

The Great Meteor Procession of 1913

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Historical sleuthing adds important sightings to the world's greatest fireball display.

NATALIE MCMINN / UNIVERSITY OF TORONTO ARCHIVES

ON THE EVENING OF FEBRUARY 9, 1913 — exactly 100 years ago this month — the most remarkable procession of fireballs ever recorded passed over Canada. University of Toronto astronomer Clarence A. Chant collected eyewitness accounts, primarily from Ontario, and summarized the local observations for the *Journal of the Royal Astronomical Society of Canada*:

At about 9:05 [Eastern Standard Time] on the evening in question there suddenly appeared in the northwestern sky a fiery red body . . . which was then seen to be followed by a long tail . . . it moved forward on a perfectly horizontal path . . . without the least apparent sinking towards the earth . . . it simply disappeared in the distance . . . Before the astonishment aroused by this first meteor had subsided, other bodies were seen coming from the north-west . . . Onward they moved, at the same deliberate pace . . . with tails streaming behind . . . To most observers the outstanding feature of the phenomenon was the slow, majestic motion of the bodies; and almost equally remarkable was the perfect formation which they retained.

Chant also obtained reports from western Canada. At Mortlach and Pense in Saskatchewan, hundreds of meteors were seen passing from west to east at about 7 p.m. Mountain Time.

Perhaps the most surprising account sent to Chant came from Bermuda. At about 10 p.m. Atlantic Time, W. R. Winter saw “two leading bodies” trailed by about 100 smaller meteors

Artist and amateur astronomer Gustav Hahn made this painting of the 1913 meteor procession as seen near High Park in Toronto. Hahn estimated that the fireballs passed about halfway between Rigel and Orion's Belt (upper left).

in a “procession” traveling nearly horizontally in the sky east of Bermuda. Because all the observing sites fell close to a great circle, and all the local times corresponded nearly to 2h Universal Time, Chant deduced that the same phenomenon had been witnessed along a ground track from Mortlach to Bermuda, an unprecedented distance of 2,437 miles (3,922 km).

Extending the Ground Track

British astronomer William F. Denning became interested in the event, and by 1916 he had obtained observations of the meteor procession from two ships: *SS Bellucia* and *SS Newlands*. The *SS Newlands* was just south of the equator off the coast of Brazil, and Denning remarked that the ground track of the 1913 procession thus extended for about 5,500 miles (8,850 km). In 1923 William H. Pickering at Harvard College Observatory uncovered observations from three more ships (*SS Tennyson*, *SS Custodian*, and *SS Manuel Calvo*) near Bermuda.

Other researchers found additional sightings. Alexander Mebane in 1956 filled in the ground track with several dozen accounts, mostly newspaper stories from Minnesota, Michigan, New York, Pennsylvania, and New Jersey. John O’Keefe in 1968 added a newspaper story from Didsbury, Alberta, which extended the known ground track farther west for a total length of about 6,040 miles (9,720 km).

As the centenary of the meteor procession approached, we wondered whether there were even more reports of the 1913 meteors. The Library of Congress historical newspaper site includes two stories based on interviews with the captain of the *SS Zafra* (located northeast of Bermuda at the time). The first is from the *New York Evening World*, February 14, 1913:

Hardly had the skipper turned in when a white-faced seaman appeared at the door of his stateroom and pleaded with him to come on deck. “The world is coming to an end, sir, sure,” he groaned . . . An unearthly flare hung over the ship, and, sailing across the sky was what looked like a flock of monstrous birds of fire. They were coming towards the *Zafra*, and they passed over her, shedding their unearthly radiance . . . the meteors . . . sailed on . . . The crew stayed on deck, shivering and praying, until the last faint glow of their taillights had flickered away in the distance.

The other account is from the *New York Sun*, February 15, 1913:

The meteors were fired slowly. It took six minutes for forty of them . . . to write their glowing bluish white autographs across

the sky. In this six minutes of incandescent glory the skipper read over the love letters of his youth and made his will, as he thought that the last day might be pretty close. He says the stream of meteors passed from northwest to southeast.

These reports, though colorful, did not extend the ground track. Denning’s 1916 investigation remarked that as the meteor procession passed the *SS Newlands*, at latitude 3° 20’ south, the fireballs were “still going strongly . . . and may have pursued their luminous career far southwards over the South Atlantic Ocean, but navigators alone, during morning watches, can give us further information on the subject.”

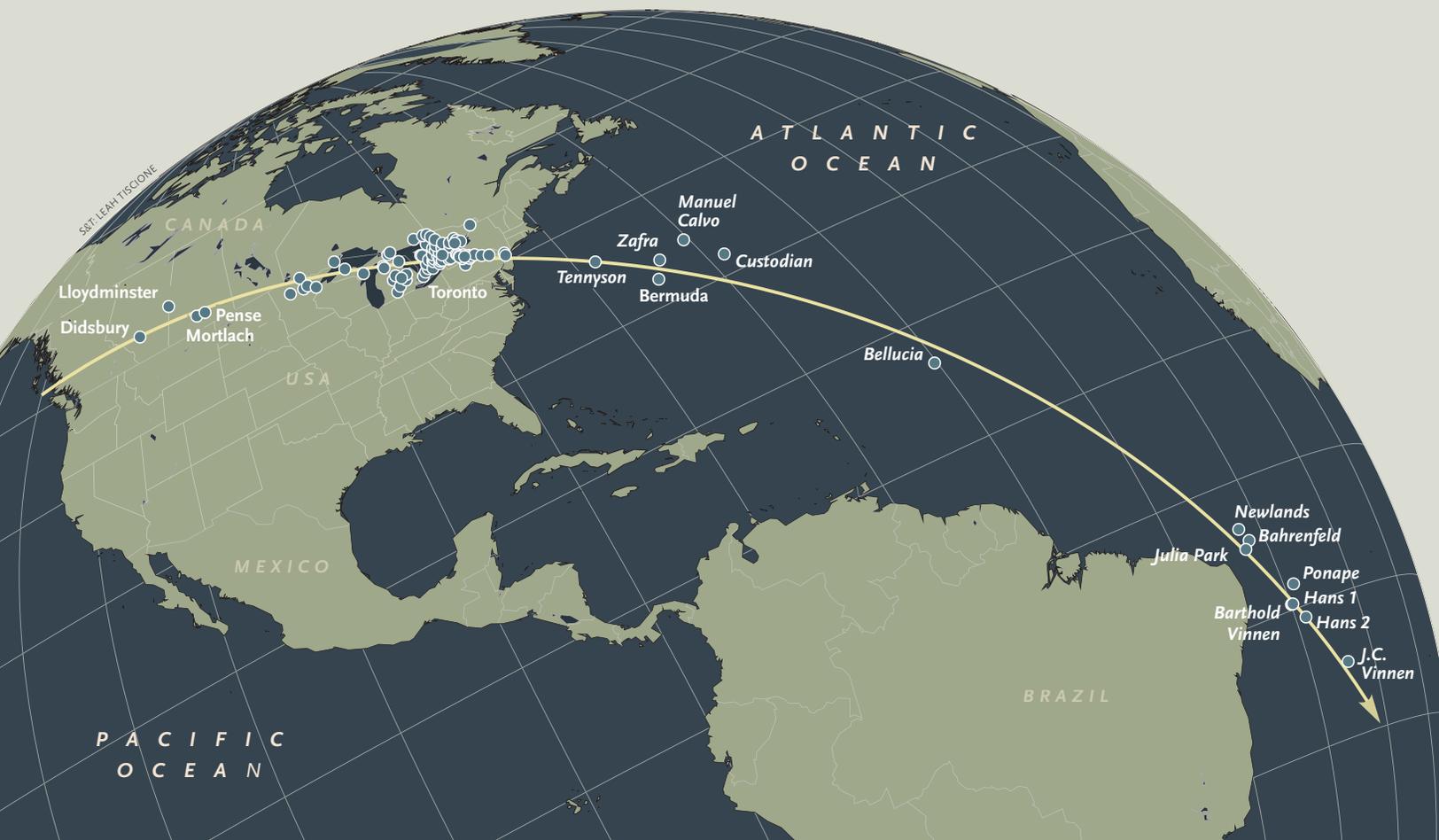
This call for further observations has finally been answered. With assistance from British and German archivists, we recently located seven meteorological logbook entries from ships at latitudes south of the *SS Newlands*. These entries were recorded on February 10th, since the local times were just after midnight.

A logbook at the U.K. National Meteorological Archive includes this account:

SS Julia Park (32° 44’ W, 4° 41’ S)

Witnessed a brilliant Meteoric shower immediately overhead. More

The blue dots mark locations where the meteor procession was observed. The accounts from the ships at latitudes south of the *SS Newlands* were discovered during the preparation of this article. To have traveled so far around Earth, the 1913 meteor procession apparently followed tracks similar to the gradual reentry of satellites in low-Earth orbit.



Other Historical Meteor Processions

1783 August 18: Scotland, England, English Channel, France.

1860 July 20: Wisconsin, Michigan, Ontario, New York, Pennsylvania, Atlantic Ocean.

1876 December 21: Kansas, Missouri, Illinois, Indiana, Ohio, Pennsylvania.

than a hundred being seen within a minute, and all travelling from NNW, the whole breadth of the sky, and very low down.

Six logbooks at the German Meteorological Service archives describe the meteor procession (translated from German):

Steamship *Bahrenfeld* (31° 55' W, 4° 18' S)

From oh 5m to oh 10m a.m. true solar time an exceptionally strong shooting star event took place. The shooting stars of intense yellow color were all moving in the west from approximately WNW magnetic to ESE. Noteworthy was their moderate speed.

Sailing ship *Ponape* (28° 41' W, 8° 23' S)

At 12½h three great meteors (emitting sparks) in succession. Impact was heard onboard.

Sailing ship *Barthold Vinnen* (29° 51' W, 9° 36' S)

At 12h 10m there was exhibited a strange spectacle of nature. In the direction NbyW suddenly appeared north of the constellation of the Lion, coming seemingly from infinity, an uncounted number of shooting stars. The track appeared like a chain of star molecules and was resplendent in a grayish light. They moved southeast at a slow speed and disappeared in the region near Alpha Crucis and Alpha and Beta Centauri . . . The duration of the display was about ten minutes.

Sailing ship *Hans 1* (Captain Bade, 29° 39' W, 9° 37' S)

At 12h 40m suddenly about 70 shooting stars were flying across

space with tremendous speed. They came up from the NNW horizon and disappeared in the SSE horizon. Many of the shooting stars had no sparkling tails behind them, but looked like stars that suddenly were flying across space.

Sailing ship *Hans 2* (Captain Külsen, 28° 36' W, 10° 48' S)

At 12h 30m an uncounted number of shooting stars passed over from NW to SE.

Sailing ship *J. C. Vinnen* (24° 29' W, 14° 41' S)

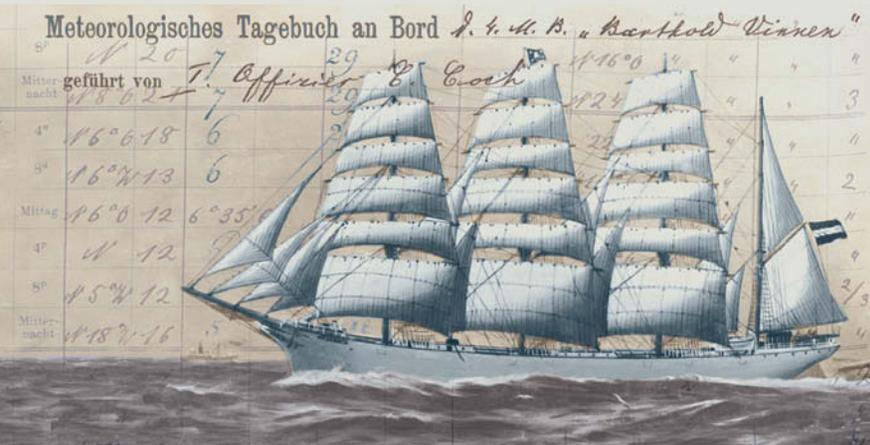
At 12h 40m local mean time we observed a strikingly bright star in the direction NWbyN, at an altitude of about 10° above the horizon. This star grew in size and brightness as we watched and eventually burst apart in a bright shower, and after this from the same direction came over 100 meteors, some of them very bright with long tails. Their path was from Orion to the Southern Cross, which they traversed in 20 seconds. The last and less bright came at 12h 50m.

These ship accounts, all previously unknown, extend the ground track to more than 7,000 miles (11,000 km) — more than a quarter of the way around Earth — and show how historical archives can provide new information even a century after a spectacular celestial event.

To travel so far around the curvature of Earth, the individual members of the 1913 meteor procession apparently followed tracks similar to the gradual reentry of satellites in low-Earth orbit. The lack of precise altitude and speed information from 1913 prevents us from accurately determining the orbit of the parent body before it was captured to become a temporary “mini-moon” of Earth

To explain how the individual meteors became so spread out — taking several minutes for the procession to pass each observing location — O’Keefe in 1961 suggested that the parent body fragmented in the lower atmosphere near perigee on the revolution immediately prior to the one that was observed. The individual smaller bodies would have proceeded around Earth on orbits with slightly different apogee heights and periods and would have re-entered the lower atmosphere one revolution later to form the procession that amazed observers from Canada to the South Atlantic. ♦

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The logbook from the *Barthold Vinnen*, a four-masted barque, reports “a strange spectacle of nature . . . an uncounted number of shooting stars” appeared north of Leo and passed slowly across the sky, disappearing near Crux and Centaurus.

LOGBOOK: DEUTSCHER WETTERDIENST; SHIP: STATE LIBRARY OF VICTORIA, BRODIE COLLECTION