ASTRONOMY

Camera Study of Meteors

Photographs of "shooting stars" are expected to provide much new information about the ionosphere, weather variations and the climate of the world.

➤ PICTURES of "shooting stars" have shown that the density of the atmosphere 45 miles or so above the earth increases in summer and decreases in winter. This new discovery was announced to the American Astronomical Society meeting in New Haven, Conn., by Dr. Fred L. Whipple of the Harvard College Observatory.

Meteors are high-velocity projectiles, but unlike V-2 rockets, they begin their flight in outer space and become trapped in our atmosphere, where they boil away high above the earth. The flash of light by which we know of their passing originates high in the atmosphere, in the same area now being reached by rockets.

More information about the densities and temperatures of this area 50-100 miles above the earth, and how they vary with the seasons, is thus vitally needed if we are to make maximum use of this "proving ground" for rockets and other high-velocity projectiles.

Density of the upper atmosphere is lowest in the northern hemisphere in late January and highest in early August, Dr. Whipple found. Thus, it is correlated with the average ground temperature, and changes with the seasons rather than with the sun.

Local variations of temperature have little or no effect on the atmosphere's density at this height, his studies indicated. Nor are storm fronts responsible for changes in density, as previously thought.

This Harvard photographic study of meteors, which has produced definite results after only a few months of observing, is sponsored by the Bureau of Ordnance of the Department of the Navy. The reduction of observations is being carried out by the M.I.T. Center of Analysis under the direction of Drs. Z. Kopal and L. Jacchia. The first photographs last August were taken simultaneously from two mobile caravans located just north of the Mexican border and near the city of Las Cruces, N. Mex. This is the first mobile photographic observatory to be used to study meteors.

These meteor photographs are also expected to provide new information about the nature and role of the ionosphere, upper layer of the earth's atmosphere which bounces radio waves back to the earth and enables us to hear distant radio signals, about weather variations and the climate of the world.

Separate stations and the use of two cameras make it possible to measure the height of meteor trails within a few feet and chart their paths more accurately. From this, scientists can determine the density of the atmosphere 50 to 75 miles up.

The assembling and most of the construction of the new type observatories was done by two young veterans, Harlan J. Smith and Richard E. McCrosky. They were assisted on the photographic work by Phillip Carroll, Jr. Mr. Smith was a Science Talent Search Winner in 1942. Three pairs of small photographic cameras equipped with rotating shutters operate at the two stations to photograph meteors simultaneously.

Two large cameras are being built specially to trap the faint, fleeting light of "shooting stars," those bits of cosmic dust that rush into our atmosphere and perish high above the earth.

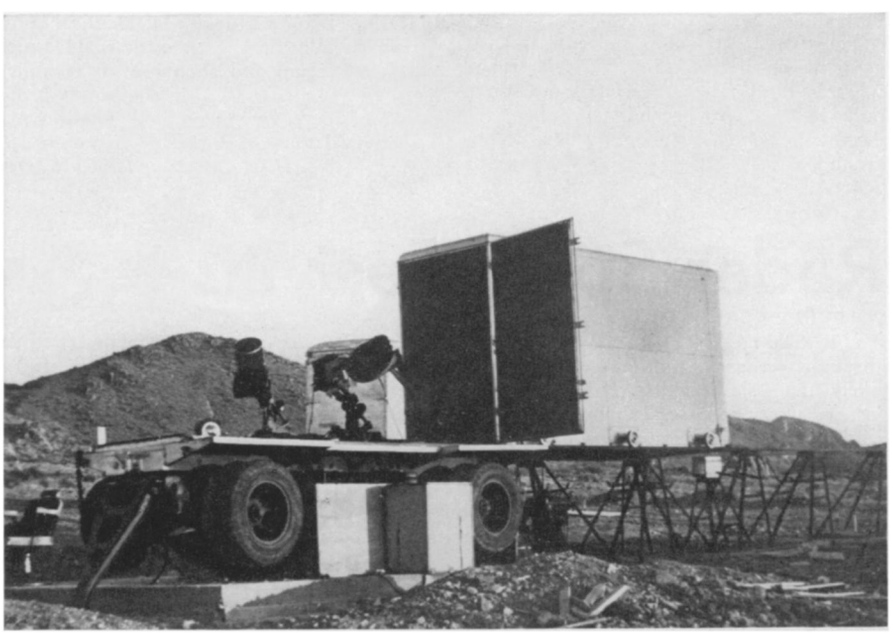
These super-duper Schmidt-type cameras are expected to be completed and put into operation in about a year, Dr. Whipple announced.

Designed by Dr. James G. Baker, they will view a wide field and record the flight of meteors much fainter than those now observed.

The speeds of meteors and the fact that their appearance cannot be predicted makes them hard to photograph. Only the bright ones show up on most plates.

"These large cameras are expected to extend the magnitude range of photographic meteors approximately four magnitudes below the limits now set with conventional lenses, that is, not far from the average limit of visual observations," Dr. Whipple stated.

Science News Letter, January 8, 1949



METEOR PHOTOGRAPHY—The three cameras housed in this trailer, and a similar set 16 miles away, constitute Harvard's newest astronomical observatory and the first mobile observatories for photographing meteors. They are located in southern New Mexico near Las Cruces.

ASTRONOMY

Antenna 50 Feet Across To Pick Up Solar Noise

➤ AN ANTENNA 50 feet in diameter, to be used with a very sensitive radio receiver in detecting radio signals from either the sun or cosmic space, was described at the meeting of the American Astronomical Society in New Haven, Conn., by John P. Hagen of the Naval Research Laboratory.

This enormous instrument, to be ready to go into operation within a year or so, will be the largest precision instrument of its kind. With it the exact location and size of the area from which the cosmic static is originating may be determined more precisely.

Now in the process of being built, this enormous "dish" is being made of cast aluminum and its parabolic surface will be machined after casting. The whole will be mounted equatorially on a pier, with the training mechanism a converted gun mount. This has the necessary precisely machined gears and also the necessary strength to hold this antenna under ad-