

Civil Engineering Heritage Scotland - Highlands and Islands



Royal
Commission on the
Ancient and
Historical
Monuments of
Scotland

R. Paxton
and J. Shipway

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Scotland – Highlands and Islands

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Foreword

The contribution of the civil engineer to the creation of the fabric of our civilisation has been immense. From land drainage to land forming; from river training to flood defences; from lighthouses to offshore oil rigs; from mill races to hydro schemes; from waggonways to high-speed rail links; from cart tracks to motorways; from fishing ports to container terminals; from standpipes and wells to piped water supply schemes for cities, these are the very building blocks of the quality of life: our life support systems.

Scottish civil engineers have been major players in the transformation of Britain from a rural agrarian community to one of the strongest economies in the world, and Scotland has offered challenges of geography and geology that civil engineers have been inspired to overcome, bridging the great river estuaries; building dams in inhospitable mountainous terrain; driving roads, canals and railways through fearsome ground conditions, often in extreme weather. This is truly a story of transformation that has maintained Scotland's place as a vibrant and successful economic unit within Europe, despite being at its outer edge.

The record of this remarkable achievement is all around us and this volume is a gazetteer and guidebook to inform anyone with an interest in civilisation.

It is a privilege for me to write this foreword for many reasons: as the 141st President of this Institution in direct line from our first President, another Scot, the great Thomas Telford; as the 23rd President to be born in Scotland (Scots have a very creditable share of the highest honour bestowed on civil engineers); as a Commissioner on the Royal Commission on the Ancient and Historical Monuments of Scotland (many of the illustrations coming from this fine organisation); as a friend and occasional collaborator with the editors; and as an enthusiast and supporter of engineering history.

Understanding the past is the key to managing the future. Without this retentiveness, as George Santayana has said, 'those who cannot remember the past are condemned to repeat it'. This book is essential reading, not just for civil engineers, but for all historians, social commentators, industrial archaeologists, economists, politicians and those with a general interest in the history and development of Scotland. It describes the visionary projects

that created the opportunities for trade and wealth creation; it records Scotland's achievements as a civilisation – for what is this if not the enduring memorials of what we build; it celebrates the charismatic and persuasive men of genius that could see beyond the status quo to a new paradigm – the civil engineers who laid down the foundations of the civilised world we enjoy today.

Gordon Masterton

President 2005–06

Institution of Civil Engineers

Preface

This book completes the Civil Engineering Heritage series for the United Kingdom and Republic of Ireland. It is essentially a brief inventory or guide to our selection of historical engineering works executed in Scotland over some 3500 years from the Callanish Standing Stones to such examples as North Sea oil rigs, the pre-stressed concrete lighthouse at Ve Skerries and Dounreay experimental nuclear fast reactor. The book contains much that is new based on site visits and historical research.

As a general rule for inclusion in this book series historical engineering works (HEWs) have to be at least 30 years old, but we have made occasional exceptions. Most works date from the start of modern civil engineering at the beginning of the Industrial Revolution. As will be seen, John Smeaton, who is believed to have been the first person to begin describing himself as a 'Civil Engineer' from ca.1754, often dubbed the 'father of civil engineering', who made a significant contribution to the infrastructure of northern Scotland including bridges at Banff and Evanton and numerous harbours.

Most entries bear a HEW number. This relates to records of the work made, (mostly yet to be written up), by members or helpers of the Panel for Historical Engineering Works (PHEW) of the Institution of Civil Engineers and curated at its library at Westminster. To these, where they exist, and the 'Further reading' references given, the reader is referred for more information.

The entries have been arranged geographically in five chapters, progressing more or less northwards from Argyll in the west, the northern edge of Perthshire, and the Tay at Dundee, in a sequence which is convenient for visiting. Coverage starts in Chapter 1 with Dunoon Pier and concludes with the Murchison Oil Production Platform more than 400 miles north. The areas covered, shown on the chapter maps, largely follow the Scottish regional boundaries set up under the 1973 Local Government Act, although not necessarily under the names designated at that time. Coverage aggregates loosely to the area of the Highlands and Islands, except for the inclusion of Angus and Aberdeenshire, for which there is a precedent in John Hume's two-volume *The Industrial Archaeology of Scotland*, 1976-77, and the exclusion of the Perthshire valleys of the Tay and its tributaries

which have been included in the companion book on the Lowlands and Borders.

For each work we have given its location, scale, the names of its engineer and contractor where known and our comment. To help illustrate the written word we have included more than 200 images and have occasionally leavened entries with a little digressive seasoning and a line or two of verse! Here and there we have given examples of earlier work at the same site where these have been significant in terms of their engineers or for development of genre, for example the four generations of bridge types adopted by leading engineers for crossing the tidal South Esk at Montrose [2-12].

Every effort has been made to trace the origin of the illustrations but, given the wide variety of sources, it is possible that some information and ascribed acknowledgements are incorrect or incomplete. We should be pleased therefore to hear from anyone with information which either corrects or enhances that provided. Copyright acknowledgements appear under each image in our cases, our respective names with the initials RP or JS. A 'Further reading' reference number indicates that copyright is believed to be with the reference author. Unless indicated otherwise the illustrations have been scanned from images in Roland Paxton's possession.

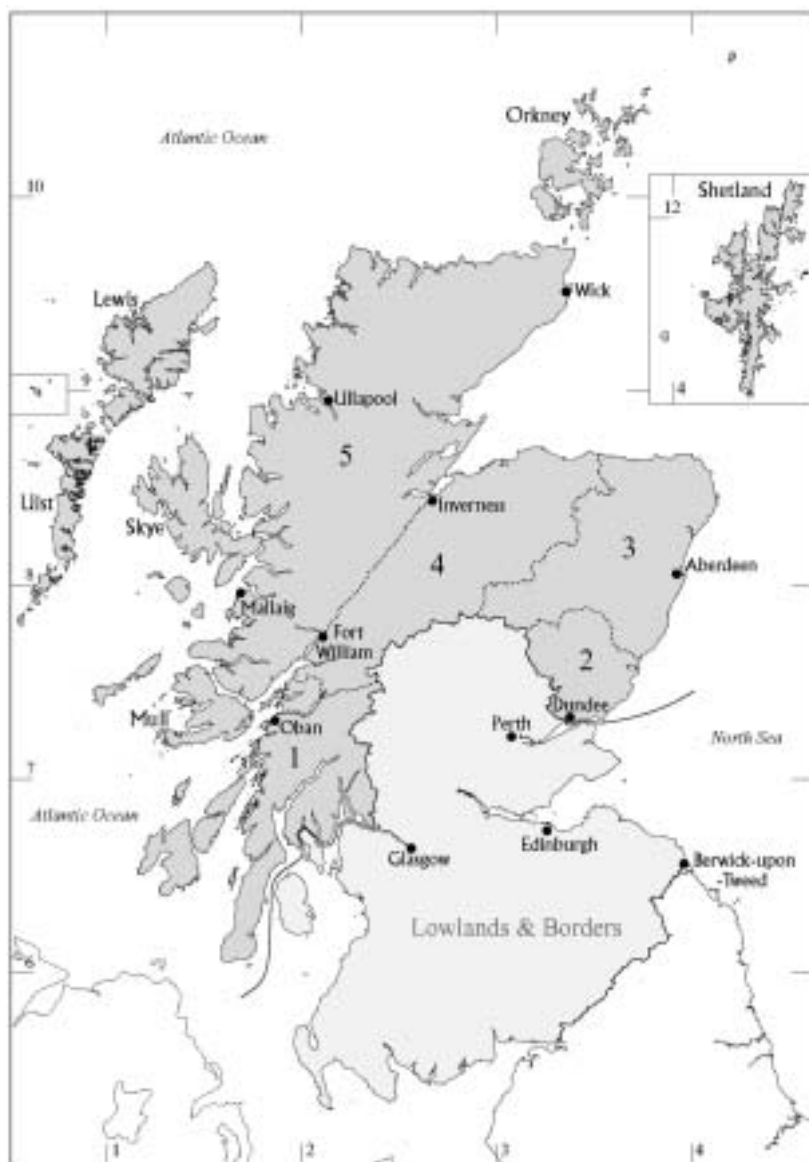
We acknowledge a significant input into this book from PHEW Scottish group members and helpers past and present, particularly from Tom Day for Aberdeenshire and its approaches; the ICE Library; the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS) via Miles Oglethorpe for supplying the maps and numerous high quality images and Heather Stoddart the originator of the maps; the School of the Built Environment at Heriot-Watt University for its research and manuscript preparation facilities and Thomas Telford Publishing via Ben Greshon and Stephen Nixey. We thank them and the many other persons and organisations listed in the acknowledgements, for their enthusiastic and valuable support.

In conclusion, we hope that the book will serve not only for reference but also, as many of the works are in picturesque locations, as a recreational guide, and that it will convey an idea of the invaluable contribution of civil engineering to the transport, water and power infrastructure of our civilisation which is so essential to Scotland's well-being and yet so often taken for granted!

Roland Paxton
Jim Shipway

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1. Argyll
2. Angus
3. Aberdeenshire and Moray East
4. Highlands East and Moray West
5. Highlands West and North, Hebrides, Orkney Islands, Shetland Islands

Contents

Foreword	iii
Preface	v
Acknowledgements	vii
Metric Equivalents	xi
1. Argyll	1
2. Angus	37
3. Aberdeenshire and Moray East	67
4. Highlands East and Moray West	123
5. Highlands West and North, Hebrides, Orkney Islands, Shetland Islands	183
Note on Authors	257
Name Index	259
Subject Index	263

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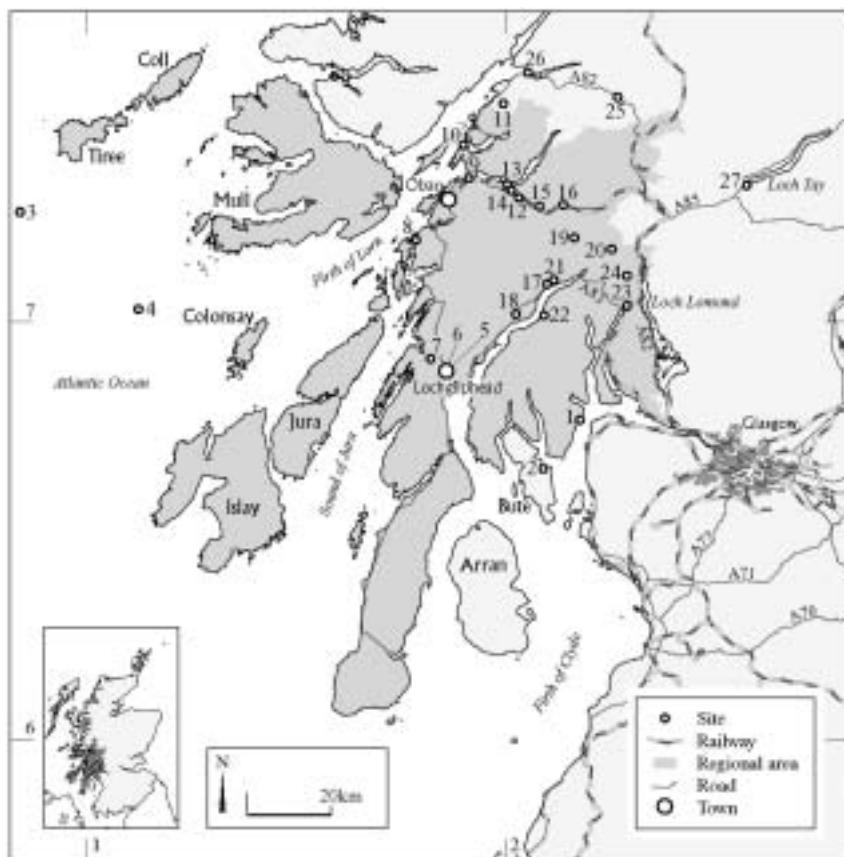
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Metric equivalents

Imperial measurements have generally been adopted to give the dimensions of the works described, as this system was used in the design of the great majority of them. Where modern structures have been designed to the metric system, these units have been used in the text.

The following are the metric equivalents of the Imperial units used.

Length	1 inch = 25.4 millimetres 1 foot = 0.3048 metre 1 yard = 0.9144 metre 1 mile = 1.609 kilometres
Area	1 square inch = 645.2 square millimetres 1 square foot = 0.0929 square metre 1 acre = 0.4047 hectare 1 square mile = 259 hectares
Volume	1 gallon = 4.546 litres 1 million gallons = 4546 cubic metres 1 cubic yard = 0.7646 cubic metre
Mass	1 pound = 0.4536 kilogram 1 Imperial ton = 1.016 tonnes
Power	1 horsepower (hp) = 0.7457 kilowatt
Pressure	1 pound force per square inch = 0.06895 bar



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Argyll

- | | |
|--------------------------------------|---------------------------------------|
| 1. Dunoon Pier | 15. Cruachan Hydro-Electric Scheme |
| 2. Rothesay Pier, Bute | 16. Awe or Orchy Viaduct (Railway) |
| 3. Skerryvore Lighthouse | 17. Aray Bridge, Inveraray |
| 4. Dhu Heartach Lighthouse | 18. Brenchoillie Bridge, Furnace |
| 5. Water Waster, Lochgilphead | 19. Glen Shira Dam |
| 6. Oakfield Bridge, Lochgilphead | 20. Allt-na-Lairige Dam |
| 7. Dunardry Bridge | 21. Garron Bridge |
| 8. Clachan Bridge, Seil | 22. Strachur Estate Bridge (Private) |
| 9. Connel Ferry Bridge | 23. Arrochar MoD Jetty (Private) |
| 10. Isle of Eriska Bridge | 24. Loch Sloy Hydro-Electric Scheme |
| 11. Telford Churches and Manses | 25. Etive Bridge and New Glencoe Road |
| 12. Bridge of Awe, Taynuilt | 26. Ballachulish Bridge |
| 13. Kelly's Pier, Bonawe, Loch Etive | 27. Killin Viaduct |
| 14. Bonawe Iron Furnace | |