

CORRESPONDENCE AND NOTES

Magnetic survey of a monchiquite intrusion in central Gwent  
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**Abstract** – A magnetic survey was carried out along a NW–SE trending monchiquite intrusion near Llanllowell, Gwent. The intrusion was previously thought to be a dyke, 23 m long and 5 m wide, and that it may have been an extension of a second monchiquite intrusion at Great House to the southeast. However, the survey revealed the intrusion to be at least 34 m long, up to 20 m wide, and independent of the Great House intrusion. Evidence suggests that both of these monchiquite intrusions in central Gwent may have been feeder pipes to post-Lower Carboniferous volcanoes.

In the *Geological Magazine* of 1957, Eyles & Blundell suggested that the monchiquite intrusion seen at Great House (ST 431971), 6 km to the southeast of Usk, may be continuous with the outcrop of monchiquite seen near Llanllowell (ST 403982), 4 km southeast of Usk (see Figs 1 and 2 for location). Barclay & Green (1981) stated that the Llanllowell dyke is *c.* 23 m long. It trends in a northwest to southeast line; a continuation of this line to the southeast passes through or very close to the Great House intrusion (Welch & Trotter, 1961). A proton precision magnetometer survey was carried out in order to determine whether or not the Llanllowell dyke is an extension to the monchiquite intrusion at Great House.

The starting point for the survey was near the northwest extremity of the Llanllowell dyke (determined magnetically). Knowing that Eyles & Blundell (1957) considered the dyke to be no wider than 5 m, a 20 m transect line was used across the dyke, taking measurements every 2 m along each line of transect. Six transects were undertaken perpendicular to the

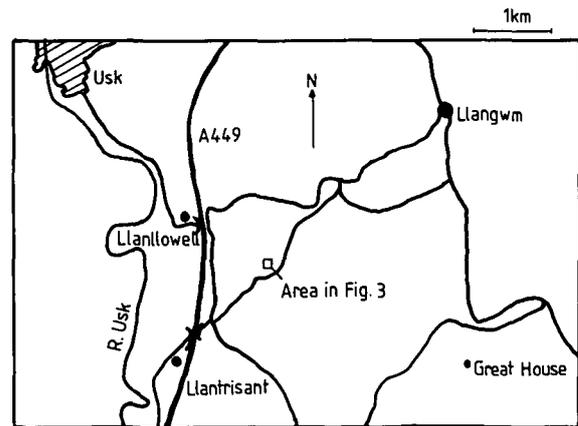


Figure 2. Location of studied area between Llanllowell and Great House.

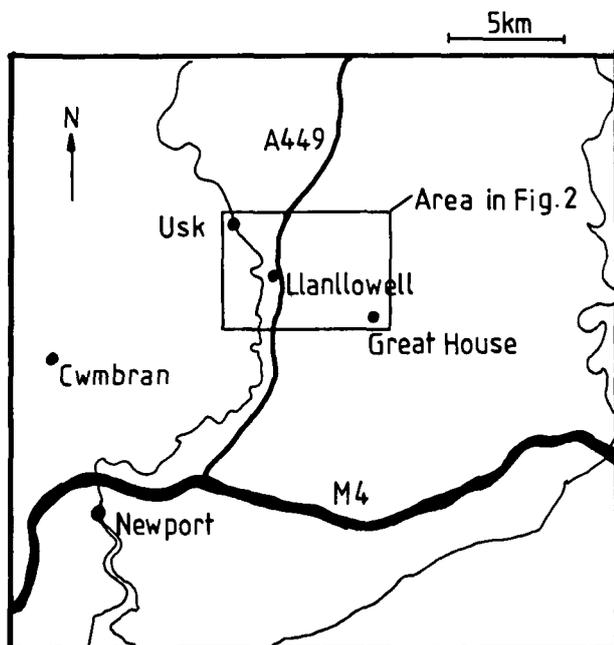


Figure 1. General location map of central Gwent, Wales, U.K. The area covered by Figure 2 is shown.

southeast orientation of the dyke at irregular intervals until more than one transect provided no anomaly. Figure 3 shows the position of each of the six transects. The data were plotted as profiles (Fig. 4).

The data were directly interpreted; the method is described by Kearey & Brooks (1984, p. 191), so that a deviation from the magnetic norm of the surrounding country rock is attributed to the presence of subsurface monchiquite which possesses a much higher gamma reading. The magnetic data, however, could not be corroborated in the field as the intrusion is not sufficiently exposed.

From the transects it is clear that the dyke is wider than 5 m and may in fact range from 15 to 20 m in width, according to the position along the dyke, and at least 34 m long. It is reasonable to assume that Pocock (1940) and Eyles & Blundell (1957) underestimated the dimensions of the dyke, because of the size of a small quarry on the dyke (now overgrown), which is itself less than 5 m wide and around 20 m in length. Due to the non-exposure of the rest of the dyke they could only suggest that the dyke was at least 5 m wide and 23 m in length, because there was no way of estimating the true dimensions of the intrusion, without the use of an instrument such as the magnetometer. The magnetic data were used to aid construction of a geological map of the intrusion's immediate area (Fig. 3).

Two points arise when inspecting the map. Firstly, the Llanllowell dyke is not an extension of the Great House

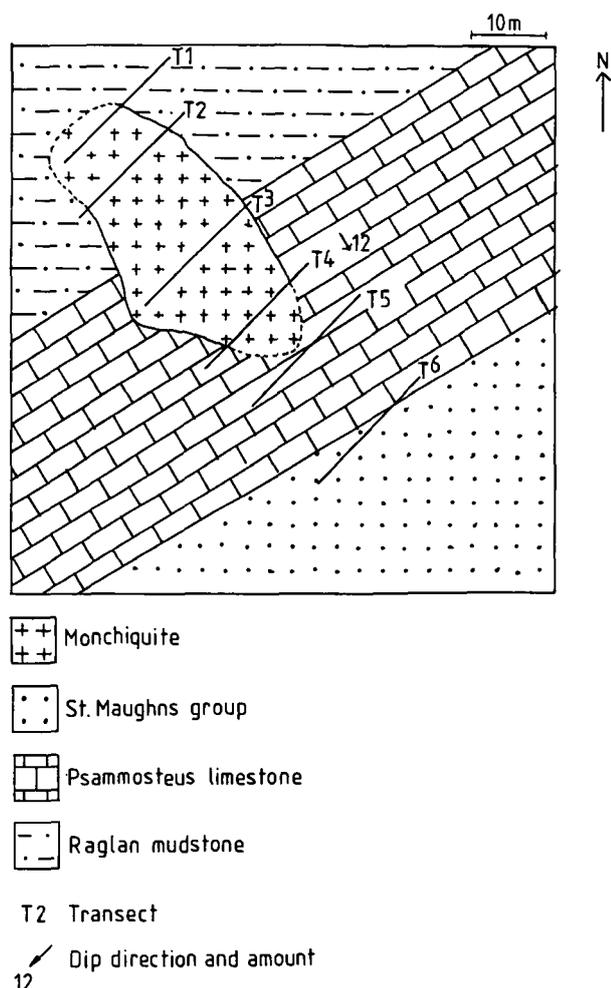


Figure 3. Geology of the studied area.

intrusion. Both the northwest and southeast limits of the dyke have tapered terminations and there is no evidence of faults cutting the areas of no-exposure adjacent to the dyke ends. Although there is no surface connection of the two intrusions, it may be possible that there is a connection at depth. The second point, in view of the petrographical similarities between the two intrusions, considers a connection at depth very likely (see Knill in Welch & Trotter, 1961, p. 139; and Haslett, unpublished data). Furthermore, the sub-linear occurrence of the Llanllowell intrusion necessitates a reconsideration of a theory put forward by Professor Cox, in a letter to the *Geological Magazine* of 1954, which suggested that the intrusion at Great House was a pipe intrusion.

At this stage, it may be postulated that the two monchiquite intrusions may have been feeder pipes, providing a connection between a common magma source at depth and the surface, via post-Lower Carboniferous volcanoes. Indeed, agglomerate containing blocks of fossiliferous, Carboniferous limestone have been found in association with the Great House intrusion (Eyles & Blundell, 1957). The lack of agglomerate at Llanllowell, however, could be attributed to the lower stratigraphical position that the outcrop now occupies. However, before any certainty can be reached as to the origin of the

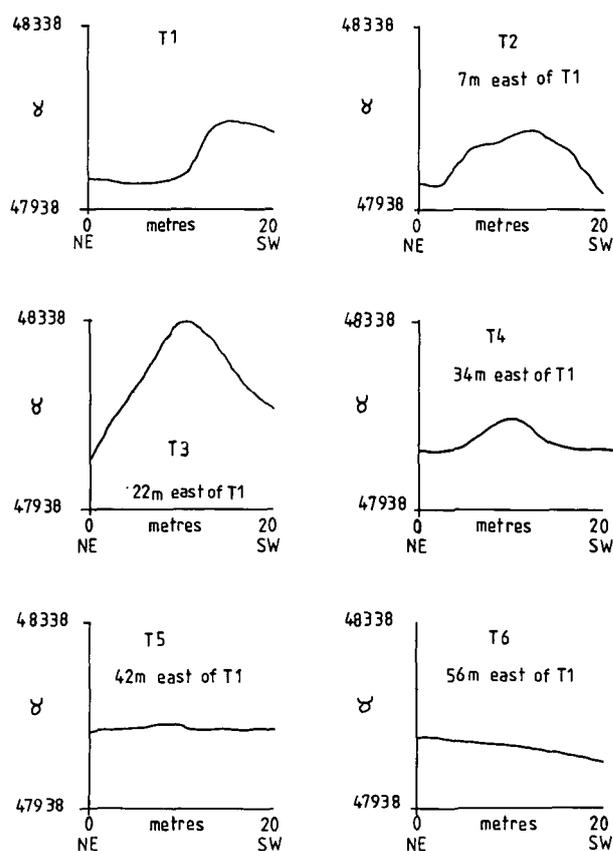


Figure 4. Magnetic profiles across the intrusion.

intrusions, the monchiquite intrusion at Great House must also be surveyed magnetically.

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## References

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