

Weardale granite and its mineralisation

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Laporan (Report)

Professor M.H.P. Bott gave the above talk at 5 pm on the 25 February 1994 at the Geology Department, University of Malaya. Prof. Bott was last here in March-April 1992 as External Examiner (Applied Geology), University of Malaya where he gave 2 talks (Warta Geologi Vol. 18 No. 2). Presently Prof. Bott is Professor Emeritus at the University of Durham and is on his way home after attending a Seismological Symposium in New Zealand.

What follows is a write-up of the talk by Prof. Bott himself for the benefit of members.

Abstrak (Abstract)

The lecture described the interpretation of gravity anomalies in northern England which concern the relationship of the buried Weardale granite. To the lead-zinc mineralization and to the later structural history of the region. This contrasts with the tin mineralization in Malaysia where a different type of relationship with the granites applies.

A local negative gravity anomaly of -35 Mbal amplitude occurs over the gently dipping Carboniferous rocks of the Alston Block (northern Pennines). The anomaly closely corresponds with the mineral zonation. The characteristics of the anomaly indicate the anomaly is caused by a granite penetrating the underlying Lower Palaeozoic basement, rather than a sedimentary basin. Limiting depth considerations placed a maximum depth of about 400 m to the top of the granite, justifying a borehole, which proved a Devonian granite unconformably underlying the Lower Carboniferous. Thus the granite did not give rise to the mineralization because it was earlier, but probably acted as a channel for the upward flow of the mineralizing fluids.

To the north and south of the granite there are gravity gradients of opposite polarity which must be attributed to substantial thickening of the Lower Carboniferous succession away from the granite, corresponding to Lower Carboniferous hinge lines which correlate with later fault lines seen at the surface. It appears that the region underlain by granite (the Alston Block) was much more stable than the adjacent regions, suffering much less subsidence during the Lower Carboniferous than the adjacent troughs. The gentle faulting and folding is also less intense above the granite. It is thus suggested that the Weardale granite has exerted an important and persistent structural influence on the later rocks of the regions as well as acting as an upward channel for the mineralizing fluids.

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