

Geology and Warfare in England and Wales 1450-1660

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ABSTRACT: Arguably, geology had an important influence on battlefield tactics in the Middle Ages and 17th century in Britain, but did it also constrain patterns of warfare at the strategic level in those times? Between 1450 to 1660 AD there were several periods of active warfare in England and Wales, in the course of which some 75 significant field engagements have been identified. An investigation of the geographical distribution of these battle-sites in relation to the solid (bedrock) geology depicted on the 1:625,000 geological maps of Britain, reveals that some chronostratigraphical units sufficiently widespread to be depicted at this scale (notably the Permo-Trias and Upper Carboniferous) are associated with more battlefields than might be predicted from the relative extent of their area of outcrop, whereas others (notably the Cambrian, Ordovician, Silurian, Lower Carboniferous, Upper Jurassic and Lower Cretaceous) exhibit a below-average number of battlefields per unit of outcrop area. The application of a Chi-squared test confirms at a >99.5% confidence level that the relationship between bedrock geology and these battlefields is non-random, which strongly suggests that geology was an important influencing factor on the conduct of the campaigns in question. Other than the avoidance of militarily unsuitable, mountainous or rugged terrain underlain by relatively resistant strata, the precise nature of this relationship remains to be established but the following outline is proposed as the basis for further investigation: lithology, structure and geological history of an area constrain relief, topography and the distribution of mineral resources, affecting drainage and overlying soil type and hence vegetation patterns and the 'going', which in turn determine agricultural productivity and the routing of lines of communication. Areas of resource production, substrate properties and drainage and lines of communication locate centres of population. Tactics on the battlefield are determined by topography and going, while strategy is dictated by the need to control centres of population, resource production and lines of communication, objectives whose location is further removed from, but none the less in part attributable to, the influences of the underlying geology.

1. Introduction

Arguably, geology is an important factor constraining military activity on the battlefield at the tactical level (e.g. Halsall, 2000a, this volume), and the design and construction of fortifications (Halsall, 2000b). However, it remains to be tested whether geology also plays a significant and more fundamental role in shaping patterns of warfare at campaign level, i.e. in determining strategy and grand-tactics. One test is the study by area of the distribution of battle sites in relation to the geology, during specific periods of history. As such, this paper presents a preliminary analysis of the distribution of battlefields in England and Wales for the period 1450 to 1660 AD, with respect to geology.

The period of British history most associated with active if intermittent warfare in England and Wales was between 1450-1660 AD. This relates, in particular, to three main episodes of conflict: (1) the Wars of the Roses 1450-1487, including the precursor action at Sevenoaks (1450) in the course of Jack Cade's Rebellion (Weir, 1995) and the battles of Bosworth (1485) and Stoke Field (1487) which finally brought this conflict to a close (Haigh, 1995); (2) the Anglo-Scots Border Wars which rumbled on intermittently through the first half of the 16th century and which featured engagements at Flodden (1513) and Solway Moss (1542) (Phillips, 1999); and (3), the 17th century Civil Wars between King and Parliament, commencing with the Battle of Newburn Ford in the Bishop's War of 1640 (Newman, 1985; Emberton, 1997) and concluding with the major battle at Worcester which brought the Third Civil War to a close (Rogers, 1968), together with George Booth's Rising of 1659 which preceded the Restoration (Newman, 1985). This 210 year time span was a period of relatively rapid development in military technology and practice (Roberts, 1967; Boardman, 1998; Haythornwaite, 1998; Phillips, 1999), so a hypothetical relationship between bedrock geology and warfare can be tested against a background involving different styles of warfare.

The armies involved during this time period range considerably in size from the 20,000-30,000 or so per side at Towton (1461), Flodden (1513) and Marston Moor (1644) (Smurthwaite, 1993), to a mere 1,000 on each side at Powick Bridge (1642) (Guest & Guest, 1996). In the majority of cases the opposing forces were relatively evenly matched, so the strategy and tactics employed were not cumulatively biased in favour of, for example, the need for a defensive posture by smaller outnumbered armies, or, for that matter, by technologically disadvantaged forces (Rogers, 1968; Seymour, 1975; Boardman, 1998; Phillips, 1999; Barratt, 2000).

2. Methodology

Military engagements have been located geographically and placed in context by reference to various source texts, such as: Ross (1976), Lander (1990), Haigh (1995), Weir (1995) and Boardman (1998), for the Wars of the Roses;

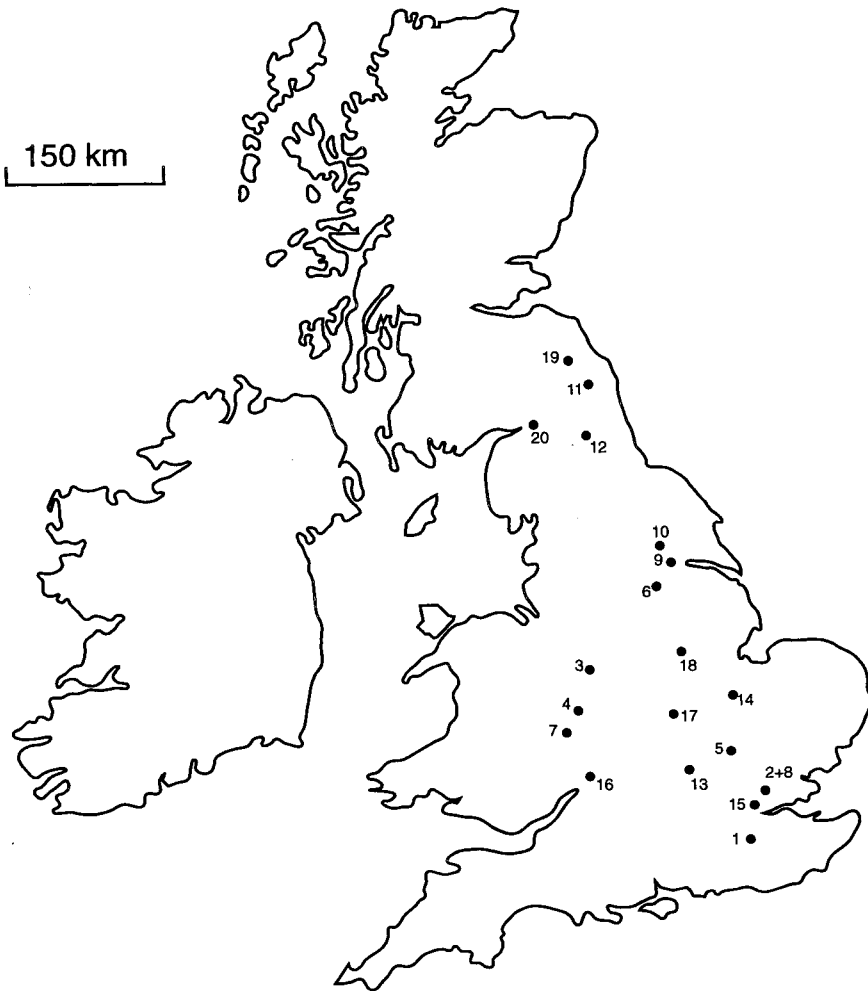


Figure 1: Battlefield sites in England and Wales: the War of the Roses and Anglo-Scots Border War. Table 1 provides a key to battlefield site numbers

Fields of Battle

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