BOOK REVIEWS

Duricrusts in Tropical and Subtropical Landscapes

Although duricrusts have been described in the scientific literature for more than a century, it was not until Dr. Goudie's book that the first attempt to bring together the abundant and widespread literature on the subject. And a brave attempt it is! After an historical review concerned with the discovery of the several types of duricrust by western scientists, Dr. Goudie deals with the physical and chemical characteristics of calcrete, silcrete, ferricrete (laterite), and alcrete (bauxite). Chapters follow on the geomorphological significance of duricrusts, the distribution of duricrusts in space and time, and the various hypotheses or models which purport to explain their development. A vast amount of information is brought together and is succinctly and, on the whole, elegantly summarized. The book is of considerable value to students and our thanks and congratulations are due to Dr. Goudie.

But the book is uneven in its quality and reliability. One of the difficulties with reviewing a work concerned with a topic of so capacious a scope as duricrusts is that the author always seems to know least about just those areas or subjects that the reviewer, one thinks he is, well informed for although Australian workers have perhaps not published as rapidly as they could or should, Dr. Goudie's selection of references to Australian duricrusts is in some instances unfortunate, and in others, borders on the idiosyncratic. Indeed, though the breadth of literature reviewed is one of the strengths of the book, the referencing is also a source of annoyance. First and this is a minor point, it would have been beneficial to have references listed by chapter. Second, the text references should surely appear in some order, either alphabetically, or, and preferably, chronologically. Moreover it is important that the source of ideas be acknowledged, so that the earliest reference on a point is appropriate, not merely one that embraces the notion. This is not always done. Places are in cited and some with original ideas and data omitted. Thus the work of Wopfner (Trans. Royal Soc. S. Austr., 1960) on the age of silcrete is omitted, as indeed is any adequate discussion of the topic despite the fact that for better or for worse this particular duricrust is widely used as a morphostratigraphic marker horizon in arid Australia. And though Dr. Goudie comments on the rarity of ancient duricrusts, he omits mention of the work of Campana (J. Geol. Soc. Aust., 1958) and others who have assembled a very strong case for regarding the laterite duricrust of the Mt. Lofty Ranges and adjacent areas as of late Cretaceous or earliest Tertiary age; while citing works concerned with duricrusts which are no older than many others in northern Australia.

Many other examples of misunderstandings about Australian duricrusts could be cited.

Another problem which is not resolved in the book, and for this Dr. Goudie can be readily forgiven in view of the uncertainties involved, concerns the definition and naming of duricrusts. On the one hand this reviewer regrets the rejection of the terms laterite and bauxite which are well established in the literature and have priority over the substitutes suggested by Dr. Goudie. But one must admit and admire the logic behind the suggested change. On the other hand it is still useful to distinguish between calcrete, a sheet-like pedogenic accumulation, and travertine, a carbonate precipitated from springs and rivers; such a separation is not always maintained (see p. 46). Quite more difficult is the question of definition. For instance not only is there great confusion between the grey billies associated with basalt in south-eastern Australia and the siliceous duricrusts of the more arid parts of the continent, but it is becoming clear that some of the latter are orthoquartzites, though others display the porphyritic texture some of us think typical of silcretes.

This problem is one that is basic to any further work on duricrusts for problems of distribution and of origin await its resolution.

Finally it may be mentioned that in his Preface, Dr. Goudie expressed the view that in some respects his book may be premature. Quite fortuitously the timing of Dr Goudie's book is unfortunate. Work on duricrusts has been proceeding at a gentle pace for many years, but now it is snowballing; and not least through the efforts of Dr. Goudie himself. In Australia for instance new ideas concerning the origin of duricrusts are being developed, based on a detail of a chemical and mineralogical examination not previously possible; and I venture to suggest that even if new answers are not readily forthcoming, then the next 5 years will at least see problems being recognized and Dr. Goudie's book will not replace Maignien's work on laterites and other more specialist books. But as a general introduction, it will serve a useful purpose. It is hoped that the book will sell so that a second edition will permit Dr. Goudie to build upon the promising beginning made in this welcome addition to the literature.—C. R. Twidale, University of Adelaide, South Australia.

Land Use and Water Resources

Dr. Pereira has written a valuable text on a subject of major (and increasing concern) to mankind throughout the world—the rational utilization of land and water resources. He has put into perspective several of the diverse problems which relate to these questions. His technique has been to shift rapidly from the broad perspective to the precise detail. He is, for example, equally at home in discussing the ebb and flow of ancient environments in which success depended upon discipline of land and water resources and in describing the problems of measuring evapotranspiration in lysimeter tanks. His treatment shifts smoothly from what may happen to runoff water during a summer rainstorm in Nebraska to what transpired in equatorial regions of the planet during the ice age. Experiences of the slash-and-burn farmer of rain-forest areas are considered along with those in major irrigation projects in Australia, and so on. Problems related to urban development and industrialization likewise come in for attention.

The result is a global treatment which will serve not only as a text for students but should be read by planners and land development officials throughout the world. Planning a road system into the Amazon Basin or encouraging the return to agriculture of idle farm lands in the United States should equally take into account the basic questions of land and water potentials in the respective areas. All too often such matters receive attention only after problems arise.

If there is one major thesis in Dr. Pereira's discussion, it is an emphasis on the need for understanding basic principles and for establishing and maintaining discipline in the use of resources. A farm, a nation, or a new knowledge and discipline is easily acquired and simply involves the application of farming practices worked out over the centuries and passed along from one generation to another. In other cases there are far more subtle trends at work, and observations extending over many generations have been necessary before the effects of particular practices could be identified. Frequently history has not stood still long enough for these observations to have been made and the forest or the desert has replaced what was a farming region.

Supplementing traditional experience with scientific observation is, of course, the crux of the problem and is one of Dr. Pereira's major pleas. At the same time he urges that results from one part of the world be carefully considered in developing resources in another. Thus, the planners responsible for developing the coastal valleys and flood plains of tropical America may gain more from traditional experience of Southeast Asia than from that of North America and Europe. No matter how scientifically they may attempt to introduce the technology or at what expense. Wetland rice, Asian style, may, for example, simply be more appropriate than corn on irrigated land a midwestern USA.

As noted, the success or failure to identify and correct trends resulting from specific water and land use practices has affected the history of empires. Our ability to identify and manage them today and in the coming decades will be equally important. 

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