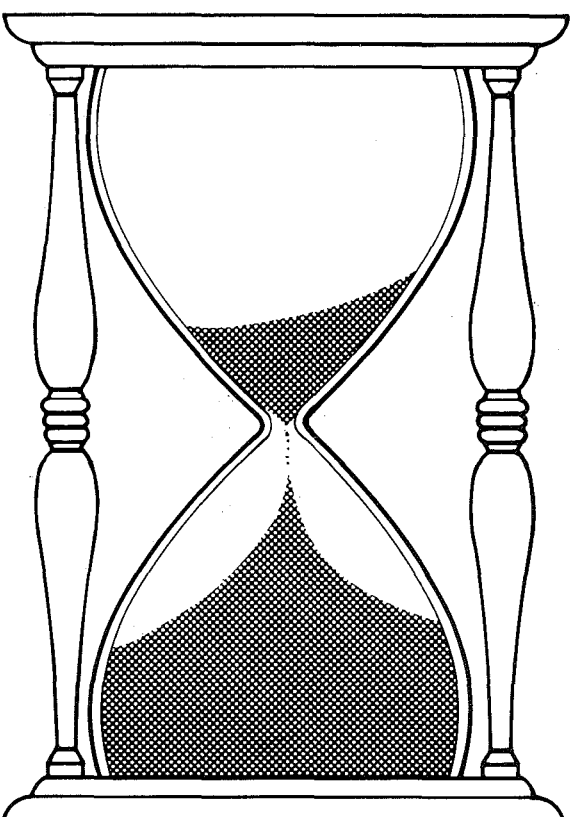
Historical Geography Research Series

The Ordnance Survey and Land-Use Mapping

J. B. Harley



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HISTORICAL GEOGRAPHY RESEARCH GROUP - RESEARCH PAPER SERIES

(Co-Editors: Professor Michael P. Conzen and Dr. Robert A. Dodgshon)

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HISTORICAL GEOGRAPHY RESEARCH SERIES

No. 2

THE ORDNANCE SURVEY AND LAND-USE MAPPING: PARISH BOOKS OF REFERENCE AND THE COUNTY SERIES 1:2500 MAPS, 1855-1918

By

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PREFACE

In planning its new Research Series the Historical Geography Research Group took the decision to cast its net as widely as possible. The studies were to include extended essays both conceptual or substantive, which could be bibliographic reviews of an important field or new research findings from empirical data. In addition, the Series would accommodate commentaries on sources or groups of sources and it is in this latter area that the present essay is offered. The subject of the parish Books of Reference of the Ordnance Survey and the related land-use data in its County Series 1:2500 maps may sound an initially esoteric note but the past large-scale maps of the national survey of Great Britain and their by-products have helped to underpin a fair amount of useful research in historical geography. The continuing study of changes in the rural land use of Britain over the last century and a half come most readily to mind, but data from the maps - to give just one example - have also been extensively used in analyses of changing vegetation and woodland characteristics undertaken by historical ecologists.[1]

In order to make a source effectively available to other scholars and scientists it is self-evident that a full contextual description should be given. Even so there is a tendency in some geographical writing to pluck evidence out of its contemporary matrix rather like gathering nuts in May; the result is that neither its characteristics nor its accuracies can be fully appraised. Sources are, after all, our principal antennae in probing the truth of the past, and before they can be used either to reconstruct the changing geographies of that past or to test hypotheses, they need to be understood in their own contemporary terms. In the case of the Books of Reference and the Ordnance Survey mapping from which they were compiled it is thus necessary to record not only the internal characteristics of the surviving books and maps, but also the process by which land-use data was collected in the field and, more subtly, for the interpretation of vegetation categories, the methods of map printing and the conventions employed to depict them. It is to these basic cartographic matters - rather than to a review of the geographical literature in which the Books of Reference and the 1:2500 maps have been used[2] - that the present essay is addressed. By this approach it is hoped that the pitfalls and potential of the data will be made clearer and they can be deployed with greater confidence by historical geographers and others in allied disciplines who draw on Ordnance Survey material.

I would like to gratefully acknowledge the financial assistance provided by the Social Science Research Council which has facilitated the collection of information for part of the essay. Yet equally the commentary could not have been written without the help of a number of map librarians and colleagues

in Exeter and elsewhere. I would particularly like to thank John Huddy and Douglas Brookman of the Map Library in the British Library and Betty Fathers and her staff in the Bodleian Library. For the parishes of Scotland I owe a complete list of the Books of Reference in the National Library of Scotland and other advice to Peter Milne, while Margaret Wilkes, Superintendent in the same Department, has also assisted my researches. On developments in Ireland, Dr John Andrews of Trinity College, Dublin has been my mentor while in the Ordnance Survey Office, Southampton, I am grateful to Ron Thornton, the Librarian, for help in tracing rare Departmental Instructions relating to various Ordnance Survey practices. Peter Clark, Dr Martin Parry, Dr George Peterken and Dr John Sheail have commented helpfully on a draft of the essay and Dr Roger Kain has supplied numerous points of information as well as sustaining dialogue on the finer points of nineteenth-century cadastral mapping. Finally, I am also especially indebted to the skill of my colleagues Rodney Fry, who drafted Figure 1, and Andrew Teed who undertook the original photography in the Ordnance Survey Office, Southampton.

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INTRODUCTION

It is not widely appreciated that from 1855 to 1918 the Ordnance Survey carried out what was in effect a simplified form of a national land-use survey. Throughout this period, a fairly standard range of land-use types - including arable and pasture - were systematically recorded as part of the cadastral mapping and revision at the 1:2500 scale. For roughly a quarter of a century this information was published in the Books of Reference and by the 1880s, when this series of pamphlets was discontinued, land-use information had been published for several thousand parishes in Great Britain. It is this source with which students of agricultural change are most familiar. What is less well known is that these tabulations of areas and associated land-use categories, sometimes known as the 'area books',[3] were only one output from a sector of mapping which was fundamental to the whole survey specification for the 1:2500 County Series. The object of this essay, by employing contemporary technical records of the Ordnance Survey, is to reconstruct the methods and processes employed in recording and presenting land-use data. It seeks to reveal the genetic relationship in the mapping process between (i) land-use mapped in the field; (ii) land-use data published in the Books of Reference; (iii) land-use types for uncultivated areas published on the 1:2500 maps; and (iv) after 1880, information still collected in the field by the Ordnance Survey but not published in any form. From this reconstruction it is possible to begin to evaluate a standard data source which is drawn upon widely by researchers requiring an historical understanding of the processes of rural land-use change.

Insofar as they provide a key to other aspects of Ordnance Survey land-use mapping the argument can appropriately begin with an introductory discussion of the Books of Reference. Their basic form is well known.[4] In the main they coincided with the period when the 1:2500 sheets of the Ordnance Survey were published as *parish* maps (with the area beyond parish boundaries left blank on the rectangular sheets). The separate Books of Reference were accordingly also published for each parish, and contained the parcel numbers on the plans and, in adjacent columns, the area in acres of each parcel, together with 'remarks' on the state of cultivation (Figures 2 - 5).

Taken in isolation they exhibit several drawbacks which seriously limit their value as evidence for nineteenth-century land-use changes. Perhaps their principal deficiency is that of coverage. First, although they were introduced to coincide with the authorisation of 1:2500 mapping in 1855, and provided a straightforward elaboration of the information included in the maps, the land-use column was omitted in 1879-80, and the series as a whole was discontinued in 1888 - before national coverage at the large scale had been completed. Secondly, insofar as the 1:2500 mapping related only to 'cultivated' areas

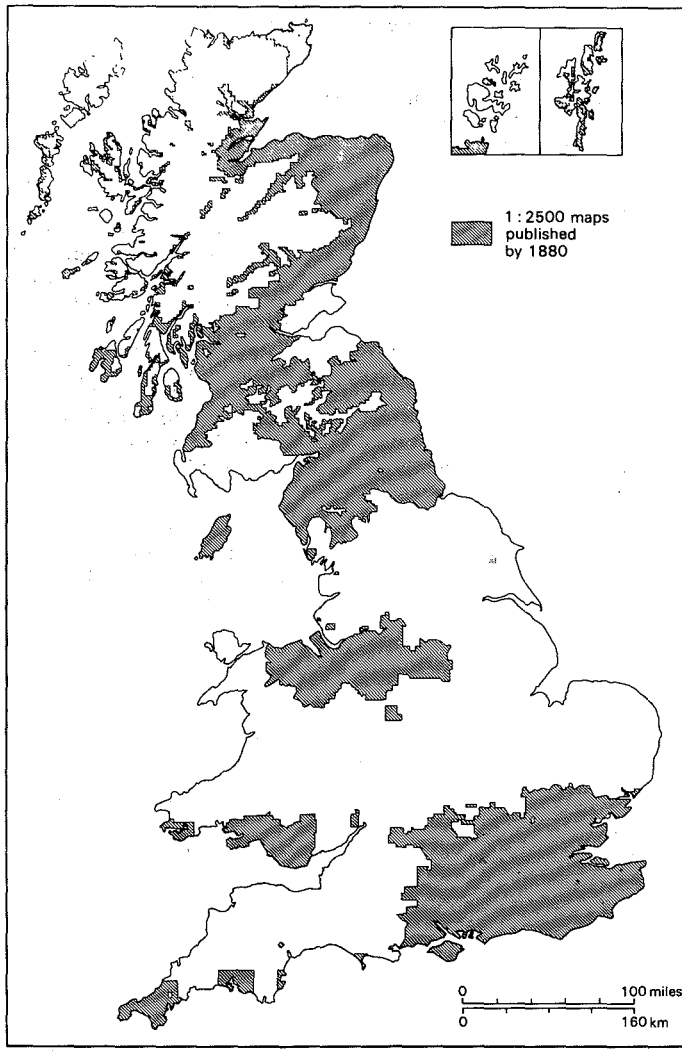


Figure 1. Published sheets of the First Edition of the Ordnance Survey County Series 1:2500 maps in 1880. This shows approximately the area for which Books of Reference were published containing land-use statistics.
Source: *Report of the progress of the Ordnance Survey to 31st December 1880* (1881)

of the country, the coverage of the Books of Reference was further restricted and in total they relate only to about a quarter of England and Wales and parts of Lowland Scotland (Figure 1).[5] Thirdly, rather than providing the national analyst of rural land-use with synchronous or 'cross-sectional data', they straddle a quarter of a century and were issued in tandem with the leisurely progress of the cadastral survey as a whole. Fourthly, the failure hitherto to locate any of the instructions given to the surveyors has meant that the 'criteria used to delimit the land uses can ... only be inferred, and the meaning of some terms like "Arable and Grass" and "Arable etc." ' remain somewhat obscure. Finally, and most perceptively, it has been suggested - again in the absence of 'supporting documentary material' - that the land-use information given in the Books of Reference may not 'have been recorded for any specific purpose'. Furthermore, inasmuch as it 'had no legal significance and would not have been publicly scrutinized until after publication'[6], it was almost certainly of unknown quality.

The list of deficiencies is indeed formidable and a first reaction might be to dismiss the Books of Reference as an irrelevant aside to Ordnance Survey cartography with little practical legacy for the present-day scholar. In two respects this would be misleading advice. First, for the areas for which they publish land-use information, the Books of Reference undoubtedly afford a useful supplementary record which can be deployed in conjunction with other contemporary sources such as the tithe documents or, after 1866, with the official agricultural statistics compiled annually on a parish basis. Their value in these areas, for a key period in British agricultural history, has been recognised by historical geographers since their potential was first demonstrated by H.C.K. Henderson in the 1930s. Thereafter, they were analysed and mapped in the historical sections of a number of County volumes of the reports of the First Land Utilisation Survey and, from the 1950s onwards, in studies of rural change primarily associated with the Tithe surveys.[7] Secondly, as part of the wider mapping processes for the 1:2500 County Series, they also alert us to comparable data enshrined either in the maps or - until recently at least - remaining in manuscript form at the Southampton archive of the Ordnance Survey.

The history of the Books of Reference is intimately bound up with the 1:2500 survey as a whole. This was introduced, as is well known, in an atmosphere of intense public debate, culminating in the 1850s, and already dubbed by contemporaries the 'Battle of the Scales'. The many twists of policy before the cadastral survey was finally approved are beyond the scope of this paper, but the founding charter - alike of the 1:2500 series and of the Books of Reference - may be regarded as the Treasury Minute of 18th May, 1855. This was to set a pattern for the large-scale Ordnance Surveys for the rest of the nineteenth century and beyond. Three clauses in particular provided a framework for the Survey's treatment of land-use features on the large scales:

'1. That it is unnecessary to have plans of the Highlands and extensive moorland tracts, as well as other uncultivated districts, made on the scale of one two-thousand-five-hundredths; that the said scale should be limited to the populous, mineral, and cultivated districts; and that the superintendent of the survey, acting according to these general rules, should exercise his discretion as to the districts, the plans of which are to be made on this scale.'

'2. That plans on the one two-thousand-five-hundredths scale should not be engraved, but that copies, when wanted, should be made by the anastatic process, with reference books in which the area of each inclosure would be given.'

'3. That the Highland and other partially cultivated and thinly peopled districts should be drawn on the scale of six inches to the mile; and copies, when wanted, should be made by the anastatic process.'[8]

It is true that there were minor modifications to this policy - for example Henry James the newly appointed Director of the Survey was able to persuade the Treasury to sanction the publication of the 6-inch series by traditional engraving methods - but in essence this Minute was to determine the basic demarcation between the two scales for almost the next 100 years. The 'reference books' were to publish information on parcel areas identified on the 1:2500 series, and suffice it to say - at this stage in the argument - that the Minute makes no specific provision for the publication of land-use information.

THE FORMAT AND CONTENT OF THE BOOKS OF REFERENCE

During the first 5 or 6 years of their publication the Books of Reference underwent several changes of format which reflected both the experimental early years of the cadastral survey and the economies imposed on the Ordnance Survey in the last stages of the 'Battle of the Scales'. Although it had sanctioned the two basic large scales the Treasury was still determined to restrict expenditure wherever possible and hence an insistence on a piece work system for the operations of the survey and the use of an 'anastatic process' (a cheap form of lithography using a zinc plate[9]) to reproduce the manuscript plans. Something of the mood of economy is reflected in James' statement in February 1856 that while the present cost of the 1:2500 surveys was 12d an acre he hoped to reduce this to 11d;[10] it is entirely consistent with such policies that in the early years the Books of Reference were produced by relatively cheap, 'in house', lithographic methods. That they were subsequently published by letter-press printing, soon mainly by contract to an outside printer, may in turn reflect James' growing emancipation from the more intense political pressures of the late 1850s. In terms of changing production methods and format

the Books of Reference can be classified into four stages.

(i) 'AREA SHEETS' OR 'TABLES OF AREAS'

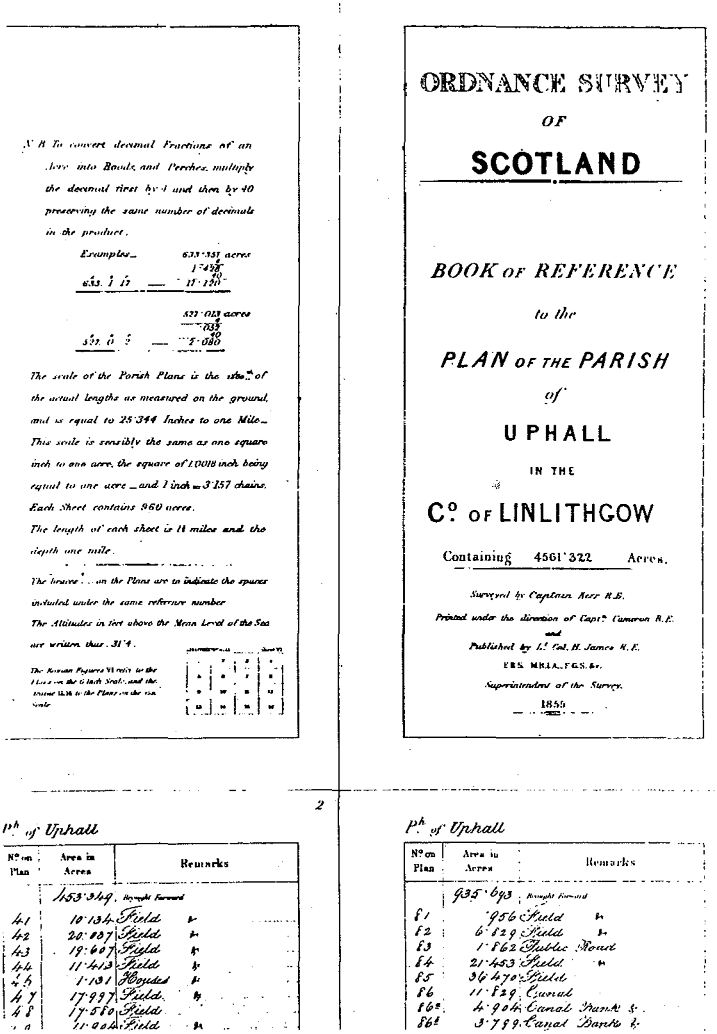
In the earliest stage - represented by examples from parishes in County Durham and in Scotland - the data on parcel numbers, areas, and associated land-use descriptions, were published in sheet form and known in the Ordnance Survey as 'Area Sheets'[11] and 'Tables of Areas'[12]. They were in fact an integral part of the 1:2500 'parishes atlases' (as some contemporaries called them) and were printed on sheets the same size as each individual 1:2500 plan. Each 'Area Sheet', bound in at the front of the appropriate volume, could - as in the example of Uphall in Co. Linlithgow,[13] accommodate 12 columns of the area and land-use lists relating to parcel numbers, although on the initial sheet there was included a title-page, an index map to the 1:2500 sheets covering that parish, and instructions and a table 'To convert decimal Fractions of an Acre into Roods, and Perches' (Figure 2).[14] The individual columns printed on these sheets are paginated and may accordingly be regarded as embryo Books of Reference. This format was used in County Durham for only a short period (the information for twenty or so parishes was presented in this way) but it persisted longer in Scotland and 'unbound' Area Sheets have survived from the counties of Ayrshire, Berwickshire, Dumfries-shire, Forfarshire, Lanarkshire, Linlithgowshire, Peebles-shire, Renfrewshire, Roxburghshire, and Selkirkshire.[15] This may possibly result from their production in the Ordnance Survey regional office in Edinburgh rather than in Southampton. In County Durham several of the early Area Sheets were later reprinted as regular Books of Reference in a letter-press format.[16]

(ii) EARLY LITHOGRAPHED BOOKS OF REFERENCE

A second stage in the development of the Books of Reference was reached simply when the columns on the Area Sheets were cut up and the material for one parish stitched together and then bound. As in the example for Stranton, Co. Durham (Figure 3), this tall format (31cm x 14cm) was introduced in 1855, but in northern England it was discontinued - as in Durham, Northumberland and Westmorland - sometime in 1859, although in Scotland it again survived longer.[17]

(iii) THE LARGE LETTER-PRESS FORMAT

In a third stage, applying to Books of Reference produced at Southampton, it was decided to adopt letter-press printing. Initially, the Ordnance Survey seems to have experimented with a large format (33cm x 20cm) but only a handful of parishes, such as Ormside in Northumberland (Figure 4) were published during 1859 in this manner with the arrangement of data as well as the size differing from the 'regular' format to be adopted in the following year.



ORDNANCE SURVEY
OF
SCOTLAND

BOOK OF REFERENCE
to the
PLAN OF THE PARISH
of
UPHALL
IN THE
C^o OF LINLITHGOW
Containing 4561·322 Acres.

Surveyed by Captain Kerr R.E.
Printed under the direction of Capt^n Cameron R.E.
and
Published by L^t Col. H. James R.E.
F.R.S. M.R.I.A. F.G.S. &c.
Superintendent of the Survey.
1855

N.B. To convert decimal Fractions of an Acre into Roods and Perches, multiply the decimal first by 4 and then by 40 preserving the same number of decimals in the product.

The scale of the Parish Plans is the 1/2500 of the actual lengths as measured on the ground, and is equal to 25·344 Inches to one Mile. This scale is sensibly the same as one square inch to one acre, the square of 1.0018 inch being equal to one acre, and 1 inch = 3·157 chains.
Each Sheet contains 960 acres.
The length of each sheet is 1½ miles and the depth one mile.

The braces ... on the Plans are to indicate the spaces included under the same reference number.
The Altitudes in feet above the Mean Level of the Sea are written thus, 31·4.

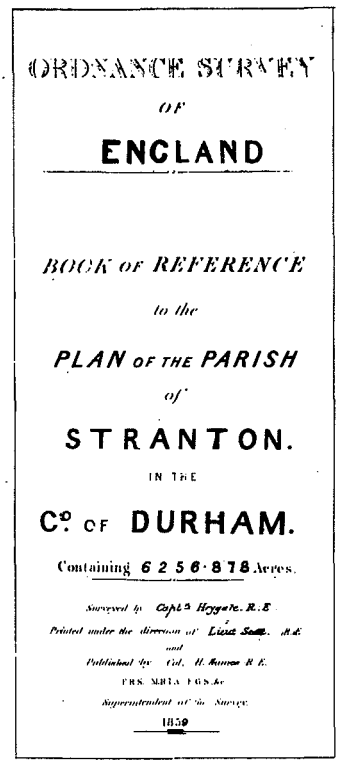
P^h of Uphall

N^o on Plan	Area in Acres	Remarks
	453·349	Brought Forward
41	10·134	Field
42	20·037	Field
43	19·607	Field
44	11·413	Field
46	1·131	Houses
47	17·997	Field
48	17·580	Field

P^h of Uphall

N^o on Plan	Area in Acres	Remarks
	935·693	Brought Forward
81	·956	Field
82	6·629	Field
83	1·862	Public Road
84	21·453	Field
85	36·470	Field
86	11·829	Canal
86^a	4·904	Canal Banks &c.
86^b	3·799	Canal Banks &c.

Figure 2. Part of a lithographed 'Area Sheet' : parish of Uphall, Co. Linlithgow, 1855. By Courtesy of the Map Room, National Library of Scotland.



ORDNANCE SURVEY

OF

ENGLAND

BOOK OF REFERENCE

to the

PLAN OF THE PARISH

of

STRANTON.

IN THE

Co. OF DURHAM.

Containing 6256·878 Acres.

Surveyed by Capt.n Hoggate. R.E.

Printed under the direction of Lieut. Scott. R.E.

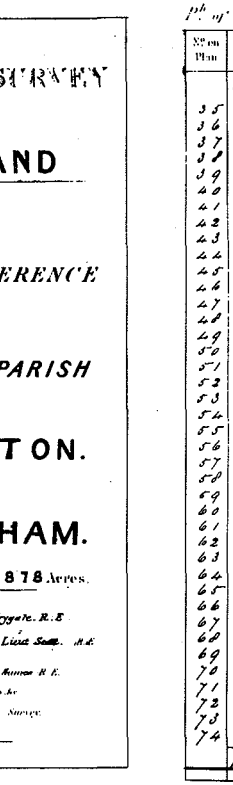
and

Published by Col. H. James R.E.

F.R.S. M.R.I.A. F.G.S. &c

Superintendent of the Survey.

1859



Pish of Stranton.

No on Plan	Area in Acres	Remarks
	527·683	Brought Forward
35	2·747	Pasture
36	·923	Houses &c
37	6·296	Cemetery &c
38	14·859	Arable &c
39	16·500	Arable &c
40	·402	Waste &c
41	·660	Slaughter Houses &c
42	16·779	Arable &c
43	5·861	Pasture
44	10·244	Arable &c
45	2·102	Quarry &c
46	3·691	Pasture &c
47	1·702	Waste Marked &c
48	2·270	Quarry &c
49	·149	Quarry
50	·580	Waste &c
51	2·972	Waste &c
52	·244	Houses &c
53	·151	Houses &c
54	1·331	Public Road
55	·493	Houses &c
56	1·941	Rock
57	8·700	Hartlepool (Part of)
58	2·955	Rock
59	·244	Rock (Castana Co)
60	1·810	Hartlepool (Part of)
61	·694	Pier
62	3·011	Public Road
63	15·471	Arable &c
64	37·595	Arable &c
65	11·863	Arable &c
66	3·716	Arable
67	4·393	Arable &c
68	6·474	Arable
69	·019	Houses
70	7·343	Arable
71	·300	Houses &c
72	3·868	Arable &c
73	5·880	Arable &c
74	9·320	Arable &c
	746·506	Carried Forward

Figure 3. Early lithographed Book of Reference: parish of Stranton, Co. Durham, 1859. By Courtesy of the British Library.

(iv) THE SMALL LETTER-PRESS FORMAT

A final format for the Books of Reference was introduced in 1860 and was maintained in largely unmodified form down to 1888. Early examples (Figure 5a) were all printed in Southampton and were published in blue covers. After 1863, as the volume of work outran the limited printing capacity at the headquarters office[18], the majority of the parishes were printed by Eyre and Spottiswoode (Figure 5b), in which case they were issued with oatmeal covers.

A second criterion by which to classify the Books of Reference is in terms of content. The treatment of land-use descriptions relating to individual parcels underwent modification and three such stages can be tentatively identified. The earliest stage, dating from 1855 to the early 1860s, is characterised particularly in some of the parishes of northern England by relatively lengthy descriptions of individual parcels. The early recorders of land use seem to have adopted a more minute yet less selective approach to landscape features than subsequently, and this may reflect Henry James's claim in 1856 that 'each separate cottage or garden' would be included in the Table of Areas in an effort to make the maps an essential prerequisite for the 'registration and valuation of property'[19]. Parcels for which areas were computed were also often smaller than later, indeed sometimes miniscule, and the classification and terminology for the features so described is accordingly miscellaneous. Such an approach is especially characteristic of some of the Books of Reference for the industrial areas of County Durham, but it may also reflect the inevitably experimental nature of the cadastral survey in its pioneer years.

In a second period, from the early 1860s to 1880, there seems to have occurred not only an increasing standardisation of the categories recorded but also a more succinct terminology adopted for description. Calculations of areas for miniscule parcels (and hence land-use descriptions) tended to be fewer and in towns and cities blocks of houses were now frequently braced together.[20] The trend probably reflects more explicit instructions for use in the field as well as a growing experience among Ordnance Survey personnel in recording landscape features at the 1:2500 scale.

Thirdly, from sometime in 1880 until the Books of Reference were entirely discontinued in 1888, parcel areas were still listed, but the descriptions of land use were abruptly omitted from the published record.

It is likely that a definitive examination of complete sets of the surviving Books of Reference would turn up further minor anomalies and changes of practice. But at least this preliminary survey of their format and internal characteristics may offer some initial clues about the importance of their data in the developed scheme of Ordnance Survey cadastral mapping.

ORDNANCE SURVEY

OF

ENGLAND.

BOOK OF REFERENCE

TO THE

PLAN OF THE PARISH

OF

ORMSIDE,

EAST WARD,

IN THE

COUNTY OF WESTMORLAND,

CONTAINING 2713·191 ACRES.

SURVEYED BY LIEUT. H. HELSHAM JONES, R.E.
PRINTED UNDER THE DIRECTION OF CAPT. A. de C. SCOTT, R.E.
AND PUBLISHED BY
COL. H. JAMES, R.E., F.R.S., M.R.I.A., F.G.S., &c.
SUPERINTENDENT OF THE ORDNANCE SURVEY.

1859.

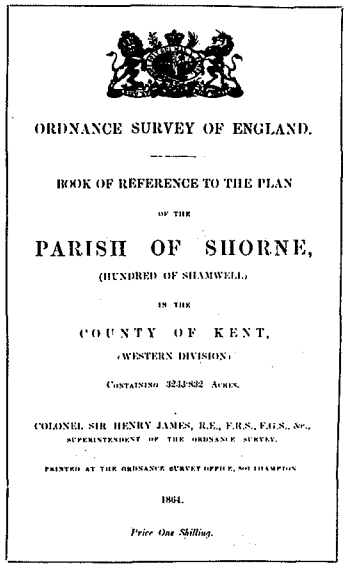
3

TOWNSHIP OF GREAT ORMSIDE.

	No. on Plan	Area in Acres.	Remarks.
		652·576	*Brought forward.*
	115	1·539	Arable.
	116	1·518	Pasture.
	117	2·177	Arable.
	118	1·152	Arable.
	119	4·160	Pasture.
	150	6·900	Arable.
	151	6·854	Arable.
	152	5·223	Pasture.
	153	11·760	Pasture, &c.
	154	19·644	Pasture, &c.
	155	16·538	Arable, &c.
	156	4·976	Arable, &c.
	157	9·779	Arable, &c.
	158	2·176	Arable, &c.
	159	7·444	Public Road, &c.
	160	1·969	Quarry, &c.
	161	·167	Occupation Road.
	162	14·126	Arable, &c.
	163	3·926	Wood.
	164	·364	Houses, &c.
	165	14·252	Rough Pasture, &c.
	166	3·202	Pasture, &c.
Sheet XV. 11.	167	5·257	Arable, &c.
	168	5·129	Pasture, &c.
	169	10·527	Arable.
	170	11·059	Rough Pasture.
	171	10·290	Arable, &c.
	172	·194	Plantation.
	173	6·262	Pasture.
	174	3·244	Plantation, &c.
	175	6·006	Arable.
	176	12·098	Plantation, &c.
	177	6·252	Arable, &c.
	178	10·522	Rough Pasture, &c.
	179	20·207	Arable, &c.
	180	5·775	Arable.
	181	6·557	Arable, &c.
	182	·120	Pasture.
	183	2·645	Pasture, &c.
	184	24·740	Arable, &c.
	185	16·185	Arable, &c.
	186	10·055	Arable, &c.
	187	12·474	Public Road, &c.
	188	8·309	Arable, &c.
	189	5·131	Pasture, &c.
	190	4·293	Pasture.
	191	·874	Pasture.
	192	5·110	Pasture, &c.
	193	5·135	Pasture.
	194	4·246	Pasture.
	195	·105	Occupation Road.
	196	3·596	Pasture.
	197	1·065	Pasture.
	198	3·434	Pasture.
	199	2·010	Pasture, &c.
	200	7·362	Arable, &c.
	201	5·619	Arable, &c.
	202	·652	Pasture.
XV. 12.	203	2·983	Pasture, &c.
	204	1·155	Mill Beck (part of).
	205	·152	Pasture.
	206	7·325	Pasture, &c.
	207	6·061	Arable.
	207a	·196	Pasture, &c.
	208	6·757	Arable.
	209	3·117	Public Road.
	210	15·960	Arable, &c.
	211	9·185	Arable, &c.
	212	7·147	Rough Pasture, &c.
	213	3·571	Rough Pasture, &c.
	214	16·231	Rough Pasture, &c.
	215	9·206	Wood, &c.
		1124·033	*Carried forward.*

	No. on Plan	Area in Acres.	Remarks.
		1124·033	*Brought forward.*
	216	3·348	Wood, &c.
	217	2·074	Wood, &c.
	218	·421	Pasture.
	219	3·363	Wood, &c.
	220	10·294	Arable, &c.
	221	9·655	Pasture, &c.
	222	1·678	Pasture, &c.
	223	·632	Pasture.
Sheet XV. 12.	224	10·620	Pasture.
	225	11·434	Rough Pasture, &c.
	226	·304	Helm Beck.
	227	13·614	Pasture, &c.
	228	3·515	Wood, &c.
	229	·174	Occupation Road.
	230	1·527	Pasture, &c.
	231	·492	Strip.
	232	1·294	Becks (parts of)
	233	6·274	Pasture, &c.
	234	3·922	Arable.
	235	·523	Pasture, &c.
	236	·827	Arable.
	237	·457	Plantation, &c.
	238	·343	Pasture.
	239	5·058	Pasture.
	240	3·111	Plantation.
	241	2·962	Arable.
	242	·410	Plantation.
	243	6·522	Pasture.
	244	6·920	Arable.
	245	5·348	Pasture, &c.
	246	5·653	Arable.
	247	4·321	Arable, &c.
	248	8·019	Rough Pasture, &c.
	249	10·518	Arable, &c.
	250	6·798	Public Road, &c.
	251	·197	Houses, &c.
	252	4·710	Rough Pasture, &c.
	253	·137	Houses, &c.
	254	22·210	Pasture, &c.
	255	10·124	Arable.
	256	11·734	Arable.
	257	10·201	Arable.
	258	·372	Houses, &c.
XV. 15.	259	·332	Pasture, &c.
	260	·371	Pasture, &c.
	261	3·127	Pasture, &c.
	262	·774	Ashy Beck.
	262a	·070	Strip.
	263	3·305	Arable.
	264	3·164	Arable, &c.
	265	4·683	Arable, &c.
	266	1·293	Plantation.
	267	4·395	Pasture.
	268	3·074	Pasture, &c.
	269	3·065	Arable, &c.
	270	4·450	Pasture, &c.
	271	5·884	Arable, &c.
	272	4·426	Pasture.
	273	5·279	Pasture.
	274	1·001	Pasture.
	275	4·236	Pasture.
	276	2·635	Rough Pasture, &c.
	277	15·001	Rough Pasture, &c.
	278	·904	Pasture, &c.
	279	2·257	Rough Pasture, &c.
	280	·091	Garden.
	281	·924	Houses, &c.
	282	1·816	Rough Pasture, &c.
	283	5·843	Pasture, &c.
	284	2·758	Arable.
	285	1·911	Rough Pasture, &c.
	285a	·255	Pasture.
		1421·898	*Carried forward.*

Figure 4. Book of Reference in large letterpress format: parish of Ormside, East Ward, Co. Northumberland, 1859. By Courtesy of the British Library.



ORDNANCE SURVEY OF ENGLAND.

BOOK OF REFERENCE TO THE PLAN

OF THE

PARISH OF SHORNE,

(HUNDRED OF SHAMWELL)

IN THE

COUNTY OF KENT,

(WESTERN DIVISION)

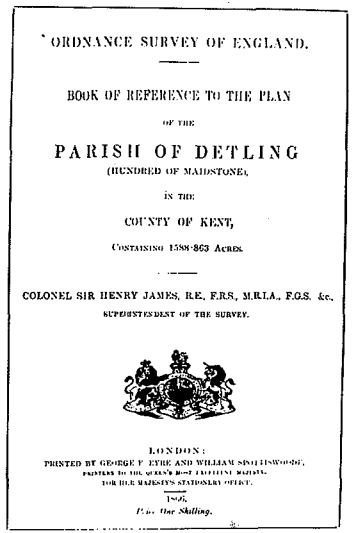
CONTAINING 3243·832 ACRES.

COLONEL SIR HENRY JAMES, R.E., F.R.S., F.G.S., &c.,
SUPERINTENDENT OF THE ORDNANCE SURVEY.

PRINTED AT THE ORDNANCE SURVEY OFFICE, SOUTHAMPTON

1864.

Price One Shilling.



ORDNANCE SURVEY OF ENGLAND.

BOOK OF REFERENCE TO THE PLAN

OF THE

PARISH OF DETLING

(HUNDRED OF MAIDSTONE)

IN THE

COUNTY OF KENT,

CONTAINING 1588·863 ACRES.

COLONEL SIR HENRY JAMES, R.E., F.R.S., M.R.I.A., F.G.S. &c.,

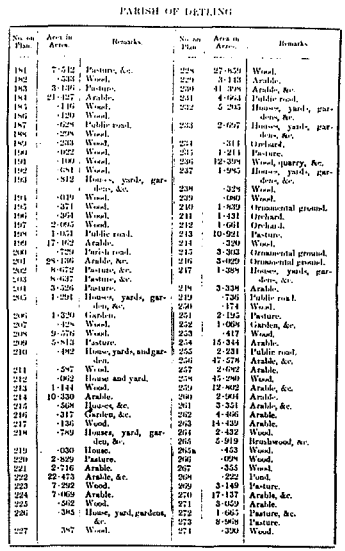
SUPERINTENDENT OF THE SURVEY.

LONDON:

PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.
FOR HER MAJESTY'S STATIONERY OFFICE.

1866.

Price One Shilling.



PARISH OF DETLING

No. on Plan	Area in Acres.	Remarks.	No. on Plan	Area in Acres.	Remarks.
181	7·512	Pasture, &c.	228	27·859	Wood.
182	·533	Wood.	229	3·143	Arable.
183	3·136	Pasture.	230	41·398	Arable, &c.
184	21·427	Arable.	231	4·964	Public road.
185	·116	Wood.	232	5·205	Houses, yards, gardens, &c.
186	·120	Wood.			
187	·628	Public road.	233	2·697	Houses, yards, gardens, &c.
188	·298	Wood.			
189	·233	Wood.	234	·311	Orchard.
190	·922	Wood.	235	1·214	Pasture.
191	·109	Wood.	236	12·398	Wood, quarry, &c.
192	·681	Wood.	237	1·985	Houses, yards, gardens, &c.
193	·812	Houses, yards, gardens, &c.	238	·328	Wood.
194	·039	Wood.	239	·080	Wood.
195	·371	Wood.	240	1·839	Ornamental ground.
196	·364	Wood.	241	1·431	Orchard.
197	2·095	Wood.	242	1·691	Orchard.
198	1·051	Public road.	243	10·921	Pasture.
199	17·102	Arable.	244	·320	Wood.
200	·729	Parish road.	245	3·203	Ornamental ground.
201	28·196	Arable, &c.	246	3·029	Ornamental ground.
202	8·672	Pasture, &c.	247	1·388	House, yards, gardens, &c.
203	8·637	Pasture, &c.			
204	3·226	Pasture.	248	3·338	Arable.
205	1·291	Houses, yards, gardens, &c.	249	·736	Public road.
			250	·174	Wood.
206	1·320	Garden.	251	2·195	Pasture.
207	·128	Wood.	252	1·004	Garden, &c.
208	5·576	Wood.	253	·417	Wood.
209	5·813	Pasture.	254	15·344	Arable.
210	·492	House, yards, and garden.	255	2·231	Public road.
			256	47·578	Arable, &c.
211	·587	Wood.	257	2·672	Arable.
212	·902	House and yard.	258	45·280	Wood.
213	1·144	Wood.	259	12·802	Arable, &c.
214	10·330	Arable.	260	2·504	Arable.
215	·568	Houses, &c.	261	3·351	Arable, &c.
216	·317	Garden, &c.	262	4·466	Arable.
217	·136	Wood.	263	14·439	Arable.
218	·789	Houses, yard, garden, &c.	264	2·432	Wood.
			265	5·919	Brushwood, &c.
219	·030	House.	265a	·453	Wood.
220	2·829	Pasture.	266	·078	Wood.
221	2·716	Arable.	267	·355	Wood.
222	22·473	Arable, &c.	268	·222	Pond.
223	7·292	Wood.	269	3·149	Pasture.
224	7·069	Arable.	270	17·137	Arable, &c.
225	·502	Wood.	271	3·052	Arable.
226	·385	House, yard, gardens, &c.	272	1·667	Pasture, &c.
			273	8·868	Pasture.
227	·387	Wood.	274	·230	Wood.

Figure 5. a. Book of Reference in small letterpress format printed by the Ordnance Survey: parish of Shorne, Kent, 1864.
b. Book of Reference in small letterpress format printed by Eyre and Spottiswoode: parish of Detling, Kent, 1866, with sample page.

Figure 6. Specimen sheet for an examiner's trace showing method of recording land-use details. By Courtesy of the Ordnance Survey.
Source: Ordnance Survey, *Instructions to Field Examiners* (1905)

DIVISIONS between Areas of different character to be indicated where no physical division exists on ground. (Vide paras.

Divisions to be shown between areas as below, and those on the right	Forest Trees	Fir Trees	Forest & Fir	Forest (or Fir) & Underwood (or Shrubs)	Forest, Fir & Underwood or Shrubs	Underwood	Shrubs	Bushes	Furze	R.P. and/or R.H.P.	Arable	Pasture (permanent)	Ornamental Pasture	Ornamental Grounds
Forest Trees		P	P	P	P	I/P	P	P	I/P	I/P	I/P	I/P	P	P
Fir	P		P	P	P	I/P	P	P	I/P	I/P	I/P	I/P	P	P
Forest and Fir	P	P		P	P	I/P	P	P	I/P	I/P	I/P	I/P	P	P
Forest & Und. (or Fir)(or Shrubs)	P	P	P		P	I/P	P	P	I/P	I/P	I/P	I/P	I/P	I/P
Forest, Fir & Und. (or Shrubs)	P	P	P	P		I/P	P	P	I/P	I/P	I/P	I/P	I/P	I/P
Underwood	I/P	I/P	I/P	I/P	I/P		I/P	I/P	I/P	I/P	I/P	I/P	I/P	I/P
Shrubs	P	P	P	P	P	I/P		P	P	P	I/P	I/P	I/P	I/P
Bushes	P	P	P	P	P	I/P	P		P	P	I/P	I/P	I/P	I/P
Furze	I/P	I/P	I/P	I/P	I/P	I/P	P	P		P	I/P	P	P	P
R.P. and/or R.H.P.	I/P	I/P	I/P	I/P	I/P	I/P	P	P	P		I/P	P	P	P
Arable	I/P	I/P	I/P	I/P	I/P	I/P	I/P	I/P	I/P	I/P		I/P	I/P	I/P
Pasture (permanent)	I/P	I/P	I/P	I/P	I/P	I/P	I/P	I/P	P	P	I/P		-	-
Ornamental Pasture	P	P	P	I/P	I/P	I/P	I/P	I/P	P	P	I/P	-		-
Ornamental Grounds	P	P	P	I/P	I/P	I/P	I/P	I/P	P	P	I/P	-	-	
Orchards	I/P	I/P	I/P	I/P	I/P	I/P	I/P	I/P	I/P	I/P	I/P	I/P	I/P	I/P
Marsh	I/P	I/P	I/P	I/P	I/P	I/P	-	I/P	P	P	I/P	P	P	P
Bog	I/P	I/P	I/P	I/P	I/P	I/P	-	I/P	P	-	I/P	P	P	P
Osiers	I/P	I/P	I/P	I/P	I/P	I/P	-	I/P	I/P	I/P	I/P	I/P	I/P	I/P
Saltings	I/P	I/P	I/P	I/P	I/P	-	-	P	P	P	I/P	P	P	P
Sandhills	I/P	I/P	I/P	I/P	I/P	-	-	P	P	P	I/P	I/P	I/P	I/P
Shingle	-	-	-	-	-	-	-	P	P	P	I/P	I/P	I/P	I/P
Sand	-	-	-	-	-	-	-	-	P	P	I/P	I/P	I/P	I/P
Mud	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sand & Mud	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sand & Shingle	-	-	-	-	-	-	-	-	P	P	I/P	I/P	I/P	I/P
Reeds	Show extent in areas of													

Table 1. Land-use distinctions recorded by field examiners of the Ordnance Survey at 1:2500 scale. Source: Ordnance Survey, *Instructions to Field Revisers 1/2500 scale* (1932, amended September 1935).

on Revised Traces by Ink, or by Pencil, pecked lines, 53, 59, 60, 68, Instructions to Revisers. 1932).

Orchards	Marsh	Bog	Osiers	Saltings	Sandhills	Shingle	Sand	Mud	Sand & Mud	Sand & Shingle	Remarks
I/P	I/P	I/P	I/P	I/P	I/P	-	-	-	-	-	P = Divide by pecked pencil line. I = Divide by pecked inked lines. The purpose of these divisions must be borne in mind by the Reviser. Pencil divisions are needed only for the ornament stamping on plans. Inked divisions are needed for the publication of separate reference numbers and areas, as well as for the ornament character stamping. It follows that inked divisions must be accurately surveyed. Pencilled divisions need be of approximate accuracy only, and may be supplied by paced measurements and sketching. Where I/P is shown areas of approximately ¼ acre in extent and over will be divided by inked pecks, and areas under approximately ¼ acre in extent by pencilled pecks. Note.- An area of ½ inch square on the 1/2,500 scale is approximately ¼ acre. On the shores of the sea, large rivers, and estuaries, the limit of land vegetation (above high water mark) will always be shown by a pecked ink line if no physical feature exists.
I/P	I/P	I/P	I/P	I/P	I/P	-	-	-	-	-	
I/P	I/P	I/P	I/P	I/P	I/P	-	-	-	-	-	
I/P	I/P	I/P	I/P	I/P	I/P	-	-	-	-	-	
I/P	I/P	I/P	I/P	I/P	I/P	-	-	-	-	-	
I/P	I/P	I/P	I/P	-	-	-	-	-	-	-	
I/P	-	-	-	-	-	-	-	-	-	-	
I/P	I/P	I/P	I/P	P	-	P	-	-	-	-	
I/P	P	P	I/P	P	P	P	P	-	-	P	
I/P	P	-	I/P	P	P	P	P	-	-	P	
I/P	I/P	I/P	I/P	I/P	I/P	I/P	I/P	-	I/P	-	
I/P	P	P	I/P	P	I/P	I/P	I/P	-	-	I/P	
I/P	P	P	I/P	P	I/P	I/P	I/P	-	-	I/P	
I/P	P	P	I/P	P	I/P	I/P	I/P	-	-	I/P	
	I/P	I/P	I/P	I/P	I/P	-	-	-	-	-	
I/P		-	I/P	-	I/P	-	-	-	-	-	
I/P	-		I/P	-	I/P	-	-	-	-	-	
I/P	I/P	I/P		I/P	-	-	-	-	-	-	
I/P	-	-	I/P		I/P	I/P	I/P	I/P	I/P	I/P	
I/P	I/P	I/P	-	I/P		I/P	I/P	I/P	I/P	I/P	
-	-	-	-	I/P	I/P		P	P	P	P	
-	-	-	-	I/P	I/P	P		P	P	P	
-	-	-	-	I/P	I/P	P	P		P	P	
-	-	-	-	I/P	I/P	P	P	P		P	
-	-	-	-	I/P	I/P	P	P	P	P		

water only by pencil pecked lines

The pointers are ambivalent. On the one hand, there is the data on areas relating to parcel numbers on the plans. This was clearly regarded as essential information. It continued to be printed beyond 1880 and, after 1888, when the series was entirely discontinued, it was transferred to beneath the parcel numbers on the face of the maps. But what, on the other hand, are we to make of the land-use information? Clearly perhaps, insofar as it was dropped from the Books of Reference after 1880, it must be regarded as in some way a less essential category of the information recorded by the cadastral survey. It is this suspicion that the land-use information in the Books of Reference served no particular purpose which has puzzled earlier researchers and it is important, therefore, as a next stage in the argument, to set it more fully into the context of the methods and processes of the cadastral survey as a whole.

THE BOOKS OF REFERENCE AND THE PROCESSES OF THE 1:2500 SURVEY

It is possible to reconstruct the sequence of operations undertaken by the cadastral survey in the field, in broad outline at least, both from the instructions and descriptions of processes which were printed by the Ordnance Survey, and also from such fragments of their working maps, sketches, traces and data collection forms as have survived the twin assault of enemy action and past weeding of documents in the Southampton office. The reconstruction of survey processes, and in particular an examination of the field specification for the 1:2500 series, dispels the notion that the land-use information published in the Books of Reference was in some way divorced from the activities of the mapping as a whole. On the contrary, from 1855 to 1918 the Ordnance Survey conducted, as an integral part of the cadastral mapping, what may be defined as essentially a national land-use survey. It is true that the emphasis was placed on types of non-cultivated land but arable and permanent pasture were also consistently recorded. The classification of land-use observed was subject to some alteration in this two thirds or so of a century (often only in terminology rather than in topographical substance) but its scope as an integral part of the cadastral survey is confirmed in Table 1, taken from the 1932 *Instructions to Field Revisers*. This may be regarded - although the arable-pasture distinction had already been dropped - as broadly representative of Ordnance Survey land-use mapping for the County Series 1:2500 maps. No less than 26 either single or combined land-use types were specified for identification by revisers in the field, an impressive attention to detail which implies a central place for land use in the overall mapping specification.

To understand the status and significance of this data it is first necessary to appreciate how it was collected, both during and after the period of the Books of Reference. Fortunately, the slot of land-use mapping in the sequence of Ordnance Survey operations, if not the precise criteria by which

land-use types were identified, is clearly set out in an official publication as early as 1875. By this date there had already developed standardised procedures for field and office, linked to a division of labour applied to successive processes, and relying on standard documents for data collection. Land-use was recorded in an operation secondary to the initial topographical survey. This was plotted in field notebooks, which were returned either to Southampton or to one of the regional offices of the Survey,[21] where they were fair drawn as manuscript plans. From these plans a 'manuscript trace' - covering 160 acres or 1/6th of the area represented on a 1:2500 plan - was taken and issued for the use of an 'examiner' in the field. The field examiner added land-use information. In 1875 it was noted he would be 'a surveyor and plotter, and sufficiently a draftsman to be able to represent objects clearly and distinctly to scale according to conventional rules'. The examiner's main task was to 'verify the accuracy of the detail by judicious intersections and productions', but, more specifically, on the 1:2500 scale he was

> 'required to give on the face of the traces all the information necessary for the numbering of the parcels and describing them in the books of reference ... to accomplish which he has to write the nature of the different characters of ground, whether arable, pasture, wood, rough pasture, moor, moss, sandhills, &c., and in cases of doubt, defining on the ground to the best of his judgement by dotted lines the limits of the parcels as he would recommend them to be computed.' [22]

It has already been shown how similar categories of land use to those in 1875 - apart from arable and pasture - were still being collected in 1932 (Table 1) and the survival of the 1905 edition of the *Instructions to Field Examiners* provides an intermediate confirmation of this continuity of field methods and basic specification. Furthermore, in the preface to these *Instructions,* it is explained that rules current in 1905 represented an up-dating of basically similar instructions issued in 1884 and they therefore provide a direct link with the First Edition of the 1:2500 plans and the period of the Books of Reference.[23] The main land-use types, including at that date the arable-pasture distinction, are set out in the 1905 text, and they are also identified on an accompanying specimen sheet of an examiner's field trace. This reveals the nature of the land utilization survey undertaken by the Ordnance Survey. The abbreviations for the examiner are carefully specified (A. Arable, P. Pasture, R.P. Rough pasture, V.G. Vegetable garden, etc.) so that there was little room for ambiguity (Figure 6). Apart from a few examples preserved in connection with boundary matters (Figure 7), most of the examiner's traces have now been destroyed[24], and it is unfortunate that the opportunity to abstract this data has now disappeared. It could have added an important dimension to our understanding of nineteenth and early-twentieth century land-use change.

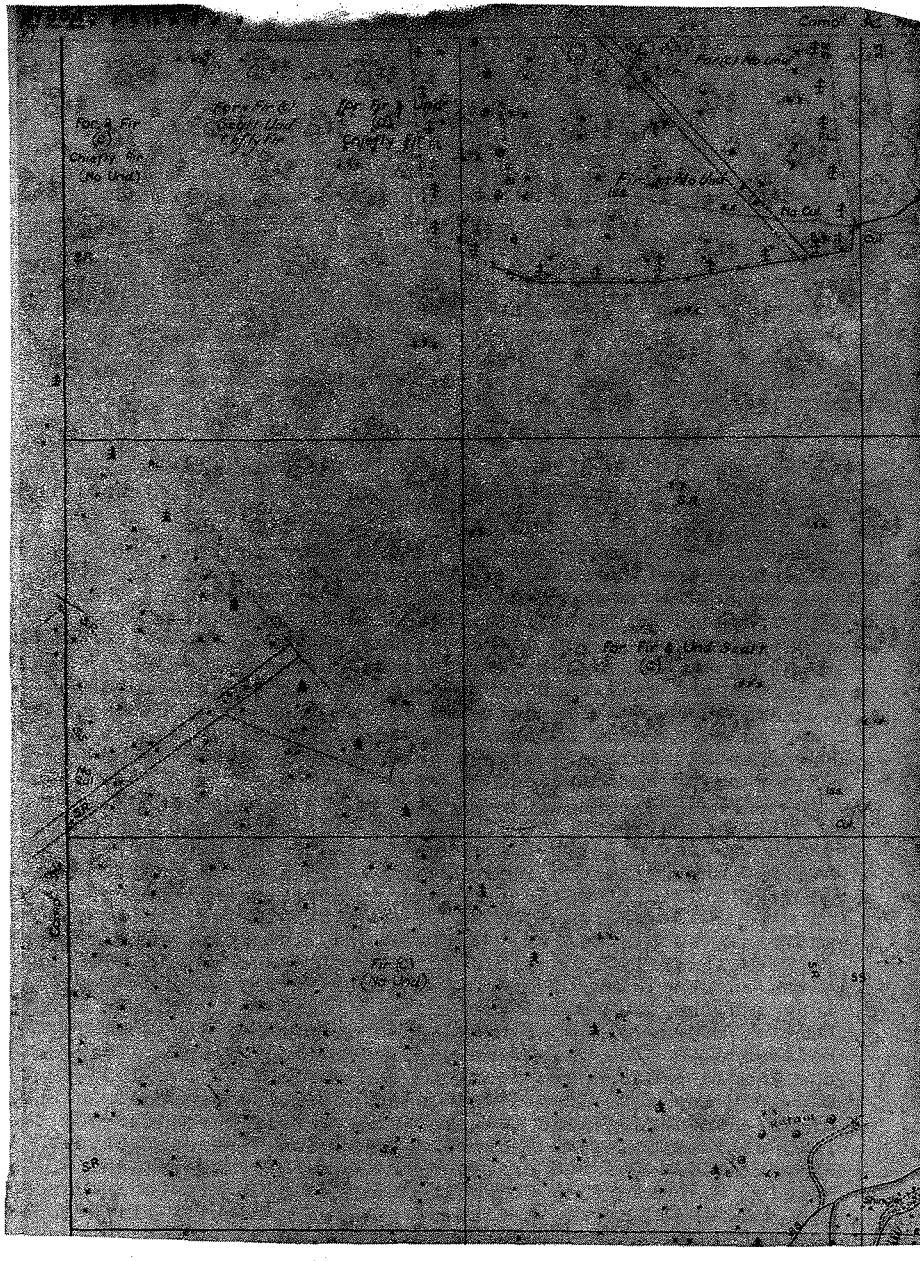


Figure 7. Examination trace, Co. Durham, Sheet 5. Revised 1939. These documents were printed in red (the faint detail on the illustration) and revision or cancelling was done in blue or green ink (the darker linework). The example shows careful attention to the revision of vegetation characteristics with the small 'x's' deleting tree symbols on the previous edition. By Courtesy of the Ordnance Survey.

To establish the status of the land-use data in the Books of Reference (as well as that published on the 1:2500 plans), it is also necessary to explain how the information thus acquired in the field was subsequently modified. In fact these data were essential and integral to two main processes - the one cartographic, the other statistical. The cartographic role of land-use information was clear cut: it identified the character of parcels of land on the ground which would be distinguished by symbols on the published maps. This is true of all 'uncultivated' categories into which surface land cover was classified and a simple comparison of parcel descriptions in the Books of Reference - such as brushwood, chalk pit, furze, gravel pit, marsh, ornamental ground, osier bed, rough pasture, plantation, rocks, underwood and so on - with the appropriate 1:2500 map confirms how they are not standard elements in a selective land-use classification but a definitive record of landscape features which relate to the mapping specification. There was one principal exception to this relationship. The arable-permanent pasture data remained unpublished on the maps throughout the life of 1:2500 County Series; this is an anomaly which will be returned to later.

As well as parcel identification for mapping purposes, the same data were also required for the statistical obligations of the national survey. These were of a three-fold nature: first, to measure from the finished plans areas of distinctive parcels of land; secondly, to calculate the parish areas (or that of other administrative units) within which these parcels lay; and thirdly, for the parishes so measured, to provide broad aggregate statistics of surface land-use cover. We are again fortunate that surviving *Instructions for Computation and Examination of Areas* (1907) outline the statistical manipulations for parcel measurement at a date when the practices were still essentially those of the period of the Books of Reference. These working rules leave us in no doubt that an identification of land-use types was an integral part of the measurement process, something on which important decisions of both a private and public nature would rest. It was laid down as a basic principle of parcelling (i.e. deciding which areas were to be measured separately) that

> 'The main consideration in numbering plans is to give separate numbers to any space the area of which may be considered of use to the public, providing there is room for stamping the number and area without overcrowding the plan.' [25]

'Use to the public' is perhaps a vague concept, but clearly it involved the selection for individual measurement of parcels likely to be the object of transactions for the conveyance and valuation of land. This was one of the primary services provided by the cadastral survey, [26] and in practice many parcels were co-incident with land-use types bounded by enclosures in the landscape.

O.S. 151.

W B & L (85)—35083—10000-4-92

AREA SHEET.

Sheet 93 Plan 6 Co. of Norfolk (Western Division)

Computed by C Thursday

No.	Area 1	No.	Area 2	No.	Area 3	No.	Area 4
		B/fwd	179 228				
		15 part	4 816		Mumford Pt.		Sanston Pt.
		16	2 020	part	1 044	5 part	5 532
		17	980			6 part	3 554
		18	1 154			7	1 206
	Lynford Pt.	19	26 240			7a	692
		20	1 504			8	51 082
1	430	21	2 820			9	2 024
2	32 886	22	2 508			10	32 420
3	642	23	556			11	1 624
4	3 060	24	624			12	32 826
5	5 042	25 part	31 880			13	1 644
6	4 680	26 part	6 988			14 part	2 834
7	36 526	27 part	52 716			15 part	38 004
8	3 898	28 part	39 144			16 part	1 350
9	6 282	29	392			17 part	19 904
10	1 336	31 part	1 942			18	1 020
11	63 324	33 part	044			19 part	1 498
12	672	40	198			20	25 994
13	20 556	41	812			21 part	22 410
14 part	830						
B/fwd	149 221	Total	355 528	Total	1 044	C/fwd	245 284
	149 228		355 528		1 044		245 284
	149 298		355 644		1 042		245 296
2	358 526	2	711 202	2	2 086	2	490 560
	149 263		355 601		1 043		245 280

* A check upon the extraction and addition of the Means in the several pages

Figure 8. Ordnance Survey standard form no. 151 for area measurement, 1892. By Courtesy of the Ordnance Survey of Ireland office, Dublin.

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O. S. 196.

COMPUTATION OF AREAS.

Sheet 93 Plan 6 County of Norfolk (Western Division)

No.	Computed Area	Mean	Correction	Corrected Area	Description and state of country
		Parish of Lynford			
1	·430 ·426	·428		·428	Rough Pasture
2	32·886 32·874	32·880	·52	32·828	Arable &c
3	·642 ·640	·641	1	·640	Houses gardens &c
4	3·060 3·056	3·057	4	3·053	Wood
5	5·084 5·072	5·078	7	5·071	Rough pasture &c
6	4·824 4·820	4·822	7	4·815	Road
7	35·390 35·386	35·388	52	35·336	Arable
8	3·906 3·898	3·902	6	3·896	Rough pasture &c
9	6·320 6·304	6·312	9	6·303	Wood
10	1·352 1·336	1·344	1	1·343	Pasture
11	63·366 63·324	63·345	97	63·248	Arable
12	·656 ·650	·653	1	·652	Rough pasture
13	20·562 20·556	20·559	31	20·528	Rough pasture
14 (part of)	·854 ·854	·854	1	·853	Wood
	Carried forward	179·263	269	178·994	

Figure 9. Ordnance Survey 'Computation of Areas' standard form no. 196 with land-use descriptions for parcels added, 1890. By Courtesy of the Ordnance Survey of Ireland office, Dublin.

The operations of measurement were broken down into a series of clearly defined stages. Parcel numbers for a plan were first demarcated and listed (on O.S. 'Area Sheet', standard form 151: Figure 8); their areas were next computed; and then, using two other standard forms (O.S. 196 and 197), the process of 'describing' was undertaken. This consisted of writing against each parcel on the tabular sheet (these were gathered into 'books') its land-use character as recorded on the examiner's traces. Figure 9 shows data at this point in its processing and three points may be made about its subsequent manipulation and status in the mapping operations.

(i) First, using these computations, it was possible to aggregate acreages for parishes as a whole. Eventually, as the survey of a county was completed, county totals and lists of parish acreages could be published by the Ordnance Survey. From the 1880s the information was tabulated on the county index diagrams which also served to reference the 6-inch and 1:2500 surveys.[27] The provision of these small-area data by the cadastral survey was in itself of major utility and they soon formed an essential infrastructure for the collection of other agricultural statistics.[28]

(ii) Secondly, as well as the publication of acreages for parcels and parishes, there was a requirement placed on the Ordnance Survey to compile classified aggregate land-use statistics at a parish level. These summaries were similarly compiled on a standard form (Figure 10), and the Books of Reference - for the period of their publication from 1855 to 1888 - also printed these 'Recapitulations' at the end of the parcel list for each parish.[29] There were changes of policy. Although there was relative consistency in the categories of information recorded on the examiner's traces in the field, the requirement for aggregate data changed from time to time according to ministerial policy. In the early Books of Reference, for example, the 'Recapitulations' consisted of 'Land', 'Public Roads', 'Water' and 'Railways', but by 1875 the categories to be enumerated were land, roads, railways, water, tidal water, and foreshore of tidal water,[30] although saltmarsh was designated as a type in some parishes. After 1900 a trend towards simplification can be detected and in July 1912 (although the data continued to be collected on the examination traces), 'the State of Cultivation, Arable, Pasture etc' was no longer totalled in the columns of O.S. 196 and 197: only 'Inland Water and Tidal Water' were to be described for subsequent aggregation.[31] In 1925, however, a more complex classification was re-introduced and the categories of aggregated data within the parish were increased to ten:

Inland water
Roads and railways
Towns and village areas, houses, yards and gardens
Woods and forests
Public parks and recreation grounds
Private parks and recreation grounds

Abstract of the Areas of Sheet 93, *Plan* 6, *Co. of* Norfolk (Western Division)

Parish	Land	Roads	Railways	Water	Salt Marshes	Foreshore	Tidal Water	Total
Lyngford	348 1/03	6 3/5						355 6/8
Mundford	1 0/42							1 042
Santon	259 3/4/4	6/42						260 6/9
Meeting with Bromehill	81 4/53	39/3						81 8/46
West Tofts	261 4/72	2/53						262 0/25
	952 3/14 4 6/83							960 0/00

Figure 10. Ordnance Survey standard form for aggregating parish land-use statistics from area documents, 1890. By Courtesy of the Ordnance Survey of Ireland office, Dublin.

Marsh, fresh and salt
Foreshore and tidal water
Mountain, heath and moorland
Other land.[32]

The insertion of the category 'Towns and Village Areas...' may reflect a changing perception by government departments of the problem of environmental management, but the absence of revision at basic scales meant that the information was computed for only a tiny fraction of the country. Indeed, Middlesex was the only county to be completely revised in the old County Series after 1925. In 1952, after soundings in government departments, the categories were reduced to three: land, inland water, and tidal water and foreshore.[33]

(iii) Thirdly, the data published in the Books of Reference can now be set in a matrix of land-use mapping and statistical processing for the 1:2500 County Series. It will be seen that O.S. forms 196 and 197, in particular, represent the *unpublished* state of data published from 1855 to 1880 in the Books of Reference. The corollary is that when land-use information was dropped from this series (and when later the series was discontinued altogether) this represented a shift in publication policy but *not* in the field specification for the 1:2500 mapping. The same information as before - as is made clear in some of the later *Instructions* - continued to be collected on the examination traces.

Only in 1918 did the arable-pasture information cease to be collected by the field examiners. The circumstances were the beginning of post-war retrenchment on public expenditure. In August 1918 Colonel C.F. Close, by then Director General, drew up a 'Memorandum on the simplification of the methods employed in revising the large scale Ordnance Maps of the United Kingdom'. Among a whole range of measures it was decreed that

> 'Descriptions will not be given by the revisers to the cultivation ... of areas, except so far as these are necessary for the stamping of the correct conventional ornament, etc.; thus, the letters A. and P. will no longer be used'.[34]

It was thus in the aftermath of a World War that the cartographic trimmings of a more expansive age were finally cut away.

THE WIDER CARTOGRAPHIC CONTEXT OF ORDNANCE SURVEY LAND-USE MAPPING

It has been shown how the cartographic and statistical operations of the 1:2500 survey provide an explanation for the type of data published in the Books of Reference. What they fail to provide, however, is an interpretation of why the Books of Reference were introduced in a form separate from the printed

maps in the first place, and why they were then abandoned before a national coverage of 1:2500 mapping was complete. Furthermore, the question is also unanswered as to why after 1880 - when the information was no longer either published or aggregated - arable and pasture were maintained as distinctions by the field examiners.

The answers, as so often in the history of Ordnance Survey mapping, have to be sought in a combination of the technical precedents with which the organisation was familiar, coupled with the specific experience and preferences of the men who made the critical decisions at different dates. On the first point, there is no doubt that when the 1:2500 mapping was being specified in the early 1850s its designers had in mind a long tradition of large-scale cadastral surveys accompanied by separate books of reference, and which in essence were similar to the format which was to be adopted as part of the national survey. Many estate surveys, for example, consisted of maps linked to written descriptions and by the nineteeneth century privately subscribed parish plans were sometimes accompanied by published books of reference,[35] while enclosure maps were also supplemented by written awards recording, *inter alia,* ' the state of cultivation' at the date of survey. But if such were the general precedents there was also a more precise model - the Tithe Surveys - which specifically gave shape to the Ordnance cadastral survey. The specification for the Tithe Surveys, as written into the 1836 Act,[36] and to which the surveyors had to agree by written 'Articles of Agreement', had insisted that

> 'Each separate parcel of land should be numbered upon the Plan, the numbers following in succession from No. 1 to the highest number required. These numbers are to correspond with those given in the Reference Book, in which will be specified the name and description of each field or inclosure, with its true quantity or contents in statute measure, the names and description of the owners and occupiers thereof, the state of cultivation of the several lands, whether as arable, meadow, pasture, wood, coppice or common land, garden, orchard, hop ground, or howsoever otherwise.'[37]

In this paragraph there is set out not only the Tithe practice but also the role of the Ordnance Survey Book of Reference which, from 1855 onwards, was likewise to record, if not owner-occupier data, at least the 'state of cultivation', including 'arable' and 'pasture'.

Such an identity of approach was more than coincidence. That it should have been transmitted from the tithe into the national survey reflects the influence of one man in particular, R.K. Dawson, R.E., whose career in the public service spanned the Ordnance Survey and the Tithe Commission (where he was responsible for the technical direction of mapping) and also the

key position of cartographic advisor to the Treasury in the early 1850s when the form of the Ordnance cadastral survey was being decided.[38] Indeed, among those capable of influencing public policy, Dawson was the best qualified and most consistent advocate of a large-scale national survey. Already experienced in boundary surveys and commons enclosure, he had elaborated in 1836 a specification for combining tithe commutation with a full cadastral survey of England and Wales, but this was largely frustrated by the Tithe Act of 1837.[39] In 1842, still undaunted, the Tithe Commission at his instigation had memorialised the Home Office in favour of a scale of 26⅔ inches to one mile as opposed to the 6-inch survey.[40] Later, in the 1840s, he emerges as an ally of Edwin Chadwick. Supporting the Ordnance Survey claim to undertake Board of Health urban mapping, he was a member of the 'Ordnance Survey Committee' of the Metropolitan Commission of Sewers which had supervised the making of the 5-foot (1:1056) plans of London.[41] It thus comes as no surprise to find him in the 1850s urging Treasury opinion behind official cadastral mapping; it was he, for example, who had pressed for the Treasury Circular of April 1853 which had so consolidated argument behind the 1:2500 scale.[42] Equally, inasmuch as Dawson's concept of a cadastral survey - firmly rooted in the enclosure and tithe practices which he had helped to fashion - consisted of plans accompanied by books of reference, there was no reason for him to advise in 1855 that the Ordnance Survey should be different in this respect. The Books of Reference must owe a great deal to Dawson's influence.

The other salient personality to help fashion the initial specification for the cadastral survey, especially perhaps its systematic consideration of land-use features, was Henry James. He had been appointed to direct the Ordnance Survey in 1854, the very year in which the large-scale debate was moving to its climax. James was a senior officer with service under Colby in Ireland and later a superintendent of the Edinburgh office of the Ordnance Survey. The experience gained in each of these phases in his career, linked to his energetic and ambitious nature, positively influenced the decision to publish separate data on parcel areas and the 'state of cultivation'. It is true that in Ireland the scheme to publish 'Parish Memoirs' had foundered on grounds of cost (and in any case the Memoirs did not attempt to relate land use to maps in the manner of the Books of Reference[43]), but it was in that country that the practical value of small-area acreages derived from Ordnance Survey maps was first demonstrated. By 1855 there were sound precedents within the Ordnance Survey itself for publishing such information.

The Irish survey does not, however, specifically account for the inclusion of the arable-pasture distinction in the Books of Reference. For this (apart from the influence of Dawson and the tithe surveys) James's interpretation of the national role of the Ordnance Survey was critical. Rather like Colby earlier in the century, James saw the professional duties of the Survey ranging beyond the narrow tasks of map-making. His officers

were encouraged to interest themselves in the archaeology, geology, local history and meteorology of the areas they were surveying; moreover, the Ordnance Survey would offer them (and especially James) an opportunity to publish these researches.[44]

Whilst still in the Edinburgh Office, James had begun to interest himself in the collection of agricultural statistics. This was an issue, like the future of the cadastral survey itself, which was much to the fore in official circles by the 1850s[45]; characteristically James sought for the Ordnance Survey a chance to widen its operations. That the nation's cartographers should be responsible for the collection of agricultural statistics on a parish basis (and by inference their publication) was perhaps not an entirely novel idea. Thomas Larcom, James's able ex-colleague in Ireland, had mooted a scheme in connection with the Irish Survey in which he argued that

> 'when a sufficient number of persons exists, able to read and use a map, there will be no difficulty in marking on the map itself from actual inspection, the Crop each field contains at any time - say annually in the month of June.'[46]

James's strategy was possibly influenced by this earlier proposal. In 1853 we find him in correspondence with J. Hall Maxwell, Secretary of the Highland and Agricultural Society, which was then engaged in the collection of agricultural statistics on an experimental basis. The suggestion that the Survey could perhaps work in harness with Maxwell's own efforts did not result in any practical development,[47] but, in June 1855, James was able to explain his ideas more fully in evidence before the Select Committee of the House of Lords on 'The best Mode of obtaining accurate Agricultural Statistics from all Parts of the United Kingdom'.

James's scheme was that the Ordnance Survey 6-inch sheets could be used as a base map on which to add agricultural details. With fields numbered and acreages computed at this scale, it would be an easy matter to record

> 'for the various crops, woods, plantations, mountain pastures, &c., including everything, even down to the foreshore ... the exact number of acres under each kind of crop, &c., on each property, and these added together of course make up the total to be put into a tabular abstract form'.[48]

In several respects the ambitious proposal strikes a twentieth-century note. 'Enumerators', with maps in hand, were to seek the co-operation of the occupiers. As well as recording property and farm boundaries, all they would have to do, James explained, 'was to put W. for wheat, O. for oats, B. for barley, &c. in the fields under crop'.[49]

A year later, in evidence before another Committee sitting on the Ordnance Survey of Scotland, James was still plugging away at his scheme for collecting agricultural statistics:

> 'it would be impossible to carry it out without the aid of maps; but with the aid of maps, I have no hesitation in saying that by using the simple machinery of parish schoolmasters, you would obtain accurate statistics at a very trifling cost'.[50]

For land-use surveyors anxious about non-cooperative farmers there was even a note of reassurance. The method as James pointed out would arouse

> 'no jealousy as to the operation; parties would never know when the information for the agricultural statistics was being taken, because the school master would have nothing more to do than, in taking his walk in the evening or in the morning, to see what crop was growing in certain fields, and that he might, of course, do without reference to either owner or tenant'.[51]

Determined to prove his case James had diverted surveyors to make what was in effect a specimen land utilisation survey. In a Report to the Board of Trade, dated October 1857, J. Hall Maxwell noted

> 'Lieutenant Colonel James, who is at the head of the survey, with the view of showing how the ordnance maps may be made available for statistical purposes, selected the county of Linlithgow for an experiment, and caused the area of the different crops there to be ascertained.'[52]

Despite this persistence, and the favourable comparison he was able to make with Maxwell's results, James was unable to secure for the Ordnance Survey, or its maps, a share in the national task of collecting agricultural statistics. Indeed, parts of his scheme were naive: the schoolmasters, for example, could perhaps have noted crops, but only with difficulty could they have obtained comparable statistics for livestock in the course of their daily walks. Almost a decade later the government adopted a system of statistical monitoring for agriculture which involved not maps but the use of printed schedules.

Apart from its intrinsic interest in the history of land-use mapping (and it anticipates ideas in the land utilisation surveys of the 1930s when schoolmasters were also employed), James's interest in agricultural statistics helped to fashion his specification for the 1:2500 maps. Even if it did not directly lead to the authorisation of the Books of Reference, we may suppose that James was encouraged in continuing to record 'state of cultivation' data, including arable and pasture types, which strictly speaking were non-essential for the main

cartographical and statistical needs of the 1:2500 series.

If this interpretation is correct - that the Books of Reference were adopted by the Ordnance Survey partly through historical inertia and that to some extent their land-use content was superfluous to the cadastral mapping - then it also explains their silent demise. By 1880 James's influence (he retired in 1875) was waning in the Survey. Moreover, in the same year the Treasury was to authorise a doubling in the survey strength to finish the large-scales within the decade. There was accordingly a need for streamlining production and publication processes and, among other economies,[53] Books of Reference could be quietly dropped. Their continuation was also raising technical problems of a different nature. In 1872, the 1:2500 sheets, rather than remaining strictly parish plans with large areas left blank beyond the parish boundary, were henceforth to be filled to the sheet edges. Data in the parish Books of Reference thus rapidly ceased to collate precisely with the reorganised plans, added to which, the experimental revision authorised for the cadastral survey in the mid-1880s led to further disparities. While a zincographed plan could be revised piecemeal without destroying its whole matrix it was difficult to up-date Books of Reference without resetting them completely.[54]

By the date the influential Dorington Committee was taking evidence in 1892 the Books of Reference had fallen out of official favour. The general concensus among witnesses, with only one exception, was that on grounds of cost and convenience they would prefer the areas to be printed on the plans. For the 'state of cultivation', including the arable-pasture distinction, there were apparently no public mourners. Why therefore this information was recorded in the field for almost another 40 years is not clear. Perhaps, once again, it was inertia from established surveying practices, which tended to become fossilised along with a finely articulated division of labour in the mapping operations, or even the belief that the data (as in the parish aggregates of land use) would one day prove useful. That the arable-pasture mapping remained sacrosanct until 1918 may also be a reflection of the fact that the scrutiny of Treasury and Parliamentary Committees focussed more on the end products of the Survey than on the processes by which they were created. To the public at large these remained shrouded in technical mystery. Almost by default the ideas of the age of Dawson and James were perpetuated in the specification long after they had outlived at least some of their usefulness.

ACCURACY AND INTERPRETATION OF LAND-USE INFORMATION IN THE 1:2500 COUNTY SERIES

We are now in a better position to assess the reliability of the land-use information on the 1:2500 published maps and in the Books of Reference. It has been shown that insofar as they

represent different recensions of the same field data collected in a standard fashion, no real distinction should be drawn between the quality of these two sources of Ordnance Survey land-use data nor, for that matter, between them and land-use recorded on the examiner's traces and other unpublished documents. All the data was derived from common operations which were integral and essential to the cadastral survey and this should allow us to approach them with greater confidence than some researchers have suspected. It is germane to note that the field recording of the 'state of cultivation' was not a chance or casual process. Nor was it undertaken by a surveyor whose primary duties lay in other aspects of the survey. It was, as noted, the responsibility of a field examiner, an independent specialist presumably selected for aptitude in such work, and who would soon have built up useful experience in identifying land-use types in the field.

Furthermore, insofar as the examiner worked on a completed field survey with the perimeters of different land-use types already delimited, the mapping of land use partakes, in a planimetric sense, the accuracy characteristics of the 1:2500 mapping as a whole. For the County Series, depending on area and edition, this was variable. Although it was specified that the chain lines between tertiary triangulation stations (1.5 to 3km apart) had to close to 1 part in 500 with a maximum allowable error of 15 links (3 metres)[55], modern accuracy tests have revealed greater errors accumulating between successive revisions of the Survey. The principal sources of such errors were owing to distortions in the paper copies used to transmit the original maps, the replotting of county boundary sheets on different meridians, and the numerous tracing and transfer processes used in the production of new editions. It has been estimated that the third cause alone could result in positional errors of up to 2.5 metres so that sheets with errors in excess of this may be encountered.[56] For some research purposes planimetric errors of this magnitude can be disregarded, but as they are often random, independent testing of sheets (against National Grid cartography), may be desirable in studies where positional accuracy is vital.[57]

Such is the general status of the mapping. However, for the practicalities of research employing land-use data, more specific and precise questions may be asked. The text below considers five separate aspects of interpretation which arise out of the Ordnance Survey's mapping of land-use information at the 1:2500 scale:

(i) the distinction between cultivated and non-cultivated land

(ii) The reliability of the arable-pasture designations

(iii) the meaning of multiple land-use descriptions

(iv) definitions of vegetation types

(v) conventions in depicting vegetation types

(i) THE DISTINCTION BETWEEN CULTIVATED AND NON-CULTIVATED LAND

The line distinguishing cultivated (i.e. arable and improved pasture) and non-cultivated land has always been a primary concern of Ordnance Survey mapping. This was true both of micro-features at the local level, such as the vegetation zone surrounding an inland lake or an artificial slope,[58] and of ecological divisions of major regional significance, such as the boundaries of heath, marsh or moor. The Survey's interest in this line undoubtedly stemmed from the general nineteenth-century trend of waste-land reclamation, culminating in the period of High Farming. But it also became progressively important as a surveying distinction in its own right and after 1855 it was to separate the areas of 6-inch and 1:2500 mapping. From a research point of view, too, the fluctuating boundary between improved and unimproved land retains both a scientific and practical interest,[59] and for this reason the paragraphs below draw together fragmentary references which enable us to infer something of the Ordnance Survey approach to its mapping, and hence an indication of accuracy on the published maps.

The first point to note is that from the early years - and even at the 1-inch scale - a systematic survey was made of the edge of cultivation. While no instructions have survived for this period, on some of the Ordnance Survey *Old Series* sheets for southern England a clear line marks the upper limit of cultivation. In other areas, as on the moors of Devon and Cornwall, there is sometimes a symbol (a short line at right angles to the road casing) demarcating the upper edge of the improved land.[60] That the surveyors were instructed to draw a line between improved and various unimproved lands is also confirmed by Thomas Colby, Superintendent of the Survey, when he noted in 1824 in evidence before the Select Committee on the Survey and Valuation of Ireland, that

> 'The only division which is at present made in the ordnance survey, is between common land, wood land, and cultivated land. There is no division between corn land and pasture land at present, but it would add considerably to the labour if there was a necessity to distinguish them'.[61]

This was a fair summary of early English practice, but in the 6-inch survey of Ireland - which in many respects was to influence the mapping of Great Britain when the large scales were introduced after 1840 - the opportunity was not at first taken of surveying in detail either land-use characteristics or the edge of cultivation. With respect to the latter, although the Irish survey had commenced in 1824, Colby could still observe in 1831 that he 'had not contemplated the demarcation of the boundaries of bog and uncultivated land with reference to their utility in the valuation'. By this it may be concluded (as can be verified by an inspection of the early maps) that no particular attention was paid to this line. Yet, as with the showing of fences in general, he was soon forced to

reconsider this policy because 'the valuators require the boundaries of uncultivated land as additional lines by which lands of different quality may be separated and the respective areas of each quality computed'. Thus, in the same year, he gave instructions

> 'in order to abridge the time required for seeking out the boundaries of cultivation where it is progressive and uncertain, in all such cases the nearest fence bounding cultivated land will be surveyed as the boundary, though cultivation may have partially extended beyond it. And all patches of about five acres or less will be considered as too trivial for notice, whether they be of uncultivated land in the midst of cultivation, or of cultivated land enclosed in masses of bog or uncultivated land except where such patches are so situated as to be surveyed without any loss of time.'[62]

In the absence of superceding instructions it is likely that this compromise was implemented during the remainder of the 6-inch survey of Ireland. Even at the 1-inch scale an Ordnance Survey map was expected to show the limits of cultivation and thus, Thomas Larcom, when being questioned before the Select Committee on the Ordnance Survey of Ireland (1846), about the details which ought to be depicted on a 1-inch map of that country had included 'the fence which bounds cultivation, where cultivation has crept up the hills, - the last fence'.[63] This was perceived as a line of major economic significance and in Ireland, sufficient confidence was placed in the reliability of the 6-inch survey, for the maps to be used to calculate lands reclaimed from the waste between the dates of original and revised mapping.[64]

This attitude towards the survey of the boundary of the waste, together with some of the Irish methods, were transmitted to the cadastral survey of Great Britain after 1855. In 1856, when James was being questioned before the Select Committee on the Ordnance Survey of Scotland, he claimed to have no difficulty in tracing 'through all the sinuosities of a glen or strath' the limits of improvement. He continued, echoing Colby's rule of thumb of 25 years earlier, that 'we require no instructions whatever. The fields and fences are indications where cultivation stops'.[65] By 1875 a rule was simply phrased that 'the surveyor is required to show the division between cultivated and uncultivated land'.[66] In practice, however, more thought and care was given to the potential complications of the field situation, not least because the basic scale of mapping rested on the outcome of the demarcation. In 1855 the Treasury Minute had left this to the 'discretion' of the 'superintendent of the survey' but the 1875 *Account* was more specific:

> 'The officers in limiting the area to which the $\frac{1}{2500}$ plans are to extend endeavour as far as

> possible to make the line of demarcation between the two scales as regular as possible, and to include all the fields extending from the cultivated towards the uncultivated lands on the plans on the $\frac{1}{2500}$ scale. Detached groups of fields in the midst of moorland tracts are not drawn on the $\frac{1}{2500}$ scale, nor is the uniformity of the scale in the cultivated districts broken on account of some partially cultivated or uncultivated ground lying in the midst of it.'[67]

The value of this quotation is to confirm that the attention of Ordnance surveyors and field examiners was carefully focussed on the interdigitation of cultivated and uncultivated land along the margin of unimproved land. Moreover, in the process of area computation, patches of arable surrounded by moorland were invariably given a number and area. The likelihood is that where cultivation was bounded by a fixed fence of some kind it was accurately positioned on the 1:2500 and 6-inch maps at the date of their survey.[68] Indeed, it was a basic rule of the Southampton office that fences were 'a most important detail in the survey' and negligence in their survey or examination was 'usually punished by loss of pay'.[69] This penal incentive to accuracy, coupled with a specification which distinguished arable and pasture as well as various uncultivated vegetation types, may increase our confidence in the accuracy of this aspect of the maps.

There remains a residual difficulty that concerns not so much the accuracy of the information *when it was surveyed* as the frequency of change thereafter in an inherently instable agricultural zone, and which has to be further set against the inadequate revision cycles of the cadastral survey.[70] These problems are more insurmountable and they were pin-pointed by J. Hall Maxwell before the 1851 Select Committee on the Ordnance Survey of Scotland. When asked, 'Would you think it desirable to give the line where cultivation ceases on a hill-side?', he replied

> 'It might be interesting afterwards, with a view of ascertaining how far the country had been progressing, but it could not be a very well-defined line, it varies so much; what one person thinks is under cultivation, perhaps another does not; or it may have been under cultivation, and is not now'.[71]

These are ambiguities which the Ordnance Survey evidence is not equipped to resolve. Colby's policy of surveying the 'last fence', a visible and unmistakeable boundary on the ground, was probably fairly valid, especially in an age when cultivation was climbing the hillsides rather than descending as in the twentieth century.

(ii) THE RELIABILITY OF THE ARABLE-PASTURE DESIGNATIONS

The classification into arable and pasture, both as published in the Books of Reference or as recorded on examination traces and in documents used in area computation, may be less consistently accurate than the simple distinction between cultivated and non-cultivated land. It is probably unwise to generalise, but certainly for researchers employing the Books of Reference in comparative studies, any errors by the examiners in assigning fields to one or other category may falsify an interpretation of the data. Such a problem area was reported by Coppock

> 'When the land use of Middlesex and Hertfordshire *c.* 1870 was reconstructed from the Area Books, the county boundary appeared as a major land-use divide, although physical conditions are very similar on either side of the boundary ... in the Middlesex parish of South Mimms, for example, nearly every field was recorded as arable land, while in the adjacent Hertfordshire parish of Ridge the land use was given largely as grassland, although it is known from the Tithe Surveys and from the agricultural returns and other sources that most of the land was grassland'.[72]

In this example, the presence of a county boundary can hardly have marked such an abrupt change in land use. An explanation of the contrasting pattern probably has to be sought in some internal inconsistency in the data source rather than in the reality of the agricultural landscape. One interpretation might be that the differences between two parishes in Coppock's study were related to the appearance of fields depending on the date of survey; where this occurred in a different year or even season, examiners could have misunderstood the fact that the land use was merely in another stage of a broadly similar arable-pasture rotation. However, this implies that two examiners were adopting different definitions of 'arable' and 'grassland' for the purpose of recording, and we need to define the factors influencing this aspect of the mapping operation.

Some of the variables in the mapping process are unfortunately also imponderables through lack of evidence. Little is known, for example, either about the competence of different examiners, or of the assiduity with which they approached the task of noting land use in improved fields. On this point it has already been shown how arable and pasture (although their identification helped in establishing the perimeter of non-cultivated land-use types) were not destined to be part either of the final map or of the statistical aggregates produced by the Survey. This could have encouraged some examiners to be less fussy about their character than, for example, the distinction between permanent and rough pasture. Yet if this is speculation the difficulties which even a conscientious examiner could encounter in the field are better documented. In particular, while most non-cultivated land-use types could

be unequivocably placed among the 'permanent' features of the landscape (the principal objective of Survey mapping), arable and pasture fields were of a more transient nature, especially where regional farming practice favoured a cycle of rotation grasses rather than permanent grassland. The surveyors employed under the terms of the Tithe Commutation Act had been given explicit instructions on this point: land which was judged to have been ploughed within the previous three years for crops, rotation grasses, or fallow was to be regarded as arable; grasslands and leys which had not been under the plough for three years were to be recorded as grass.[73] For the Ordnance Survey examiner, however, there was no such firm directive from Southampton and while the 1905 *Instructions* showed awareness of this problem of convertible husbandry they merely noted

> 'Land temporarily in pasture under a rotation system of agriculture is not shown as P., but as A.; P. is only applicable to permanent pasture.'[74]

The absence of any specification as to the length of ley could have led to considerable problems of interpretation in districts such as western England and Wales where long leys of over three years duration were often customary. Furthermore, for the Ordnance Survey examiner there was no opportunity (as in the tithe commutation process) for landowners to check this aspect of the mapping and, equally, no apportionment of a rent charge depended on the outcome of the work. Taking these factors together it may be concluded that the Ordnance Survey standard of mapping arable and pasture fell short, especially in areas of ambiguous practice, of similar data collected by tithe surveyors. Indeed, in some of the earlier Books of Reference, descriptions such as 'clover', 'fallow', 'field', 'space or enclosure' and 'mountain grass land', may reflect the quandary of examiners unfamiliar with local custom and faced with assigning a state of cultivation to particular parcels of land.

Such ambiguities limit the inferences to be drawn from maps of arable and pasture areas plotted from the Books of Reference. They must be taken with a pinch of salt and interpreted in the light of regional agricultural practice. Theoretically at least it should be possible, as Coppock implies, to check the content of Books of Reference with independent sources such as the tithe and agricultural statistics. In practice, however, the data is often incompatible both with respect to date and more fundamentally the basis of collection. With regard to the former limitation a majority of tithe surveys had been completed well over a decade before the commencement of the Books of Reference in 1855 so that any strictly contemporaneous check is usually excluded. At first sight the possibility of cross checking the consistency of land use in the Books of Reference with the official agricultural statistics collected annually from 1866 would seem to offer more potential; but here too there are impediments of a two-fold nature. First, while the agricultural statistics for any parish were recorded on June 25th

of the specified year, the precise date on which the field examiner was working in an area (in the absence of examiner's traces and allied documents) is impossible to ascertain. The Books of Reference record only a date of publication on their titlepage, which could - in view of the usual backlog of Ordnance Survey work - differ by a year or more from that of examination, and for the date of examination it can only be said that it lay between the date of survey (on the maps) and that of publication, a fact easily ignored in mapping such data. In a short cycle of conversion from arable to pasture, or vice versa, a year may be critical in any interpretation, especially for examiners working without the 'three year clause' incorporated in the tithe surveyors' instructions.

Secondly, and equally fundamentally, the thresholds of recording in the cartographic and statistical operations, respectively, were not identical. Thus while the Ordnance Survey mapped every acre within the parish (yet, as will be shown below did not necessarily measure each land-use type separately in the stage of bracing and calculating areas), the agricultural statistics pertained to land-holding units of five acres and upwards; in the absence of maps of farm boundaries, such as James sought to add to the Ordnance survey, there is no way of effecting a watertight comparison. Furthermore, relying as they did on the co-operation of farmers in completing schedules, the agricultural statistics tended to be unreliable in the first few years; whereas the Ordnance examiners, although they might identify arable and pasture wrongly in the field, were both impartial and bound by rigorous instructions and checks to record every fraction of every acre within a parish.

Nor were the Board of Agriculture always able to consistently determine what constituted the category of permanent grass; grassland, other than rotation and permanent grass, does not figure in the Returns until 1892 when a general return was made of rough grazing.[75] Some of these errors in the two sources may cancel each other out, but in the context of the arable-pasture designations, the comparison of aggregate totals on a parish basis, with or without statistical manipulation, is unlikely to offer a panacea in verifying either data set. The best it can offer is to help isolate areas of apparent anomaly which can then be studied further in other primary sources such as estate records.

(iii) THE MEANING OF MULTIPLE LAND-USE DESCRIPTIONS

A characteristic feature of the descriptions in the Books of Reference, noted by several previous commentators, is that they often refer to combined rather than to single categories of land use. This is true of the data even when it had settled down into more regular categories in the 1860s and 1870s: 'Arable and Pasture', 'Pasture and Wood', 'Arable &c.', 'Pasture &c.', 'Pasture, Rough Pasture &c.', 'Arable and Trees', and 'Arable and Brushwood', are just a few of the terms which

are commonly employed. The point which this section seeks to establish is that far from denoting a casual approach to land-use mapping on the part of the examiners the terms can easily be explained in the light of standard instructions and, moreover, in the majority of cases, the different land uses can be unscrambled on the map should particular research require it. The key lies in recognising that the Ordnance Survey was primarily concerned with measuring and recording (to 1886 in the Books of Reference and thereafter on the actual maps) field areas, that is, areas defined by visible and permanent perimeters on the ground such as fences, hedges and stone walls. Combinations of land use referring to parcel numbers in the Books of Reference thus arose, quite simply, when there was more than one type of land use (the areas of which could not be published separately) within a single field. The principle was clearly stated in the 1907 'Instructions for Computation and Examination of Areas' where it was stipulated that 'Field areas, irrespective of various descriptions within their limit, should as a rule remain intact'.[76]

At this point in the explanation it may help to re-emphasise the distinction between the two Ordnance Survey processes of (a) computing areas, done largely for discrete enclosures and published in the Books of Reference and (b) depicting by symbol small patches of non-cultivated vegetation, which, although differentiated on the 1:2500 maps, were often engrossed in parcel descriptions found in the Books of Reference. With respect to (b), an examination of many 1:2500 sheets will reveal such small areas of non-cultivated vegetation occupying only part of a single enclosure and also braced and lacking a parcel number. Faced with this type of decision in the field the examiner was provided with a rule of thumb; the *minimum* threshold below which a patch of vegetation was not to be recorded for subsequent symbolisation on the maps was 0.25 acres, or approximately ½ inch square on the 1:2500 map. With patches of woodland slightly different rules operated. A 0.25 acre threshold was still adopted for field recording, but woodland areas above this, even where they formed only part of a single enclosure, were separately numbered and computed.[77]

The same Instructions also provide an explanation of the use of the abbreviation '&c' after a named land-use type, a practice which has puzzled previous commentators. It was stated that

> 'Rocky patches of rough pasture in fields are treated as follows:-
> Where such patches predominate, the whole enclosure may be treated as one of "Rough Pasture, &c".
> Otherwise the parcel is described as "Arable, &c", "Pasture, &c", as the case may be; but no separate areas are given for the rocky patches, unless they are so large as to effect the agricultural value of the field, and there is room for stamping the numbers and areas'.[78]

In the example given, '&c' denoted 'Rocky pasture', although in other combinations it could refer to features including houses, gardens, or occupation roads. Once again, given a knowledge of local topography and with recourse to 1:2500 maps as well as to Books of Reference, it is possible to disaggregate many multiple land-use categories.

Such rules account for most of the combined parcel descriptions, but it remains to comment on the meaning of the term 'Arable and Pasture'. Did it apply to discrete areas of arable and permanent pasture within a single enclosure or, alternatively, to a similar combination of arable and a temporary grass ley? Such interpretations, for example, seem to be envisaged in the 1907 *Instructions for Computation and Examination of Areas,* in which it was noted that 'Arable and pasture in one field are not separately numbered and computed, unless the pasture is permanent'.[79] Unfortunately, although this explanation may be tenable, as neither arable nor pasture were differentiated by symbol on the 1:2500 map, there is no way of reconstructing the two land-uses within a single enclosure. But there are other interpretations of the phrase. These depend on regional agricultural practices and on the terminology used to describe them: thus, in parts of the West Country, 'Arable and Pasture' was sometimes applied as a generic term to lands which were regularly rotated between arable and pasture, while in other areas, still surviving after 1855, where parcels contained a form of farming with intermixed arable and pasture strips, these were also known by the double term. Examiners could easily pick up such local usages. The point is underscored that information in the Books of Reference can be fully understood only by using additional clues in the associated maps, as well as other contemporary information to illuminate local farming practice.

(iv) DEFINITIONS AND CHARACTERISTICS OF VEGETATION TYPES

For researchers with botanical or ecological interests, especially those working at a micro-scale, more rigorous questions may have to be asked of the Ordnance Survey evidence. It may be necessary to know, for example, not just the perimeter of a broad land-use category but more explicit information about species mapped, the existence of features such as trees surveyed accurately in position, or the spacing and density of vegetation types. One problem is the difficulty of translating some Ordnance Survey descriptions of vegetation into modern botanical terms. It has been said that in the design of the vegetation classification adopted by the Ordnance Survey on the large-scales after 1855 and which survived, in basic outline at least, to 1963,[80] two guiding principles were adhered to. First, topographical distinctions and characteristics governed the classification into types rather than those of plant ecology. Secondly, the classification had to be readily applied by examiners in the field and accordingly excluded complex identification of plant species.[81]

In assessing the effects of these principles on the information in the 1:2500 County Series maps or the Books of Reference derived from them, two main considerations are relevant:

(a) the types and definitions adopted by surveyors and examiners in recording vegetation in the field

(b) the reduction in the recording and representation of some categories of vegetation from *c.* 1880 to 1918.

(a) Types and definitions adopted by surveyors and examiners

From 1855 until the end of the nineteenth century the rules adopted by the Ordnance Survey for depiction of non-cultivated vegetation types tended to develop in an *ad hoc* fashion. They were only gradually codified into printed instructions and there is no one document containing either an accepted classification for vegetation features as a whole or definitions for single types. In Table 2 below, an attempt is thus made to compound scattered information from a number of sources including Ordnance Survey instructions, the maps and their associated conventional signs, and, in cases where the vegetation type is unambiguous adopting present-day definitions to clarify the scope of the mapping. The four-fold division of vegetation types in Table 2 is similarly not that explicitly set down by the Ordnance Survey, but is imposed to present scattered information in a more systematic fashion. The actual terms in column 1 on the other hand are those of the Ordnance Survey and many can be traced back to the early years of the 1:2500 series.

TABLE 2

Non-cultivated vegetation types distinguished on the 1:2500 County Series maps and in the Books of Reference [82]

Types	Definitions
A. FOREST AND WOODLAND, SHRUBS	
Forest, forest trees, hardwood	Deciduous trees. Until December 1888 birchwood (and single birch trees) were distinguished by separate symbols, after which they were represented by the general symbol for hardwood. By the 1880s the distinction between 'close', 'medium' and 'open' tree cover had probably been adopted although numerical thresholds were not stipulated. [83] Prominent isolated trees were surveyed in their correct planimetric position.*
Fir, plantation	Coniferous trees.
Mixed wood	Combination of deciduous and coniferous trees. By 1884 the examiners had been instructed: 'Although the character

of woods need not be minutely shown, yet their general character should be truthfully shown. For instance, a fir wood should not be described as "mixed" wood because it has a few forest trees on its margin; nor a large wood of forest trees be shown as "mixed" because it has a small clump of firs in one corner. In such cases the general character of the wood will be written, and a few of the special trees will be sketched approximately where they occur on the ground'.[84] Evidence of inconsistency in the recording of mixed woodland can sometimes be detected at sheet boundaries; where the balance of deciduous and fir symbols changes abruptly, this obviously does not correspond to the management boundary.

Underwood

One of the most ambiguous and possibly inconsistently mapped types appearing on Ordnance Survey maps. In normal use the term refers to a woodland management system which produces isolated standard trees and an underwood which is periodically cut down or coppiced (see below). On the 1:2500 maps it could sometimes refer to windblown sapling growths not associated with forest trees. Originally the term may have had military significance as wood easily cut for camp fires. But on the large scales the Ordnance Survey also maintained the distinction because of its importance in valuation and in 1905 it was reaffirmed that 'It is most important that underwood and timber should be kept apart, as they are assessed differently for income tax, succession duty, poor rates, highway rates, &c.'[85]

Brushwood, bushes

Brushwood is also difficult to define botanically, but probably referred to patches of secondary scrub or clumps of bushes (such as holly or thorn) or saplings without large trees, and developing by succession on formerly unwooded land. Ordnance Survey statements can be confusing: on occasions the term was used interchangeably with underwood or was synonomous with it; in 1926, for example, the term, brush-

	wood seems to have been preferred,[86] but in 1932 the term underwood had been reinstated.[87] It has also been suggested that brushwood was sometimes applied to coppice (see below).[88] The term bushes was confined to single or scattered bushes, although after 1893 single 'thorns or bushes' were not shown unless connected with boundaries, or were objects of special interest.[89]
Coppice	Small trees, including hazel, grown for periodic cutting, and in many cases virtually synonymous with underwood.
Shrub	'Large shrubberies' with species such as laurels and rhododendrons.

* This applies to all forest and woodland types.

B. MOORLAND AND HEATH TYPES

Furze, furze with rocks, whin	Areas of the shrub gorse (or whin) were distinguished on Ordnance Survey maps from species such as bramble which could occur in similar locations. In many maps the symbols were combined with rocks and other types given below.
Moor, heathy pasture, rough heathy pasture, rocky heathy pasture etc.	Uncultivated and unwooded ground carrying a variety of species including bracken and heather, and interspersed with patches of rough grazing. Areas of bog were sometimes also included, although in September 1897, the rough pasture, rough heathy pasture, and bog types were amalgamated where they occurred in combination and were thereafter represented by the symbol for rough pasture.[90]
Rocky heathy pasture	A variant depending on local topography, but often distinguished in maps of heath and moorland terrain.

C. MARSH TYPES

Bog, Moss	Bog as noted above was often combined with rough pasture; moss refers to peat mosses, probably following local usage, in both upland and lowland locations.

Marsh	Vegetation associated with land water-logged all the year in a variety of swampy locations.
Osiers	Species of willow used in basket making.
Reeds	Confined to reeds growing in open water, on the edge of a lake, pond or river.
Saltings	Saltmarshes: stabilized and colonized areas of vegetation in the inter-tidal zone.
D. PASTURE TYPES	
Rough pasture	Any combination of unimproved ground-level plants, also frequently combined with various types above.
Ornamental pasture, parks and demesnes, ornamental ground.	Parkland landscape, including scattered trees which were shown in correct planimetric postion. Ornamental ground denoted as large formal gardens.

It will be seen from this table that the main problems of classification and definition arose not so much with woodland types, which were prominent topographical features, but with lesser bush and shrub species, and with rough pasture combinations where finer judgement was required in delimiting and identifying vegetation boundaries in the field.

(b) Reduction in vegetation detail c. 1880-1918

A second set of factors influencing the quality of the map evidence, especially for comparative studies based on different editions, are connected with specification changes for either the data input from field survey or the manner of its selection for presentation on published maps. The cartographic philosophy of the mid-nineteenth century favoured showing the maximum amount of detail the scale could accommodate and vegetation was no exception. With respect to woodland, for example, an officer of the Survey noted with pride in 1886

> 'we show all woods, plantations, tree-clumps fenced or unfenced, orchards, and shrubberies, but also the trees along every hedgerow, scattered ornamental timber in parks, and, generally speaking, every single tree of the large or "forest" class wherever it may occur, whether in fields, by river-sides, overshadowing dwelling-houses or farmsteads, or in any other situation... In our maps the single trees are delineated in correct position; but where they stand too close together, along a hedge, avenue, or elsewhere, to admit of every one being drawn on the map, in that case some

of the less important ones are left out, yet still so that the proper appearance and continuity of the group of trees are maintained, and that all the gaps in the row are accurately depicted'.[91]

Yet even as he wrote such 'elaborate arboreal representation' was coming under attack as 'a waste of public money for a cartographic superfluity'.[92] Such was the pressure on the Ordnance Survey that in 1892, among enquiries made for the Dorington Committee, a question on trees was included in the circular letter sent to '319 landowners, agents, surveyors, civil engineers, and other gentlemen'. It had been suggested in evidence to the Committee that

> 'hedge-row timber, single trees, and trees and shrubs round houses, should be omitted from the Ordnance Survey plans. It has been represented that it is in no case of much value to show such trees on the Ordnance Survey plans, and that for some purposes it is inconvenient. Trees add materially to the expense of survey'.[93]

Accordingly it was asked whether it was

> 'desirable that hedge-row trees, single trees, and trees and shrubs round houses, should be shown as at present on the Ordnance Survey town maps, also on the 25-in. and 6-in. scale maps, or would they be better omitted?'

It was not possible to 'tabulate' the answers to the circular but on the matter of trees, a 'very large majority, amounting to nearly three to one' believed that 'such trees would be better omitted altogether, or that there was no sufficient reason for retaining them'.[94]

This view was accordingly incorporated among the Committee's recommendations and was likewise confirmed by the Board of Agriculture Minute on the Report.[95] The net result was that it led to a further extension of an existing Ordnance Survey tendency towards simplifying vegetation detail on its large-scale maps. The operational evidence for these changes is fragmentary but the relevant departmental instructions which have been located are set out in Table 3.

TABLE 3

Simplification of woodland detail on large-scale Ordnance Survey maps, 1880-1919.

Date	Instruction
1.7.1880	'The detail of Villages on $\frac{1}{2500}$ scale is often much confused by the number of trees shewn in the gardens and about the houses; this should be obviated as much as possible by only shewing trees that have some importance; and by omitting small ornamental trees, fruit trees, unless of considerable size.'

15.12.1882	'where a line of trees obscures a line of Boundary it will often be desirable to omit a few trees, here and there, so that some at least of the Boundary dots may be clearly seen without sacrificing the wooded appearance of the features.'
8.12.1888	'Single Birch Trees and Birch Wood will in future be inserted on the O.S. Plans in the same character as Hard Wood'.
10.1.1889	'In stamping trees on the $\frac{1}{500}$ Plans the stamper must not allow them to extend over *ruled houses,* or over one another. If this cannot be effected by using the smaller tree stamps some one or more of the trees can be left out altogether'.
21.12.1892	'Instructions for 5-feet and 10-feet survey of London.' '(1) Isolated trees, if conspicuous, avenues of trees, clumps of trees, orchards, woods and forests will be shown on the town scale plans of London in the usual manner. (2) Isolated trees unless conspicuous, shrubs and trees in hedges or gardens will not be shown on the town scale plans of London. (3) When trees are isolated and conspicuous enough to be shown, they should be surveyed and shown accurately in position.'
7.7.1893	'Instructions as to Trees ... on the revised plans of the $\frac{1}{500}$, $\frac{1}{1056}$, and $\frac{1}{2500}$ scales.' '(1) Single trees, shrubs and bushes, hedge row timber and trees, shrubs and small shrubberies in gardens, will not in future be shown except as stated below. (2) Single trees forming land marks or of general interest, single trees in public gardens and parks, and in private parks of 10 or more acres in extent, avenues of trees, clumps of trees, orchards, large shrubberies, woods and forests, will continue to be shown as at present.' '(3) Single trees shown as being landmarks should be surveyed and shown accurately in position.'

1894	In further interpretation of the July 1893 instruction, arising from a query in Ireland, it was stated in relation to bushes: '(1) If bushes are close together so that many of them touch each other or almost touch the limit of the bushes will be surveyed by the surveyors and they will be shown by the Examiners (2) If the bushes are more open than the above but still form a marked feature on the ground as seen from a distance say a quarter of a mile they will be shown by the examiners as scattered bushes but they will not be surveyed. [i.e. not be shown in correct position] this applies to the cases in which the bushes are not more than about a chain apart from centre to centre. (3) If the bushes are more open than those described in (2) they will be omitted altogether. ... Examiners must use the discretion in applying these rules. The principle is that if the bushes form a marked feature as seen from a distance they should be shown on the plan. If moreover they form a fairly well defined close cluster of some importance they should also be surveyed.'
20.6.1894	In relation to the instruction of 7.7.1893 the limit of '10 or more acres' in relation to private parks was cancelled.
1.12.1910	'Where the insertion of the tree symbol would obscure detrimentally other detail, it may be omitted, but this rule should not be applied more liberally than is necessary because the insertion of trees is valuable in shewing the distinctive features of the street or locality.'
19.11.1913	'Division Officers may use their discretion in shewing trees, rocks &c on slopes.' [this could refer to man-made slopes shown by symbol on the maps.]
10.9.1919	Among items approved for the highly selective revision in the period of post-war retrenchment was 'Alteration in the character of woods of more than 10 acres in extent, *e.g.*, when the

forest symbol is altered to underwood, or to mixed wood, or *vice versa*! This implies that woodland below the 10-acre threshold was not revised thereafter on the County Series maps, even in the limited areas of the country where revision was kept up. In view of extensive cutting of woods during World War I this is a significant instruction. In the same month it had also been decided to allow the names 'Wood' or 'Plantation' to be retained on the maps if there was 'a reasonable probability of the wood being replanted'.[96]

Source: Ordnance Survey Office, Dublin: 'The Southampton Circulars'.

These instructions suggest that after 1880 there was a definite trend towards 'cartographic disafforestation' on the large-scale maps. Its impact extended alike to the look of the maps in rural, suburban and urban areas. By the 1930s, indeed, the utility of the basic maps had been so generally eroded in this respect that the Davidson Committee was to suggest more detailed information about plantations and woods could be incorporated on the large-scale maps.[97] As far as the 1:2500 maps are concerned the period of maximum woodland detail coincides exactly with the quarter of a century when land-use data was published in the Books of Reference. By the date of the Second and Third Editions (where such surveys were completed[98]) much hedgerow timber in particular had been systematically eliminated from the cartographer's brief.

To a lesser extent the post-1880 trend also affected the depiction of other land-use categories. As early as the circular of 1st July 1880, for example it was stipulated

> 'Vegetable or Kitchen Gardens and Allotments and Market Gardens will in future not be shewn on any of the published plans of the Ordnance Survey, they need not therefore be distinguished by Division Officers on the M.S. Plans of the $\frac{1}{2500}$ and $\frac{1}{500}$ Scales.'[99]

In assessing the overall consequences of this instruction it should however be noted that it applied to manuscript plans being prepared for publication, yet at the field stage of the mapping process the data continued to be collected on the examination traces. Not until April 1913 was it further decided that

> 'In future the initials or descriptions indicating the nature of small spaces, such as "V.G", "O.G", and "yard" at the front or back of houses in towns, villages or elsewhere, will be omitted from revised tracings.'[100]

Nor is this example unique. As already noted, a similar situation existed with regard to rough pasture, rough heathy

pasture, and bog. Although after September 1897 these types relinquished separate identity on the published maps, being subsumed in a single symbol for rough pasture, where appropriate a three-fold classification was still maintained in the field. In a sense such instructions describe the letter of the law but not necessarily the spirit of its implementation. A change of rule would not automatically lead an experienced surveyor to abandon his customary practices immediately and, despite a trend towards simplification, the surviving examination traces for the 1930s, for example, reveal an extremely thorough approach to the task of revising woodland detail. Even within a system of mapping characterised by rigid uniformity and a fine division of labour, much hinged on the performance of individuals.

Such examples may also highlight another potential pitfall in accepting the instructions at face value. The problem is that some but not all of these directives may have survived; some circulars could have been countermanded. The surviving documents serve primarily to alert us to *probable changes in specification,* but the definitive impact of such rulings on map content can only be obtained from a detailed collation of successive editions of actual sheets. This is a task for local research. When it is complete the frustrating situation may still obtain (as with arable-pasture information after 1880) where we are aware of land-use details mapped in the field but because they remained unpublished and because of the subsequent destruction of the raw materials of the survey, their data is permanently lost to historical reconstruction.

(v) CONVENTIONS IN DEPICTING VEGETATION

A final variable in interpreting the land-use content of the large-scale series depends on the mode of conventional representation adopted for the range of vegetation types already described. The conventions - the actual symbols representing different land-uses - were not arbitrarily chosen designs but were inter-related with the cartographic processes of printing and reproduction. As far as vegetation is concerned, on both the 1:2500 and 6-inch series, three phases in the development of these controlling processes can be identified.

(i) Pre-1855: vegetation (as with other features) on the 6-inch and 1:1056 town plan series were hand drawn and then engraved. An important characteristic of the hand-drawn manuscript plans (the model for the engraver) was that they allowed some of the minor variations recorded by individual surveyors and examiners to be transmitted into the printed maps. Moreover, the delicate character of the engraving further facilitated the reproduction of some of the individual characteristics of woodland and similar areas, although punches for engraving trees on copper-slates had been introduced by the 1850s.

(ii) 1855-1881: in 1855 zincography was adopted for the 1:2500 and 1:500 town plans. This greatly altered the look of the maps and to speed up the process of fair drafting, a little known technique, that of hand stamping, was developed from *c.* 1857

onwards. Standard symbols for vegetation (in the same manner as standard type faces for lettering) were 'stamped' on the manuscript plans by specially trained craftsmen prior to their reproduction by zincography. From the outset vegetation on the 1:2500 series thus had a very different and often much coarser appearance to comparable areas on the engraved sheets.

The essence of the technique of stamping, together with illustrations, was described in the 1875 account of the *Methods and Processes adopted for Production of the Maps of the Ordnance Survey* (Figure 11). It was noted

> 'The employment of types for letters and figures, and a variety of stamps for trees and clumps of wood and for different characters of ground, has greatly simplified and economised the production of the larger scale plans, at the same time that it has produced greater uniformity in the work of the different offices. The stamps are used under a spiral spring set in a tripod of brass, and are resorted to whenever they will accelerate the work of the draftsmen'.[101]

Examples of the symbols as they appear on the maps in various combinations are reproduced in Figure 12. In addition, there were symbols to represent single hardwood, fir and birch trees, and, as well as moor and furze as illustrated, separate stamps existed for single bushes, and small clumps of brushwood, rough pasture, marsh, osiers, and reeds.[102] Several points may be made about these conventions. First, the process of hand stamping with standard symbols created an artificial botanical landscape. As already indicated the primary objective of surveyors and field examiners was to establish the *perimeter* of distinctive land-use types for subsequent measurement. Within that perimeter the draftsman had to delineate the 'general character' of woodland but not its micro-geography, and it would be erroneous, for example, to conduct a species count from the maps. Indeed, despite the systematic attempt to record broad variations in density, small changes of woodland character were beyond the examiner's brief: 'temporary' clearings in woods were not shown and private paths and temporary cart tracks were also omitted. The aim of stamping vegetation was to iron out idioscyncracies of individual surveyors and draftsmen (as between the work of the different regional offices of the Survey where the plans were prepared) and the name 'ornament' given by the Ordnance Survey to vegetation symbols is a fair measure of their function being designed to communicate the essence of an area in conventional rather than naturalistic terms. The approach was summed up in the 1906 *Instructions to Draftsmen and Plan Examiners:* 'Trees in a large wood should be artistically grouped and not crowded together'.[103]

The period 1855-1881 was equally a distinctive one for the character of vegetation on the derived 6-inch maps. The 6-inch sheets were reduced by photography from the 1:2500 maps and then engraved. The main task of the engraver with regard to vegetation was thus to reproduce with smaller symbols the pattern already

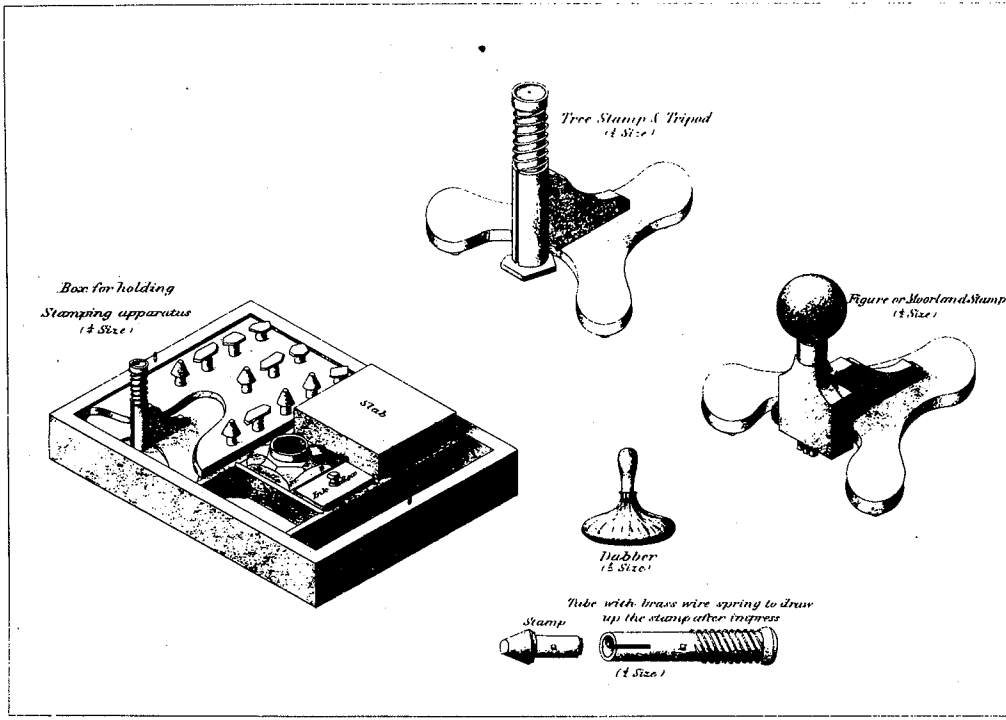

Figure 11. Stamps and tripods used in drawing and zincographing Ordnance Survey maps on the 1:2500 scale, 1875. By Courtesy of the Ordnance Survey.
Source: *Account of the Methods and Processes* (1875)

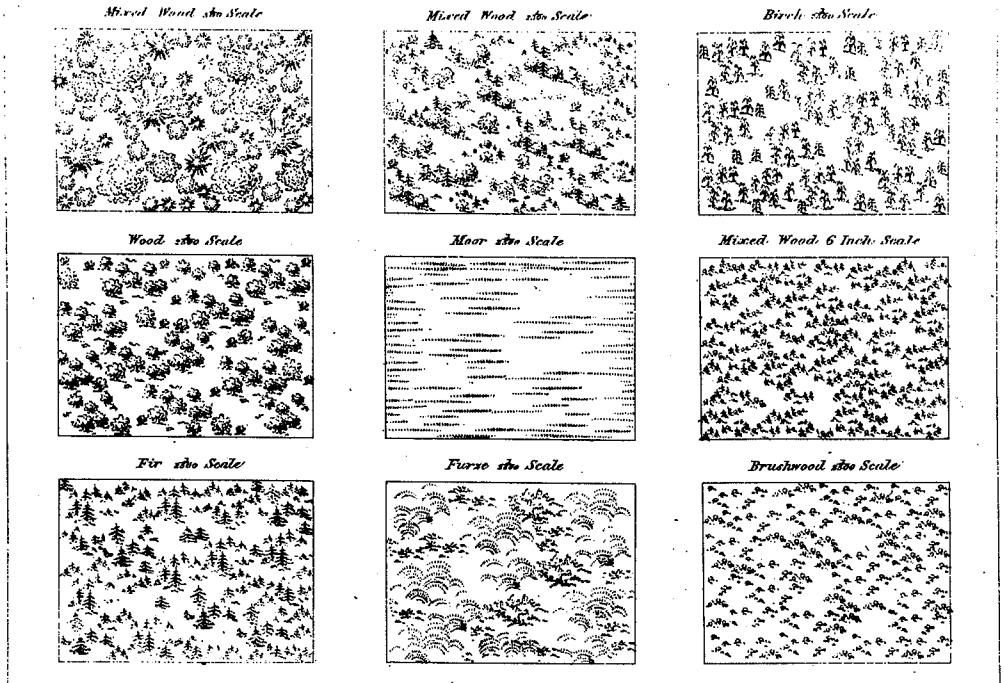

Figure 12. Specimen of vegetation stamps used for Ordnance Survey maps on the 1:500, 1:2500 and 1:10,560 scales, 1875. By Courtesy of the Ordnance Survey. Source: *Account of the Methods and Processes* (1875)

pre-determined by the parent map. There was no significant generalisation although the number of tree symbols was sometimes reduced at the smaller scale - from two to one for example - where trees were close together on the 1:2500 maps. Moreover, these stereotyped patterns, through the use of stamps in drafting (Figure 12), were also extended to areas where the engraved 6-inch maps formed the basic scale and where the same broad rules applied to the mapping of vegetation.

(iii) post-1881: after this date a major technical economy induced further change in the appearance of vegetation on both the 1:2500 and 6-inch maps. The essential innovation was the decision to reproduce the 6-inch maps (without engraving) by direct reduction and photozincography from the 1:2500 plans. There were also subsequent technical modifications to the production processes for the 6-inch maps. After *c.* 1889, for example, an intermediate reduction was introduced to 12-inch to 1 mile scale; this was followed by redrawing - again involving the use of stamps - but the changes initiated in 1881 had three long-term and generally irreversible consequences. First, obviously, the vegetation content of the 6-inch maps was now identical to that of the basic parent scale. Secondly, the trend towards simplification on the 1:2500 series after 1880 was further fuelled by the necessity to ensure legibility on the 6-inch maps. There is an interesting parallel here to the relationship between the 1:10,000 and 1:25,000 series in the 1960s and 1970s. Thirdly, again to aid reduction, coarser or simpler stamps for vegetation types tended to be adopted. In 1884, for example, a new marshland symbol was introduced. It was characterised with two small tufts of vegetation with a single underline and replaced a larger tuft with a triple underline. Similarly, about the same time (the specimen is undated in the Southampton Circulars), a new design for brushwood was substituted with the needs of 6-inch reduction in mind. Such cosmetic changes do not of course mirror real differences in vegetation character; the danger is that they may sometimes convey that impression to the non-cartographic eye.

A final point about stamped vegetation symbols emerges from Figure 12: different designs of tree stamp were adapted to the scale of the maps. On the 1:500 town plans trees were depicted by three sizes of stamp related not only to the actual size of trees but also to the space available for their insertion among other details. These were the circular symbols - as if the tree was being viewed vertically from above - and where the symbol centre represented the location of the base of the tree. For the 1:2500 scale, however, the more familiar elevations of trees were preferred, in which the base of the trunk (in the case of isolated single trees, but not compact multiple symbols) marked its location on the ground. This gave rise in later Ordnance Survey practice to the 'surveyed' tree symbols distinguished on the large-scale maps.

Some of these finer points may be of more interest to map historians than to historical geographers. They nevertheless serve to pinpoint the primary utility of Ordnance Survey maps.

In studies of land-use change this lies in a delineation of boundaries rather than in an apparent depiction of the micro-characteristics of areas of vegetation.

CONCLUSION

This essay has tried to illustrate the value and limitations of the old large-scale Ordnance Survey maps and one of their derivatives, the Books of Reference, as a source of information on land utilization and vegetation geography.[104] The key to successful map interpretation lies in the reconstruction of the technical processes of survey, drafting and printing, and in understanding how changes in specification arose from technical developments and increasing budgetary constraints faced by the Survey. The 1:2500 mapping cannot be modelled as a neat linear progression. Data was not transmitted from field to final map in a largely unmodified, or even entirely logical way. Rather it was transformed in different degrees at various stages in the map-making process; not all the original data survived the sieving tendency of cartographic operations.

The form in which data is now extant in relation to these processes also determines its use in modern research. Had they survived perhaps the most valuable raw material of the survey would have been the manuscript examiners' traces from successive editions of the maps. As it is, we are left with data in the Books of Reference which preserve a filtered record of landscape, reflecting the triple inputs of surveyors, examiners, and the 'computers' responsible for bracing and measuring individual parcels of land. Or similarly, a woodland characterised on a 1:2500 sheet, embodies the judgement of a stamper and the quality of his instructions as well as the skill of a surveyor.

Finally, it should perhaps be stressed that especially before 1945, 'standard' national map series exhibited significant spatial and temporal variations in the quality of their data. By the 1930s Britain had slipped more than a notch or two from its proud pedestal as the 'best mapped country in the world'. As a result, particularly for local scientific studies, Ordnance Survey land-use data has to be further tested against other independent sources as a means of validating its representations of landscape. Meanwhile, a working knowledge of relevant processes and conventions of the cadastral survey should assist in preliminary abstraction and evaluation. The rich vein of information comprised in 5,000 or so parish Books of Reference and over 40,000 1:2500 County Series sheets (for the First Edition alone), has many untapped applications in historical research.

NOTES AND REFERENCES

1 To give just two recent examples: G.F. Peterken and J.C.E. Hubbard, 'The Shingle Vegetation of Southern England: The Holly Wood on Holmstone Beach, Dungeness' *Journal of Ecology* 60 (1972) 547-71; and T.C.E. Wells, J. Sheail, D.F. Ball and L.K. Ward 'Ecological Studies on the Porton Ranges: Relationships between Vegetation, Soils and Land-Use History' *ibid.* (1976) 589-626.

2 This is adequately covered elsewhere: see note [7] below.

3 From 1855 onwards, irrespective of format, they were always designated on their titlepages as the *Book of Reference to the Plan of the Parish of ...* In some Ordnance Survey publications they were referred to as 'area books', a term picked up by geographers employing them in rural landscape reconstruction. The terminology was obfuscated by H. St. J.L. Winterbotham in *The National Plans* (London, 1934) 98-99 who wrote of the 'Area Books by Parishes' being first published in 1855 and, in 1872, of the 'End of Parish Area Book. Known as "Books of Reference" from this date.'

4 For an introductory account see J.T. Coppock, 'Maps as Sources for the study of land use in the past' *Imago Mundi*, 22 (1968) 37-49.

5 A complete listing (but lacking dates of publication and failing to distinguish Books without land-use data published after 1880) appears with the 'County and Parish' lists of 1:2500 maps included in two Ordnance Survey catalogues: *Catalogue of the Maps and Plans and other publications to 1st July 1886 of the Ordnance Survey of England and Wales and the Isle of Man* (1886); and *Catalogue of the Maps and Plans and other publications of the Ordnance Survey of Scotland to 1st January 1896* (1897).

6 J.T. Coppock *op. cit.* 47, pinpoints many of the fundamental problems in connection with the Books of Reference.

7 For a full review of the literature from the 1930s down to the present see Roger J.P. Kain and Hugh Prince, *The Tithe Surveys of England and Wales*, (Folkestone, Studies in Historical Geography Series, 1980).

8 *British Parliamentary Papers* [hereafter *BPP*] 1854-55 [1933], xxxii, 719: 'Treasury minute dated May 18,1855, and previous papers, relating to the Ordnance Survey'.

9 For a contemporary description by James see *BPP* 1857-58 [2396], xix, 585: 'Report of the Ordnance Survey Commission ... 1858' 45-46.

10 *BPP* 1856 [198], xiv, 361: 'Report from the Select Committee on Ordnance Survey of Scotland ...', 219 James to Inspector General of Fortifications, 4 February 1856.

11 They are designated by James as such in *BPP* 1857-58 [2396], xix, 585,21.

12 James uses this term in *BPP* 1856 [198], xiv, 361: 216 James to Inspector General of Fortifications, 30 June 1855.

13 Copy in Map Room, National Library of Scotland.

14 These Area Sheets were printed by lithography.

15 I am grateful for this information to Peter Milne, Senior Assistant, Map Room, National Library of Scotland.

16 For example, the 1863 Book of Reference relating to the parish of Dalton-le-Dale, County Durham: British Library, Map Library.

17 Lithographed Books of Reference *in bound form* were published for parishes in Ayrshire, Berwickshire, Dumfries-shire, Bute and Perthshire.

18 *BPP* 1863 [33], xxxiii, 505-522, records one letter-press printer who had been employed 6 years 8 months on the Ordnance Survey establishment for 1863.

19 *BPP* 1856 [198], xiv, 361 216.

20 Ordnance Survey of England. *Book of Reference to the Plan of the Parishes and Extra-Parochial Placesin the City of Exeter in the County of Devon* (London, 1877) in which many parishes were measured as a whole with no individual plots or other separate areas being distinguished.

21 For most of the second half of the nineteenth century final manuscript plans for 1:2500 County Series sheets were prepared in the regional offices of the Ordnance Survey rather than in the Southampton headquarters.

22 *Account of the Methods and Processes adopted for the ... Maps of the Ordnance Survey of the United Kingdom; Drawn up by the Officers of Royal Engineers employed under Lieut. -General Sir Henry James ...* (London, 1875) 46.

23 Ordnance Survey. *Instructions to Field Examiners* (Southampton, 1905) Preface. Copy in Ordnance Survey Library, Southampton.

24 Many were destroyed by the air raids of 1940; others were weeded or have deteriorated because of their fragility. Careful enquiries seem to confirm that no examination traces survive for either the First Edition or the First Revision of the County Series 1:2500 maps. The selected sheets which survive are for the sporadic 1930s revision and are stored in the Boundary Section at Southampton. They were preserved because they relate to sheets showing critical boundary changes in areas of river shift.

25 'Instructions for Computation and Examination of Areas. Provisional' (Printed for internal use, Ordnance Survey, Southampton, 1907, copy in Ordnance Survey Library) 19. These instructions served to 'collate all the circulars and "decisions" still in force, which have been issued from

time to time for the guidance of Area Departments.'; they substantially reflected the core of nineteenth-century practice.

26 The arguments are rehearsed fully in James's 'Memorandum ... upon the Advantages of a strictly public Nature which would be gained by having the Country surveyed for the Purpose of making and publishing Maps or Plans upon a more extended Scale than that of One Inch to a Mile' in *BPP* 1857-58 [2396], xix, 585: 'Report of the Ordnance Survey Commission ... 1858' 48-50.

27 For details of the appearance and availability of this series, see the annual *Catalogues* of the Ordnance Survey for the period.

28 In Ireland it was recognised that inaccuracies introduced into 'Returns of Agricultural Produce', by smaller landowners furnishing incorrect acreages, could be detected by comparing them 'with the field divisions on the Ordnance Maps' (*BPP* 1847-8 lvii), while in County Donegal it had been possible, by comparing the original and revised editions of the Ordnance Survey maps, to calculate 'the Number of Acres of Land Reclaimed since the first Publication of the Maps... the Number of Acres still Unreclaimed ... as well as the Number of Acres in Cultivation' (*BPP* 1846 xlii). In England, pioneer attempts at collecting agricultural statistics in the mid-nineteenth century relied on acreage data in the 'Tithe Commutation Books' (see, for example *BPP* 1854-5 liii), but in Scotland, which lacked both Tithe and large-scale Ordnance Surveys for most of its area, it was particularly difficult to compile accurate agricultural statistics especially for the Highlands. J. Hall Maxwell, for example, in conveying to the Board of Trade Agricultural Statistics for the Counties of Roxburgh, Haddington and Sutherland, compiled under auspices of the Highland and Agricultural Society of Scotland, noted that 'Many of the returns were made according to Scotch measurement', and although converted into imperial acreage, sheep farmers were 'frequently unable to tell the extent of hill ground held by them' (*BPP* 1852-3 ci). In Shetland, 'the returns of acreage' had to be 'taken with considerable allowance ... the land is there almost exclusively held under the "merk", a Norwegian measure of extent of fluctuating character' and 'it was frequently difficult to arrive at correct data for determining acreage' (*BPP* 1854-5 xlvii); only in counties where the Ordnance Survey had been completed were sheep farmers able to assess the size of their holdings (*BPP* 1854-5 xlvii). Maxwell reiterated this view in 'Copy of Report of the Highland and Agricultural Society of *Scotland* for 1855' (*BPP* 1856 lix), 4.

29 After the withdrawal from publication of the Books of Reference the aggregations continued to be recorded into large ledgers. These survive in mauscript as P.R.O. O.S. 4: 'Area Documents: County Series. Parish Acreage Lists.' These books were compiled as each county revision of the survey

was completed. They tabulate acreages on a parish and county basis for the land-use categories described below and employed at particular dates.

30 *Account of the Methods and Processes* ... 1875 50.

31 'Instructions for Computation and Examination of Areas ... ', 1907 13; manuscript annotation in Ordnance Survey Library copy.

32 H. St. J.L. Winterbotham, 49.

33 George A. Neale, 'The Ordnance Survey's Contribution to Land Use Classification' (Unpublished: paper read to the British Association for the Advancement of Science Annual Meeting, Nottingham, September 1966), 6. Copy in the Ordnance Survey Library, Southampton.

34 'Memorandum on the Simplification of the Methods Employed in Revising the Large Scale Ordnance Maps of the United Kingdom.' C.F. Close, Southampton August 14th 1918. Copy in Ordnance Survey Office, Dublin, Southampton Circulars, Book 2, 149.

35 For example, *Reference to the plan of the Parish of Twickenham, Middlesex; Surveyed in the Years 1813 and 1814; Corrected in 1845; By W.T. Warren, Isleworth, Land Surveyor and Draughtsman to His Royal Highness the Duke of Cambridge.* (Brentford, 1846); copy British Library, Map Library, Maps 9. b. 4.

36 *BPP* 1837 xli 9: 'Copy of Papers Respecting the Proposed Survey of Lands under the Tithe Act.', 12-16.

37 Public Record Office, IR 18/4323: 'Agreement for Survey Map and Apportionment in cases of First Class Maps.' I owe this reference to Dr Roger Kain.

38 *The Geodesy of Britain: or, The Ordnance Survey of England, Scotland, and Ireland ... In a Letter to A Scottish Laird and Imperial M.P. from Adélos.* (London, 1859) 15. There is a copy of this pamphlet in Cambridge University Library, Maps. c. 999.85.2.

39 Roger J.P. Kain, 'R.K. Dawson's Proposal in 1836 for a Cadastral Survey of England and Wales' *The Cartographic Journal* 12 (1975) 81-88.

40 *The Geodesy of Britain* ... 1859 20.

41 Greater London Record Office and Library, MCS 189: 'Ordnance Survey Committee. Minute and Report Book'. 1 vol. 1849.

42 *The Geodesy of Britain* ... 1859 25.

43 J.H. Andrews, *A Paper Landscape. The Ordnance Survey in nineteenth-century Ireland* (Oxford, 1975) 144-79 for a full account.

44 For example, Col. Sir Henry James, *Notes on the Great Pyramid of Egypt and the cubits used in its design*

(Southampton, 1869); for background and other insights to this aspect of James's Directorship see Ian Mumford, '"Never on half pay" Lt Gen Sir Henry James, 1803-1877, Director General of the Ordnance Survey from 1854-1875.' (Unpublished: paper read to British Cartographic Society Symposium at Leicester, September 1978).

45 J.T. Coppock, 'The Origin and Development of Agricultural Statistics' in Robin H. Best and J.T. Coppock (eds), *The Changing Use of Land in Britain* (London, 1962), 29-51, for general context to the pioneer attempts.

46 National Library of Ireland, Larcom Papers. 7743.

47 Manuscript correspondence, 1853-55, in a copy of *Report from the Select Committee ... appointed to Inquire into the best mode of obtaining accurate Agricultural Statistics* (1855) in the Ordnance Survey Office, Dublin. Maxwell was at first cool to the idea, but by March 1854 was converted to the possibility (suggested to him by James) that maps might be used to record property and farm boundaries together with crops on a field by field basis.

48 *BPP* 1854-55 viii, 501: 'Report from the Select Committee of the House of Lords, appointed to Inquire into the best mode of obtaining accurate Agricultural Statistics from all Parts of the United Kingdom ...', 25.

49 *Ibid.*, 26; James's scheme was also systematically set out in Appendix E., 178-80, of the *Report*.

50 *BPP* 1856 [198], xiv, 361: 'Report from the Select Committee on Ordnance Survey of Scotland ...', 208.

51 *Loc. cit.*

52 *BPP* 1857-58 lvi, ... : 'Reports to the Board of Trade, on the Agricultural Statistics of Scotland for the Year 1857' 4.

53 A simplification in the specification for the large-scale surveys was also initiated in 1880. See below (40-45)

54 A number of revised Books of Reference, with areas crossed out or amended in the appropriate column, were re-published by lithography: see Books of Reference for Chester-le-Street, Co. Durham, British Library, Map Library. In other cases a list (by sheet numbers) of revised or additional parcels only was published: see Book of Reference for the parish of Alwinton, Co. Northumberland [*c.* 1884]; copy in Northumberland Record Office in oatmeal covers. During the 1880s the Ordnance Survey issued detailed instructions for the guidance of its staff involved with the revision of areas: Ordnance Survey Office, Dublin, Southampton Circulars, *passim*.

55 Ordnance Survey, *The overhaul of the 1:2500 county series maps* (Southampton, Ordnance Survey Professional Papers, New Series, no. 25, 1972), ...5.

56 *Loc. cit.*

57 For a potential method involving appropriate cartometric analysis see Janet Hooke and R.A. Perry. 'The Planimetric Accuracy of Tithe Maps' *The Cartographic Journal* 13 (1976) 177-183.

58 See Ordnance Survey Office, Dublin, Southampton Circulars, Book 1, circular on 'True Edge of Lake' (25.7.1907), and on 'Slopes and Scarps $\frac{1}{2500}$ Scale' (11.2.1880).

59 For example, M.L. Parry, 'The Mapping of Abandoned Farmland in Upland Britain: An Exploratory Survey in South-East Scotland' *The Geographical Journal* 142 (1976) 101-110; and M.L. Parry, 'The Abandonment of Upland Settlement in Southern Scotland', *Scottish Geographical Magazine* 92 (1976) 50-60, both of which articles use older editions of Ordnance Survey maps to identify former tillage areas now lying under rough pasture.

60 *The Old Series Ordnance Survey Maps of England and Wales Scale: 1 inch to 1 mile. A Reproduction of the 110 sheets of the Survey in Early State in 10 volumes Introduction* by J.B. Harley and Yolande O'Donoghue Volume 11 *Devon, Cornwall and West Somerset* (Lympne Castle, Kent, 1977), xxiv, Figure 8.

61 *BPP* 1824 viii, 15.

62 *'Colby's* Instructions for the Interior Survey of Ireland' in J.H. Andrews, *A Paper Landscape ...* 1975 315-17; see also Dr Andrews' comments, 78-9, on the inaccuracies of the early maps with respect to the limits of cultivation.

63 *BPP* 1846 [644] xv, 73 10.

64 See note 28, above.

65 *BPP* 1856 [198] xiv, 361: 'Report from the Select Committee on Ordnance Survey of Scotland ...', 121.

66 *Account of the Methods and Processes ...* 1875 42.

67 *Ibid.*, 44

68 Dr John Sheail has drawn my attention to some published 6-inch sheets across the Hampshire-Wiltshire border with the annotation 'Edge of Arable Land' and 'Edge of R Pasture' written along the county boundary line: see Wiltshire Sheet LX1SE / Hampshire XXXSE. This written information did not form part of the regular specification for the maps and was presumably added to assist in the recognition and mereing of the boundary on the ground.

69 Ordnance Survey. *Instructions to Field Examiners ...* 1905 11.

70 J.B. Harley and C.W. Phillips, *The Historian's Guide to Ordnance Survey Maps* (London, 1964) 19-24, for the broad pattern of revision of the 25-inch County Series.

71 *BPP* 1851 [519] x, 359: 'Report from the Select Committee on Ordnance Survey (Scotland) ...; 71.

72 J.T. Coppock, *op. cit.*, 47.

73 *An Act for the Commutation of Tithes in England and Wales,* 6 and 7, William IV, c. 71. Even then, while the printed report forms used by the Assistant Tithe Commissioners complied with the letter of the Act, the schedules of landowners' and titheowners' agreements in western England and Wales often put all rotation grasses, irrespective of the length of the ley, into arable. I owe this reference to Dr Roger Kain.

74 Ordnance Survey. *Instructions to Field Examiners* ... 1905 14. The Highland and Agricultural Society of Scotland, in collecting agricultural statistics for 1855, had adopted an equally vague position. They defined 'grass and hay under rotation' as all land 'which, in the ordinary rotation or course of cropping of the farm, will sooner or later be again broken up'. *BPP* 1856 lix: 'Copy of Report of the Highland and Agricultural Society of *Scotland* for 1855', 2.

75 J. Phillip Dodd, *Worcestershire Agriculture in the mid-nineteenth century. An analysis of the 1854 Returns for Worcestershire*. Worcestershire Historical Society Occasional Publications, Number 2 (Worcester, 1979), 9.

76 'Instructions for Computation and Examination of Areas...', 1907 19.

77 *Loc. cit.*

78 *Ibid.* 20; for an explanation of the process of 'stamping' see below, pp 45-46

79 *Loc. cit.*

80 J.B. Harley, *Ordnance Survey Maps: a descriptive manual* (Southampton, 1975), 66-7.

81 George A. Neale, *op. cit.*, 7.

82 The table excludes from consideration cultivated vegetation types even where, as with orchards and hop grounds, they formed prominent topographical features and were distinguished on the map by special symbols.

83 Ordnance Survey Office, Dublin, Southampton Circulars, Book 1, circular on 'Birch Trees, &c.' (8.12.1888).; the 'close', 'medium', 'open' distinction is specified in Ordnance Survey. *Instructions to Field Examiners* ... 1905 15.

84 Ordnance Survey. *Instructions to Field Examiners* ... 1905 15.

85 *Loc. cit.*

86 Ordnance Survey, *A Description of the Ordnance Survey Large-Scale Maps* (Southampton, Third Edition, 1926), Plate 1.

87 Ordnance Survey, *Instructions to Field Revisers 1/2500 scale* (London, 1932; Amended issue, 1935), 18A.

88 George A. Neale, *op. cit.*, 8. One intergretation could be that while underwood, brushwood and coppice were sometimes distinuished by the *field examiners*, they were *not published* as discrete areas on the 1:2500 maps, and thus tended to be used interchangeably to refer to the same generalised woodland type.

89 Ordnance Survey Office, Dublin, Southampton Circulars, Book 3, circular no. 403, 'Instructions as to Trees, Footpaths, and Small Detail, on the Revised Plans of the $\frac{1}{500}$, $\frac{1}{1056}$, and $\frac{1}{2500}$ Scales.' (7.7.1893).

90 Ordnance Survey Office, Dublin, Southampton Circulars, Book 3, circular on 'Same Characteristics for R.P. - R.H.P. - & Bog' (1.9.1897).

91 T. Pilkington White, *The Ordnance Survey of the United Kingdom* (Edinburgh and London, 1886), 96-7; Lieutenant-Colonel White, R.E., was described on the titlepage as 'Executive Officer of the Survey'.

92 *Loc. cit.*

93 *BPP* 1893-4 [c. 6895] lxxii, 305: 'Ordnance Survey. Report of the Departmental Committee Appointed by the Board of Agriculture to Inquire into the Present Condition of the Ordnance Survey ...', 255, appendix XIII.

94 *Loc. cit.*

95 *BPP* 1893-4 lxxii: 'Copy of Minute of the Board of Agriculture ... upon the ... Report ... to inquire into the Present Condition of the Ordnance Survey', 11.

96 This decision was still reflected in the *Instructions for the Revision and Drawing of the One-Inch (Fifth Edition) map* (Southampton, 1936), 13: 'If a coniferous wood has been cut down and not replanted the reviser will cancel, unless he is thoroughly satisfied, from enquiries made of responsible persons, such as Factors, Agents, or Afforestation Officers, that the area is to be replanted in the immediate future. Where a wood of deciduous trees or a mixed wood has been felled, and the deciduous undergrowth is springing, the reviser must use his judgement as to whether the area should be shown as wood, or scattered trees on R.P.' (rough pasture).

97 *Final Report of the Departmental Committee on the Ordnance Survey.* (London, HMSO, 1938), 25.

98 J.B. Harley and C.W. Phillips, *op. cit.*, 19-24.

99 Ordnance Survey Office, Dublin, Southampton Circulars, Book 1, circular on 'Vegetable or Kitchen Gardens and Allotment and Market Gardens' (1.7.1880).

100 Ordnance Survey, Dublin, Southampton Circulars, Book 2, circular No. 506 (1.4.1913).

101 *Account of the Methods and Processes ... 1875* 47; before 1870 the stamps were made of steel but thereafter they were faced with copper.

102 Ordnance Survey, Dublin, Southampton Circulars, Book 1, 'Specimen of Stamps used for the Revision Survey' (18.5.1905).

103 Ordnance Survey. *Instructions to Draftsmen & Plan Examiners* (Southampton, 1906), 5; copy in Ordnance Survey Library.

104 It should be stressed that the conclusions relate to the large-scale series. They do not necessarily apply to other series, especially the 1-inch, which tended to have their own rules for generalisation and presentation of vegetation detail and in any case, after the 1890s, were progressively revised *independently* of the large scales.

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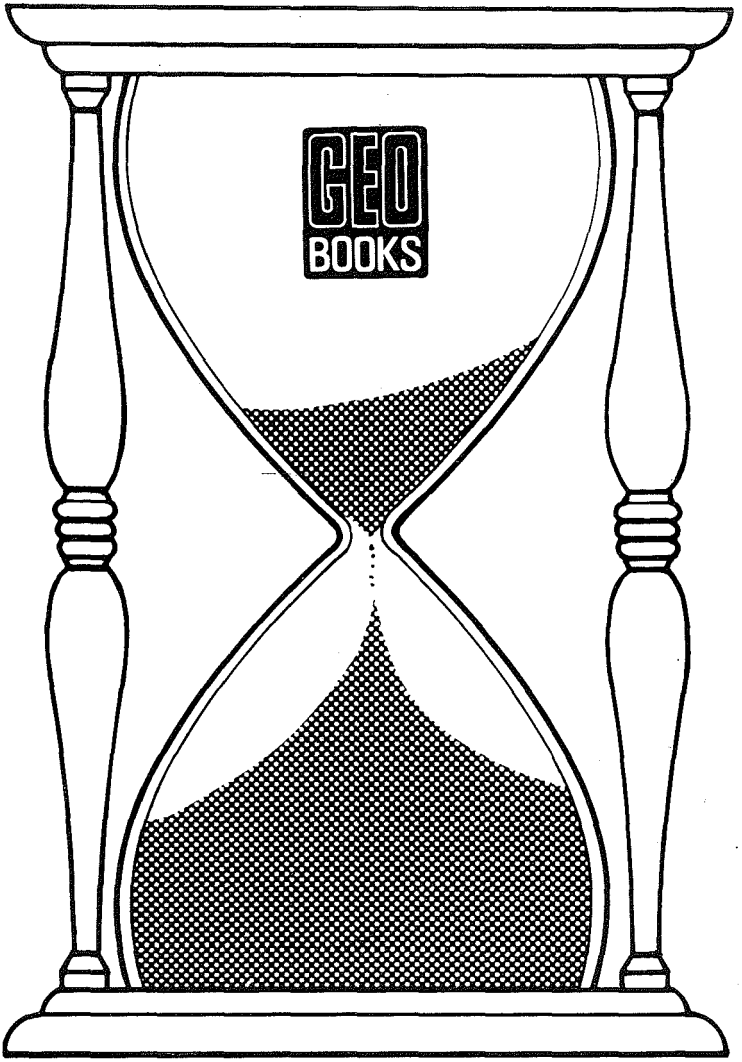

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