Deformation mechanisms applicable to upper mantle conditions are reviewed by Mercier in Chapter 19 for olivine and pyroxene. In this chapter available experimental data on the microstructures, textures and rheology of these minerals are summarized and compared with naturally occurring peridotites. Mercier points out however that, due to their different uplift histories, major fabric differences are to be expected in peridotites located within massifs compared with those occurring as xenoliths within continental rift zones and kimberlites.

In Chapter 20 phyllosilicate textures in slates are briefly covered by Oertel and (adopting the March model of rigid rotating particles—Chapter 12) their degree of preferred orientation used to estimate strain. Although good agreement is found between such strain estimates and independent strain estimates obtained from reduction spots, it is clear that the observed microstructures place considerable doubt on the applicability of the March model to these tectonites. Moving up in metamorphic grade, mechanisms of schistosity formation are reviewed by Rosenfeld in Chapter 21 using natural examples as case histories. Anisotropy of intrinsic growth rate, velocity and anisotropy of chemical diffusivity, as well as rotation, are all shown to be important mechanisms.

Returning to basic principals, the geological significance of texture analysis is reviewed by Hobbs in Chapter 22. Using quartz deformation as an example, Hobbs clearly demonstrates that texture interpretation must take account of both variation in extrinsic factors (finite strain, strain and stress history, etc.) and intrinsic factors (temperature, strain rate, chemical activity, etc.). In summarizing models for the development of crystallographic preferred orientation by slip, Hobbs points out that the models proposed by Sachs and Taylor (involving homogeneous distribution of stress and strain respectively within an aggregate of deforming grains) represent end members of a potential deformation spectrum. By considering the influence of grain shape, Hobbs also demonstrates that with progressive deformation the Taylor requirement of five independent slip systems may, at least locally, be relaxed; this will result in texture modification.

In Chapter 23 experimental techniques for determining the physical properties of rocks are reviewed by Heard. Such experimental studies clearly indicate the fundamental importance of both physical and chemical conditions (including strain rate) in governing the mechanisms of deformation. In addition single crystal experiments also illustrate the potential influence of texture on the mechanical properties of rock.

Many physical properties (e.g. Youngs Modulus, electrical conductivity) of single crystals are strongly anisotropic, being dependent on the crystal direction in which they are measured. In a polycrystalline aggregate if there is a preferred crystallographic orientation of individual grains then a macroscopic anisotropy will result. In Chapter 24 mathematical techniques for calculating such macroscopic anisotropies in single phase polycrystalline aggregates are reviewed by Bunge. Such techniques require that both the orientation dependence of a physical property within a single crystal, and the texture of the polycrystalline aggregate, are known. Using this approach relationships between texture and magnetic properties of metals are reviewed by Morris and Flowers in Chapter 25.

Finally in Chapter 26 a brief general review of anisotropy in rocks is given by Kern and Wenk. Emphasis is placed on the geological significance of the relationships between texture and the elastic, thermal and magnetic properties of rocks. Such relationships are not only of strict academic interest. For example, laboratory measurements of compressional wave velocities clearly show that seismic anisotropy is strongly influenced by texture as well as temperature and pressure. Similarly, anisotropy of magnetic susceptibility may be related to both texture and grain shape orientation.

The book is extremely well illustrated with numerous line drawings (315) and good quality photomicrographs (89). A general subject-based index is provided and the book also includes an invaluable author-based reference list which has been collated from citations in the 26 individual chapters.

Wenk is to be congratulated on editing such a wide ranging, yet generally detailed, book on texture analysis. At £55.00 the book represents good value for money, and its purchase by geology and metallurgy departmental libraries is recommended.

R. D. Law

Virginia, U.S.A.

Igneous and metamorphic microtextures

Bard, J. P. 1986. *Microtextures of Igneous and Metamorphic Rocks*. D. Reidel, Dordrecht. Price £49.50.

This book is designed principally for an undergraduate and postgraduate student readership. Its aim (so the author claims) is to help the reader bridge the gap between observations of rocks under the microscope and petrogeneic theories and, so far as it goes, I think it is successful. The emphasis is mainly petrological, and there is not a great deal in the book of direct interest to structural geologists.

The book is divided into two subequal parts: text (Chapters 1–5) and illustrations (Chapters 6 and 7). The first two chapters are concerned with theories of nucleation and crystal growth. The next three deal with the criteria for establishing the order of crystallization in igneous and metamorphic rocks, a topic which is rather underplayed in other texts on mineral textures. Chapters 6 and 7 give examples of microtextures for igneous and metamorphic rocks, respectively. The first part of each consists of a brief pictorial classification of principal textures (very helpful) and a condensed classification of the rocks themselves (not very useful).

The scientific content of the book is sound, but I cannot help feeling that the text is too brief to do justice to so large and complex a subject. Topics are over-simplified in many instances, and difficult concepts are not always well explained. There is a general tendency for the author to assume that by underlining a key word or phrase its meaning will immediately become apparent to the reader, in the absence of supporting explanation.

Unfortunately, the book suffers from being a translation from the French. On reading the text, it becomes obvious that it was never vetted by a geologist fluent in English before going to press. While not particularly serious, the grammatical and idiomatic errors are irritating, and some of the technical terms require a little lateral thinking (e.g. "superficial tension" for "surface tension"; "punctual imperfection" for "point defect"; "thermodynamic metamorphism" for "dynamothermal metamorphism"). The text has been published in teletyped form presumably in an effort to reduce cost, and this also has its drawbacks. A large number of typographical errors (including at least one duplicated line) have crept through and testify to poor editing. The reference list is disappointingly short and individual references are given in order of appearance in the text and without titles.

The micrographs illustrated in Chapters 6 and 7 (64 of them altogether) are full-page line drawings and are very impressive indeed. One cannot help wondering how long the author spent drawing them, and whether photographs could not have done the job just as well. Although these illustrations and their captions are largely self-explanatory, I feel that their value would have been increased by some reference to them in the text. As presented, the text and micrographs are entirely separate giving the book a rather unco-ordinated flavour.

This book is sufficiently different in content from other texts on mineral textures to merit reading, but the poor quality of the production and editing of this English-language version precludes me from honestly being able to recommend it as a mainstream teaching aid for petrology or structural geology courses.

G. T. R. Droop

Manchester, U.K.