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Further Small Recoveries of the Billygoat Donga and Associated Stony Meteorites

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Abstract

The recovery of several small stones of the Billygoat Donga meteorite north of Haig, Western Australia confirms the expected existence there of a strewnfield oriented approximately north-south with distribution pattern indicating a southerly direction of flight.

Introduction

The history of the finding and recovery to December, 1971 of 809 stones representing 4 distinct meteorite arrivals in a small area centred about 95 km north-north-east of Haig, Western Australia has been recorded elsewhere (Cleverly 1972). The Billygoat Donga meteorite was represented at that time by 3 stones or fragments, Mulga South by 24, Mulga North by 781 in a definable ellipse, and Mulga West by a single stone. Within portion of the Mulga North ellipse a quadruple overprinting of the strewnfields was demonstrated. The distinctness of the four meteorites was recognised initially in the field by differences in morphology and colour. The Billygoat Donga, Mulga South and Mulga North meteorites are common chondrites (McCall and Cleverly 1968); Mulga West is a carbonaceous chondrite (Binns *et al.* 1977), the first known from Western Australia.

It is pertinent to recapitulate in greater detail the recoveries of the Billygoat Donga meteorite as known in 1971. The original stone of 142 g was found by T. Dimer and P. Dimer in 1962 "one or two miles north-east" of their camp located about 11 km north of Billygoat (or Mulga) Donga, ca. 126°22′ E., 30°08′S. (Fig. 1). The stone was said to be one of three small ones found close together, two of which they had since lost. It was named Billygoat Donga I but subsequent events rendered the postcript "I" unnecessary. Whilst searching about 6 km south of the Dimers' camp in 1970, the writer's party found portion of a Billygoat Donga stone within the Mulga North ellipse: a further piece was recovered in 1971 about 230 m distant (Fig. 1). These two fragments fitted to form a nearly complete, fusion-crusted individual of 491 grams. The known occurrences with the smaller stone (one of three) in the north and the two fragments of a much larger stone in the south suggested that a more or less north-south strewnfield might exist with direction of flight southerly.

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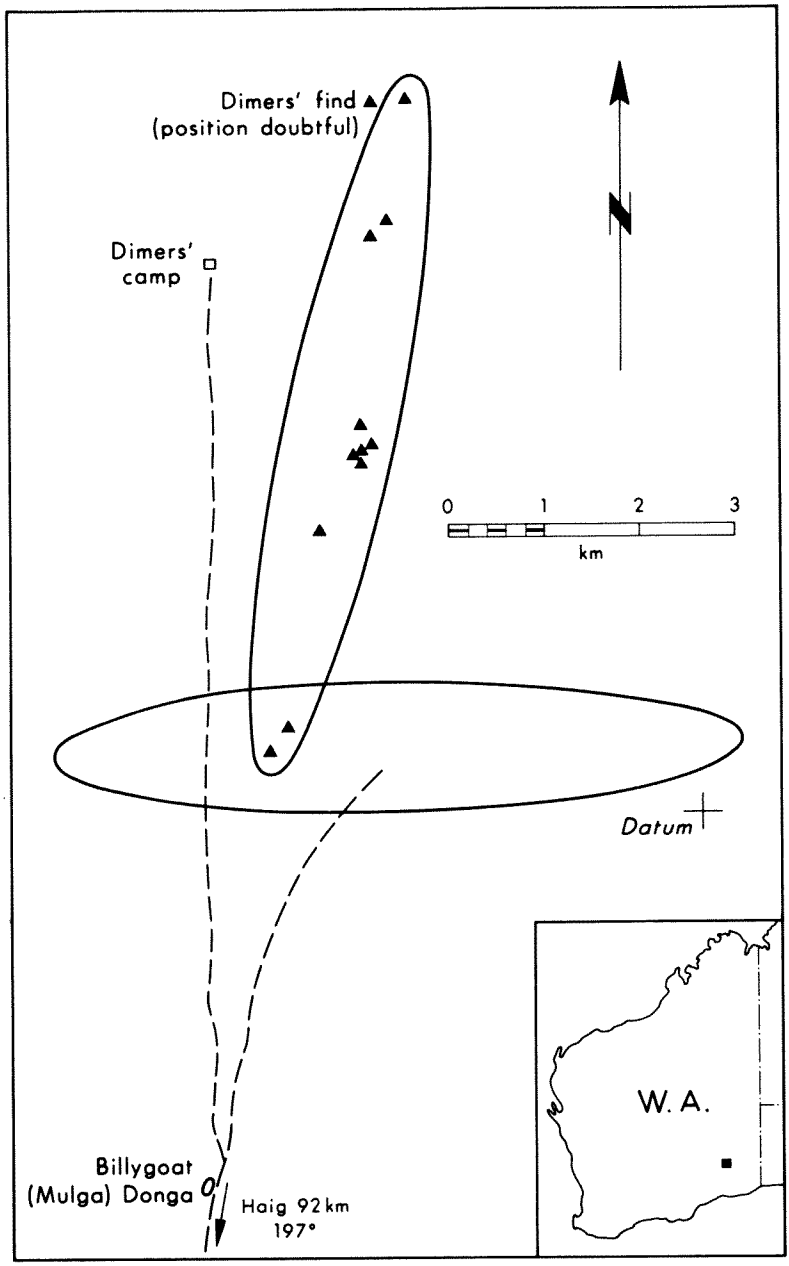

gure 1: Sketch map with triangles indicating sites of find of Billygoat Donga meteoritic stones. The approximately W - E ellipse is the strewnfield of the Mulga North meteorite as known in 1971. This map should be compared with Fig. 2 of Cleverly (1972).

Additional Recoveries

In late 1973 the above possibility was investigated. Because of excessive diurnal temperatures and the threat posed by grass fires, a simple, rapid, survey procedure was necessary. The site of the Dimers' camp was identified and reconnaisance made north-easterly with searches at regular intervals as determined by vehicle odometer. At a point estimated to be 2.6 km 50° from the camp a small stone of Billygoat Donga style was recovered. From that point a line of 20 additional stations was established to the south by odometer terminating within sight of an earlier station in the strewnfield of Mulga North. Walking searches to ~ 200 m radius were made around all stations and any finds tied in by compass and pacing. Several stations were also established west of the main line, and their vicinities searched.

Only 14 pieces of meteorite were recovered in 6 days of search (Table 1). The locality co-ordinates of the finds estimated to the nearest 0.2 km are the best that can be offered in the circumstances. The identifications are visual. The weights of the stones range from 1 g to 155 g and total only 556 grams. The average recovery of less than 1 piece per man-day may be contrasted with results for the same team of 3 men in the Mulga North strewnfield in 1970 when 325 stones were recovered in 9 days (12 per man-day), and in 1971 when 391 stones were recovered in 9½ days (nearly 14 per man-day). There can be little doubt that the extremely difficult physical conditions contributed to the low recovery rate but it also seems likely that the Billygoat Donga shower is less populous than Mulga North, at least in the strip examined.

Table 1: Recoveries of meteoritic stones in the Billygoat Donga area in 1973

Meteorite			*Locality	
**Field No.	Tentative identification	Weight g	Westing km	Northing km
828	(?)	1.00	4.8	6.0
829	Billygoat Donga (?)	4.25	3.0	7.4
830	Billygoat Donga	23.0	3.2	6.2
831	Billygoat Donga (?)	6.76	3.4	6.0
832	Billygoat Donga	15.7	3.6	3.6
833	Billygoat Donga	138.5	3.6	3.8
834	Billygoat Donga	28.2	3.4	3.8
835	Billygoat Donga	94.6	3.6	3.6
836	Billygoat Donga	44.1	3.6	4.0
837	Billygoat Donga (?)	7.31	4.0	2.8
838	Mulga North	15.3	4.0	2.4
839	Mulga North	17.4	4.0	2.4
840	Mulga South (?)	4.45	4.0	2.4
841	Mulga North	155.2	3.8	1.6

*Co-ordinates are relative to the datum shown in Fig. 1 and identical with the datum of Cleverly (1972 Fig. 2).
**Numbers continue on from those of Cleverly (1972).

The 14 recoveries include 9 of Billygoat Donga style, all from the northern two thirds of the strip. The two heaviest of these stones were amongst the southernmost of their type suggesting that the direction of flight was southerly. Recoveries from the southern one third of the strip include two stones of Mulga North which were well outside the strewnfield as previously known.

Conclusions

The recoveries of Billygoat Donga stones confirm the existence of an approximately north-south strewnfield more than seven km in lenght overlapping or being overlapped by the Mulga North and Mulga South strewnfields at its southern end. There are now additional indications that the direction of flight was southerly. The localities of two Mulga North stones, if they are not "strays", suggest that their strewnfield is wider on its northern side than was previously believed.

The searches were manifestly inadequate. It was intended to return, tie in the stations by a more regular survey and continue the search, but as time passes without opportunity the recoveries are reluctantly placed on record with approximate locations.

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