The water cycling system is largely ignored, but admitted to be fundamental (p45): in sum the book is an amalgamation of factual accumulation and unauthoritative interpretation, structurally flawed and badly organised: as one focused on systems, there is no clear and early distinction between open and closed systems. By the time I had got half way through this book, though I read it to the end, I had already formed the conclusion that the contemporary geographical problem was with the author and his approach, not the topics under discuussion. This is not a text I would recommend at university level. It does, however, contain information of value, if one has the time and patience to search for it.

The subject of *Environmental Change* by A. S. Goudie (pp244) is environmental change over the past 3 Myr and the topic is approached from a geographer's viewpoint. It aims to show how the physical environment and landscape has changed during the time that "man has lived on earth". The environmental changes focused on are varied: climate, sea level, vegetation association, desert and lake limits, river discharge variation, hurrican frequencies, sea ice cover and mammalian variations. All these changes are properly seen by the author as necessary to the understanding of present-day soil, landforms (though his timescale in relation to the latter is too short), and floral and faunal distributions (because, as is rightly stressed, many features of the present environment and landscape are not in equilibrium with present processes and cannot thus be explained by time.

The impact of man's activity forms only an incidental part of this book, this being seen rightly as justifying a further volume in its own right (perhaps an up-dated and synthesised digestion of "Man's role in changing the face of the Earth"—a mammoth task).

By far and away, this is the most exciting of the three volumes, to the professional academic geographer—not the audience for which it was designed. Fluent, impressively researched, bold in generalisation, generally correct in fact and interpretation, this book is an impressive achievement: it instructed and informed its reviewer very well in most areas. There are of course flaws in such a compressed, generally well judged and fully researched volume; but these are small and subject to counter-argument: the sparse treatment of East Africa (once the key area and still central geographically in terms of evidence); the deficiency of research into the alternatives of the 'Cambridge view'; and the lack of mastery/reading of the French sources here (and elsewhere on occasion). The author must be faulted for trying to be too clever. This is not a beginning text for first-year students, but a text for researchers ot argue over. It is in many ways a *tour de force* but this is not what the series is said to be about.

Many (despite the number quoted) key references are absent. If the volume comes out in an expanded second edition, it could then be a *chef d'oeuvre*. I use the French terms intentionally, for where are references to Cahen, Lepersonne, de Heinzelin, and so on? The section on tropical Africa is particularly weak and uncritical: Olduvai (its interpretation, and so on) is not considered in detail, but is critical to the argument. Lake Chad is weakly treated but is crucial, as it is in a stable tectonic area. Carping comments these may be, but a volume of this calibre (with even greater future potential) deserves more than a few lines, and can absorb, as can its author, a few sabre thrusts.

The aim of *Earth Surface Sediment Transport* by F. Statham (pp184), on the broad subject of transport processes, is to introduce the basic mechanics and chemistry of sediment and solute transport at the Earth's surface. The book concentrates on the processes involved, rather than on their geomorphological implications—for example, in relation to drainage basin and slope form. Differences between specific environments or different types of fluids are covered in superficial way. A conscious attempt has been made to group together processes or groups of processes according to their similarity of operation. The major groups discussed are mass movements (rapid and slow), fluid sediment transport and solute transport.

This text is in a number of ways the most satisfactory of the three under review, bearing in mind the level at which it is aimed, and the requirement to be concise, selective and well-organised. It certainly does cover a problem area in geography—the frequent lack of a simple knowledge of mechanics and chemistry among geography undergraduates.

The seven main sections of the book are organised with admirable clarity and selectivity: the mechanics and dynamics of material transport; sediment in transfer systems (its nature and properties); transfer through soils; transfer of sediment by rapid mass movement; slow mass movement processes; material transport in fluids; and process regimes and the time aspects of material transport. It thus forms an important bridging text in environmental sciences between hydrology, soil science, mechanical engineering and geomorphology. **P. H. Temple**

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Mechanical properties of amorphous materials

Physical Aging in Amorphous Polymers and Other Materials. By L. C. E. Struik. Pp.229. (Elsevier: Amsterdam, 1978.) $39.95.

It is very rare that any book concerned with physical properties has one common theme running through the text. L. C. E. Struik's book is the exception to the rule in that its whole theme is devoted to showing the existence and explanation of an effect called physical ageing.

The property in question is that related to quenching an amorphous material through its glass transition temperature. The physical properties of the material such as creep, yield strength and electrical properties will then subsequently change with the time that the material is held below the glass transition temperature. The author shows that the effect is real and quite general for many different amorphous polymers and other materials such as glassy metals. The interpretation of the effect is also unified in that the concept of free volume is used throughout.

Essentially an amorphous material quenched below its glass transition temperature T_g will initially be in a non-equilibrium state and possess a free volume greater than its equilibrium value. Because of mobility below T_g, with time the free volume will decrease towards its equilibrium value with corresponding changes occurring in the physical properties of the materials. This becomes manifested, for example, in a 20% decrease in the creep compliance over a period of three years for a polymer such as PVC.

The work presented in the book is authoritative and the experimental results have been collected from one laboratory over a period of sixteen years. It is a pleasure to discover an effect which seems to be general for a wide range of amorphous polymers, other amorphous materials such as inorganic and metal glasses, and for more esoteric materials, of which "compression moulded dry cheese powder" is an unusual example. Enthusiasts of mechanical properties and amorphous materials should be encouraged to read this book. **M. R. Mackley**

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