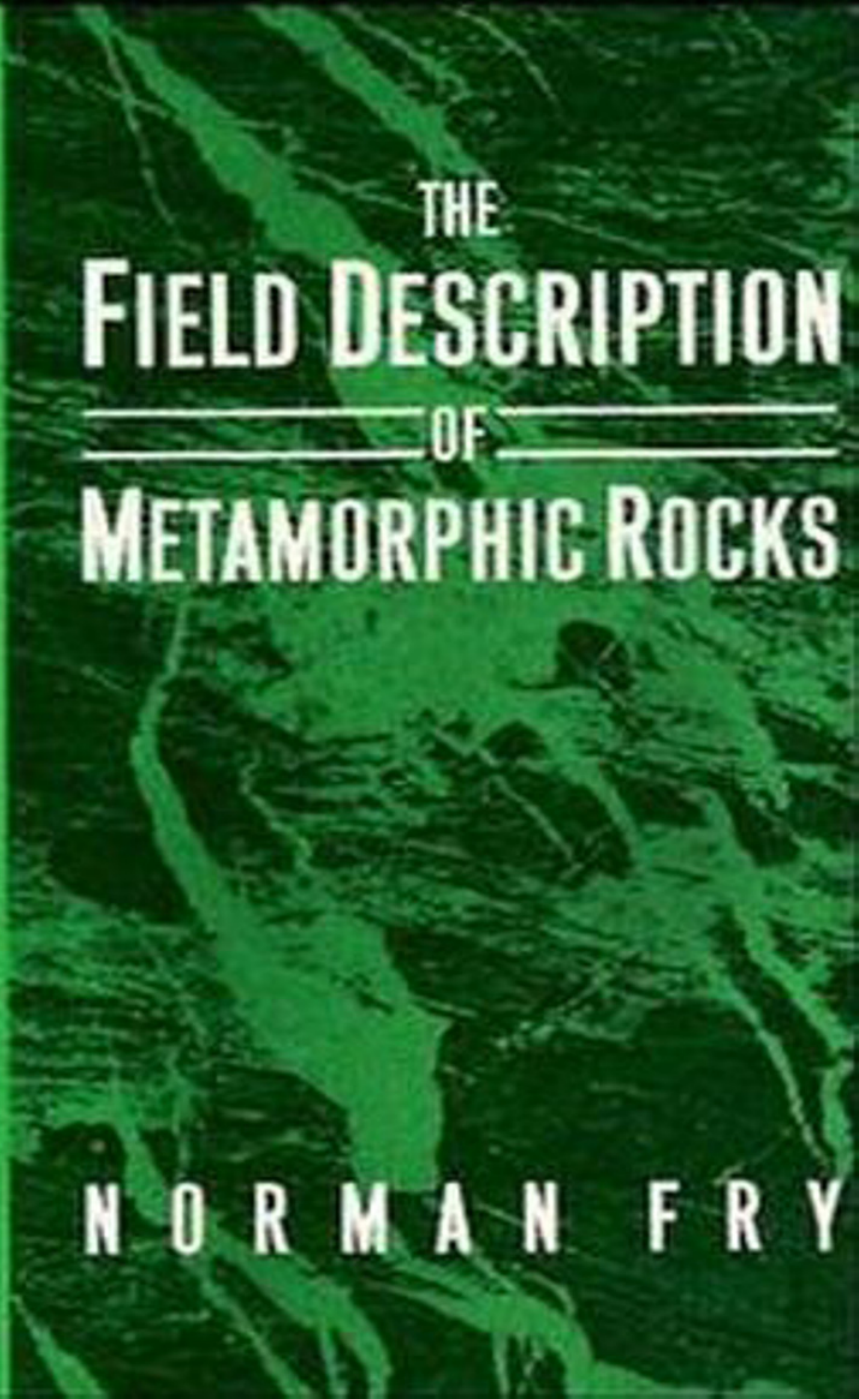
GEOLOGICAL SOCIETY OF LONDON HANDBOOK

THE FIELD DESCRIPTION OF METAMORPHIC ROCKS



NORMAN FRY

Rocks illustrated in this book are from the Western Alps or from Ireland, unless specified otherwise.

The scale of photographs is generally shown by inclusion of a millimetre rule or a white 10 cm bar. For other cases, scale is stated in the figure caption.

Hardness is measured according to Mohs' scale, set out below. Other objects (such as knives or coins) can be used to test the hardness of minerals once their own hardnesses have been determined.

1 Talc
2 Gypsum
—Finger nails, soft metals.
3 Calcite
4 Fluorite
—Bronze coins (most).
5 Apatite
—Most glass and most steels (e.g. hammer).
6 Feldspar
—Hard glass and hard steels (e.g. knife).
7 Quartz
8 Topaz
9 Corundum
10 Diamond

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The Field Description of Metamorphic Rocks

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1
Introduction

1.1 Aim and scope

This book is about *describing metamorphic rocks and rock-masses.* It is primarily for use *in the field*, when describing those aspects of metamorphic rocks which are discernible with only basic equipment (handlens, hammer, clinometer, etc.). It has been written with final-year undergraduate students in mind, but should be helpful to any undergraduate, graduate student, practising geologist or amateur faced with making a *general description* of an area of metamorphic rocks. This book provides a systematic framework, enabling readers to produce useful and broadly similar descriptions, despite possible differences of background or specialist interest. It does not provide metamorphic specialists with assistance in the detailed interpretation of metamorphism.

This volume is a companion to handbooks on the field description of sedimentary and igneous rocks. It therefore does not cover pre-metamorphic features of obvious sedimentary or igneous origin which may sometimes be preserved in metamorphic rocks. The reader will have to decide whether to refer to this book alone or to the *handbook set*, in areas where pre-metamorphic features are preserved.

Describable features of metamorphic rock-masses may be:

1 *Pre-metamorphic* in origin (though perhaps altered beyond recognition).
2 *Metamorphic* — relating to local mineral changes.
3 *Metasomatic* — involving chemical transport and mineral change.
4 *Structural* — relating to rock deformation.

As the first three all require microscopic and chemical techniques for specialist study, there is a practical limit to their non-specialist description in the field. The limit to what may be expected in the way of structural description is less obvious. It is assumed here that production of a *map* is essential and one chapter has been given to considering the problems which can arise when mapping in metamorphic terrains. The companion handbook, Basic Geological Mapping, should be referred to for mapping techniques. *Qualitative* relationships between structural and metamorphic aspects of a rock-mass are important, and this book gives guidance on their treatment. *Quantitative geometry* and *mechanisms* of deformation are *not* dealt with, being considered beyond the scope of a non-specialist description.

1.2 Approach to metamorphic rocks

There is a widespread belief that metamorphic rocks are the most difficult rocks to understand. The techniques used in laboratory studies of metamorphic petrology can certainly seem