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REVIEWS

Mines and minerals of the Mendip Hills by Peter S. Burr. 2015. Mendip Cave Registry and Archive. 2 volumes: 1, pages 1-500; 2, pages 500-1000. Price £70 plus £15 P&P ISBN-13: 978-0-9531310-6-8 (vol. 1) and 978-0-9531310-7-5 (vol. 2). Available from www.mcra.org.uk.

The Mendip Hills in Somerset are well known, at least locally, as the site of lead mining since Roman times. They were once also an important source of zinc, and other metals in smaller quantities. Smaller in area than the well known metalliferous areas of Devon-Cornwall and the north of England, they may have received less attention.

The only book-length account of mining in the area, *The Mines of Mendip* by J.W. Gough (1931), was by a historian, and dealt mainly with lead mining. On the geological and mineralogical aspects, there have been numerous scientific papers, that by G.W. Green (1958) being one of the most important, but describing only a specific area. C. Alabaster (1982) wrote a systematic account of the minerals and their geological occurrence in a local journal, summarising previous work and explaining the 'Mississippi Valley' theory of the origin of the mineralisation. Lastly, Gary Morse (2002) of the Russell Society compiled a reference list of over 90 minerals which had been recorded from the Mendips.

The British Geological Survey revision of the Bristol and Somerset coalfields, including the Mendips, was completed after World War II, but necessarily made only limited reference to mineralisation in published reports (Green and Welch 1965; Kellaway and Welch 1993).

Now Peter Burr, in the present work, has provided us with a comprehensive account of the minerals, their geological occurrence, the mines by which they were exploited, and histories of the families who worked in them.

The book begins with an 'overview of the mineral deposits' which includes brief accounts of the mines and orefields, in sequence from the west (Steep Holm island) to east (Frome). A table lists thirteen types of mineralisation, plus 'Recent cave deposits' (p. 69).

There follow nine maps on which the distributions of different elements are plotted on a small scale structural base map. Unlike the rest of the book, these maps include the whole area of the former Bristol and Somerset coalfields, from the Mendips to Cromhall in the north) (pp 72 – 82).

After this interpolation follow detailed accounts of the different types of mineralisation, as previously tabulated, including discussion of their geological environments and their geological ages.

All the above constitute Chapter One, which ends with tables giving the total (recorded) ore production of the Mendips.

Chapter Two begins the systematic descriptions of the chief mining areas, thirteen chapters in all. These have a standard format, the major headings being: Geological History; Mining History and Social History. Three chapters are devoted to lead mining. Lead mineralisation is divided into four phases: Phase I is dated by isotopic analyses to the Upper Permian, and is found only along two of the major overthrusts along the south flank of the Mendips. Phase II, dated to the end of the Carnian Stage of the Trias, survives only on Steep Holm and at Nyland Hill, near Cheddar. Phase III was deposited during the Norian Stage of the Trias and is subdivided into two episodes: the first is represented by secondary lead minerals near Priddy Hill Farm, and also at Henbury near Bristol. The second episode constitutes the major lead

mineralisation of the Central Mendip Lead-Zinc Orefield. Phase IV comprises episodes from Middle Jurassic to Lower Cretaceous in age in several areas.

The source of the lead is discussed in some detail. The Mississippi Valley type of ore deposit has been invoked by a number of authors. This had been originally described by E.S. Bastin (1939) as lead-zinc mineralisation in limestone country rock. Authors had suggested that the metallic minerals had been released from carbonate sediments in developing basins during diagenesis and compaction, but the present author, reviewing some of these, concludes that 'different authors have used different definitions, that these have evolved over time, and that *all* of the definitions are rather vague.' (p. 165). He concludes that the main lead and zinc deposits of the Bristol – Mendips area are not to be classified as of Mississippi Valley type. He writes that 'More research is required, but it is suggested that the deposits of galena and baryte of the main episode … of the "Mendip Lead" mineralisation were formed when basinal brines within the Somerset coalfield were heated to 150 to 200 ºC by deep thermal convection facilitated by rifting and the reactivation of deep-seated faults … The brines then rose to the surface dissolving lead and other metals from the … "Old Red Sandstone," and, to a lesser extent, younger strata. Near to the surface the brines mixed with small amounts of lower temperature, "open system" fluids carrying reduced sulphur enriched in ^{32}S, and sulphate enriched in ^{34}S. The sulphur was probably derived from Upper Triassic (marine) evaporites …' (p. 172).

Among the most detailed accounts is chapter 5, on the "Calamine" (zinc carbonate) mines, which occupies just over 200 pages. After describing the sites of mining, chiefly in the western Mendips but also at East Harptree, the history of mining, and its intimate connection with the brass industry, is discussed. Production of calamine began in the Shipham area between about 1566 and 1598.

Interspersed with the accounts of the mining areas are chapters on Merehead Quarry (Torr Works) and Whatley Quarry, the former in particular having become a major source of Mendip minerals in recent years. About 50 minerals are listed from Merehead Quarry and many of these are discussed under separate headings. 'Minerals found in the Mendips' has a chapter to itself and lists about 80 species, excluding queries and synonyms. Here and elswhere are details of many collectors and collections.

Mendipite was the first 'new' mineral to be described from the area (1839) and a separate chapter is devoted to it, discussing theories of its mode of origin.

An important feature of the book is the results of analyses of rocks and minerals, over 160 carried out for the author and many others from the literature. Samples and results are tabulated on pp. 853-891. They include not only chemical analyses but also isotopic analyses of lead, sulphur, carbon and oxygen.

The book is well illustrated with maps and air/satellite photos of the sites described. There are numerous colour photos of mineral specimens, many of them by the author, and almost uniformly of high quality. Some are enlarged and the scale is always stated.

This is a major reference work and seems to record just about everything that is known about the minerals, their occurrence and exploitation. So how does the reader find what he/she needs in the 1000 pages of the two volumes? The main resources here are the very detailed 'Contents' pages of the two volumes, although page references are not given for all the headings listed. The Index, however, is almost useless. Common (and less common) minerals, and some place names, just have long lists of page numbers, for example 'Bath' has a list of about 80 page numbers, while 'Cheddar' is not indexed at all. The choice of entries is chaotic, and misleading; for example, the entry for the surname 'Walker' refers on page 338 to 'John Walker, auctioneer', of Axbridge, and on pages 384 *et seq*. to the (presumably unrelated) Ann Walker of East Harptree, and other members of her family.

These volumes are a lifetime's work by Peter Burr and should satisfy anyone's needs for information on the minerals of Mendip, their geological occurrence, and their mining history.

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The Archaeology of Caves in Ireland by Marion Dowd. 2015. Oxbow Books. 320 pages. Price £50. ISBN-10: 1782978135; ISBN-13: 978-1782978138. Available from www.wildplaces.co.uk.

The University of Bristol Spelaeological Society began its relationship with Ireland in July 1928 when Tratman first visited Co. Waterford. Two members of the Society had been invited to join a committee set up by the Royal Irish Academy to obtain material for the comparison of Irish and English cave fauna and this led to investigations in a number of caves, with a significant excavation at Kilgreany cave (Tratman, 1929). This was shown to have been used over a long period of time through the Neolithic, Bronze and Iron Ages, but their conclusion that occupation stretched back into Upper Palaeolithic time was later overturned by more extensive excavations by the Harvard Archaeological Mission led by Hallam Movius who showed that the deposits were far more disturbed than had been seen in the earlier work (Coleman, 1969; Movius, 1935).

The Archaeology of the Caves of Ireland by Marion Dowd is a comprehensive study of Irish caves and their archaeological content. In addition, it examines the myths and stories surrounding the caves and tells the story of how people have interacted with Irish caves in a variety of ways over the 10,000 years of human occupation of the island.

There are 980 caves documented across the limestone regions of the country and of these, 91 are registered archaeological sites. The vast majority of archaeological discoveries in