CORVID METEOROIDS AND A GIORDANO BRUNO RAY ARE
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Summary
Both Corvid meteoroids and the Giordano Bruno (GB) crater are
products of recent events. On June 25, or 26, 1178, Corvid
meteoroids and a portion of GB ejecta were at the same place in the
Solar System and moved in the same direction (right ascension = 12°
and declination = +19°). The ground track of this direction is the
same as that of the most prominent GB ray (azimuth = 237°). These
"coincidences" could not have occurred by chance and, therefore,
support the conclusions that the GB impact occurred on June 26,
1178, and that Corvid meteoroids are high-velocity ejecta fragments
from that impact. Finally, those fragments ejected with somewhat
lower velocities failed to escape from the Earth-Moon system and
produced the prominent ray extending southwest from the GB crater.

Abstract
Between June 25 and July 2, 1937, a Corvid meteor shower was
observed (1). The apparent lack of Corvid showers in other years
suggests that Corvids are the product of a recent break-up event.
The right ascension and declination, corrected for zenith
attraction, of 192° and -19° were reported for the radiant of this
shower (2). This corresponds to a right ascension and declination
of the direction of motion of Corvid meteoroids of 12° and +19°. In
ecliptic coordinates the celestial longitude and latitude of this
direction are 18° and +13°.

In the medieval chronicles of Gervase of Canterbury for June
25 (26), 1178, it is reported that "...there was a bright new
moon...and suddenly the upper horn split in two. From the midpoint
of this division a flaming torch sprung up, spewing out, over a
considerable distance, fire, hot coals, and sparks" (3). This
report is interpreted as an eyewitness account of events
surrounding the formation of the 20-km-diameter crater, GB (4). In
selenographic coordinates the location of GB is given by a lunar
longitude and latitude of 103° E and 36° N. On June 25 (26), 1178,
the ecliptic longitude of the Sun was 93° (94°) (5), the phase of
the Moon was 19°.5 (32°) past new moon, and the geometric libration
of the Moon in longitude was 1°.5 (15°). It follows that
the ecliptic longitude of the lunar prime meridian was 294° (306°), and
the ecliptic longitude of the zenith direction at the GB impact
site was 37° (49°). The corresponding latitude was approximately
+36° (+36°). The resulting elevation angle of the direction of
Corvid motion above the local horizontal plane at the GB impact
site was 61° (54°). The values given in parentheses correspond to
conditions that prevailed exactly one day after June 25, 1178.

Experimental results show that for ejection velocities near
the lunar escape velocity, 2.7 km/sec, the ejection elevation angle
ranges up to about 60° (6,7). Therefore, the observed direction of
Corvid motion and the direction of motion expected independently
for some GB ejecta are essentially the same. In addition, the
selenographic azimuth of this direction, with the origin of the coordinate system at the GB crater, is 221° (238°). The azimuth of the most prominent, 1000-km-long, ray emanating from the GB crater is 237° (8).

It has been argued recently that on June 25, 1178, the Moon was not visible from the Earth because just after sunset it would have been too near both the Sun and the local horizon (9,10). However, one day later, not only would the crescent Moon have been visible, but the resulting ejection elevation angle would be lower (more in line with expectation), and the ejection azimuth would be essentially the same as that of the most prominent GB ray. This agreement lends support to the idea that June 26, 1178, is more likely the actual date of the GB impact.

Conclusions
1. The GB impact crater was formed on June 26, 1178.
2. Corvid meteoroids are high-velocity (>2.7 km/sec) members of the GB (azimuth = 237°) ejecta family.
3. The GB ray at an azimuth of 237° was formed by lower-velocity (<2.4 km/sec) members of the same ejecta family.

References