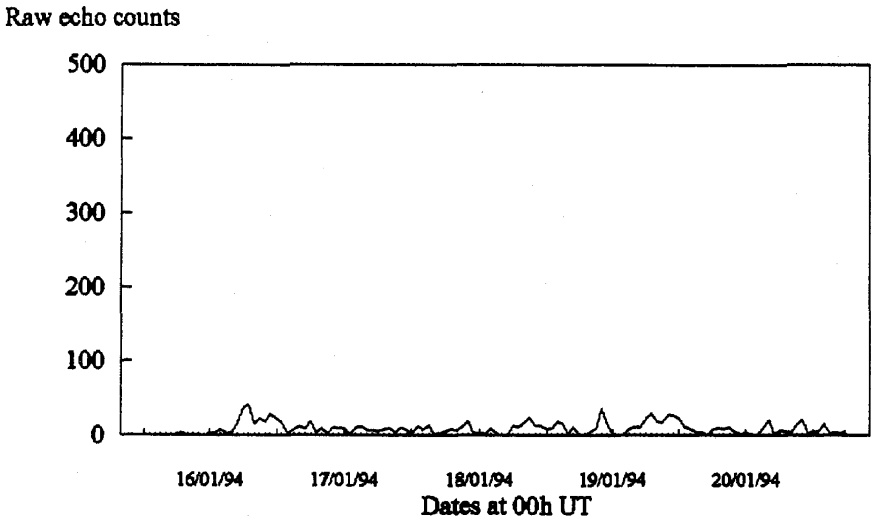



Figure 2 – Mid-January raw hourly counts of radio meteor echoes, made by Robert White.

Although only unprocessed hourly counts are shown, the effect of the Quadrantids on the rate detected is quite obvious, notably on January 3 and 4. It is useful to compare Figure 1 with Figure 2 made later in the month, since this latter almost certainly shows only the background sporadic activity. The peak hourly count of 387 echoes was recorded from $15^h$–$16^h$ UT on January 3, though this may not represent the true radio shower peak, since no account is taken of the radiant position or elevation at the time. Quadrantid rates were much in evidence between $13^h$ UT on January 3 till $5^h$ UT on January 4 from these results.

Curiously, few other UK amateur radio operators appear to have enjoyed much success for the Quadrantids in 1994, as Norman Fitch of the Radio Society of Great Britain, who collates reports on VHF and UHF propagation for the *RSGB*'s journal *RADCOM*, indicates that most radio amateurs enjoyed few opportunities to use the meteor scatter propagation mode during the shower this year. Whether this has resulted from simple bad luck or poor atmospheric conditions is not yet clear, however.

### Acknowledgment

My thanks as always go to the observers who have contributed data for this paper, especially under skies as generally unhelpful as 1994 January's.

# 1994 $\eta$-Aquarids from Malta

*Godfrey Baldacchino*

An overview is given of the 1994 $\eta$-Aquarid observations by the *Malta Astronomical Society Meteor Group*.

The *Malta Astronomical Society Meteor Group* set off with its first observational project with a difference in May 1994. Target for the meteor watchers was the strong but largely neglected $\eta$-Aquarid annual meteor shower. Recognized as one of the strongest eight annual daytime meteor showers, its zenithal hourly rate statistic fluctuates widely between one source and another. This is testimony to the relatively sparse knowledge which has been documented about this

shower. Reasons for this are not difficult to find: the shower has its radiant practically on the celestial equator. While this means that the shower activity is actually visible from any location on the surface of the Earth, it is best seen by observers from southern latitudes which, at the time of the shower activity, are experiencing the winter season. Secondly, its appearance at a tolerable altitude above the observer's horizon (20°) coincides with the early morning and pre-dawn hours for Europe-based observers, possibly the most unlikely times for amateur meteor watching. In any case, such a strong and regular event is noticeable by its absence from the 1994 *IMO Calendar*, in spite of observing conditions particularly favorable during the latter period of activity.

Maltese observers are now probably the most southerly group of organized meteor watchers in Europe; we have therefore sought to exploit this comparative advantage by observing the 1994 return of this shower.

Meteor Group members carried out naked-eye observations (lasting some 30 hours in all) of the $\eta$-Aquarid shower from a variety of locations in Malta. The participating observers were as follows:

> Anna Baldacchino (**BALAN**), Godfrey Baldacchino (**BALGO**), Edwin Camilleri (**CAMED**), Franco Gatt (**GATFR**), Antoine Grima (**GRIAN**), Sandro Lanfranco (**LANSA**), and Umberto Mule Stagno (**MULUM**).

All 9 project nights (April 29-30 till May 7-8, 1994) were covered although there was appreciable lunar interference during the first 5 nights of the project. The magnitude distribution of the meteors seen is tabulated in Table 1, below.

Table 1 – Magnitude distribution of the 1994 $\eta$-Aquarids as seen from Malta.

| Magnitude | −3 | −2 | −1 | 0 | +1 | +2 | +3 | +4 | +5 | Tot | $\overline{m}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aquarids | 1 | 9 | 16 | 12 | 20 | 34 | 38 | 27 | 10 | 167 | 1.93 |
| Sporadics | 1 | 3 | 2 | 10 | 13 | 16 | 26 | 22 | | 93 | 2.15 |

The low number of shower meteors seen per watch precludes a valid resort to magnitude ratio estimates for the calculation of meteor rates. The low shower altitude makes the resort to an altitude correction factor equally suspect since the multiplication factor is bound to be too high. Thirdly, the relatively poor skies also advise against using a limiting magnitude correction factor, since a high multiplier would necessarily have to be used. In view of the above circumstances, it was decided to complete an activity curve based on the relative performance of the Aquarid stream to its sporadic background. This was considered as the most valid approach since (1) it avoids utilizing limiting magnitude or altitude correction factors; (2) it is based on a series of observations held practically at the same time of the night ($02^h00^m$–$04^h00^m$ UT); and (3) it is grounded on a database where the mean magnitude of shower and sporadic components differ by only 0.22 magnitudes (see Table 1 above). The technique, introduced to Maltese observers by former *BAAMS* and *JASMS* Director George Spalding, assumes a standard sporadic background. The activity curve is tabulated as Figure 1.

Assuming a standard (limiting magnitude of +6.5) sporadic background activity rate of 12 meteors per hour, the Aquarid rate on the night of maximum works out as $3.4 \times 12 \approx 40$ meteors per hour.

Noticeable also is a secondary maximum 2 nights after the first, on May 6-7, with a shower to sporadic ratio close to 2.0. This would be equivalent to a ZHR of 24 meteors per hour. This confirms the reports of a similar secondary peak by other observers, suggesting that the stream is actually an overlap of two different streams, the $\eta$-Aquarids (maximum on May 3) and the Halleyids (maximum on May 8). [1,2]

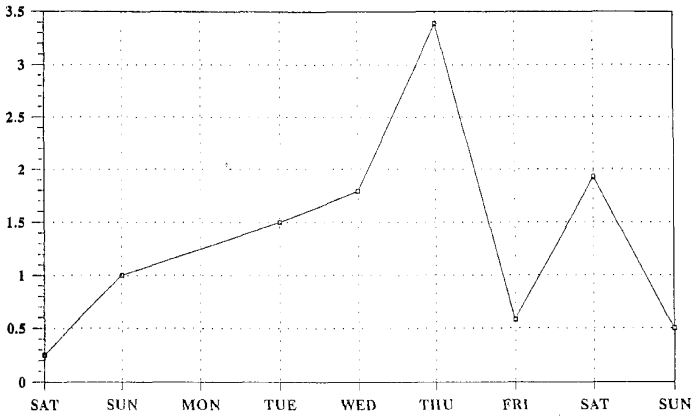
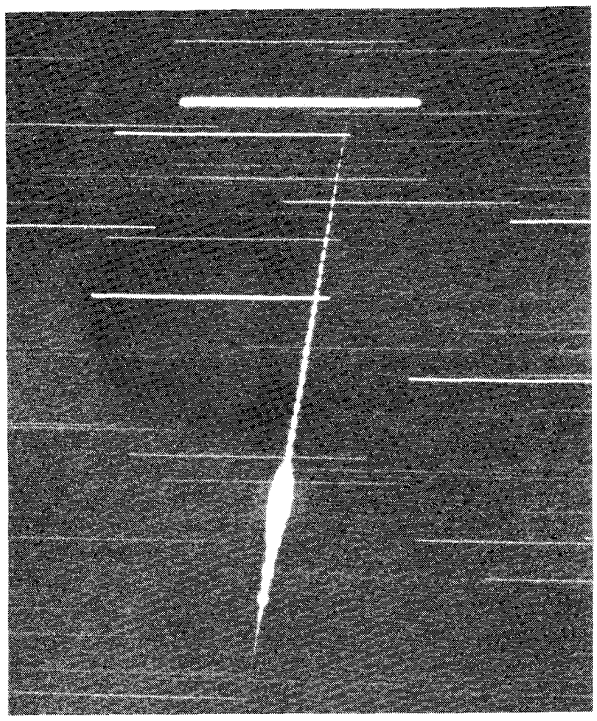



Figure 1 – Activity of the $\eta$-Aquarids as seen from Malta relative to the sporadic background, from Saturday, April 29-30, to Sunday, May 7-8.

## References

[1] J. Wood, "Visual Observers' Notes: May–June 1994", *WGN* 22:2, April 1994, p. 3.

[2] M. Currie, "Telescopic Observers' Notes: May–June 1994", *WGN* 22:2, April 1994, p. 35.



Magnitude $-5$ $\kappa$-Cygnid meteor photographed by Dutch observers in Rognes, Southern France, on August 13 at $21^h55^m20^s$ UT.