

Survey of Meall Chomraidh

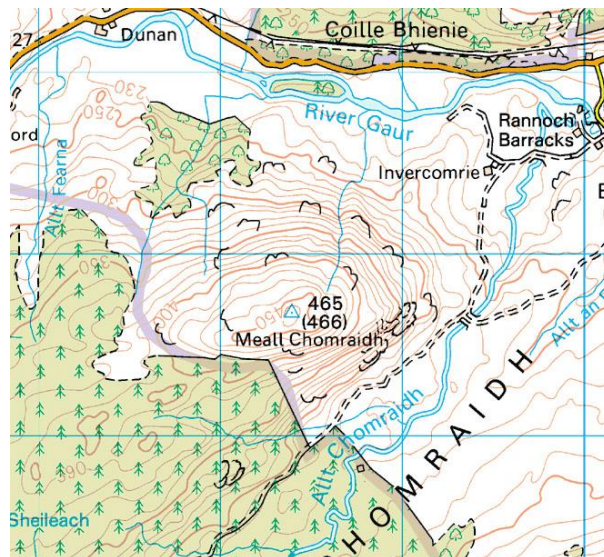
11th & 12th November 2013

The Team:

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1) Introduction

Meall Chomraidh (Hill 140, Section 2A, OS 1:50000 Map 42 & 51, OS 1:25000 Map 385E, Grid Ref NN483556) is situated near the West end of Loch Rannoch above Bridge of Gaur and about 7km East of Rannoch Station. It is listed as having a drop of 150m and therefore is classified as a Marilyn. (A Marilyn is any hill in England, Scotland, Wales, Isle of Man and Ireland with a minimum drop of 150m or more). Meall Chomraidh was not listed in the original publication of The Relative Hills of Britain, but made its appearance in the 2006 update sheet. The value of drop has been measured from maps with the summit value derived from a spot height (the map indicates ground 1m higher than the adjacent trig point) and that of the bealach from interpolation of contours. Consequently there is a significant chance that the drop could be less than 150m.



The purpose of this survey was to measure the drop for Meall Chomraidh and thus clarify its status.

2) Equipment used and Conditions for Survey

Ground surveys to determine the position of the bealach were carried out using a Leica NA730 Professional Automatic level (X30 telescopic system)/tripod system and a “1m” E-staff extendable to 5m.

The absolute height of the bealach was measured using a Leica Geosystems Viva GS15 Professional receiver. This is a dual-frequency, multi-channel instrument, which means it can lock on to a maximum of 12 GPS and 8 GLONASS satellites and receive two signals (at different frequencies) from each of these satellites. The latter feature reduces inaccuracies that result from atmospheric degradation of the satellite signal. As a stand-alone instrument it

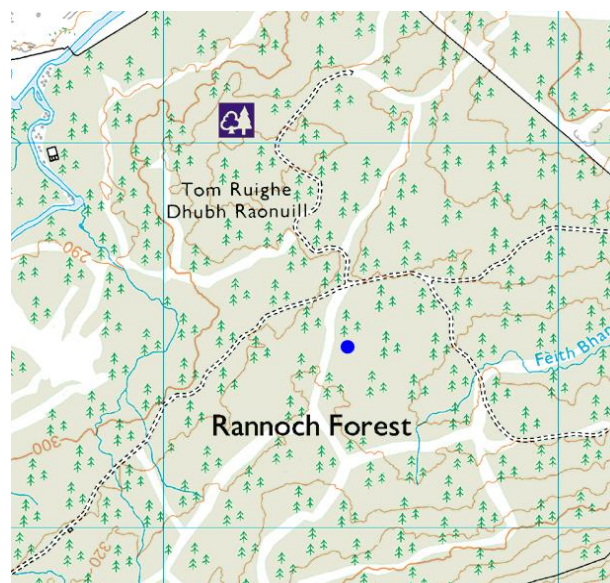
is capable of giving position and height to an accuracy of about two metres and five metres respectively. Note that a hand-held GPS receiver can only receive up to 12 GPS satellites and each at a single frequency and therefore it has a poorer positional accuracy of +/-5m and a height accuracy of no better than 10 metres. Some recently produced hand held GPS Garmin receivers can also receive signals from GLONASS satellites which greatly improve the speed at which these units can achieve a satellite “fix”. The summit was measured using a Leica RX1250 receiver which locks on to the GPS satellites, but does not receive signals from GLONASS satellites. Despite the on-board features of both the Leica RX1250 and Viva GS15 receivers, there are still sources that create residual errors. To obtain accurate positions and heights, corrections were made to the data via imported RINEX files from Ordnance Survey which were post-processed using Leica Geo Office 8.3 software.

Conditions for the survey, which took place between 14.00hr and 16.00hr on 11th November for the summit and between 12.30hr and 15.00hr on 12th November for the bealach, were fair. The weather was overcast with occasional heavy showers and a cloud base above 400m on both days. The temperature was 10 degrees Celsius, although it felt colder in the light wind.

3) The Survey

3.1) Character of Hill

Meall Chomraidh is only 466m high and has higher neighbours to the East (Leagag 601m) and South (Meall Buidhe 932m) but nevertheless is prominent on the skyline above the West end of Loch Rannoch. Its South-East face is steep and craggy, but it is easily climbed by its East ridge. The summit area comprises thick grass and heather and there is a trig point on the summit, although the highest point is marked by a large overgrown cairn just a few metres to the South-East. There is ample parking either at the start of the track at NN503565 or in a small car park just 100m East along the road. The bealach lies near the same track, but is 7km away from the road at NN454534. Both the 1:50k and 1:25k maps indicate that the bealach is in thick conifer forest and indeed this was the impression gained on our first visit late in the afternoon of 11th November (see map below where the blue spot marks the approximate position of the bealach).



However, aerial photography shows a fire-break leaving the track and leading to a large open area in the region of the bealach. Although difficult to find, because of the tree density in this

area, the fire-break does exist and does lead to an extensive area of open ground as shown below.



Small saplings of self-sown Sitka spruce have colonised this open area and therefore it too may soon become woodland. Much of the area is boggy and a small stream exits to the West and in fact passes under the main track. It is fed by numerous small nearly stagnant pools within this open area.

3.2) Summary of Survey Method

The first task at the clearing was to identify the exact position of the bealach. The level was set up at a convenient and relatively dry area in the centre and then sightings were taken at points around the periphery. This work quickly showed that the ground was very flat over the entire area of the clearing, dropping by about 30 – 40cm to the West where the stream made its exit, but otherwise varying by only +/-10cm or so over the rest of the area. Next we investigated the ground to the North and to the South of the clearing and in both cases found it to be rising, as would be expected from the map. We then investigated the area in the forest to the East where the tree density was sufficiently low for us to be able to use the level and staff. For the first few metres into the trees the ground was level, but it then began to drop over the next 50m or so. From this work we concluded that the position of the bealach lay near the Eastern edge of the clearing.

The absolute height of the bealach was measured with the Leica Viva GS15 receiver with data from both GPS and GLONASS satellites being collected. The instrument was set up on a 2m

pole with tripod support to hold it firmly over the point to be measured. This was done upon arrival at the clearing and so a small correction was added to the result to allow for the measured height difference between the set-up position and the position identified as the bealach. The epoch time was 15seconds and the data collection time was 1hr 35min

The summit of the hill was obvious and is the ground in the vicinity of the overgrown cairn near the trig point (see Appendix). Stones were temporarily removed from the cairn to ensure that the highest ground had been identified.

The absolute height of the summit was measured with the Leica RX1250 receiver with data from GPS satellites being collected. Data collection time was 1hr 2min.

3.3) The Bealach

The bealach was surveyed with level and staff as described in Section 3.2 and we are confident this was achieved to within +/-0.1m of height.

The ten-figure Grid References recorded for the bealach were:-

Garmin Etrex 20 NN 45496 53492 Height = 322m

Garmin Oregon 450 NN 45496 53493 Height = 318m

In view of the large area of ground of similar height we can only be confident of the bealach's position to +/-10m.

The Leica Viva GS15 was set up about 30m West at a convenient position in the middle of the clearing. The position and height data that were recorded by the Leica Viva GS15 were post-processed with Leica GeoOffice 8.3 using imported OS RINEX data were:-

System	Easting	error(1SD)	Northing	error(1SD)	Height(m)	error(1SD)
GS15	245462.859	0.002	753490.820	0.002	315.213	0.006

Staff readings to the GS15 and the bealach positions were:

GS15 set-up position = 0.91m

Bealach position by Eastern edge of clearing = 0.84m

The height of the bealach is $315.213 + 0.07 = 315.28\text{m}$

3.4) Summit of Meall Chomraidh

The summit is ground by a large overgrown cairn.

The ten-figure Grid References for the summit are:-

Garmin Map60CSx NN 48394 55663 Height = 472m

Garmin Etrex NN 48394 55662 Height = 469m

Garmin Oregon 450 NN 48393 55662 Height = 476m

These were recorded on previous visits between 2007 and 2013 by John Barnard, Peter and Liz Hastie and Graham Jackson.

The Leica RX1250 was set up on the summit position and the vertical offset from measuring point to the ground was 0.85m.

The position and height data for the summit recorded by the Leica RX1250 and post-processed with Leica GeoOffice 8.3 using imported OS RINEX data were:-

System	Easting	error(1SD)	Northing	error(1SD)	Height(m)	error(1SD)
RX1250	248392.172	0.004	755670.740	0.003	466.221	0.006

4) Discussion of Results

The largest error was associated with the correct location of the bealach. Although the area was extensive and large trees encroached close to its position, the area was very flat and therefore we are confident this was identified to within +/-0.1m of height (and +/-10m in position). The instrumental measurement uncertainty for both receivers for an hour's data collection is +/-0.06m and the uncertainty in summit location is no more than +/-0.05m in height. We therefore estimate the overall measurement uncertainty for drop to be +/-0.14m in height.

The drop measurement is 150.9 +/-0.14m and therefore Meall Chomraidh does achieve the 150m required to retain its Marilyn status.

5) Summary and Conclusions

The **summit of Meall Chomraidh** is at grid reference * NN 48394 55662 and is ground by a large cairn 3m South of the trig point. Its height is **466.2m**.

The bealach for Meall Chomraidh is at grid reference * NN 4549 5349. Its height is **315.3m**.

The **re-ascent from the bealach to the summit is 150.9m** and therefore **Meall Chomraidh retains its Marilyn status**.

* NB average hand-held Garmin/Magellan GPS grid references are quoted in the summary.

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Appendix 1

View of RX1250 set-up on summit position



View of GS15 set up at bealach

