# Innisfree meteorite — Winter windfall

*Canadian scientists are reading the biography of a meteorite photographed in the Prairie sky, then recovered on earth.*

It weighed 4 lb. 9 oz. and like any new arrival drew a good deal of fuss and attention. But this one was different — born in the asteroid belt and left in the dead of winter on science's doorstep — Canada's newest meteorite.

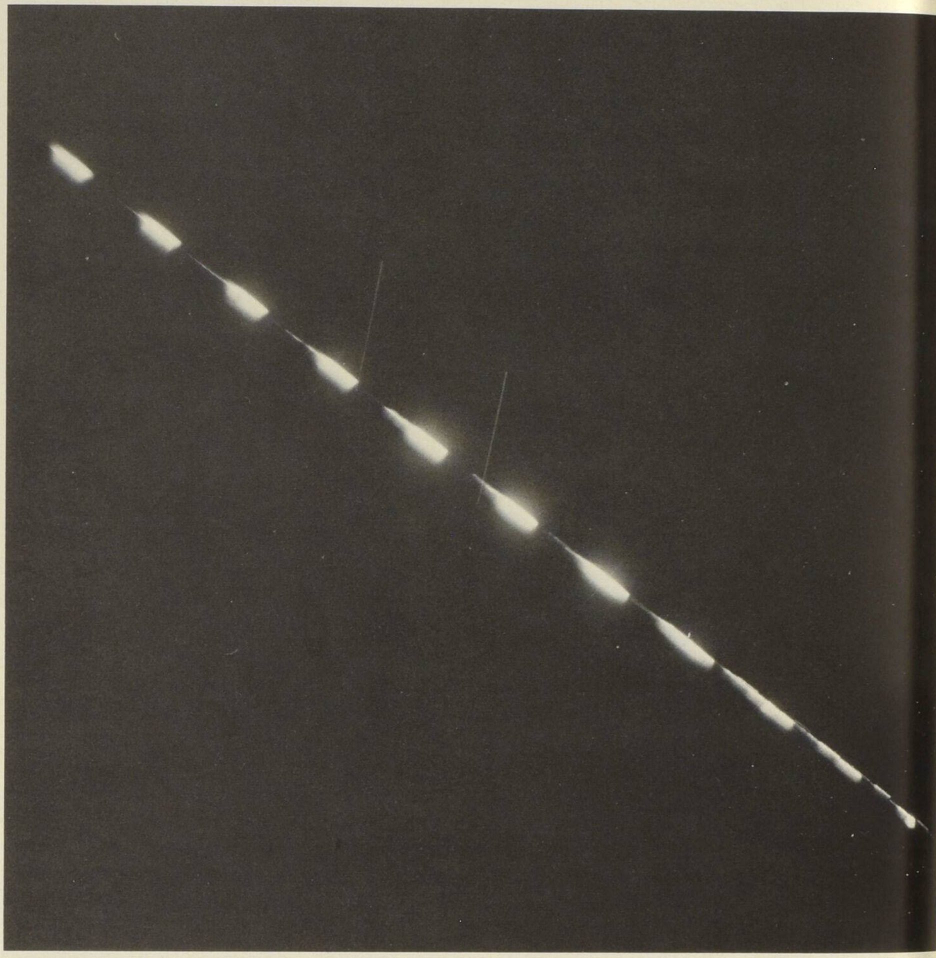
"The thing that makes it so special," notes astrophysicist Ian Halliday, "is that we have pictures of it coming down through the atmosphere. In fact, this is only the third time anywhere that a meteorite has been found after it was photographed in flight."

On such rare occasions, the photographs tell scientists how fast the earthbound particle was moving, the path it took into our atmosphere and even where it came from in the solar system. But most important of all, having fragments to analyze in the laboratory gives scientists the chance to relate a sample's physical and chemical characteristics to its orbit and environment in space.

During early February, Dr. Halliday's successful meteorite search was triggered by a fireball event over Northern Alberta. While eyewitnesses in the vicinity followed the "shooting star", NRC's western network of semiautomatic camera tracking stations (the Meteorite Observation and Recovery Project) recorded the flight on film. Two of the exposures contained just the information astronomers needed to retrace the meteorite's steps and compute a possible landing area. The trail led a search party from the Herzberg Institute of Astrophysics in Ottawa to Innisfree, a small community some 140 km east of Edmonton.

"I recognized the meteorite immediately," recalls Halliday, who spent nearly four hours on snowmobile combing open fields in the computed target area. "There it was, sitting up in plain sight against the snow, barely a quarter mile off our predicted flight path."

Halliday wasted little time in flying his prize to Washington state for analysis at the Battelle Memorial Institute. There, sensitive radiation counters went to work measuring the decay of various isotopic elements in the sample. Cobalt-60 tests indicated the object weighed less than 100 kg when it hit the atmosphere. More isotope measurements, for aluminum-26, lead and other elements of different half-



Battelle Memorial Institute

**The falling meteorite as photographed by the NRC camera station at Vegreville, Alberta. During exposure, the image is chopped automatically into many short segments, each streak being separated from the next by exactly one-quarter second. This method of time marking is used to determine the meteorite's speed on its plummet to earth. Two trails become visible (lower right) when the original single stone begins to fragment.**

**La météorite photographiée pendant sa chute par les caméras de la station de poursuite de Vegreville, dans l'Alberta. Des clichés consécutifs sont pris automatiquement à intervalles réguliers espacés d'un quart de seconde. Cette méthode de chronophotographie permet de déterminer la vitesse de la météorite lors de sa descente vers la Terre. Deux traînées lumineuses deviennent visibles (en bas à droite) lorsque la roche commence à se fragmenter.**

lives will provide a form of age dating, indicating both the meteorite's history of cosmic ray exposure and when it solidified during the solar system's adolescence.

"Making these measurements quickly was vital," explains Halliday, "especially for the short-lived isotopes which could decompose and disappear in a matter of weeks. Now, with results for different isotopes to compare, we will have enough information to learn about the conditions the meteorite encountered during different parts of its space odyssey."

These results along with geological tests being carried out by Dr. Robert Folinsbee at the University of Alberta in Edmonton, may be doubly interesting for Halliday and his Herzberg Institute colleagues. As luck would have it, the Innisfree stone fell during a period of sunspot minimum, a low ebb of solar activity. Normally, magnetic fields generated by the Sun near the inner planets shield against cosmic ray bombardment. However, during solar minima, when the shielding is weakest, higher radiation effects can be expected inside the asteroid belt. These, in turn, should show up in isotope measurements on the meteorite sample. By contrast, the two previous occasions on which meteorites were both photographed and recovered, Czechoslovakia in 1959 and Oklahoma in 1970, occurred during sunspot maxima. □

**Wally Cherwinski**