



The use of electrical surveying and predictive deconvolution to discover Anglo-Saxon Grubenhauser at New Bewick, UK

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Aerial photographs of the Anglo-Saxon palace at Milfield (NT941339) near Yeavinger in Northumberland (northern England) have shown quasi-rectangular features that were confirmed by excavation to be Grubenhäuser (sunken-featured buildings). Similar features were also present on aerial photographs of the New Bewick site (NU061206), and assumed to also represent grubenhäuser. An accessible area of farmland at the New Bewick site was chosen where the cropmarks seemed to indicate the presence of a grubenhäuser. An electrical resistivity survey was carried out over the area with an ABEM Mk II Terrameter and a multiplexing box serving 31 electrodes in line at any given time. The wenner configuration was used with an electrode spacing of 1 m. Data was acquired in blocks of 30 m by 30 m during a period of dry summer weather while the field was under young winter wheat. The wenner array produces a characteristic 'M' or 'W' shaped response over filled in excavations such as those expected to represent a grubenhäuser. Such anomalies were present on the raw data. The resulting data were analysed using 1D and 2D predictive deconvolution in order to remove the wenner response. The deconvolution was carried out using an inverse matrix element method. The filtered results indicated the presence of an anomaly that is consistent with a grubenhäuser measuring about 5 m by 4 m and with a pit depth of 0.6 m below 0.5 m of topsoil. The results also showed broader areas of increased resistivity which have been attributed to compaction resulting from human and animal movement. Following the geophysical study the site was excavated (T. Gates and C. O'Brien "Cropmarks at Milfield and New Bewick and the Recognition of Grubenhäuser in Northumberland." *Archaeologia Aeliana* 5th series, Vol XVI, 1988, 1-9) and a grubenhäuser was discovered at the site. The excavated grubenhäuser measured 4.7 m

by 3.9 m with a pit depth of 0.5 m below the base of the topsoil.