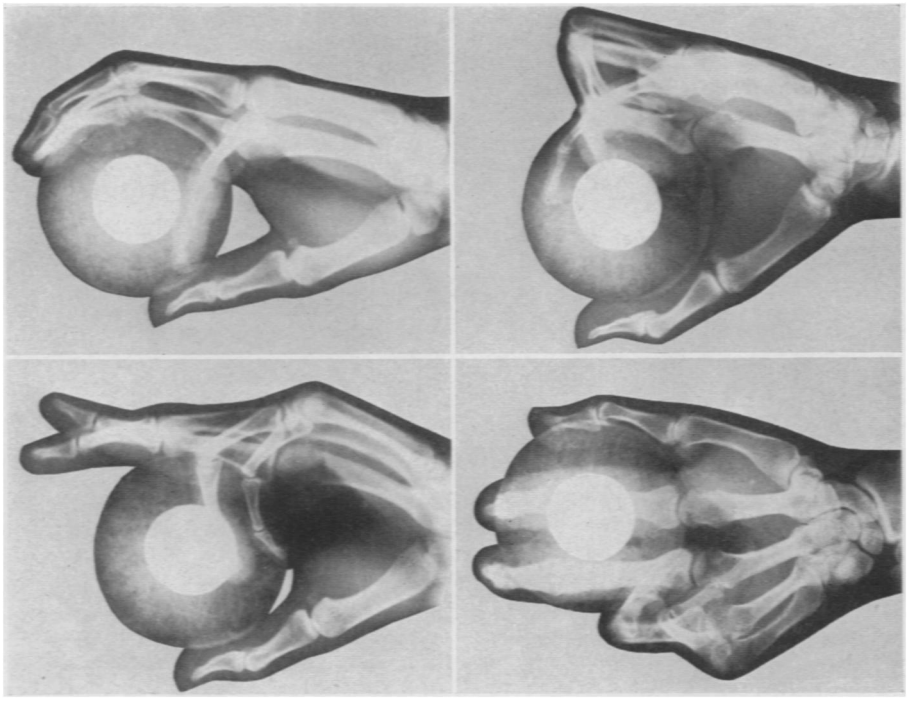
Harvard's meteor cameras were located twenty-four miles apart, one at the Cambridge station, and the other at Oak Ridge, in Harvard, Mass. The telescopes are the regular sky-patrol type in common use, and for this study were both trained at the same point in space, some fifty miles above the earth's surface.

The "meteor speedometer," in the shape of an electrically operated "windmill camera," was attached to the Oak Ridge telescope. Main feature of this instrument is a set of fan blades revolving in front of the camera lens, interrupting the sky picture twenty times per second.

When a meteor flashed down in front of the lens, its trail was cut twenty times for every second it was visible, and measurement of the artificially produced segments in the trail provided a precise indication of velocity. Dr. Whipple said that the underlying principle of this "speedometer" has been understood for many years, but because of various difficulties involved in its use, precise results have not been obtained by this method before.

The great distance between the two observing cameras was necessary, Dr. Whipple said, to give a long enough "base" for geometric computations from the photographs of the position and movement of the bodies.

Dr. Whipple found that the midpoints of the visibility of the meteors came at altitudes ranging from forty to seventy miles. "The fastest meteors were observed at higher altitudes," he said, "which is exactly what we should expect because the greater air friction of faster moving bodies would cause them to become visible at higher altitudes where the air is rarer. The meteors photographed would have appeared brighter than Mars to the naked eye and were therefore much brighter and larger than the average."



HERE IS HOW IT LOOKS

Top left: The X-ray camera of Miss Francis M. Davis catches the grip of a left handed pitcher for a fast ball, with a hop on it. Lower left: The change-of-pace, or slow ball, which the pitcher hopes will surprise the batter after the fast one. Top right: Grip on the famed knuckle ball that floats up to the batter without revolving and is difficult to bat for a long hit. And it's difficult to control, too. Lower right: Here's how a curved ball grip looks by X-ray. Miss Davis used a West Coast pitcher for her shadowgraph model.