

**Serpentine and its Vegetation: a Multidisciplinary Approach:** by R. R. BROOKS, Crom Helm, London, 1987, 454 pp. + vii, £40.

There is an initial problem over the word 'serpentine' which is discussed by the author. I now much prefer the words 'ultramafite' and 'ultramafic' to 'serpentine' and will use them in this review except in quotations. Professor Brooks has researched on ultramafic rocks and their vegetation for several years and is one of many scientists who has been intrigued by their frequently unusual vegetation and the odd chemistry of their soils. His aim in producing the present book is 'to reach a wide spectrum of scientists and laymen by above all simplicity of presentation while at the same time providing adequate citations for deeper study'. This attractive, well illustrated book will largely fulfil these aims but it must be said it has many serious flaws.

The book is divided into two parts. The first part has nine chapters on 'Serpentine Ecology', the second has 12 chapters on 'Serpentine Vegetation of the World'. Nearly all the chapters have some useful information but most are marred by inadequacies of several types. The geological account is incomplete and difficult to understand. The chapter on soils is patchy, does not use up-to-date nomenclature and has too much on 'laterites' of non-ultramafic origin. The next chapter called the 'Serpentine Factor' is poor. The concept of a universal cause of the peculiarities of vegetation on ultramafic substrata has been dead for many years (e.g. Proctor and Woodell, 1975) and little is served by bringing it back into prominence in the present book. In this chapter there is neglect of the possible importance of unusual soil physical characters. The openness of many ultramafic areas is more likely to have a physical cause than a chemical one. For example once tolerant plant races have evolved to soil chemical toxicity there is no reason why a complete vegetation cover should not form unless there are physical constraints. The section on the availability of soil elements is confusing for chromium, cobalt and nickel. Several important interactions are inadequately discussed; for example there is scant reference to the effects of magnesium on nickel toxicity and none on those involving soil chemical with physical factors. I did not report (p. 44) '4320 µg/ml of magnesium in soil solutions from the Meikle Kilranoch outcrop!'. The value is much too high. Too little is known about the høle ultramafic site in Norway to justify the assertion that it 'furnishes perhaps one of the best known examples of the effect of magnesium alone in controlling a serpentine flora'. The author's conclusion that 'we are hardly any closer today to solving or explaining the serpentine factor than we were 50 years ago' is astonishing. The vast literature cited in his book includes many aspects of ultramafic soils and their vegetation of which have been clarified during this time.

The chapter on 'Serpentine and Agriculture' is satisfactory but I feel that the author's endorsement of ultramafic rocks as agricultural fertilizer should have included a

warning that they would be likely to result in enhanced nickel concentrations in the crops. The chapter on 'Plant Evolution and Serpentine' includes some useful summaries but in using Zimbabwe as an example Brooks has missed two important points. First there is the shortage of morphological races or varieties of wide-ranging species. Such morphological variants are common in ultramafites in temperate areas where they have been given the name of 'serpentinomorphoses' (curiously altered to 'serpentinomorphoses' in many places in the book). Their rarity in Zimbabwe and other tropical areas is intriguing. Secondly, speciation on the Zimbabwean ultramafites is relatively poorly marked compared with Cuba or New Caledonia. It is a major problem why tropical ultramafites differ in the extent of the speciation they have elicited. A disturbing feature of the book is the inconsistent use of the word 'endemic'. Brooks often uses it to describe a species that is restricted to a cited area and found nowhere else in the world but unfortunately sometimes he uses 'endemic' with a different meaning. For example we read of *Serratula tinctoria* as endemic to the ultramafites of the Massif Central in France and *Ceratium arvense* as 'not only endemic to serpentine in the northern Urals but also to serpentine on the east coast of North America!' Both these species are widespread on a range of soils. The penultimate chapter in the first part is on nickel-accumulating plants and this is good but regrettably lacks a discussion of ecological aspects of this phenomenon.

The second part of the book has several shortcomings but its wide coverage of the world's ultramafic areas will be very useful. The author has done a fine job here in drawing together so much information from many areas which were virtually unknown ecologically. It is a pity though that there is nothing on the ultramafites of Central America (in Costa Rica and Guatemala for example) in the Chapter on Tropical America. I noticed a number of errors in the chapter on northwest Europe which includes Britain. Figure 13.1 shows substantial areas of ultramafites in Fife, Scotland an area where there are none! The record for *Lychnis alpina* on Rhum is not on ultramafic rock (p. 177) and its indigeneity there is doubtful.

My conclusion is that the book is flawed but contains much useful information and will stimulate further work on the topic by highlighting the geographical areas where research is needed. It can be recommended to general readers of *Phytochemistry* particularly for its chapter on nickel-accumulating plants.

#### REFERENCE

Proctor, J. and Woodell, S. R. J. (1975) The Ecology of Serpentine Soils. *Adv. Ecol. Res.* **9**, 255.

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