PRINCIPLES OF PHYSICAL GEOGRAPHY

F. J. Monkhouse M.A., D.Sc.

PRINCIPLES OF PHYSICAL GEOGRAPHY

F. J. Monkhouse M.A., D.Sc.

formerly Professor of Geography
in the University of Southampton

HODDER AND STOUGHTON
LONDON SYDNEY AUCKLAND TORONTO

ISBN 0 340 04944 8

First published 1954
Eighth edition 1975
Fourth impression 1979

Printed and bound in Great Britain for
Hodder and Stoughton Educational,
a division of Hodder and Stoughton Ltd,
Mill Road, Dunton Green, Sevenoaks, Kent,
by Hazell Watson & Viney Ltd, Aylesbury, Bucks

Preface

It is significant that such terms as 'basis', 'groundwork', 'elements' and 'background' are commonly applied to physical geography. It may be said that there can be no geography at all without physical geography, which concerns itself with the solid rocks, the actual shape and form of the land surface, the configuration and extent of the seas and oceans, the enveloping atmosphere without which life as we know it cannot exist, the physical processes which take place in that atmosphere, the thin vital layer of the soil and the 'green mantle' of vegetation. All these, in conjunction, comprise man's physical environment.

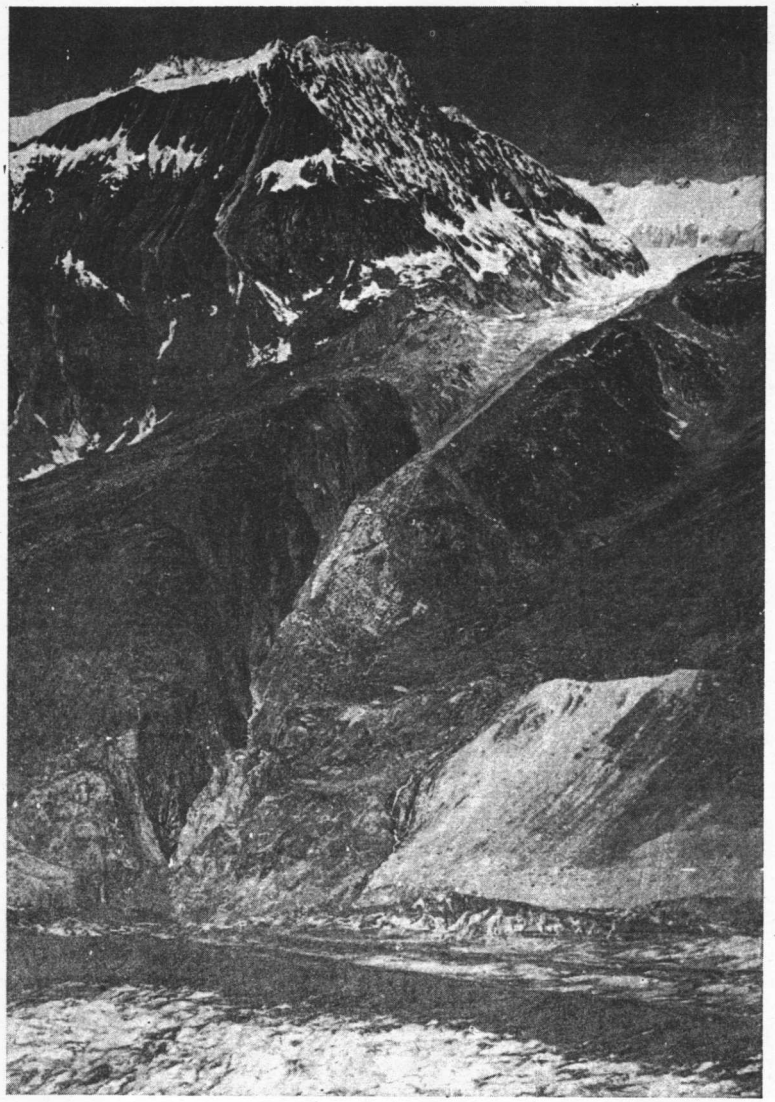
Each of these various aspects has an interest in its own right, and the geologist, the meteorologist, the pedologist and the botanist are intimately concerned with the understanding of the various phenomena falling within their respective fields. From these allied natural sciences physical geography necessarily draws much of its data. But geography, physical or otherwise, is far from being a mere descriptive compilation of facts derived *en bloc* from these external sources. The geographer seeks to use this information so as to describe and attempt to explain the features of the stage on which man plays his part; description without explanation is a poor thing, unsatisfactory and unsatisfying. Wherever possible, classifications, with careful headings and sub-headings, have been used in order to bring some system and ordered relationship into the mass of material with which we are confronted. Description, classification and explanation in as objective and scientific manner as possible is the triple task of the physical geographer. But theory and explanation should always be treated with caution, as we are reminded by the words of the eminent French geomorphologist, H. Baulig, "... truth in geomorphology ... is seldom more than increasing probability".

Since this first book first appeared in 1954, minor amendments and additions have been made to the text in subsequent reprintings and editions, notably to the seventh edition. University of London Press Ltd has now been so kind as to allow me to undertake another edition, involving a thorough revision and where necessary updating of the text in the light of recent research. While most of these alterations are of a minor detailed character, some are of great significance to the physical geographer.

Dimensions are given in both Imperial and metric systems, rounding off where necessary to the equivalent order of magnitude, except where precise figures need exact trans-numeration. Spot-heights and contours on maps and diagrams are still given in feet (except where otherwise stated) when the original source was in that form.

ENNERDALE, 1974 F. J. M.

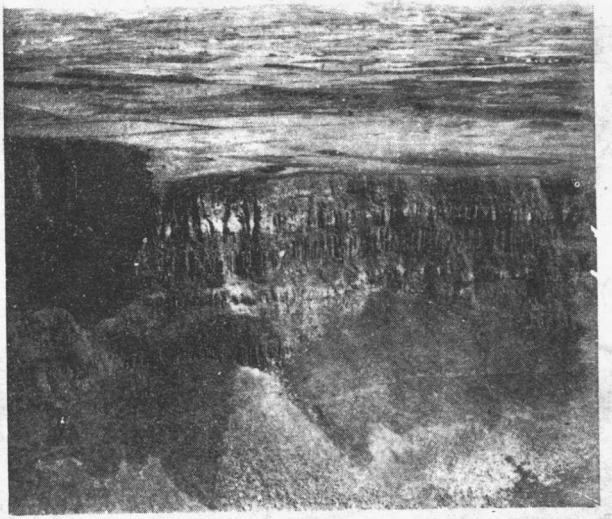
Plates 1–57



1 The Nesthorn (3819 m, 12,530 feet) in the Bernese Oberland, Switzerland, with part of the Aletsch Glacier in the foreground

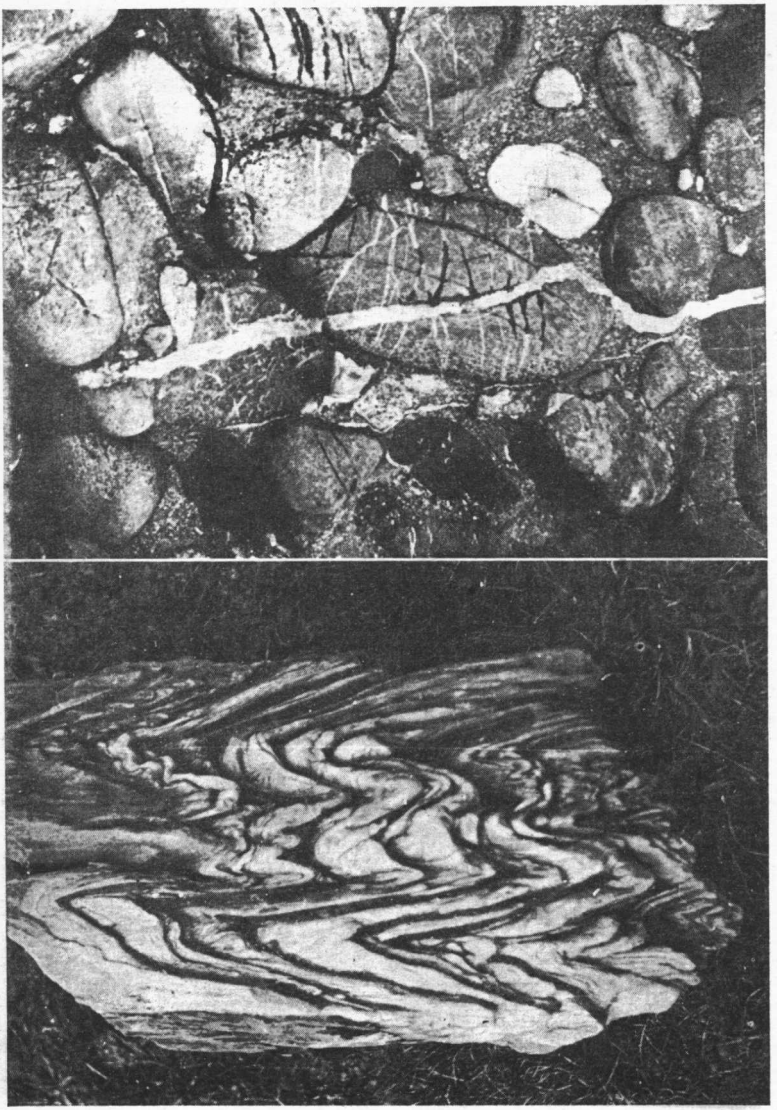
Note the gullying on the face of the peak, the small hanging glacier, the deep gorge cut by its melt-water stream, and the several lines of moraine.

(*Eric Kay*)



2 The columnar basalt cliffs at the edge of the plateau of Antrim
This is a view of the 'Spanish Organ' and the projecting Benanouran Head, near the Giant's Causeway. Note (i) the level surface of the plateau; (ii) the different lava flows; (iii) the scree slopes flanking the base of the cliffs.
(Aerofilms Ltd)

3 The hexagonal basalt columns of the Giant's Causeway, Antrim
(Mystograph)

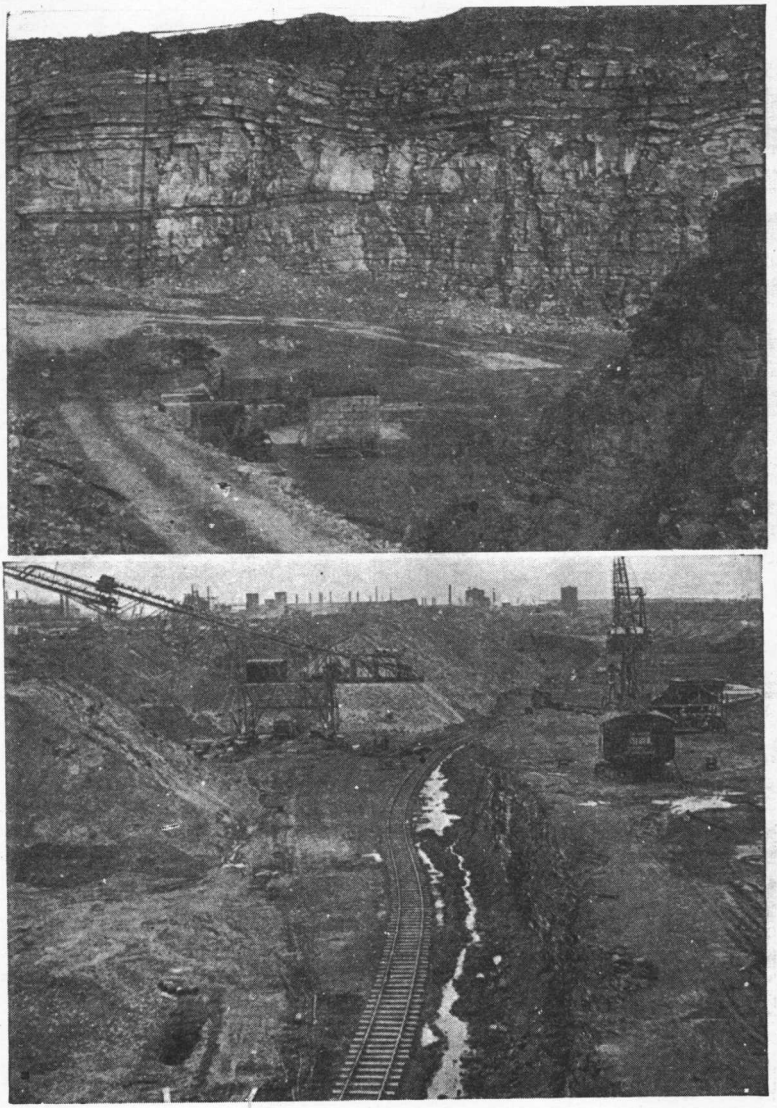


4 Quartz vein traversing pebbles of conglomerate in Old Red Sandstone, near Oban

(R. Kay Gresswell)

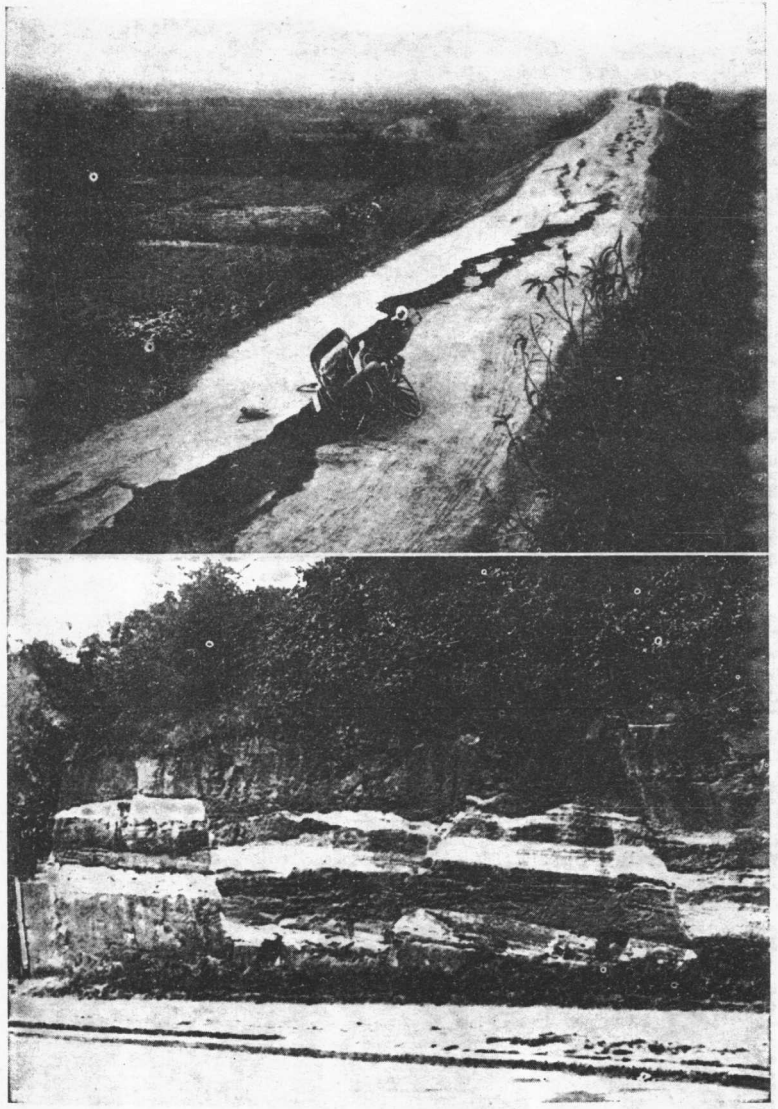
5 A Pre-Cambrian rock contorted by metamorphism at Holy Island, Anglesey

(R. Kay Gresswell)



6 Quarry in Carboniferous Limestone, near Pateley Bridge
Note the remarkable stratification, with slight foldings.
(*Eric Kay*)

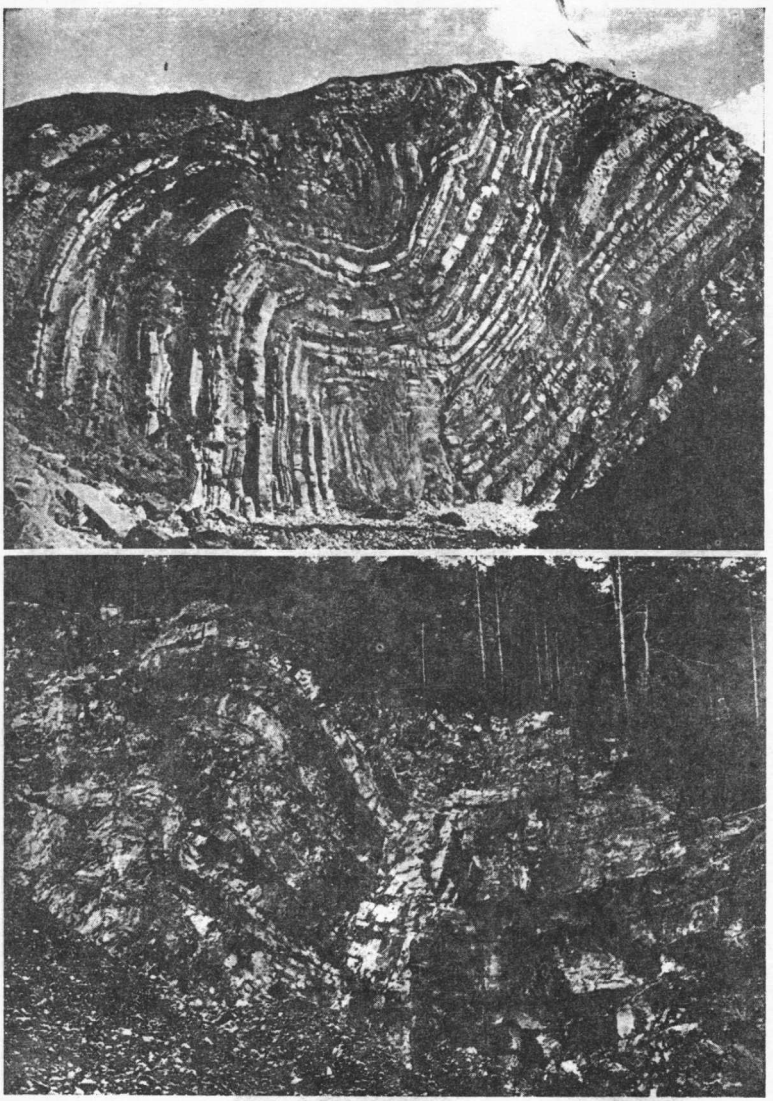
7 Open cast iron-ore mining, near Scunthorpe
Thick beds of iron-stone in the Lower Lias (Jurassic) formations are exposed by the removal of the overburden of clays and shales, and can then easily be worked by large-scale open-cast methods.
(*Eric Kay*)



8 Road fissured by an earthquake, near Kyoto, Japan
(*Paul Popper*)

9 Multiple normal faults in Bunter Sandstone, Bromborough, Wirral, Cheshire
The small throw enables the individual strata to be traced across the faults.
(*R. Kay Gresswell*)

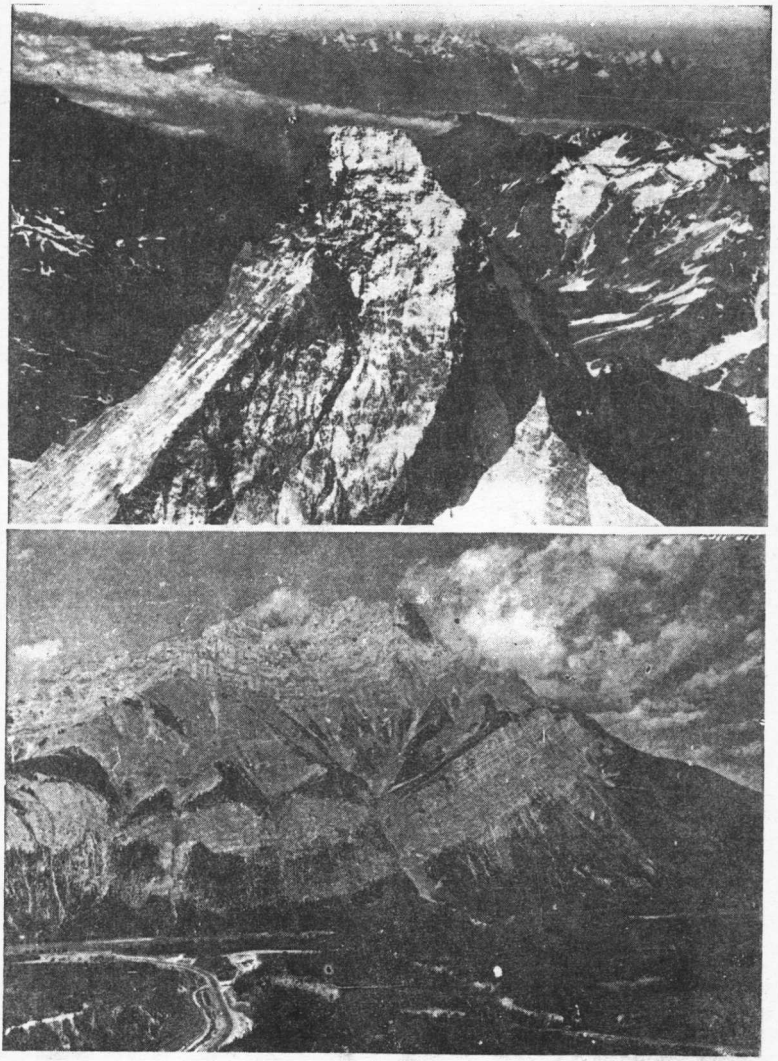
10 The rift-valley of the Jordan, south of the Sea of Galilee
(*Paul Popper*)



11 Folded strata in Purbeck Limestone, Stair Hole, Lulworth, Dorset
(R. Kay Gresswell)

12 Folding in the Jura Mountains
An example of a small anticline and syncline in Jurassic limestone near Delémont, Switzerland.

(Eric Kay)



13 The summit of the Matterhorn

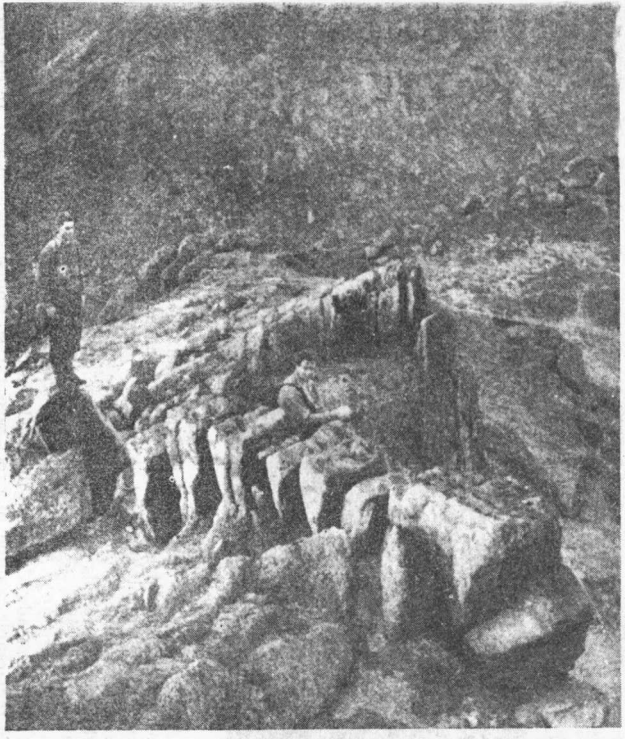
An unusual view of this fine rock-pyramid; the more familiar triangular profile visible from Zermatt is of the face on the left (the east face). The ridge in the left-centre is the Hörnli, Edward Whymper's route on the first ascent in 1865, the easiest way to the summit. On the extreme left is the Fürggen ridge, on the extreme right the Zmutt ridge. The fourth ridge of this pyramid is on the far side, the Italian ridge.

(Swissair-Photo A.G.)

14 Cascade Mountain in the Canadian Rockies, near Banff, Alberta

A remarkable example of a rock peak carved from a synclinal fold. In the foreground are sections of the Canadian Pacific Railway and the Trans-Canada Highway.

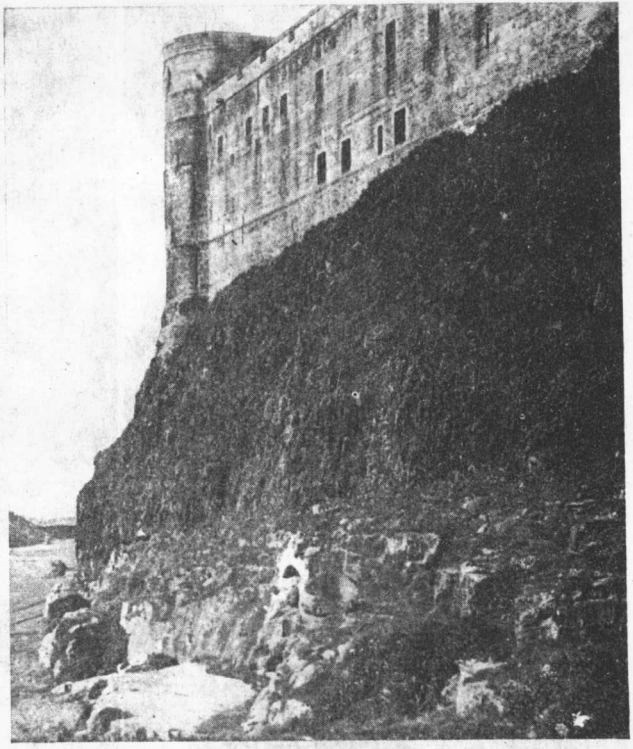
(The Photographic Survey Corporation Ltd, Toronto, Canada).



15 Granitic dyke on the Saddle, Arran

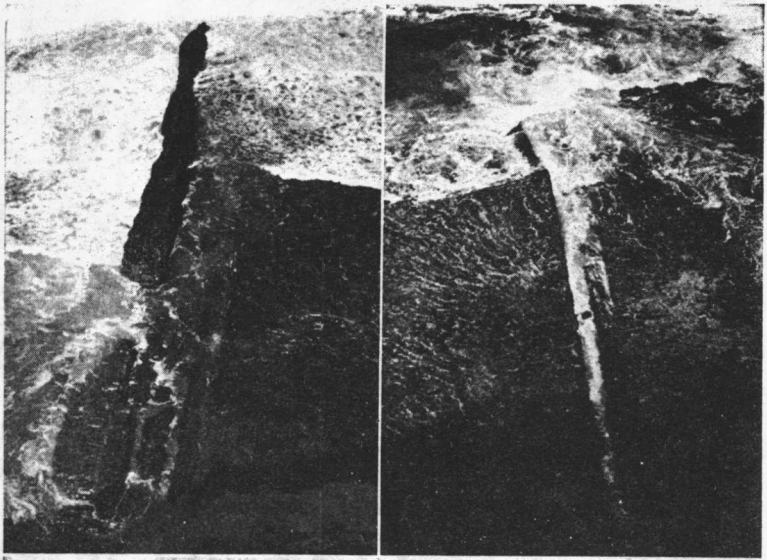
A well jointed granitic dyke, situated in the Saddle (a col between Goat Feil and Cir Mhor) Sands out because of the removal of less resistant rocks.

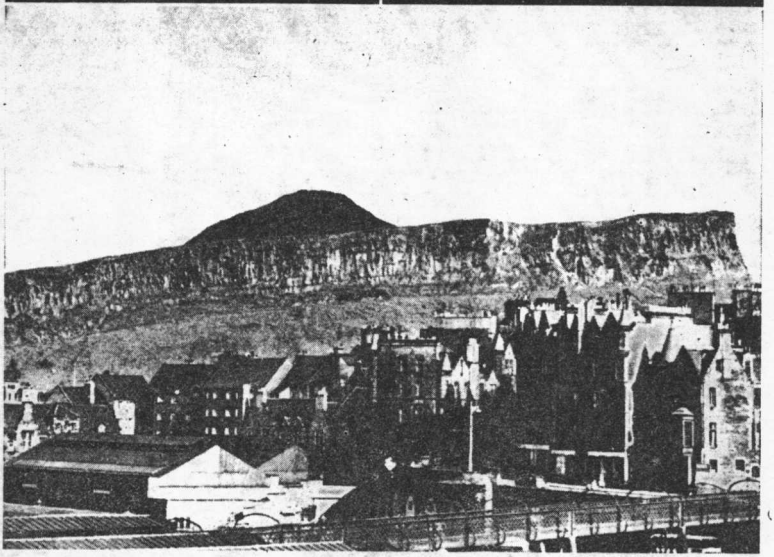
(L. J. Monkhouse)



16 The Great Whin Sill at Bamburgh Castle, Northumberland, overlying sandstone of the Carboniferous system

(R. Kay Gresswell)





17, 18 Dykes on the coast of Portugal

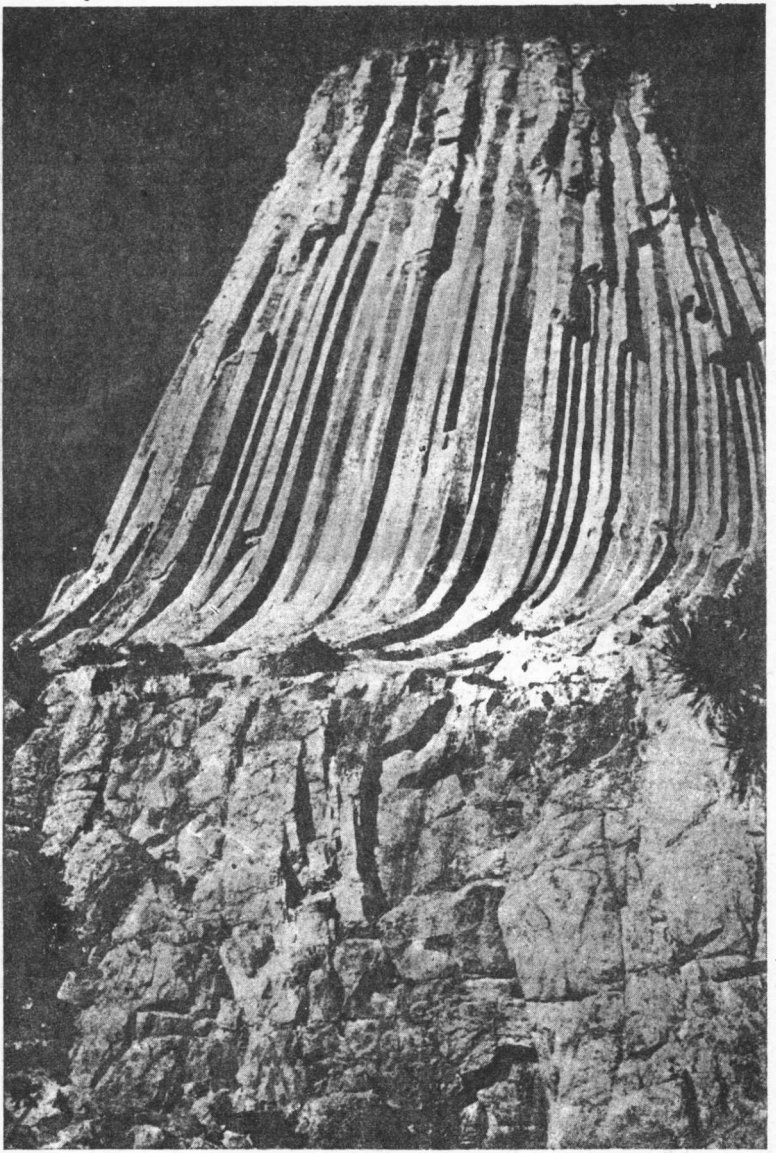
The left-hand dyke is more resistant than the country rock and stands out as a wall; the right-hand dyke is less resistant and has been eroded by the waves to form a trench.

(*F. J. Monkhouse*)

19 Salisbury Crags and Arthur's Seat, Edinburgh

Salisbury Crags are part of a sill, Arthur's Seat a much eroded composite volcanic neck, probably the remnants of a volcano with two vents.

(*Eric Kay*)



20 The Devil's Tower, Wyoming

(*F. J. Monkhouse*)