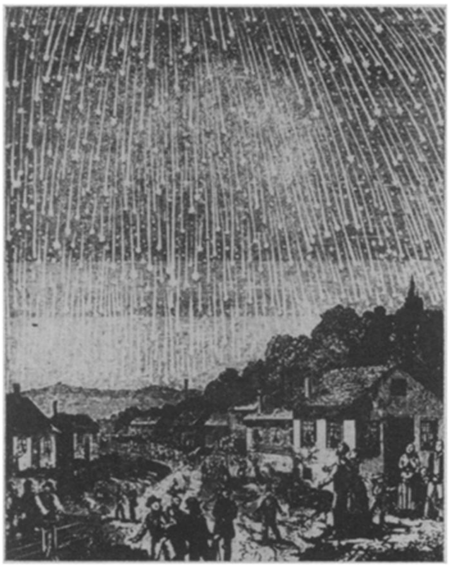
Leonids Fulfill Promise



19th Century Wood Cut

Of the dozen meteor streams that the earth runs into every year in its journey through space, the Leonids—although not providing the highest number during an hour of viewing—usually make a good show in mid-November.

Every 33 years, the Leonid meteor shower is expected to give a truly spectacular display. This was a 33rd year, and the shower lived up to predictions for people who were not frustrated by clouds and who made their observations within a couple of hours of dawn.

Estimates for one hour of pre-dawn viewing ranged from 200 per hour along the East Coast to a 40-a-second peak over Arizona, compared to the 50 seen last year. The average number of "shooting stars" seen when the earth is not passing through a concentration of cometary debris is seven.

In 1966, the position of the earth in relationship to Comet Temple-Tuttle, believed to be the parent of the Leonid meteor shower, was the same as it was when the awe-inspiring Leonids showered "like snowflakes" 133 years ago.

Although historically a 33-year period has produced the most spectacular displays, a more reliable period, based on the orbit of Temple-Tuttle and the particles in the Leonid meteor stream, may be 133 years. Such a long period would account for the good show made by the Leonids in 1966.

SEISMOLOGY

Blasts Test Detector

A pair of underground nuclear tests planned during November are expected to provide the key to whether one monster seismic array is enough to provide fool-proof detection of sneak underground nuclear tests.

There are already indications that the one 525-seismograph array of arrays in Montana may be inadequate. A decision on whether to build a second is imminent.

The atomic blasts of Nov. 21 and 29 are expected to give the Government the important clues needed to settle the role of large arrays of seismic stations. When the results are in, they should show whether earth's quiverings can be identified at a distance as natural earthquakes or nuclear explosions by seismographic techniques.

The difference is a crucial one in negotiating an international treaty banning nuclear tests, since proving it out could make on-site inspections, an anathema to the U.S.S.R., needless.

The Atomic Energy Commission scheduled for Nov. 21 what was billed as the most powerful underground atomic explosion ever detonated at the Nevada Test Site. Also planned for November, on the 29th, is the explosion in a Mississippi salt dome of a 350 ton yield device aimed specifically at improving techniques for detecting underground blasts. The specific purpose the second shot, called "Project Sterling" is to test the theory that "decoupling," or reducing the transmission of earth shock and long-range seismic signals by careful placement of the blast, will reduce the shock signals recorded around the world.

Since the location of both these tests is exactly known, scientists hope to examine the seismograph records, figure out the exact detonation point from the seismogram calculations alone, then check this position against the actual origin. They were miles off in earlier tests.

The 525-unit array of seismographs in Montana that the Defense Department put into operation last year to monitor nuclear blasts has not yet yielded any positive results, mostly because scientists had a difficult time learning how to cope with the mountains of data the instruments were recording. A computer had to be instructed how to handle the masses of information, and that operation took time to iron out.

It is probable that the 1966 calculations will show that only one seismic array—even one the size of the Montana installation—is not enough to determine the exact location of an underground tremor, whether natural or nuclear. At least two such stations may be needed to identify the blast source and pinpoint the site.

Montana's Large Aperture Seismic Array, or LASA, is the largest and most sensitive earthquake detector in the world. The array is five to 20 times more sensitive than previous seismic stations.