



Folding and Fracturing of Rocks: the background

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This book was generated by structural geology teaching classes at Imperial College. I was appointed lecturer during 1957 and worked together with Dr Gilbert Wilson teaching basic structural geology at B.Sc level. I became convinced that the subject, being essentially based on geometric field observations, required a firm mathematical basis for its future development. In particular it seemed to me to require a very sound understanding of stress and strain. My field experience suggested that a knowledge of two- and three-dimensional strain was critical in understanding natural tectonic processes. I found a rich confirmation for this in early publications of deformed fossils, oolitic limestones and spotted slates made by several geologists around the beginning of the 20th century (Sorby, Philips, Haughton, Harker) often using surprisingly sophisticated mathematical methods. These methods were discussed and elaborated in *Folding and Fracturing of Rocks* in a practical way. The geometric features of folds were related to folding mechanisms and the fold related small scale structures such as cleavage, schistosity and lineation explained in terms of rock strain. My work in the Scottish Highlands had shown just how repeated fold superposition could produce very complex geometric features, while further work in other localities suggested that such geometric complications are common in many orogenic zones.

From the development of structural geological studies over the past decades it seems that the readers of this book have found many of the ideas set out are still of practical application. The mapping of these outcrop-scale structures should be emphasised in all field studies because they can be seen as "fingerprints" of regional scale tectonic processes. My own understanding of structural geology has been inspired by field work and I am of the opinion that future progress in understanding will be likewise based on careful observation and measurement of the features of naturally deformed rocks mathematically analysed using the concepts of three-dimensional continuum mechanics.