

A REPEATING FIREBALL RADIANT IN CETUS. H. Povenmire, Florida Institute of Technology, 215 Osage Drive, Indian Harbour Beach FL 32937, USA.

On the morning of October 8, 1972, a meteor storm was predicted from the Draconid meteor shower. At 5:24 U.T. on October 8, 1972, a magnitude -16.0 fireball occurred over central Florida and produced sonic phenomena. This fireball which radiated from Cetus was photographed and plotted by members of the American Meteor Society. The plots and photographs were sent to C.P. Olivier for computational reduction. The results were published as A.M.S. fireball No. 7031 (Povenmire, 1980).

A literature search linked Nielson No. 969 and the Prairie Network fireball, P.N. 40503 of October 9, 1969 to No. 7031 (Nielson, 1968) (McCroskey, et al., 1976). These fireballs had the same radiant. The radiant of P.N. 40503 is R.A. = 18° , Dec. = $-17^\circ.2$ (2000.0). The orbital elements of P.N. 40503 are:

$$\begin{aligned}\omega &= 73.^\circ 1 & e &= .642 \\ \Omega &= 15.^\circ 6 & q &= .722 \text{ A.U.} \quad q' = 3.31 \text{ A.U.} \\ i &= 12.^\circ 6 & a &= 2.02 \\ \text{velocity} &= 21.0 \text{ km/s} & \text{period} &= 2.54 \text{ yrs.}\end{aligned}$$

Prairie Network 40503 was one of the brightest fireballs ever photographed with an estimated magnitude of -20.0 (Sky and Telescope, Jan. 1970). The computed density of this meteoroid was estimated at 2.5 g/cm^3 or similar to a carbonaceous chondrite. The mass of P.N. 40503 was estimated at $35,000 \text{ kg}$ (McCroskey, 1977). Sekanina describes this type of fireball as mini-Tunguska objects as their terminal bursts usually last less than .1 second and usually do not result in meteorites reaching the Earth (Sekanina, 1983).

Approximately 10 other fireballs with less precise solutions are suspected of originating from this radiant. Visual observers report rates of several meteors per night from this radiant for several days on each side of October 9. These meteoroids must orbit the Sun in a torus which crosses the Earth's orbit at approximately Solar longitude 195° . This is similar situation to the suspected torus associated with the Innisfree meteorite.

The Catalogue of Meteorites was searched for carbonaceous chondrite falls which could have originated from this radiant. The Cold Bokkeveld, South Africa fall of a Type II (CM2) on October 13, 1938 is the only good candidate (Graham, et al., 1985).

References: (1) Povenmire H. (1980) Fireballs, Meteors and Meteorites JSB Enterprises Indian Harbour Beach, FL (2) Nielson, A.V. (1986) Catalogue of Bright Meteors Meddeleser Fra Ole Romer Observatoriet Nr. 39 Aarhus, Denmark (3) McCroskey, R.E., Shao, C.Y. and Posen, A. (1976) Prairie Network Fireball Data I: Summary and Orbits Center for Astrophysics – Reprint Series No. 665 Center for Astrophysics Cambridge, MA (4) Widely Photographed Fireball Sky and Telescope (Jan 1970) P. 8 (5) McCroskey, R.E., Shao, C.Y. and Posen, A. (1977) Prairie Network Fireball Data II. Trajectories and Light curves Preprint Series No. 721 Center for Astrophysics Cambridge MA. (6) Sekanina, Z. (1983) The Tunguska Event: No Cometary Signature in Evidence Astronomical Journal Vol. 88, No. 9 Sept. pp.1382-1414. (7) graham, A.L., Bevan, A.W.R., and Hutchison, R. (1985) Catalogue of Meteorites 4th Ed. University of Arizona Press Tucson, AZ.