Maps and Survey

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CAMBRIDGE

MAPS AND SURVEY

BY

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FIFTH EDITION

CAMBRIDGE
AT THE UNIVERSITY PRESS
1944

CAMBRIDGE
UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom

Published in the United States of America by Cambridge University Press, New York

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning and research at the highest international levels of excellence.

www.cambridge.org
Information on this title: www.cambridge.org/9781107699601

First edition 1913
Second edition 1923
Third edition 1933
Fourth edition 1942
Fifth edition 1944
First published 1944
First paperback edition 2014

A catalogue record for this publication is available from the British Library

ISBN 978-1-107-69960-1 Paperback

MAPS AND SURVEY

PLATES

PREFACE

In the Preface to the first edition of this book it was explained that the work was designed as an introduction to the study of Maps and the processes of Survey by which they are made.

In planning the work it was necessary to decide in the first place whether to call it Maps and Survey, or Survey and Maps: that is to say, whether to take the logical order, of Survey before Maps, or the order of general interest and use, which is Maps before Survey.

Since many more people use maps than are engaged in making them, or than need to know the details of how they are made, it seemed better to begin with the consideration of the map as it is published and used. A clear understanding of the best results that have been produced up to the present time, leading to an appreciation of the ways along which progress is desirable, will make a convenient basis for the study of the methods of Survey, and the manner in which our representation of the world's surface may be extended and improved.

Some years of teaching Topographical Survey and the elements of Geodesy to the students of the Department of Geography in the University of Cambridge had shown me that there was need of a book to give a general account of the many-sided art of Survey. The official *Textbook of Topographical Surveying* by Colonel Sir Charles Close, F.R.S., is invaluable for instruction in all the details of the various processes. But it seemed to me that the student needs some explanatory introduction, unobscured by much detail, which shall exhibit the general nature of the operations, and the relations to one another of the various parts of the subject.

It is certain, also, that the student of geography requires an elementary account of the operations of Geodesy proper, that is to say, of the higher survey whose aim is to contribute to the knowledge of the size and shape of the Earth; and which has in recent years extended its enquiries into the constitution of the Earth's interior. These subjects are entirely excluded from the official book mentioned above, and I do not think that there is any book

which gives a general account of this most interesting part of the subject.

The ultimate refinements of Geodesy cannot affect the maps in the slightest degree, cannot be said to be of any practical use whatever, can offer no return in cash for the money which may be, and which ought to be, spent upon them. Their justification is on a higher plane. A nation is judged, and rightly judged, by the public spirit and the public taste which it shows in its buildings, its pictures, and its gardens, which any educated man is, or thinks he is, competent to appreciate. And equally a nation is judged, though by a smaller circle of judges, for the contributions which it can make to pure knowledge. An exquisite piece of Geodesy may give as real a pleasure, and be as genuine a source of pride, as the masterpieces of art and literature.

I made no attempt to describe the minutiae of instrumental adjustments or processes, believing that a general view of the subject should not be obstructed by a mass of detail which is tedious to read, but had better be avoided until the student comes to deal with the instruments themselves, and carry out an actual piece of survey with them. Nor was I able to give anything more than the slightest sketch of the large subject of cadastral survey. This is an intricate subject whose methods are to a great extent governed by the system of land registration and taxation in force in the country to be surveyed.

While the literature of Geodesy and Topographical Survey is extensive, comparatively little has been written in English on the subject of topographical representation on the map. The subject is relatively new, because until the introduction of colour printing there was not a great deal of scope for enterprise. It is still in the experimental state, as is evident from the continual change in the style of the publications issued by the principal map reproduction offices. In these circumstances discussion and criticism are doubly interesting, and I devoted more space than might seem necesssary at first sight, to the detailed analysis of typical sheets produced by the leading surveys of the World. But since it is impracticable to give adequate specimens of these maps, this analysis can be effective only if the student is able to study a selection of the actual sheets. For this reason I gave the sheet numbers of good specimens, in the hope that the schools of geography who may be

interested in the subject might find little difficulty in procuring a characteristic series of maps.

In the years of war that followed the publication of the first edition many changes were made in maps, and many interesting processes of survey were devised. In a second edition, published in 1923, these developments were treated in new chapters, the bulk of the book being reprinted without change. The second edition was therefore transitional from the pre-war subject which I had taught in the Geography School at Cambridge to the considerably developed and altered Maps and Survey which had come within my experience at the Royal Geographical Society since 1913.

For a third edition no such patchwork treatment was possible: the subject has changed too much. The present work has therefore been extensively altered and largely re-written. A brief chapter on early maps has been prefixed to the treatment of the modern, and a few pieces of typical maps have been reproduced to show the style of early periods. The maps analysed have mostly been published since the war. They are nearly all elaborately coloured; their merits could not be judged from small pieces, even if it were not too costly to reproduce them, and I have judged it no longer possible to give any idea of the range of modern maps from a few small specimens. It seemed best to enlarge the analysis and discard the illustration. I have made some attempt to deal with the new and difficult subject of Air Survey; the chapter on Geodesy has been entirely re-written; and the sections on Stereographic Survey much extended to cover important advances in this delightful subject. If these sections seem to be disproportionate in detail and in difficulty to the rest of the book, it is because the subject is new, and not as yet generally treated in textbooks. And if anyone should remark the frequency of reference for further information to papers in the *Geographical Journal* may I be allowed to say that the Society at its afternoon meetings for the discussion of technical subjects tries to deal adequately with all new methods, processes, and theories as they appear; and that since one may hope that a set of the *Journal* is within reach of all students of Geography, it seemed to be both natural and convenient to refer the reader thither for fuller treatment than is possible in a brief textbook.

I have to thank my friends Mr Edward Heawood, the Librarian, R.G.S., for much advice on the first chapter, and Mr Fawcett Allen, the Assistant Map Curator, for help in selecting maps for analysis. To the President and Council I am indebted for permission to reproduce many of the illustrations from the collections and the *Journal* of the Society, and I must thank also those who have allowed me to use their photographs of instruments.

Circumstances have much delayed the completion of this third edition: but the delay has made it possible to include many important developments of the last few years. I thank the Syndics of the Press for their forbearance.

A. R. H.

ROYSTON
July 1933

PREFACE TO THE FIFTH EDITION

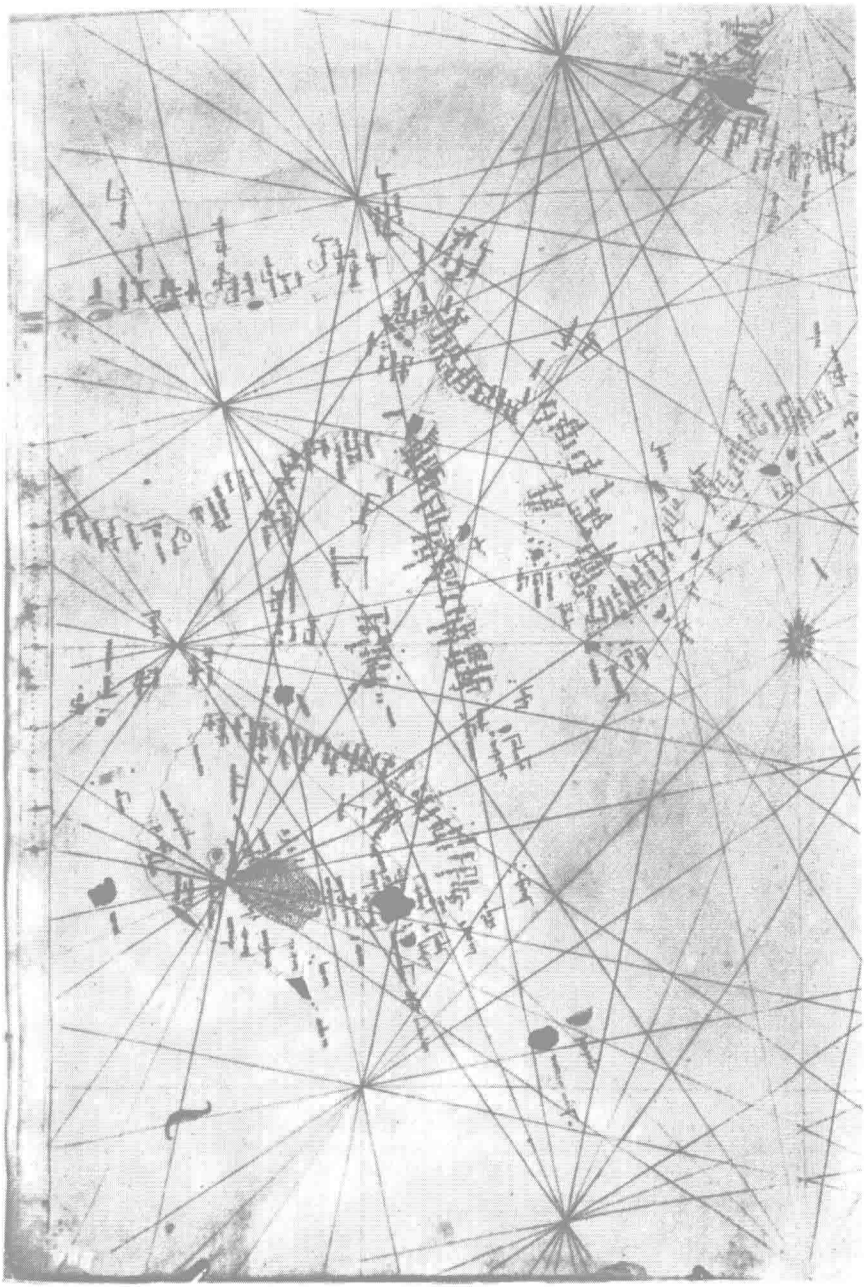
THE Preface to the Fourth Edition, dated November 1941, explained that in the midst of a second World War it was not possible to give to the expiring Third Edition, dated July 1933, that thorough revision which the passage of years required. It was necessary to rewrite seven of the pages given to Ordnance Survey maps; other additions and corrections were made in a new chapter, at the end of the book.

This Fourth Edition has been consumed in eighteen months, during which a new series of One inch to the Mile maps of Great Britain with a kilometre grid has been placed on sale, and a new map on 1/625,000 has been published with a different metric grid. Long-distance flights have required new maps for studying great-circles and distances, and unfamiliar aspects of the world. These and other matters which seemed appropriate to the time are treated in a chapter of Further Additions to the preceding chapters.

I have as before to thank the President and Council of the Royal Geographical Society for permission to use material from the collections and the *Journal* of the Society.

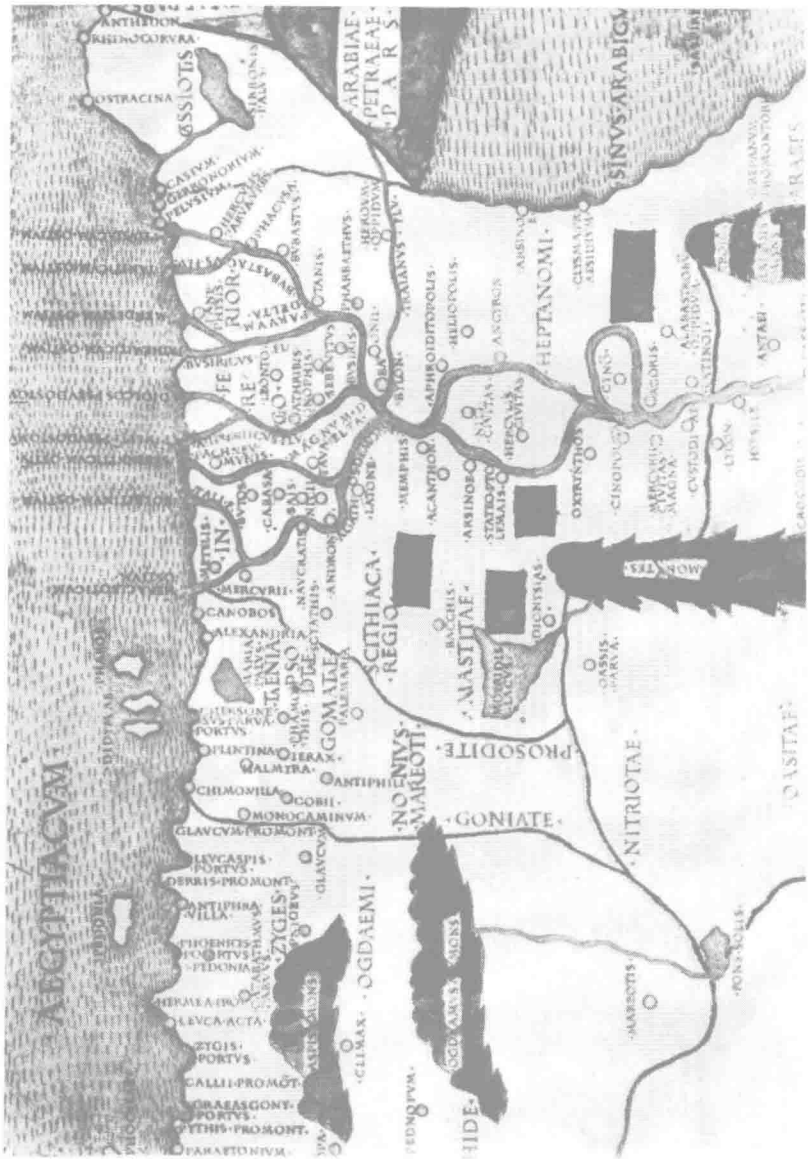
A. R. H.

LONDON
January 1944

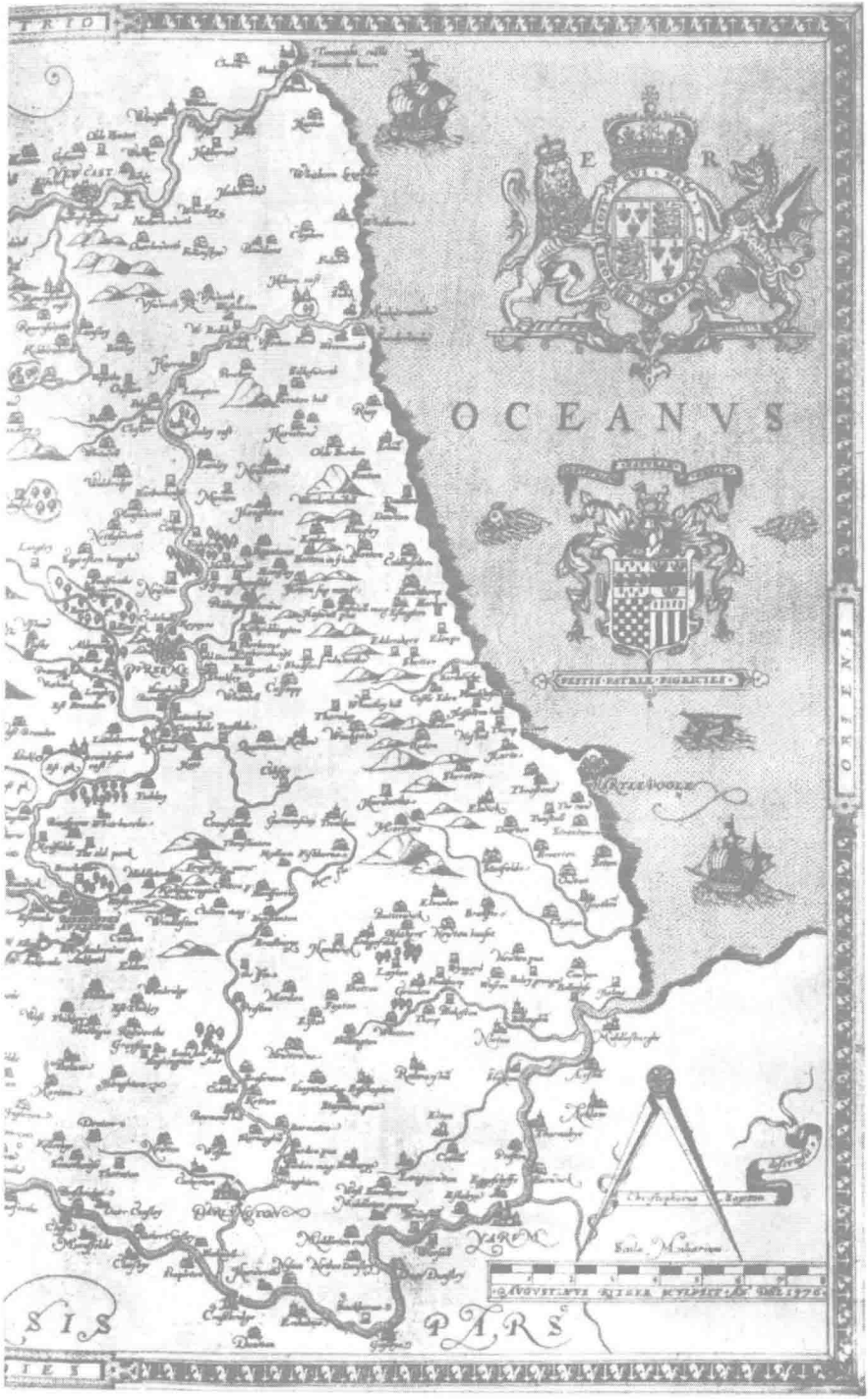


The British Isles on the Portolan Chart of Nicolaus de Combitis (Venice, Biblioteca Marciana).

Plate II

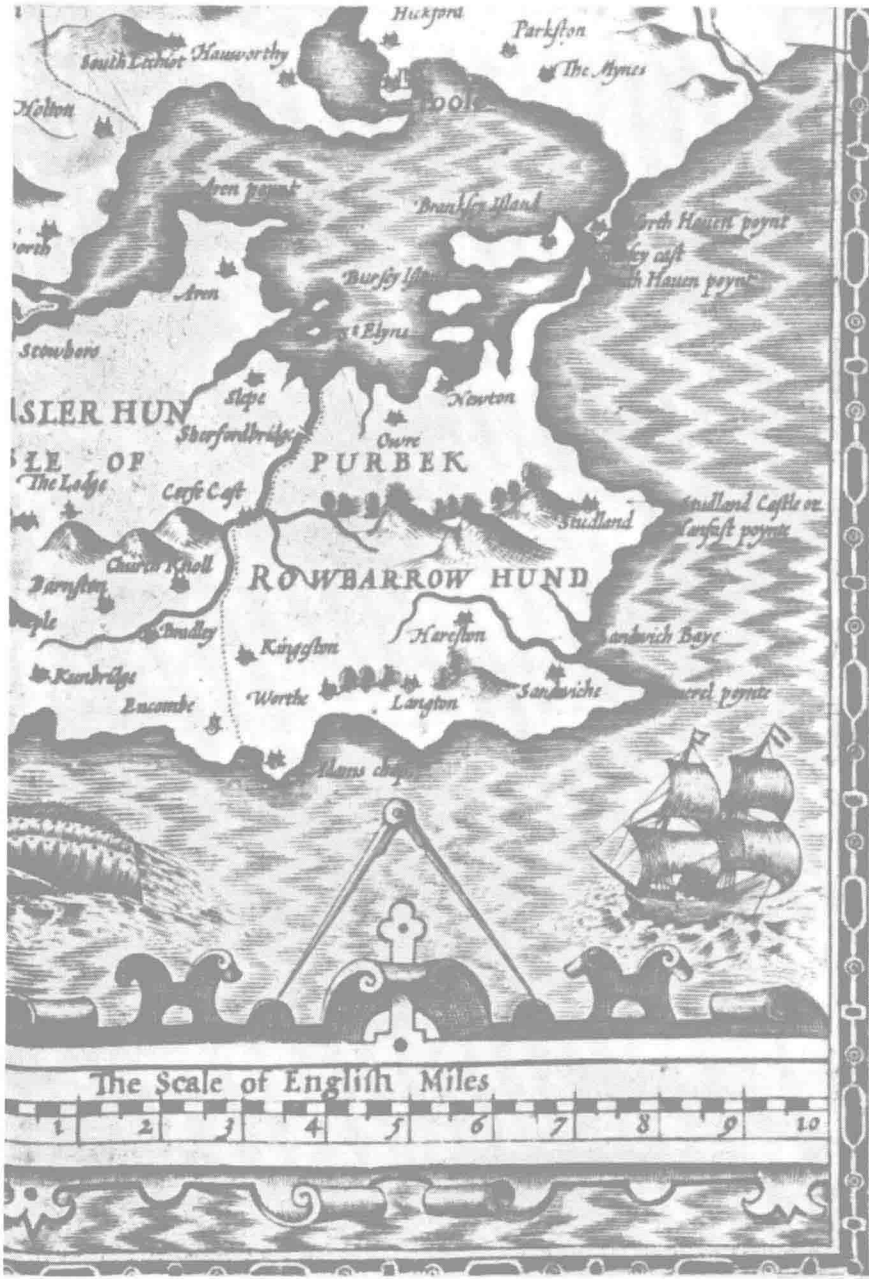


Egypt: from the Rome Ptolemy of 1490, plate engraved on copper for the first edition of 1478; names stamped.

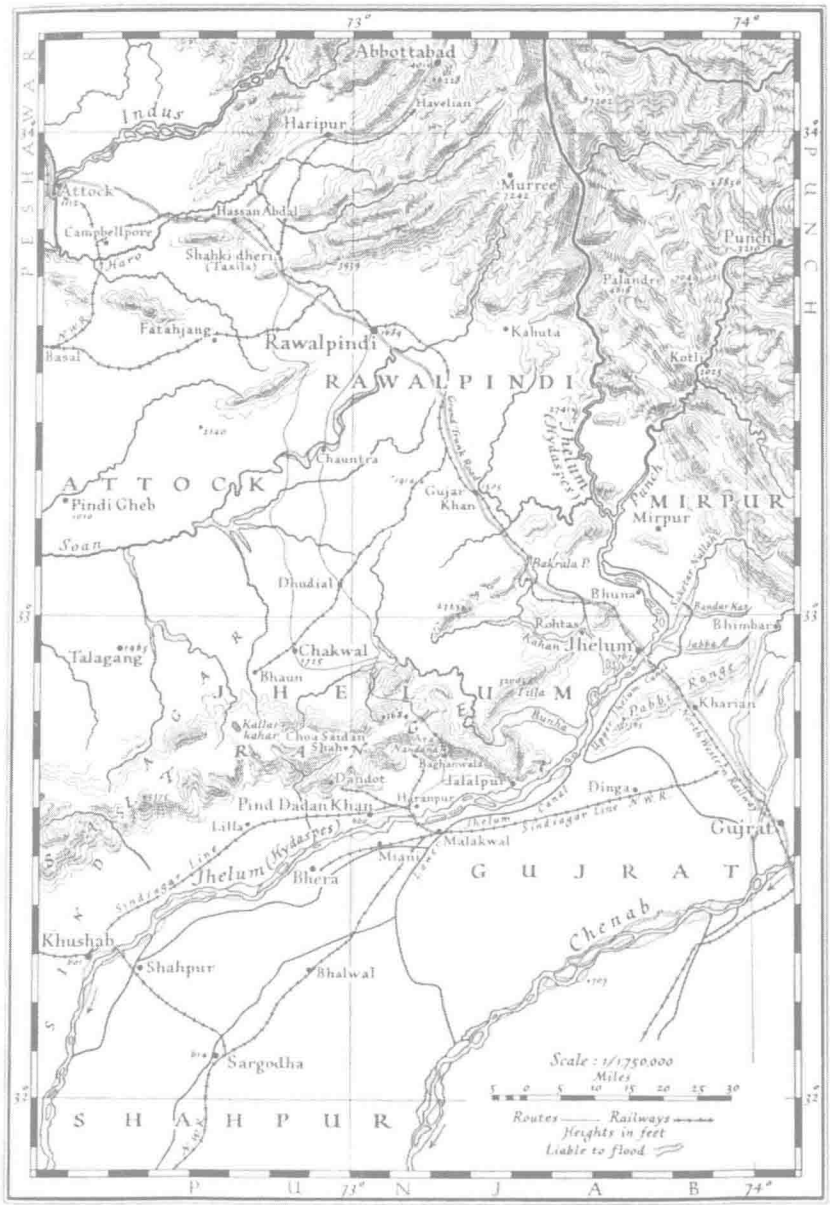


Part of Christopher Saxton's Map of the County of Durham, reduced to half scale. Engraved by Augustine Ryther 1576.

Plate IV



The Isle of Purbeck, from Speed's Atlas of 1611.

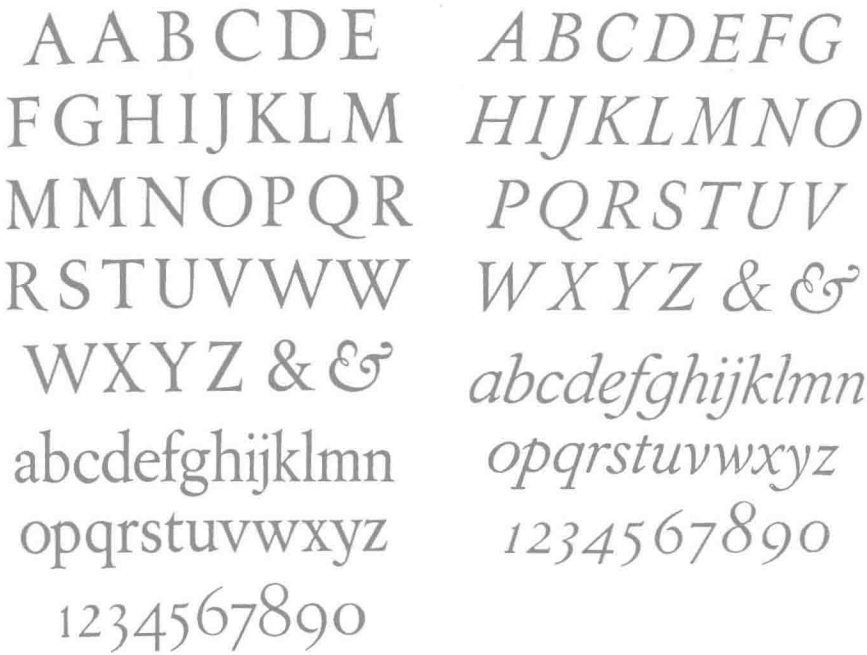


(*Geogr. Jour.* LXXX, 32, *July* 1932)

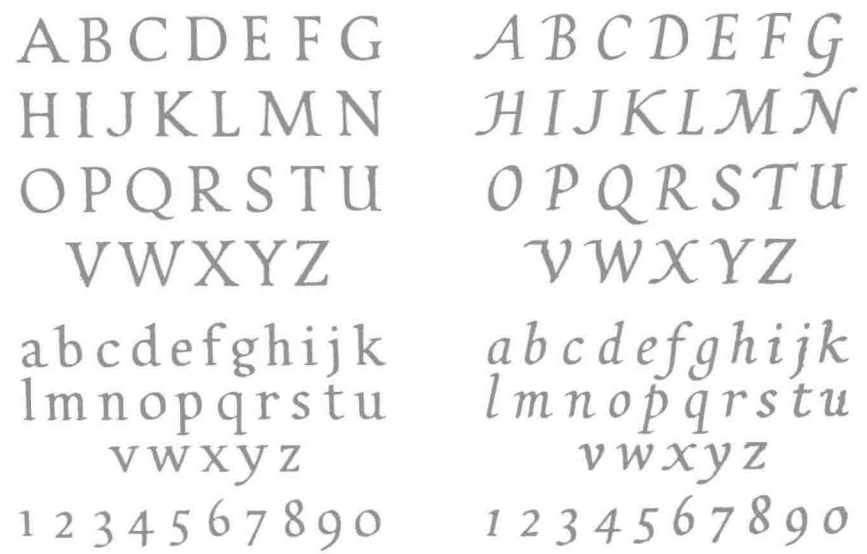
Quill-written Roman lettering and hill-shading by cross-hatching contours.

(*From paper by Mr Michael Spender: "The new Photographic Survey of Switzerland", reproduced by permission of the Director, Swiss Federal Surveys. Geogr. Jour.* LXXIX, 383, *May* 1932)

Contour plate plotted on the Autograph worked up in pencil by topographer in the field to improve the representation of rock faces.



Alphabets designed for the new One-inch Map, Ordnance Survey.
Drawn with steel pen, built up.



Alphabets designed by R.G.S. Redrawn by C. E. Denny 1944.
Single strokes of quill, except for serifs.