

In Part V the account of European Carboniferous and Permian coalfields is comprehensive, and deals with the depositional environmental contrasts of paralic and limnic coal basins. Further, interesting contrasts occur in the heat supply, which affects the rank of coal in these coalfields. In the European coalfields the heat supply was from below; in South Africa it was often from above, i.e. from thick intrusive sheets and dykes of dolerite. Finally, to show that widespread coal formation was by no means a Carboniferous or Permian phenomenon, the book ends with an account of German Mesozoic and Cainozoic brown coal basins. Although these brown coal basins show some differences from the Carboniferous due to formation in somewhat dissimilar environments the causes of increase in coal rank are the same as those described for the earlier coals, and even anthracite occurs in areas close to igneous intrusions.

The book contains a wealth of new information and admirably summarizes recent advances in many fields. It is well produced, illustrated, and edited; only one error of reference was noted, i.e. on p. 146 where the initial W. occurs for S. E. Hollingworth. It will be long used as a general reference work but its price is probably somewhat prohibitive for all but those with specific interests in the subjects covered.

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SIDDIQUI (M. K. HASNUDDIN). *Bleaching Earths*. Oxford and New York (Pergamon Press), 1968, 86 pp. Price 42s.

Although the industrial exploitation of clays has assumed great economic importance in many countries during the last fifty years or so, books on various aspects of clay technology are not very common, and a small volume summarizing the subject of bleaching earths in less than eighty pages can expect to have wide appeal among young scientists entering the field, to whom the volume is dedicated. Siddiqui's little book seems, at first glance, to fill the gap admirably: the layout is good, the style is simple, and the chapters are well chosen, going gradually from the general and academic to the specific and practical. The faults of the book become apparent only when one reads the text in detail. It seems a great pity that an apparently well-planned project should fall down on account of the inaccuracy of much of its scientific material.

The first chapters introduce the main clay minerals used as bleaching earths, montmorillonite and attapulgite (palygorskite), including theories of their formation. These are followed by two chapters dealing with the crystal structure, the physical and chemical properties, and the methods used for laboratory examination of these clays. The activation processes used for improving bleaching capacity and the bleaching mechanism itself are described in the next chapters, and the book ends with an account of the world-wide distribution of bleaching earth with particular emphasis, understandably, on India.

It would take up much space to list the small errors, incorrect factual statements, and confused or unacceptable theoretical explanations; only a few examples are quoted: The use of the terms meta or sub-bentonite for the non-swelling forms of montmorillonite, e.g. calcium montmorillonite, is incorrect. The range of pH for these

clays, given as 4–7, is also wrong. It is not true that sepiolite is the end-member of the magnesium-for-aluminium substitution series in attapulgite, or that less than 10 % Fe_2O_3 in a clay is indicative of beidellite, or that the water removed by water solvents from acid-activated clays is considerably in excess of that removed by simple drying. Some readers may even object to seeing the location of an occurrence of palygorskite given as Shetland Isles (England), but, of course, this is a very small error when viewed from distant India. Rather more serious is the confusion existing on some of the theoretical points. The most conspicuous example is an account on p. 34 of the various types of surface held responsible for the bleaching action of montmorillonite and of the supposed effect of acid-activation, which is said to produce flat silicate sheets and thus give an extended surface useful in adsorption. Anybody who has compared natural and acid-activated clays by electron microscopy can prove that there are far fewer flat silicate sheets in the acid-treated product.

All these criticisms are perhaps of little importance for the practical reader who wants to get general information quickly on a new subject. For such a purpose, the book is adequate, since the errors found are more on the academic than on the practical aspects of the subject.

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EDMONDS (E. A.), WRIGHT (J. E.), BEER (K. E.), HAWKES (J. R.), WILLIAMS (M.), FRESHNEY (E. C.), and FENNING (P. J.). *Geology of the country around Okehampton (Explanation of one-inch geological sheet 324, new series)*. Inst. Geol. Sci., Mem. Geol. Surv. Gt. Britain, 1968, xii+256 pp., 20 figs., 22 pls. (8 in colour). Price 40s.

This area is dominated by the northern portion of the Dartmoor Granite, which has been intruded into an area of intensely folded and faulted Carboniferous chert, shale, and sandstone to produce a metamorphic aureole up to 2 km wide. The nature of the Dartmoor Granite, and in particular the implications of the presence of secondary potassium feldspar and quartz, are critically discussed. No new chemical analyses are presented and the sequence of events postulated by Dr. Hawkes is based mainly on textural evidence, taken together with theoretical considerations. The Dartmoor magma is considered to have behaved as two distinct phases: a silicate melt of trondjemitic composition, and an aqueous fluid bearing appreciable quantities of K and Si with less amounts of Al, Li, Be, B, F, Fe, and Sn. The crystallization of the melt gave a plagioclase-quartz-biotite crystal mush, containing only a minor amount of interstitial potassium feldspar; it is considered that the associated aqueous phase remained largely passive at this stage but that once the temperature had declined sufficiently ionic exchange took place between the K in the fluid and the Na in the plagioclase, causing the replacement of plagioclase by orthoclase perthite. As crystallization proceeded the arrival of more aqueous fluid of similar composition gave rise to the late-stage albite-rich aplites, the largest of these being the Meldon Aplite, which crystallized outside the granite with a suite of lithium minerals and numerous rare accessory minerals. Further aqueous fluid is thought to have reached the outer parts of the pluton after the formation of the aplites, this fluid being more depleted in alkalis