

# THE OLD BRIDGES OF GREAT BRITAIN AND IRELAND

## **Synopsis**

This is intended to be essentially the final version of a compendium of the oldest masonry bridges in the British Isles, i.e., those incorporating substantial elements built before 1700, though there may be some minor revisions and additions in the future. The document centres on information sheets which comprise photographs together with descriptive and historical notes pulled together from observations and available reference sources; one sheet for each of the bridges I have visited. The introduction which follows gives some background, and explains the rules which have guided the formation of lists of the so-called oldest bridges, which have become targets for visits and assessments, and explains the ordering of the collected data. The process has so far resulted in the identification of 921 target bridges, along with 29 thought to fit the criteria, but inaccessible on private land. Of the 921, 53 have been discarded after actual or attempted visits, most often because they have been demolished and/or replaced, but on a few occasions because contrary to expectation, access was not possible. This means that there remain 868 target bridges, of which 836 (96%) have been visited and assessed; an information sheet for each of them can be reached from Page 17 of this document by clicking on the appropriate link. Tabulated data collected for all 868 target bridges can be reached from the same place. Lists of bridges not yet visited are in the Appendix.

The information sheets have been grouped within the county, region or province, in which the bridges concerned are found, reached from links on Page 17 of this, the main document. Similarly, the tabulations of data including dimensions, characteristics and other information, for all the target bridges have been pulled together into larger groupings such as 'Scotland' and 'Northern England' and are also in nested documents accessible from Page 17 of this document. These data are discussed briefly, in the context of their locality, in the appropriate nested documents, and then are aggregated to allow a broader consideration of the national picture in the main document. Other items are largely as in previous postings, with the introduction including a brief discussion of the engineering issues faced by builders of the bridges described in the information sheets; as an aid to understanding these issues, I include a tabulation of river lengths and outflows (taken from the Natural Environment Research Council web site, which I reference). There is a Glossary of terms used in the information sheets. Finally, I provide a reference list, including books, learned papers, and web sites, which I have found useful or interesting.

I am aware that there are still gaps. Not all the bridges which have been identified as targets, have been visited and there are some photographs which disappoint. Data are missing for a considerable number of bridges, and values are more estimates than accurate measurements in some cases. Nonetheless, The conclusions, drawn from what is uniquely comprehensive information, are thought to be robust; obviously, more and better data apart from being intrinsically desirable, might allow other ideas to be tested. So there may be further updates to the document, but future changes will be addendums rather than major revisions.

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## 1. Introduction and General Remarks

The compendium presented in this document had its origins in some years of casual observation around the country, which had become a bit more intensive after retirement yielded greater time and opportunities to search out old bridges. I brought no professional expertise to the pursuit as I am not an architect, civil engineer, or surveyor, but a physicist who spent a working life managing industrial research and development, so the standpoint is that of a reasonably well informed layman. About four years ago, I decided to transform what had remained an intermittent hobby into a project, which had the objective of viewing and recording the surviving old bridges in the country as they are now, and understanding the changes to them which had occurred since they had been built. The end product was to be a document posted on my website, and I anticipated spending a fair amount of time on the project for two years, in fact a reflection of a gross underestimate of what I had taken on. My starting point was an exploration of the information on old bridges in the 'literature', followed by the setting of some limits on what I actually meant by old bridges; these actions were aimed towards allowing me to develop lists of 'target bridges'. Thereafter it was a case of developing itineraries which allowed them to be visited in a fashion as economical as possible in time and distances covered, knowing that I also had to find sensible ways of presenting the information I had assembled.

No-one discussing old English and Welsh bridges can go very far without mentioning Edwyn Jervoise who over a decade around 1930 produced four volumes which identified old bridges, described them, and searched out documentary evidence of their antiquity and vicissitudes over the years; it was the acquisition of two of his books, and the realisation that no-one had attempted to repeat his survey in almost a century, which prompted me to systematise my own efforts. Though his focus was narrower than that of the great Tudor traveller, John Leland, he can be seen as creating a modern version of the famous 'Itineraries', at least with regard to bridges and rivers. He included material dealing with bridges which no longer stand, but occupied important sites. Rightly or wrongly, and it is unlikely to have been possible anyway, I have felt no need to consult most of Jervoise's sources directly because my observations have convinced me of his trustworthiness, competence, and thoroughness, with his mistakes few and far between. A volume of slightly different format covering Cornwall was produced in the same period by different authors, Henderson and Coates who maintained similar standards, before Jervoise completed the picture for England and Wales by producing a volume dealing with the old bridges in Devon, based on work carried out by the aforementioned Henderson, who unfortunately had died before he could publish his results.

Jervoise was commissioned to produce his books for a purpose, which was to identify a national cultural resource, and to encourage those charged with the preservation of historical artefacts to appreciate the importance of old bridges and act accordingly. In a sense, the timing was opportune, because the upsurge in motorised road transport of the previous few decades, though vastly less than was to come, had already resulted in characterful old bridges being seen only as narrow bottlenecks which would have to be drastically modified or replaced. Unfortunately, for some outstanding examples, Jervoise's survey had come more than a hundred years too late. The great age of turnpike road development in the late 18<sup>th</sup> and early 19<sup>th</sup> century had encompassed demolishing or reconstructing some fine medieval bridges, on major routes between towns and cities with even the great civil engineering pioneer, Thomas Telford, carrying some responsibility. Concurrently, in towns and cities across the land, rocketing populations and corresponding increases in urban

horse-drawn traffic meant that the barriers to local communication imposed by other old bridges had to be circumvented, and often this spelt the end for the bridges concerned. Thereafter, Victorian attitudes to old bridges tended to replicate their ruthless modifications of churches to contemporary needs and tastes.

Fortunately, matters have proceeded differently in the modern era, and preservation of the 'built heritage' has moved up the agenda, not least because of the seminal Parliamentary Act of 1913 which realised earlier pleas for protection of 'ancient monuments', a responsibility taken on by Charles Peers and his successors, the Inspectors of Ancient Monuments. If Jervoise had lived past 1955 and had been able to repeat his survey in recent times, I think he would have been pleasantly surprised. Relatively few of the bridges which he listed have collapsed, been demolished or even been greatly altered during the eighty plus years since he was actively surveying them. Many have been bypassed, and now carry only pedestrians or light local traffic. Either by design or serendipity, a good proportion of those which have been modified in a major way, and fortunately this applies as much before as after 1930, have been left relatively untouched on one of the upstream and downstream faces, so that the main features of the original bridge can still be viewed and appreciated (It is usually easier and cheaper to extend at one face, since only one new structure is required, effectively an adjacent parallel bridge, though approaches have to be realigned.) There are also cases where a main river bridge has been dismantled or totally rebuilt, but flood arches remain, and they, especially when viewed alongside prints or even old photographs, can allow the original configuration to be divined, though it would be wrong to pretend that such relics usually answer all pertinent questions about the original bridge. Often, a bridge viewed from the level of the carriageway appears to be a completely modern reconstruction, but it is possible to descend to the river bank and look underneath to see the original arches and soffits, perhaps with ribs and multiple arch rings, but now enclosed and extended by parallel arches or cantilevered beams. Indeed, I would go so far as to suggest that the different methods of modification sometimes furnish an added level of interest, though it is unarguable that there are also too many examples of unsympathetic reconstructions which have removed any real link with times past, and frankly ruined a historic artefact. Unfortunately, this is very often true of the parapets, practically always rebuilt in modern times, sometimes decoratively, but not necessarily in the style of the rest of the bridge, sometimes functionally under the time pressure imposed by safety considerations, after a heavy vehicle has ploughed into them, and sometimes it seems, according to an architect's whim of little obvious merit. Rightly or wrongly, my response has been to devote little space to this aspect of most of the bridges described, in spite of the temptation to provide a list of the 10 worst examples, if nothing more.

I am not sure if Jervoise would have seen his books as 'popular works', though they have in my view been almost indispensable to the enthusiast who wants to find and view old bridges, and learn a little about their history and most notable characteristics. Quite simply, there has been nothing to approach them as an accessible, nationwide survey, though they do have their limitations such as the uneven quality of the photographs and inconsistencies in the amounts of information supplied about different bridges. They have been out of print for years, but it is still easy to obtain second-hand copies at reasonable prices. There are a growing number of relatively recent publications which consider bridges from different standpoints; by implication, there has been a growth of interest and especially, a realisation by some, though by no means all, local bodies responsible for tourism that an impressive old bridge can be a draw. Some books deal mainly

with the aesthetic pleasures to be gained from viewing bridges in their settings, and depend heavily on the quality of their photographs, or other depictions like old engravings and paintings. Others focus on the history and anecdotes associated with bridges, with 'the devil' sometimes a prominent actor. Entertaining as the latter may be, they can also frustrate when it transpires that a well-told tale refers to a bridge which was knocked down a few centuries ago. At the other extreme are of course civil and mechanical engineering manuals, standards and text-books which deal with bridges as working structures. Some books attempt to bridge the gap in a manner of speaking, by seeking to explain the principles of design in a basic way. It is likely that the masons and other craftsmen who erected ancient bridges were little better equipped with theoretical engineering knowledge than readers who absorb and comprehend the information so presented, though the former were usually blessed with the wisdom of experienced craftsmen; certainly the medieval masons and even the aforementioned Telford would be confounded by the structural models and finite element solving techniques which underpin the designs of today. Usually, if not always, such analyses guarantee stability and longevity, while at the same time allowing the bridge members to be matched more closely to the duty which will be placed on them, so yielding economic and sometimes aesthetic benefits. For example, many ancient masonry bridges are supported on piers which we would now regard as un-necessarily massive, and apart from extra costs of construction and diminished elegance, (always a matter of opinion), the resulting greater than necessary obstruction made flooding much more likely, and rendered the waterway less navigable.

In the reference pages there are brief comments on many of the publications and web sites I have found helpful, but several in addition to those produced by Jervoise, deserve special mention. First, I will highlight two fairly recent volumes one authored by Harrison which addresses general questions about medieval bridges, such as those concerning their locations, fabric, and designs, in an illuminating fashion. Harrison provides an overview absent from the writings of Jervoise who described individual bridges as he found them, rather than devoting much space to wider considerations. The other recent book worthy of special notice is an Encyclopaedia of British Bridges, authored by McFetrich, which contains over 1500 concise descriptive entries and illustrations of bridges of all ages and types. It ranges much wider in that regard than I do, though there is considerable overlap, but my focus on a narrower population means that my compendium is more exhaustive for its subject matter, and I have the luxury of far more space. Jervoise and Harrison confined their attentions to England and Wales, and there are no comparable volumes for Scotland, but there is a useful web-site, named appropriately enough 'About Scotland's Oldest Bridges' which helps to fill the gap. It lists those Scottish bridges which appear in a survey carried out by Roy in the 18<sup>th</sup> century, and on older maps produced by Pont and Blaeu, (the earliest available sources). There are brief descriptions, photographs, and links to other relevant websites; exact locations on a map are also given. Anyone interested in Scottish bridges should also be aware of a series of papers produced by H.R.G Inglis, best known as a map-maker, almost exactly a century ago, because he, even more than Jervoise, should be viewed as the pioneer of modern studies of old bridges. Dealing with a much smaller population of bridges, though he did not confine himself to Scotland, but made comparisons with bridges in England and the rest of Western Europe, he set himself to understand the requirements and constraints in the minds of medieval bridge-builders, and the resulting impacts on designs. It can be argued that some of his conclusions go further than his evidence allows, but that is a matter of opinion, and it is disappointing that his work goes unacknowledged by many of those who have written on the subject in the last few decades.

For Scotland, and more for England and Wales, there are books which deal with old bridges in different regions and counties; like all books on the subject, they are of variable quality and I reference only those which enhanced my knowledge or appreciation, but the best are excellent. Also, there are a few web sites which ambitiously itemise all the bridges, regardless of age, in single counties, and provide photographs and information culled from many sources, including the Listed Buildings and Pastscape web sites, perhaps the most indispensable references of all. (The problems in using these latter websites arise from the quantity of entries amongst which those dealing with bridges are a very small proportion, and the sometimes unpredictable even quirkily-chosen bridge names which register with their search engines.) British History online is another valuable source of information and photographs, though again location of relevant items in the vast repository can be difficult. I should also mention Hinchcliffe's excellent compendium of packhorse bridges, with the slight reservation that his selection has been weighted very heavily towards the North of England, where I think he was based. Unfortunately he ventured, (in print at least), into neither Scotland, nor Wales. In view of my inclusion in this update of a list of target bridges in Ireland, it is appropriate to end with O'Keeffe and Simington's book on Irish Stone Bridges, recently updated in a 2<sup>nd</sup> edition; this is simply, by some margin, the best book on bridges that I have encountered.

I should explain my apparent neglect of another source of information about old bridges which I have mentioned only in passing as used by others, namely old maps, many of which have been digitised in recent years and are thus easily accessed. Aside from the fact that some simply show roads continuing across rivers rather than making the existence of bridges explicit, they provide only a snapshot at a given date, and have nothing to say about whether any specific bridge was present at a location, a decade earlier or later, far less about whether a marked bridge still stands today in some form. The famous Gough map of England, (rightly highlighted by Harrison) was produced in the 14<sup>th</sup> century, but had no successor until those of Ogilby in the 17<sup>th</sup> century, so the continuing existence of a route rather than a bridge seems to be the most that can be deduced from maps alone. As an example, I quote the Scottish city of Perth where the River Tay was bridged in medieval times, but the bridges were washed away and small ferries had to suffice until well past my cut-off point of 1700. Of course, the information on maps can contribute to a timeline implying the survival of a bridge, but it has been my experience that reference to them has not helped me a great deal in understanding bridges with confusing or hidden histories.

Having discussed the sources from which I have compiled lists of target bridges, I must now deal with the evolution of the criteria which constrained my selection process. I will start by making explicit the fact that I am dealing mostly though by no means exclusively with bridges built to allow passage over flowing water, i.e., rivers and streams, even if occasionally changes in the flow path have left a bridge 'high and dry'. Jervoise included some bridges built in the 19<sup>th</sup> century as 'ancient' (hardly a century old at the time), dealt, sometimes at length, with bridges long vanished, and though I have not done a full count, must have mentioned upwards of 2000, and there are at least a couple of hundreds more in the Devon and Cornwall companion books. Knowing that I was intending to deal with Scottish, and possibly Irish bridges as well, I would have been contemplating a task of visiting 2500 bridges if I had decided to follow his example. I began with the idea of dealing only with medieval bridges, which would strictly have meant a cut-off date close to the end of the 15<sup>th</sup> century. I soon realised that this was unhistorical and unworkable, because there was continuity in bridge

design into the Tudor age (in England), even if preferred arch shapes changed a bit, and Leland's survey, carried out during the first half of the 16<sup>th</sup> century acknowledged no break-point at 1500, so included some Tudor bridges, and his brief descriptions served as important evidence for the existence of many of the oldest bridges in something like their present forms. Similar, if weaker, considerations led me to vacillate as regards the 17<sup>th</sup> century as well. However, the clinching arguments for making 1700 my break-point came from the other direction, working back from the Georgian age during which great divergences from the past as regards bridge design and construction methods and materials occurred. It is also true to say that bridges were built in the 18<sup>th</sup> century and later under the supervision of professionals, be they engineers, or architects, whereas before then with occasional exceptions like a couple linked loosely to Inigo Jones, projects were in the hands of artisans like masons, and amateurs like squires and churchmen. So my selection is probably best described as comprising 'pre-modern' or 'pre-industrial age' masonry bridges, though the composite 'medieval and sub-medieval' would also be appropriate if clumsy, with the latter seen as including the 17<sup>th</sup> century; however, terms like old or oldest remain true enough if more vague, and I have most often stuck with them. I have not been absolutely rigid in observing the 1700 cut-off especially as regards Scottish bridges because as will become clear, developments were later there, and I have shown a small amount of flexibility in other regards as well, which I shall come to next. Nonetheless, my decisions caused me to omit such as the Turnpike road bridges, Telford's great road-building projects, and the Wade and Caulfield bridges in the Scottish Highlands, together with all canal and railway bridges. I thought then that I had reduced my programme of visits to easily manageable proportions, with an over-optimistic estimate that there would only be a few hundred qualifying bridges.

However, other decisions had a contrary effect. I had started with the intention of focusing on substantial river bridges, as opposed to smaller packhorse and foot bridges, but this was a stand-point I quickly found to be untenable. Any selection criteria would have been arbitrary, because there is a continuum of key dimensions such as arch-spans, and widths. There would also have been a problem in dealing with substantial bridges which had originated in much smaller guise. So, smaller bridges of all types appear, including clapper bridges which in modified and strengthened form have also graduated in some cases from footbridges to road bridges. Unfortunately my date-based criterion is far harder to apply for bridges which have remained small, than for larger river bridges, for two reasons at least. One is the scarcity of documentary evidence for such relatively inexpensive bridges, many of which were built on the initiative of a single person who had no reason to communicate much on the matter. The second is the inherent simplicity of many of them which means that they often have few if any distinctive attributes related to their ages, and especially lack the mainly decorative features which can aid dating. A majority of surviving packhorse bridges are thought to have been built between 1650 and 1800, but differences in design and fabric over that period are small and haphazard, and do not follow a time-line. My solution to this problem, which was arguably even greater for clapper bridges, is to include those which hint at predating 1700 rather than to insist on clear pointers in design or documentary evidence which I required for inclusion of larger river bridges. Nonetheless, I suspect that in areas like the Lake District (Cumbria) for packhorse bridges, and especially Dartmoor (Devon) for clapper bridges, I may well have failed to include many bridges which actually satisfy my age criterion.

The project was well advanced before I gave serious thought to another category of old bridge, namely those crossing moats, wet or dry, associated with castles, mansions, farmhouses, religious establishments and other buildings. They are of interest because some at least conform to the structural and stylistic patterns of their times, and provide a few of the finer examples. However accessibility is more of an issue with them than the other bridges considered here, because a significant proportion are on private property and cannot normally be viewed. I have decided to furnish all such bridges with an identifying number, but to omit from the compendium listings the bridges which cannot be accessed, though they are listed in the Appendix. I have included the letter 'M', in the identifying number for all such moat bridges. I will return to this topic briefly at the end of the introduction. So far, it can be seen that most decisions as to whether or not to include a class of bridges went in the direction of increasing the number of target bridges, but at this point I drew a line by excluding the bridges on medieval town walls where walkways crossed arterial roads at gateways; there are fine examples in towns like Caernarvon, but they are not for this compendium.

It is unarguable that almost every bridge surviving from before 1700 has been refurbished, or reconstructed to some extent since then, and a few are almost unrecognisable as what they once were. In this regard, my criteria for inclusion are that any bridge, even if much modified, must retain a sufficiency of as-built features to permit an observer to form a mind picture of its original appearance, or be the subject of documents which support its pre-1700 existence. When in doubt, I have settled for inclusion, while making my reservations clear. In this category, are a few bridges of documented medieval origins, yet without any visible fabric from that period, though the arch forms and/or pier configurations clearly support the documentary evidence. So, by searching the sources, and applying the criteria, as described, I built up the lists of target bridges. The lists are still being refined; a few bridges have been added in the past year, while others have been removed because visits have shown either that they no longer exist, or were totally rebuilt after 1700. As of now 868 bridges appear in those lists after 53, initially present have been removed on the grounds indicated.

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With decisions taken on how to select bridges to go into target lists, it remained to decide how to organise and order them so as to develop itineraries for visits, and logical ways of presenting the information obtained. My first idea of grouping the bridges in clusters found its way into earlier versions of the compendium. Each cluster, centred on a town or city, included bridges in fairly close proximity regardless of whether they crossed the same or connected water courses, or were found in the same formal geographical divisions; their adoption was a response to difficulties in using Jervoise's books to develop itineraries. He ordered the bridges he described according to the rivers they crossed, which although logical, means that bridges fifty miles or more apart can be on the same page, while bridges relatively close to each other are to be found chapters or even books apart. For so long as the focus was on visiting bridges and collecting information, thinking of the bridges as grouped in clusters, and using sketch maps to relate their locations, one to others nearby, worked well enough, and the same mode of ordering was at first used to present information. However, I decided some time ago that the clusters had outlived their usefulness, and that I should change to a more conventional ordering of my data. Accordingly, each bridge, is now listed in either its region in Scotland and Wales, or its county in England, though I have taken a predominantly historical view of the geographical entities. These regions or counties are then grouped to provide 28 points of access to nested sets of



information sheets. The aggregation of these groups of regions and counties into 7 logical divisions covering the whole country provides the framework for tabulations of bridge parameters and characteristics, which also now appear in nested documents.

Each of the 28 sets of information sheets commences with an alphabetically ordered list of the bridges in its county/region with 'moat bridges' separated out, in which each bridge is given a unique identifier. This list also provides the OS Grid location of each bridge, and an estimate of build date of greater or lesser accuracy. Red typescript is used to indicate that a bridge has not been visited. The information sheets for the individual bridges then follow, also in alphabetical order. Photographs play important roles in these sheets; obviously they allow the general form of the bridge to be shown in its setting, but views of the underside or soffits of masonry arch bridges often yield the most important clues to their ages and historical development. I present many more of these than have appeared elsewhere, even although shining sufficient light into these shadowy regions, often compromises the aesthetics of a photograph by saturating other parts of the structure. In those cases, there will invariably be another photograph which presents a better picture of the bridge as a whole. Wherever possible the text provides the dimensions, such as spans, and carriageway widths, before and after widening exercises; many of the measurements are my own with tape and range-finder, while many come from the referenced sources which I trust. It is also possible by various means to derive estimates of spans and widths from satellite views, as on Google Earth; for example, if a car happened to be on a bridge when their images were obtained, its known dimensions can allow quite accurate scaling of width and arch span.

Other issues treated are accessibility and visibility. There have of course been great changes since Jervoise gathered his information 80 odd years ago, as roads have become busier, trees have grown, and buildings have been erected. He may have formally requested and been granted access to private property, as his task was semi-official, whereas I have deliberately stuck to public paths and byways, except on a few occasions when a casual enquiry or invitation has allowed a better view to be obtained; my aim has been to act only as an interested member of the public who does not hold much with trespass. It has sometimes been very difficult to find somewhere near-at-hand to leave a car, or to access the river bank to view either or both faces, and the underside, of a bridge, or to see through and around bushes and trees. It is perhaps stating the obvious to point out that bridges may be best seen during the winter months when obscuration by foliage is at a minimum, but unfortunately immediate access is likely to be poor then with flooded paths and slippery river banks. Inclement weather and bad road conditions might be another issue; perhaps the best compromise is to observe bridges in March and April.

The greatest frustration, other than failing to find a bridge altogether, which is a far from unknown experience, has been to be able to walk across a bridge but to be unable to get any sort of view of its structure, other than by looking over the parapets. This occurs sometimes because a river is running in a gorge, but more often because the banks at each face of the bridge are private property. In such cases, I have been reduced to trawling the internet in the hope of finding a decent representation of the bridge concerned, sometimes successfully thanks to the activities of canoeists, fishermen, and others, or even because an adjacent property is for sale, and a bridge is portrayed in the documentation. In this context, I acknowledge here an omission in that I have not referenced formally all the photographs I have used, though I have usually named the photographer. I derive no pecuniary advantage from the website, nor do I have any intention of doing so in the

future, so anyone concerned will hopefully be assured that their efforts have not been exploited unreasonably, but used only to provide an accessible resource.

I mention in the relevant information sheets any specific difficulties I have encountered in gathering information in order to spare others from experiencing my exasperation and wasted time. (In this context, it is unfortunate that responsible bodies, even those acting positively by providing access, direction signs and information boards, rarely seem able to organise the cutting back of scrubby undergrowth which all too often obstructs views of bridges.) I give details of roads carried and streams crossed in individual bridge information sheets, and as already mentioned, I have provided 8-symbol OS Locations for every bridge, including those I have not yet visited. In this context, I would highly recommend the website [Grid Reference Finder](#) which gives instant access to OS and Google Maps, and Post Codes, if the OS Location is entered. If I had discovered this invaluable tool earlier, some of my failures to find bridges would certainly have been avoided, as would much time-consuming circling of my targets. Other useful tools are the relevant OS map(s), and car satellite navigation systems, though even with all such aids, old bridges can still prove elusive, as evidenced by the fact that I fairly recently failed to find a way of getting anywhere near a bridge alleged to be on a public right-of-way. Sadly, it is also true that even when a route to a bridge is clear enough on paper or computer screen, failure to maintain a right of way as regards such things as stiles, can prevent access, and I have also had to make more than one attempt to reach a couple of bridges, because a right of way went through a field contained cattle nursing calves.

The information sheets are the essential core of the compendium, but as mentioned I have extracted data from them to create tabulations covering 7 larger divisions, in which I have grouped the county/region sub divisions. For each of the 7, I have provided 3 tables, one which locates every bridge, on the OS grid and by river and catchment area, and also itemises key dimensions such as width before any modern extension, and span of the largest arch; a second table lists additional features, like fabric, and where relevant, arch ring number and design. The best estimate of build-date for each bridge is also provided in these tables, and a third table summarises the dating information, and gives the state of play as regards the numbers of bridges visited to-date. To my knowledge, this amount of information has never been made easily accessible before, though I would acknowledge some debt owed for the format to Inglis, mentioned earlier, and to O'Keefe and Simington's book on Irish Stone Bridges. There are, of course, gaps in the data, which I continue to try to fill. The purpose of making this data, acquired from many of the acknowledged sources, as well as my own observations, more easily accessible, is to allow comparisons to be made, and trends to be identified both within the 7 geographical divisions and between them. Along with the tables, are given the list of those target bridges visited but excluded afterwards, and the conclusions drawn specific to the bridges in the region concerned.

However, I have in this version of the document made two changes, one each to the scope and mode of presentation of the tabulated data. Previously I have included information in the Tables, only for those bridges which I have visited. In this document will also be found measurements and observations made by others, or deduced by myself from photographs and satellite views, for those I have not visited, though I use red typescript in those cases as an indicator of a lesser degree of confidence. These data are included in the summary tables. The presentational change is that I have nested the 7 documents containing the tabulations

for each division, providing access through links attached to the respective names in a listing which accompanies the corresponding listing for of the 28 sets of information sheets. All the links are in the section headed 'Compendium' which follows this introduction. The overall summaries and conclusions remain in the main document.

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Before laying out the compendium, as I have described it, I shall make some general comments about old bridges beginning with some thoughts on the engineering problems faced by those charged with building masonry bridges carrying roads and tracks over rivers and streams. I start with the obstacles which confronted those charged with larger bridges, namely the rivers which had to be crossed, and I refer readers to the following tabulation, which lists lengths and discharge rates for many of the rivers mentioned on the information sheets.

**Table 1. River Lengths and Discharge Rates**

River	Comments	Mean Discharge m <sup>3</sup> /s	90% Discharge m <sup>3</sup> /s	Length miles	River	Comments	Mean Discharge m <sup>3</sup> /s	90% Discharge m <sup>3</sup> /s	Length miles
Almond	<b>SCOTLAND</b>	6.2	14.2	28	Inney	<b>ENGLAND</b>	2.9	6.6	20
Ayr		16	42	40	Lea		5.5	8.5	42
Clyde		48.2	112.3	106	Lugg		10.9	26	45
Dee	Aberdeen	47.2	95.1	87	Lune		36.2	88.5	44
Devon		4.7	9.8	25	Lynher		4.4	10.5	21
Don	Aberdeen	21.2	41	80	Medway		10.8	24.7	70
Doon		7.6	15.7	23	Mersey		37.4	79.9	70
Eden	Fife	4.1	8.2	29	Nidd		8	18.4	59
South Esk	Lothians	4.5	9.4	23	Piddle		2.4	4.8	18
Findhorn		19.7	43.6	65	Ribble		33.4	81.8	75
Forth		47	113.8	29	Rother	Sussex	4.5	10.2	33
Luce		6.2	16.8	17	Soar		11.9	25.5	59
Nairn		5.6	12.3	38	Stour	Dorset	13.7	31.1	61
Nith		27.9	67.9	71	Swale		20.7	48	73
Spey		65.9	124.2	107	Tamar		22.3	55.1	61
Tay	With R. Earn	199.5	401.9	117	Taw		18	47.2	45
Tweed		82.1	179.6	96	Tees		19.6	45.2	85
Tyne	E. Lothian	3	6	30	Teme		17.9	41.4	81
Urr		6	15.1	30	Thames		65.3	161	215
Aire	<b>ENGLAND</b>	34.8	78.2	71	Torridge		15.5	39.3	48
Avon	Bristol	21.2	48.5	75	Trent		89.2	179.8	185
Avon	Warwicks	17	40.8	96	Tyne	Newcastle	46.2	104.2	73
Avon	Hants	20.1	39	60	Ure	+ Ouse	21.5	51.5	129
Bure		2.4	3.7	50	Warlegan		0.83	1.72	8
Calder	Yorks	19.8	40.7	45	Wear		14.7	32.4	67
Camel		6	13.2	30	Welland		3.7	8.7	65
Derwent	Yorks	16.9	34.5	72	Wensum		4.1	7.5	44
Derwent	Derbys	17.4	36.3	66	Wey		7.2	13.7	34
Don	Yorks	16	33	70	Wharfe		17	40.5	61
Dove		14	28	45	Conwy	<b>WALES</b>	19	46	34
Eden	Cumbria	53.3	117	90	Dee		33.8	89.4	70
Exe		15.9	38.3	59	Severn		106.5	255.6	220
Fowey		4.8	10.7	31	Teifi		29.2	66.9	75
Frome		6.6	12.5	30	Tywi		39.8	92.5	68
Glen	Lincs	1.2	2.8	18	Usk		27.9	64.4	63
Gt. Ouse		15.7	33.7	143	Wye		73	173	135
Horner W.		0.46	1.05	7					

I went to school at a time when pupils had to learn many facts by rote, and one was the lengths of major British rivers; that parameter was important historically in the context of transportation because it has a large

bearing on the extent of the obstruction a river creates. Usually its length bore a direct relation to the distance over which a river constituted a significant barrier to medieval travellers. In the absence of a bridge, and with crossings by small boat often hazardous, a long river could require a substantial detour upstream to find a ford, except when the river was 'running low'. However we heard nothing much at school of discharge rate, which in the context of bridge building and survival is probably at least as important an influence. The figures presented are the largest measured by the Department of the Environment for the river concerned, so are normally those obtained at their furthest downstream metering station. The normally-quoted unit of discharge rate, the 'cumsec' or m<sup>3</sup>/s is very large; 1 m<sup>3</sup>/s is equivalent to 13,245 gallons/minute, or the discharge of the contents of the largest road tanker in just less than three-quarters of a minute. Britain's biggest river, (as opposed to longest), the River Tay, thus discharges, on average, the equivalent of 274 tanker-loads of water each minute; (the Amazon, incredibly, 1000 times more!) Of course, most rivers increase their rates of flow as tributaries join them, (though abstraction is a factor for rivers like the Thames) and it is sensible to think of the upper reaches as seeing an increase towards  $\frac{1}{3}$  of the quoted flow rate, the middle reaches, a further doubling, and the lower reaches, the attainment of the full discharge rate. Of course, the locations of meeting points with large tributaries can skew these rules of thumb. The 90% figure in the table is a flow rate exceeded for 10% of the time only, so is effectively the discharge rate when a river is running high, and invariably represents something like a doubling of the mean flow rate; any bridge would be expected to cope easily with those conditions, either by dint of its height, or because flood arches have been incorporated in the approaches. However, it was almost impossible for medieval bridge builders to provide adequately for the most extreme flooding events, perhaps one or two a century, during which discharge rates might more than double again, and Inglis is probably not unduly pessimistic in suggesting that few medieval masonry bridges could have survived much more than a century without going through a cycle of collapse and at least partial, rebuilding. Indeed the records are peppered with instances of such events, involving the fall of one or more arches, and on different occasions every bridge along some large rivers was either swept away or very severely damaged, a fact which should give pause for thought to anyone who thinks that extreme weather events are only a present-day phenomenon. As is obvious from this document, masonry bridges on large rivers were not flimsy structures, though one obvious response to a collapse, of making arches smaller and piers broader, was likely to be counter-productive because the blockage to flow would be increased as would be the danger that the bridge would be over-topped with fatal consequences.

The impact of the 'normal' discharge rates on bridge design is obvious if it is considered that the quantity is obtained as the product of width, depth and speed of flow. Fast flowing rivers like the Spey and the Lune have carved out well defined deep and relatively narrow rocky channels, so single arches were usually viable in the upper reaches, and their abutments could be fixed securely to rock. However multiple spans were necessary in the lower reaches and the piers were made bulky and robust to withstand the drag forces on them, but as mentioned already, this meant that the obstruction to the flow was significant especially when the river was running high; this scenario dictated high bridges to attempt to avoid over-topping which would impose sideways forces which could not be withstood. Similar conditions were found in all tidal reaches; sometimes the peak flows there owed much more to the sea during high tides, than the river discharge rates. Most often the task of bridging estuaries was simply beyond the capabilities and purses of medieval communities, especially where the passage of ships into major ports had to be accommodated. Recourse was usually made

to ferry-boats, but their operation in estuarial waters was hazardous, as famously illustrated by the fate of King John's treasure, and fords subject to tides and the shifting of the river-bed might be equally unsafe. The least risky option was to trek miles inland, to cross the river at the bridge nearest the sea, even if a day or more was added to the journey time. The relatively short lengths of British rivers, compared with those on the continent, made this a viable if still frustrating course of action. Slow moving lowland rivers like the Great Ouse and the Nene are wider than would be expected given the flows they carry, and often have large flood plains in which pools and marshes are prevalent, so bridges crossing them had to be multi-span, and long causeways were essential if the bridge itself was to remain accessible in anything other than dry low water conditions; at least the problems arising from obstruction of the water flows and scouring around the piers were normally less. So, the figures in the table, together with information as to whether a bridge is at the upper, middle, or lower part of a fast or slow flowing river, give some idea of the range of problems the bridge builder was likely to have encountered, and should go some way to explaining the bridge configuration, that the visitor sees.

Whether there is an old bridge at a likely place, say between two river banks in an ancient town, or crossing a river separating two such towns, is to some extent a matter of chance. Harrison addresses fundamental questions concerning where, why and how bridges might have been built in medieval times, explaining that need was an obvious determinant, so bridges carried important routes over large or treacherous rivers, but that they might appear only if money enough could be raised, and organising capacity found, often in a nearby town or abbey. In circumstances of lesser need or absent resources, the construction of a bridge was sometimes delayed until relatively modern times, while small boats or fords filled the gap. In addition, it is only comparatively recently that it has become less than prohibitively expensive and time-consuming to transport heavy building materials long distances, so if suitable stone could not be quarried near to a proposed bridge site, the masonry option was usually ruled out. Although wood was often a serviceable and economical alternative, such bridges were less robust, and their lives could normally be measured in decades rather than centuries, so frequent rebuilding was inevitable; eventually if the need remained, a stone bridge would be built, but this frequently did not happen until the 18<sup>th</sup> or 19<sup>th</sup> century. It has been suggested that this was especially the case in the South of England, but although it may be true for rivers like the Thames in its lower reaches, excluding Old London Bridge of course, the compendium suggests otherwise. Given that an old bridge was built, the other major influence on whether it will have survived, apart from natural events like floods and crises like wars, is the pressure placed on it by demand, and undoubtedly these have been greater in the South of England round London for at least a couple of centuries.

Just as modern roads and bridges are built to accommodate a minimum of two lanes of traffic, made up of cars, lorries and buses, with usually some provision for cyclists and pedestrians, so the pre-modern bridge-builder was most often designing for carts, whether pulled by one or more horses or pushed by men. The idea that there was uniformity in the wheelbase of carts from an early date is surely fanciful, just as is the attempt to trace the standard rail gauge of 4 feet 8½ inches back many centuries before George Stephenson lived, but the span of human arms, and the beam width of a draft horse, suggest that a dimension around 1.5m (5 feet) may have become normal. It follows that a bridge width of approximately 2.5m would be a minimum, if a cart was to be able to cross a bridge without continually bashing the parapets as it moved over a rough track-way. Narrower bridges were built and it can be assumed that they were for pedestrians and packhorses only, with

low parapets a sign of consideration for the latter. The narrowest bridges mainly spanned small streams in rural locations, often alongside fords which would have been used by carts and farm animals. Even those wide enough just to accommodate a cart were most often found in such situations, because one-way traffic generated too many delays even for pre-modern times, if a bridge was long, or a main artery in a large town. So the greater river bridges were often between 3.5m and 5m wide, which just about allowed carts to pass, and they usually had refuges above the cutwaters to allow pedestrians to avoid wheeled vehicles.

Nowadays, we expect to move onto bridges which more or less match the connecting roads in width, but before 1700, what passed for important roads, were far wider than now, except in towns where the exact opposite was true. Typically, in rural areas, routes were 60m wide and had been kept relatively clear of trees and other obstructions, to allow travellers to pick their way around ruts, pools and rocks on totally unprepared surfaces. As in many other spheres, change began around 1700. Enclosure of land had incentivised the narrowing of roadways to release land for cultivation, at least where the soil was fertile, and the development of long-lasting smoother road surfaces using the methods of Macadam and Telford facilitated the process, but also gave another incentive to keep widths to a minimum to reduce costs of road-building material and labour. Nonetheless, Telford still allowed more than 8.5m of width on his London to Holyhead route to enable fast moving stagecoaches, with wheelbases of around 1.5m, to pass each other. In the same period, bridge-widening became common on important routes, especially those 'Turnpiked', since 5.5m was probably a minimum to allow stagecoaches to pass, even at slow speed, on a smooth surface, if also constrained by parapets. Many other bridges in towns and elsewhere were widened at this time, obviously to ease traffic flow, but perhaps also because methodologies had been developed and such public works had acquired prestige. Unfortunately, adaptation was not always seen as the answer and a number of historic bridges were pulled down and replaced, culminating in the demise of Old London Bridge in 1831.

In the years since then, the number of vehicles using the roads has increased massively, but the majority are not very much wider than the carts and stagecoaches of earlier times; for example, my previous car was 1.82m wide. However, buses and trucks are markedly wider (and longer and heavier) with legal limits set between 2.55m and 2.75m, dependent on type. To allow a smooth flow of such vehicles, carriageways on modern roads are normally at least 7m wide (for 2-way, single-lane traffic), and to avoid the creation of bottlenecks, some old bridges have been altered accordingly, while many more have been bypassed. For those still in use, changes in width, made in two, three, or even more stages over a period of centuries, can frequently be confirmed by looking at the variations in the textures and colours of the soffits (the stonework beneath arches); the ingenuity of the engineers is often displayed in such modifications, though sadly heritage and aesthetic considerations are sometimes less in evidence. Not all old bridges have survived in the modern era of course, and not only because they have been unable to cope with the size of lorries or the volume of traffic; sometimes entirely contrary factors have come into play as patterns of movement have changed and routes have fallen into disuse. In such cases, there are usually two issues which determine whether an old bridge will survive, even in our more enlightened times. Firstly, the money has to be found to keep the bridge in a safe enough condition, for light traffic or pedestrian use. Secondly, all but single-arch bridges have piers which obstruct the water flow, and old bridges often have more, wider, piers than would be found in modern designs; in flood conditions the blockage is often increased by trees and other debris washed downstream

and if there is any tendency to flood it is increased by the presence of the bridge. In such situations, bridges no longer performing the function for which they were built are indeed vulnerable.

This very brief account of some of the issues which have affected bridges over the years can be amplified by referring to the book already highlighted, written by Harrison, and another on roads written by Davies.

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I will end this introduction by returning briefly to the topic of moat bridges. In a learned paper published in the 1970s, it was estimated that there were more than 5000 sites in England and Wales which had at some time been moated, and that number was raised to over 8000 in a researcher's recent PhD thesis. The great majority were constructed in the later medieval period (between 1200 and 1500), and comprised a platform of no set shape or dimensions, but normally of area greater than 1000 m<sup>2</sup>, wholly surrounded by ditches, which were most often water-filled. Usually, the platform accommodated a dwelling together with the ancillary buildings deemed necessary by the well-to-do of the time, (only those with substantial wealth, most often derived from land-holdings, could afford to construct these sites) and was accessed by one or more bridges. Though there is often no consensus as to why any individual site incorporated a moat, it is I think accepted that security was the usual motivation. Of course, the threats being addressed were of different orders; the moated castles in borderlands and those acting as the regional power-centres of great nobles were built to withstand sustained assault by armies, whereas the defences of moated houses owned by manorial lords could have been expected to do no more than thwart opportunistic attacks by small bands of thieves and outlaws. The same was true for a few abbeys and other secular public buildings which were also provided with moats. One thing was true of all, namely that the weak-point would have been the entrance including the access bridge, unless counter-measures had been put in place. The latter ranged from castle defences like gatehouses with portcullises, outlying barbicans, and elaborate drawbridges which could be raised at need, to the simpler expedient of incorporating within the access bridge, a section which could be lifted away by hand. The great majority of the bridges were of wood, whether complex drawbridges or simpler structures. However, at a few sites the moats to be spanned were so wide and deep that hybrids comprising stone arches, together with one or more movable wooden sections were put in place; a few fine examples of such medieval stonework survive.

The years around 1500 were a period of transition in England and Wales, with war and general lawlessness becoming less of a factor thanks to the ruthlessness and efficiency of the Tudor state. The owners of great castles when faced with a decision between maintaining defensive strength, and enhancing comfort or incorporating decorative features had begun to favour the latter, where they did not just desert the castles and build new mansions. They were perhaps over-optimistic since a number of rebellions were to come in the 16<sup>th</sup> century, followed by Civil War in the 17<sup>th</sup> century when ironically some castles saw their only action in five centuries; even a hundred years later, Carlisle, Stirling, and Blair Castles were all besieged by the Jacobite army. Nonetheless, the die had been cast, and the changes put in train affected moated manor houses to an even greater extent. In particular, if a moat was no longer needed as a defence, the question of whether it had any other value or should simply be filled in, needed an answer. Although some have suggested that fish in a moat were still an important food source, like pigeons in the dovecots which were usually maintained through

the period, I think the preservation of all or part of a water-filled moat more often depended on its decorative power, and on the perception that it was, as now, a status symbol. If a moat was to be kept, then the access question came next, remembering that convenience and the ornamental contribution rather than security were by then priorities. The easiest and cheapest option was one or more causeways, the most expensive but visually most satisfying and status-enhancing option was a decorative stone bridge, as part of a ceremonial entrance. The compromise seems to have been a causeway pierced by one or more plain small arches or culverts allowing flow between the arms of the moat, which was certainly desirable if it was spring-fed, and to make it less prone to clogging with plants and algae. So, by 1700, my cut-off point, the great majority of moats had been filled in; of those which remained, access was usually by causeway, but for a minority there were bridges, some decorative, some functional. Since then they have had a good chance of surviving, because relatively small duties have been placed on them, as compared with typical road bridges, and for the sake of appearances maintenance has usually been a priority, at least until recent years when money has sometimes run short. The main danger to them has probably been the whims of owners, and their architects and landscape designers; I believe that Capability Brown demolished more than one bridge that would otherwise have featured here.

I have so far identified 66 pre-1700 moat bridges, but almost half of them seem to be more or less inaccessible on private land, and not visible from boundaries or rights of way; I list them in the Appendix, along with a very few river bridges which seem similarly out-with my reach. Some can be viewed on occasional open days, but I have not so far been in the right place at the right time very often, and others are at wedding and conference venues. Finally, I should point out that the definition of a moat is drawn quite wide, in that it can include natural deep dry gullies which have been bridged to give access to castles built on crags, as well as the artificial trenches, dry or water-filled which may surround or part-surround a manor house.



## 2. The Compendium of Bridges

The compendium presents information on bridges built before 1700 to carry roads, tracks and footpaths mainly across water flowing in rivers, streams, burns, becks and brooks, but also those crossing moats, whether wet or dry. To state what may be obvious, the compendium is of survivals only from the period in question, and is thus a filtered sample of the structures which once existed. The core is 28 nested sets of information sheets covering every target bridge so far visited; each set corresponds to one or more counties or regions, and links to all of them are provided in the right hand column below. The sets have in turn been assigned to the 7 seven geographical divisions of Great Britain, and links to nested tabulated data for the bridges therein are provided in the left hand column below.

### LINKS TO TABULATED DATA    LINKS TO INFORMATION SHEETS

1. [Scotland](#)
  - [Orkney, Highland, Grampian & Tayside](#)
  - [Fife & Central](#)
  - [Lothian & Borders](#)
  - [Strathclyde & Dumfries & Galloway](#)
  
2. [Northern England](#)
  - [Northumberland & Tyne & Wear](#)
  - [Cumbria](#)
  - [Durham & Cleveland](#)
  - [North Yorkshire](#)
  - [Yorkshire - East, West, South & City of York](#)
  - [Lancashire](#)
  
3. [Eastern England](#)
  - [Derbyshire & Nottinghamshire](#)
  - [Lincs, Rutland, & Leicesters](#)
  - [Northants, Bedfords, Bucks, & Cambs.](#)
  - [Norfolk, Suffolk, & Essex](#)
  - [Cheshire, Shropshire & Staffs.](#)
  
4. [West Midlands](#)
  - [Warwickshire & West-Midlands](#)
  - [Herefordshire & Worcestershire](#)
  - [Gloucestershire & Bristol](#)
  
5. [Southern England](#)
  - [Kent, Surrey & London](#)
  - [Sussex & Hampshire](#)
  - [Oxfordshire & Wiltshire](#)
  
6. [South-West England](#)
  - [Dorset](#)
  - [Somerset](#)
  - [Devon](#)
  - [Cornwall](#)
  
7. [Wales](#)
  - [Clwyd](#)
  - [Gwynedd & Dyfed](#)
  - [Powys, Glamorgan & Gwent](#)

### 3. Overview of Data and Conclusions

The Tables below present the national picture as extracted from the divisional tabulations

**Table 2 Overall Status of Bridge Visits & Numbers of Bridges built in each Century**

COUNTRY/REGION	TOTALS PRE-1700	PRE- 1600	PRE- 1500	PRE- 1400	PRE- 1300	No. VISITED
Scotland	87	43	17	1	0	85
Northern England	214	98	66	30	13	207
East Midlands & East England	119	89	69	39	8	118
West Midlands & English Marches	74	45	28	9	2	74
Southern England & Thames Valley	82	64	55	27	14	80
South-West England	204	116	73	23	6	188
Wales	88	28	17	6	2	84
<b>Totals</b>	<b>868</b>	<b>483</b>	<b>325</b>	<b>135</b>	<b>45</b>	<b>836</b>

**Table 3 Countrywide Variations in Bridge Features; Pre-1700 (Pre-Modern)**

COUNTRY/REGION	Bridges Total	Span >7.5m	Width <2.2m	Gothic Arch	Ch. Arch Rings	Hood Moulds	Soffit Ribs/Ch.	Piers/ Broad	Lintel
Scotland	87	34	18	13	19	10	19/11	45/12	1
N. England	214	94	68	42	44	20	51/34	118/49	11
E. Midlands & E. Eng.	119	13	31	46	50	9	39/26	100/41	2
W. Mids. & Eng. Marches	74	6	19	20	10	2	15/4	62/34	5
S. Eng. & Thames Valley	82	2	7	33	24	0	21/11	78/21	1
S.- W. of England	204	12	50	62	26	16	10/7	166/65	14
Wales	88	32	11	11	3	23	1/0	62/28	9
<b>Totals</b>	<b>868</b>	<b>199</b>	<b>185</b>	<b>229</b>	<b>175</b>	<b>76</b>	<b>147/96</b>	<b>590/231</b>	<b>43</b>

**Table 4 Countrywide Variations in Bridge Features; Pre-1500 (Medieval)**

COUNTRY/REGION	Bridges Total	Span >7.5m	Width <2.2m	Gothic Arch	Ch. Arch Rings	Hood Moulds	Soffit Ribs/Ch.	Piers/ Broad	Lintel
Scotland	17	7	7	7	6	3	2/1	12/3	1
N. England	66	33	8	33	34	2	45/32	48/26	1
E. Midlands & E. Eng.	69	9	16	40	39	6	28/22	57/27	0
W. Mids. & Eng. Marches	28	4	5	17	8	1	11/3	25/15	1
S. Eng. & Thames Valley	55	2	3	30	20	0	16/11	52/16	0
S.-W. of England	73	6	11	38	20	2	10/7	67/34	6
Wales	17	5	0	6	2	2	1/0	14/6	3
<b>Totals</b>	<b>325</b>	<b>66</b>	<b>50</b>	<b>171</b>	<b>129</b>	<b>16</b>	<b>113/76</b>	<b>275/127</b>	<b>12</b>

In each of the above Tables the numbers presented are the number of bridges in the particular category. Some of the column headings may not be self-explanatory, i.e.,

**Ch. Arch Rings;** each entry gives the number of bridges with chamfering of the outer voussoirs which form the arch shape, (illustrated in the nested documents containing the divisional tabulations)

**Soffit Ribs/Ch.;** each entry has 2 numbers, the first, the number of bridges with ribs on the underside of their arch(es), and the second, the number of bridges where these ribs are chamfered

**Piers/ Broad;** each entry has 2 numbers, the first the number of bridges with piers, i.e., more than one aperture, the second the number of bridges for which such piers can be subjectively described as broad

**Lintel;** each entry gives the number of bridges for which apertures are rectangular, so it includes mainly clapper bridges and developments of them

## Notes and Conclusions

1. Before trying to draw a few conclusions, I should discuss the limitations of the data collected so far. The total number of bridges identified as targets, is 921, and I have visited and assessed 889. In general, those still unseen are biased towards the smaller and more remote part of the target population. The grand totals include 53 bridges which I have removed from the list, after visiting their location, on such grounds as their collapse or replacement. So an up-to-date status report would say that of 868 target bridges, I have visited 836, (96%), the numbers in Table 2. I have visited 312 out of 325 bridges thought to have origins before 1500 (also 96%). I have not included as targets, 27 bridges on private land, mainly crossing moats, which appear to meet my criteria but which are neither accessible in the normal run to the public, at least anyone not resident locally and so unable to attend open-days or functions, nor do these bridges seem to be visible from beyond property boundaries or from rights of way.

2. I will begin with reservations and words of caution about the data, but they should be viewed in the context that the sum of the information in the document is certainly the most comprehensive available anywhere, and more than adequate for the task of identifying trends associated with build-dates and geography, the use to which it has been put. However, I must acknowledge that for many of the bridges, the information is incomplete and of variable quality. Turning first to the build-date estimates; the ideal scenario is to be able to point to documentation for the construction, and enough further documentation between then and now to give confidence that a bridge has been maintained and modified, rather than replaced in the intervening period. Needless to say, that is not the normal situation. More often some kind of consensus as to age can be reached on the basis of snippets of documentary information, circumstantial evidence, and surveys of a bridge in question by experts, who have looked for characteristics favoured during a particular period. Especially for smaller bridges, not least those named packhorse bridges, information is often more limited, either from documents or the structure itself, and this is why the catch-all '17/18<sup>th</sup> century' appears quite frequently in the Tables. Nonetheless, the age data is meaningful, especially, taken in large chunks as here, without too much focus on data for individual bridges. It certainly allows patterns and trends to be expressed as functions of time and place.

Unfortunately, the other data presented is not flawless either. The quantitative information for bridges like arch spans and widths is often imprecise because measurements, especially of the former, are not always easy to make, certainly without the skills and equipment of a professional surveyor. It has been the exception rather than the rule for most who have described bridges in the past, to go much further than to specify the number of arches, and even Jervoise seemed to regard total bridge length rather than arch span as the key dimension, though bridge builders usually had to take the former as fixed by the configuration of a river and its margins. As regards width, the main problem is that so many bridges have been widened, and it is one thing to be able to see the effects in the soffits, and quite another to obtain an accurate measurement of an original dimension, taking account of perspective. It is probably a good time to stress that the values appearing here, are my best estimate for the bridge as built, rather than those of the present day or at any time in between. All this adds up to the considerable number of question marks that appear in the Tables, and the approximate nature of many of the numbers that are included. One other feature may not have been pinned down with enough rigor namely pier breadth, for which I have so far been satisfied with the purely subjective classifications of 'broad', unexceptional, 'slender', and, as part of a pierced causeway. Latterly, I have developed rough guidelines based on the ratio of pier breadth to adjacent arch spans, so that 'broad  $\equiv$  B' is equivalent to a ratio greater than 0.35, 'unexceptional  $\equiv$  U', to 0.1 to 0.35, and 'slender  $\equiv$  S', to less than 0.1, but this formula has been applied only to some of the bridges visited relatively recently, and a few more for which photographs are suitable.

3. The data in Table 2 can be compared with the only other nation-wide accounting of bridges by age that I have seen, in 3 maps presented by Cook in his book on Medieval Bridges. As might be hoped, his numbers and mine for England only, as regards the 13<sup>th</sup> century or before and the 14<sup>th</sup> century are close, namely 36 and c80 bridges compared with my numbers of 42 and 78. For some reason the agreement breaks down completely in the 15<sup>th</sup> century for which he records less than 70 bridges, so an actual decline in survivals, whereas my number is 151. I can offer no explanation for the yawning gap, not least because stone bridge building seems to follow a generally increasing trend through the centuries, notwithstanding events like plagues and civil wars, and survival to the present day should be more likely, the shorter the time between construction and now. In addition Leland's itineraries dating from not long afterwards, which have fed through into my numbers, often by way of Jervoise, and presumably influenced Cook, might have been expected to improve agreement rather than the opposite.

4. There is no doubt that bridge building in Scotland and Wales lagged behind that in England. The 42 bridges with significant pre-1300 masonry in England, noted above, compare with none surviving from then in Scotland and one in Wales. The data from both the latter countries suggest that most features appeared at least a century later than in England, up until the industrial age. There was also something of a time lag between the far south-west and the rest of England, though this was not the case perhaps surprisingly, for the north, probably because many of the oldest surviving masonry bridges are grouped in clusters, near to major medieval religious establishments like Waverley Abbey in the south-east, and Durham Cathedral and Fountains Abbey in the north, rather than radiating outwards from a single prototype, in the south-east. It is not obvious why a few out of hundreds of abbeys scattered round the country singled themselves out in this

way; obviously they were rich, but not uniquely so, and there were rivers to cross almost everywhere. Clearly, some abbots were more far-sighted than the majority given that good transport links were surely a boon to most monasteries, with their large and often far-flung agricultural interests. Where there is commonality between the North of England and the other outer regions of Great Britain is in the surge of survival numbers which must reflect a corresponding surge in building during the 17<sup>th</sup> century.

5. Turning now to Tables 3 & 4, the most remarkable feature is seen in the columns displaying the numbers of pre-modern bridges with arches spanning more than 7.5m. In Table 3, the data for all qualifying bridges shows that almost half the wide-span bridges are in the North of England, and that there are substantial numbers in Scotland and Wales, but comparatively few in the rest of England. This pattern has previously been the subject of general comments, though never, I think, made as explicit as here. Wholly satisfactory explanations are lacking, though it is fair to say that the large flow rates of the rivers of the north and west, and their propensities to flood almost compelled the development of designs with high and wide arches, which caused the least possible blockage to flow. Obviously, the spans depend to an extent on the width of the river and any low-lying surrounds to be crossed, but otherwise it is a matter of choice for the bridge-builder. So it is surprising that wide-span designs were rarely adopted further south, given that they would have coped better with such flood conditions as arose, would have been cheaper to build, and would have eased water-borne passage. Table 4 shows that the distribution of medieval bridges with large arch spans was not very different in the earlier period when more than half of those built with arch spans greater than 7.5m are to be found in Northern England, with a healthy population in Scotland, and proportionately to the total number of bridges built then, in Wales also. The results in the two Tables also dispel any idea that spans increased systematically with the passage of time before 1700; location rather than age of a bridge is a far more relevant predictor of whether bridges are likely to have large spans.

6. I included the columns referring to narrow bridges to make two points. Firstly that the number of such bridges surviving from medieval times is relatively small and secondly that those remaining from the whole period up to 1700 are fairly uniformly spread across the country, apart from being noticeably scarce in the South of England. This may not conflict altogether with the common statements that packhorse bridges are found predominantly in the 'outer' more hilly regions of the country. My numbers include all footbridges, and it may be that the number built to serve local purposes, (access to churches and worksites) in more populous areas, balances the larger numbers built as part of long distance trading routes across northern, and south-western hills.

7. The columns referring to the Gothic arch shape, chamfering of arch rings, and the insertion of ribs in the soffits (arch vaults) demonstrate that such features are indeed indicators of medieval origins, far more often than not. Looking at the figures for the whole country it is clear that the appearance of one of the three is suggestive rather than conclusive, and the appearance of more than one of the features increases the likelihood of a pre-1500 build date. There are significant regional variations. In Scotland the features are found so frequently on 16<sup>th</sup> century bridges that they support the assertion that building of medieval-style bridges extended well into that period. In Wales, chamfered arch rings and soffit ribs are very rare, and Gothic arches

seem as likely to be found on bridges built after 1500 as before. Of the three features, only Gothic arches are common in the two western regions of England.

8. The column for hood moulds shows firstly that they are mainly, though not exclusively, a post-medieval feature. Non-occurring in Southern England, as opposed to the South-West, they are especially linked to bridges in North Wales, but also are common in Northern England and Southern Scotland.

9. The columns in Tables 3 and 4, numbering the bridges with lintels, include both basic clapper bridges, and those bridges found in South West England and Wales which start from that form and build upon them roads with parapets. They are absent from Southern England, and rare in Scotland.

10. I shall not say much about the results in the columns for pier breadth, because as I have already indicated they will be of doubtful value unless they can be sharpened up. I think I might have expected some concentration of broad piers in Southern England but that has not really come through. More surprisingly, given the picture in my mind of extremely robust medieval multi-arch bridges, broad piers are not heavily biased towards this population, at least as regards my analysis so far.

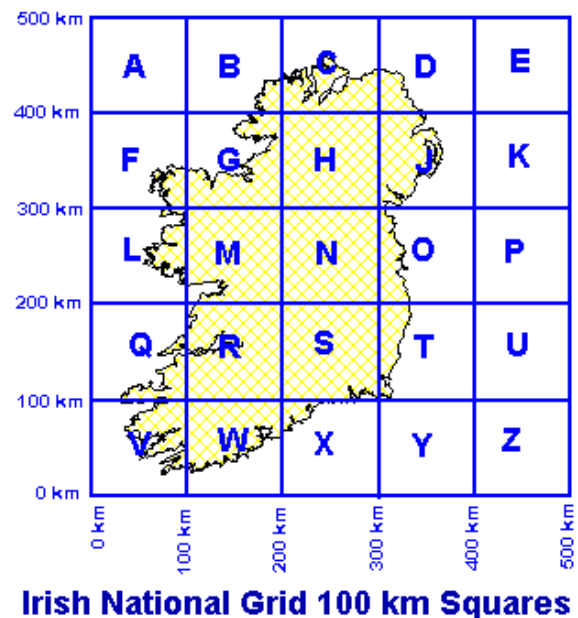
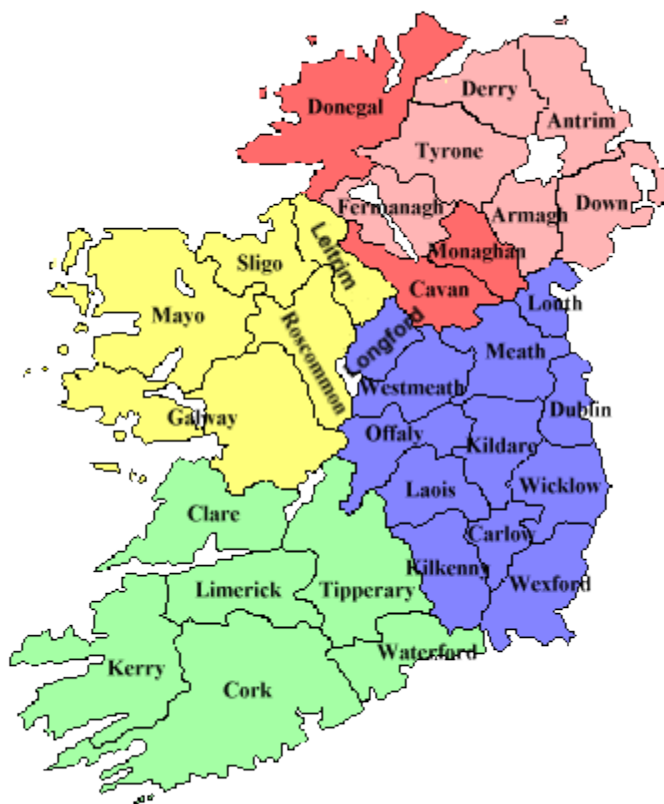
11. Another feature which would probably repay more consideration is building material (fabric). Some things are clear, namely that the use of brick was confined largely to the South and East of England, and that in areas characterised by harder rocks, like Devon, Wales and Scotland, ashlar fabric was not an easy option, given the machining required. Nowadays, it is easy enough to bring in suitable stone from a distance, when local sources are lacking, but this only became feasible at the start of the canal age in the 18<sup>th</sup> century. Hence the well-documented building of wooden bridges in medieval times in South and East England, and early experimentation with brick. It is also true that except in close proximity to thriving religious houses, small bridges were almost exclusively rubble built, presumably because the creation of ashlar building blocks added significantly to the cost.

12. It will be obvious that I have adopted a broad brush approach, in considering the data I have collected. It will certainly be possible to dig down, and try to answer questions about the locations and characteristics of bridges, viewed individually or in smaller groups. However, I must again advise caution because this will inevitably mean reducing sample sizes, and so raising doubts about the quality of the data. More importantly, it must always be remembered that we cannot look directly at the population of bridges which existed in any of the time periods specified, but rather we look always at a sample filtered by survival, in which chance has played a large part. So, while it is reasonable to assume that as long as we look at large samples, most effects are likely to have persisted through this filtering process, the same cannot be assumed for smaller samples. To give just one example of the significance of this truth, we think it likely that in some parts of the country there were in the medieval period more wooden bridges than stone bridges, yet none of the former survives.

#### 4. The Old Bridges of Ireland

I have stated for some time my intention to add the qualifying bridges of Ireland to my compendium. So far I have drawn up the list of bridges which follows, had 8 from 80 visited and can provide information sheets in the standard configuration for them. I include the latter in a nested document which for the moment covers all Ireland, but which will be split into four, one for each historic province, when a greater number of bridges have been visited. At such a time I shall also produce tabulations of characteristics in the same format as for Great Britain.

As a preliminary, I present two maps, one which locates the counties and ancient provinces, and another which shows the Irish Grid System.



#### [Irish Grid Reference Finder](#)

Above is a link to a website, equivalent to that presented earlier for British locations which allows maps to be generated if the location on the grid is known. Below is the link to the set of information sheets for the few Irish bridges visited to-date.

#### Information Sheets for Irish Bridges - [Ireland](#)

The numbering system uses the 4 historic Irish provinces, Ulster, Munster, Leinster and Connaught. Those bridges which were in Ulster and are in Northern Ireland are marked \*. Green typescript ≡ Bridge visited

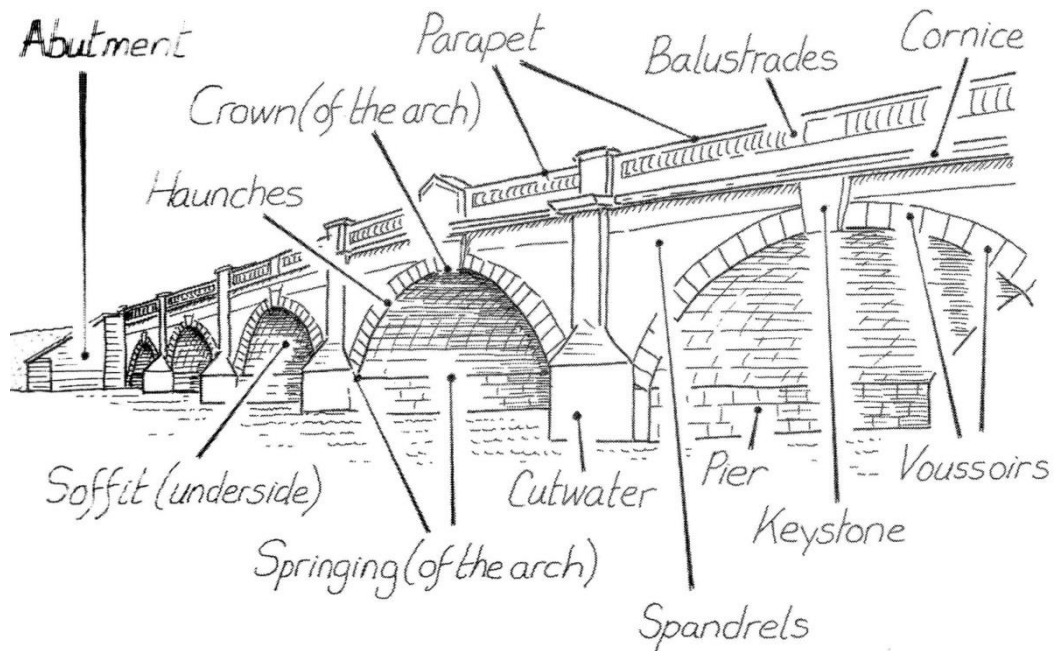
NO.	BRIDGE	COUNTY	LOCATION	RIVER	DATE
U1*	Massereene Bridge	Antrim	J 148 866	Six Mile Water	1710
U2*	Morley Bridge	Antrim	J 258 895		c1700
U3*	Callan Bridge	Armagh	H 866 452	Callan	17 <sup>th</sup> C
U4*	Conn O'Neill's Bridge	Belfast	J 364 734	Conn's Water	c1600
U5*	Shaw's Bridge	Belfast	J 325 690	Lagan	1709
U6	Ballyhaise Bridge	Cavan	H 452 116	Annalee	1710
U7	Finea Bridge	Cavan	N 402 814	Inny	1650
U8	Stramatt Bridge	Cavan	N 631 834	Blackwater	17 <sup>th</sup> C?
U9	Moville Bridge	Donegal	C 608 386	Bredagh	<1600
U10	Clady Bridge	Donegal/ Tyrone	H 292 940	Finn	1680
U11*	Ballagh Bridge	Down	J 384 250		Late-17 <sup>th</sup> C
U12*	Crown Bridge	Down	J 108 275	Clanrye	c1700
U13*	Kate McKay's Bridge	Down	J 210 408	Bann	c1700
U14*	Arney Bridge	Fermanagh	H 208 370	Arney	Late-17 <sup>th</sup> C
U15*	Bovagh Bridge	Londonderry	C 885 194	Agivey	16 <sup>th</sup> C?
U16*	Roe Road Bridge, Limavady	Londonderry	C 668 229	Roe	c1700
C1	Ballinasloe Bridge	Galway	M 855 312	Suck	1570
C2	Claregalway Bridge	Galway	M 373 332	DRY	1710
C3	Craughwell Bridge	Galway	M 511 199	Dunkellin	17 <sup>th</sup> C
C4	Lennox's Bridge	Leitrim	G 816 574	Drowes	Late-17 <sup>th</sup> C
C5	Bunlahinch Clapper Bridge	Mayo	L 754 759	Bunleemshough	Med. or 19 <sup>th</sup> C
C6	Abbeytown Bridge	Roscommon	G 807 028	Boyle Water	1200
C7	New Bridge	Sligo	G 693 360	Garavoge	1680
M1	Killaloe Bridge	Clare	R 705 730	Shannon	17 <sup>th</sup> C part
M2	O' Brien's Bridge	Clare	R 664 669	Shannon	1695
M3	Aghakista Bridge	Cork	V 684 464		17 <sup>th</sup> C
M4	Ballingeary Clapper Bridges	Cork	W 147 666	Lee	17 <sup>th</sup> C?
M5	Buttevant Clapper Bridge	Cork	R 543 079	Awbeg	Med?
M6	Buttevant Old Bridge	Cork	R 544 093	Awbeg	1250 + 1765
M7	Carrigadrohid Bridge	Cork	R 414 234	Lee	Late-17 <sup>th</sup> C
M8	Castletownroche Bridge	Cork	R 685 024	Awbeg	Med. part
M9	Glanworth Bridge	Cork	R 759 040	Funsion	c1625
M10	Kilcummer Bridge	Cork	R 691 005	Awbeg	c1650
M11	South Gate Bridge	Cork	W 673 715	Lee	1713
M12	Cromwell's Bridge	Kerry	R 082 094	Finnish	1700
M13	Adare Bridge	Limerick	R 470 466	Maigne	1410
M14	Askeaton Bridge	Limerick	R 342 503	Deel	14/15 <sup>th</sup> C
M15	Ardfinnan Bridge	Tipperary	S 083 176	Suir	16 <sup>th</sup> C
M16	Athassel Bridge	Tipperary	S 012 364		13 <sup>th</sup> C
M17	Barry's Bridge	Tipperary	S 129 587	Suir	1650



<b>NO.</b>	<b>BRIDGE</b>	<b>COUNTY</b>	<b>LOCATION</b>	<b>RIVER</b>	<b>DATE</b>
M18	Holycross Bridge	Tipperary	S 090 541	Suir	1625 (1410)
M19	Old Bridge	Tipperary	S 399 216	Suir	1447
M20	Sir Thomas' Bridge	Tipperary	S 239 229	Suir	1690
M21	Watrigate Bridge	Tipperary	S 209 348	Clashawley	1500
M22	Clonmel Bridge	Waterford	S 202 222	Suir	c1350
M23	John's Bridge	Waterford	S 608 120	John's	1650 + 1765
M24	King John's Bridge, Curraghmore	Waterford	S 438 155		1205
M25	Tallow Bridge	Waterford	W 999 943	Bride	c1700
L1	Leighlinbridge Bridge	Carlow	S 691 654	Barrow	14 <sup>th</sup> C
L2	Crooked Bridge	Dublin	O 036 248	Camac	17 <sup>th</sup> C
L3	Gormanstown Bridge	Dublin	O170 658	Devlin	13/14 <sup>th</sup> C
L4	Grace Dieu Bridge	Dublin	O 178 523		15 <sup>th</sup> C
L5	King John's Bridge	Dublin	O 040 343	Griffeen	13 <sup>th</sup> C
L6	Lissenhall Bridge	Dublin	O 186 482	Broadmeadow	16 <sup>th</sup> C
L7	Milltown Bridge	Dublin	O 168 302	Dodder	17 <sup>th</sup> C
L8	Roganstown Bridge	Dublin	O150 502	Broadmeadow	16/17 <sup>th</sup> C
L9	Carragh Bridge	Kildare	N 853 208	Liffey	1656
L10	Harristown Old Bridge	Kildare	N 877 095	Liffey	17 <sup>th</sup> C
L11	Blackfriars Bridge	Kilkenny	S 503 562	Breagagh	1633
L12	Irishtown Bridge	Kilkenny	S 504 563	Breagagh	16 <sup>th</sup> C? + 1759
L13	Tower Bridge (Jenkinstown)	Kilkenny	S 490 636	Dinin	1647
L14	Ballykilcavan Bridge	Laois	S 596 972	Stradbally	1713
L15	Monks Bridge	Laois	S 412 832	Nore	13 <sup>th</sup> C
L16	Watercastle Bridge	Laois	S 425 805	Nore	15/16 <sup>th</sup> C
L17	Clynan Bridge	Longford	N 214 586	Inny	1700
L18	Bellews Bridge	Louth	J 019 099	Creggan	1674
L19	Babes Bridge	Meath	N 892 700	Boyne	13 <sup>th</sup> C
L20	Bective Bridge	Meath	N 859 598	Boyne	Med?
L21	Kilcarn Bridge	Meath	N 884 655	Boyne	16 <sup>th</sup> C
L22	Kinnegad Bridge	Meath	N 601 452	Kinnegad	1670
L23	Mabes Bridge	Meath	N 736 744	Blackwater	13 <sup>th</sup> C
L24	Newtown Bridge	Meath	N 815 568	Boyne	c1450
L25	Slane Bridge	Meath	N 963 736	Boyne	14 <sup>th</sup> C part
L26	St. Mary Magdelene Bridge	Meath	O 050 685	Nanny	12/13 <sup>th</sup> C
L27	Trim Bridge	Meath	N 801 570	Boyne	1393
L28	Bridge Street Bridge	Offaly	N 059 047	Camcor	1660
L29	Abbey Bridge	Wexford	S 796 099	Tintern Stream	1567
L30	Bachelor's Walk Bridge	Wicklow	T 316 940	Leitrim	1690, widened
L31	Clara Bridge	Wicklow	T 169 921	Avonmore	1680
L32	Leabeg Bridge	Wicklow	O 296 063		1700

## 5. Glossary of some frequently used terms

The useful diagram below is taken from Yorke's book, though it portrays a modern masonry bridge, the terminology applies generally to stone bridges. I strongly recommend the Penguin Dictionary of Architecture, as a more comprehensive source of information about relevant terms than I can provide.



Some other relevant descriptors are not in the diagram.

Arch, 3-centred (Tudor)	An arch shape made up of intersecting arcs of different radius, usually dated to the late-15 <sup>th</sup> century or after
Arch, 4-centred	
Arch, Gothic	Pointed arch shape, most often made up of two intersecting arcs of a circle, rather than triangular
Arch, Segmental	An arch shape which is a simple arc of a circle, not extending to a full semi-circle,
Arch, Semi-circular	Self-explanatory, can be a sign of great antiquity 'Norman Arch'
Arch Rings	Comprise the voussoirs, but can be doubled or tripled in layers for decorative purposes, and the lower ones can be recessed, or mounted 'in two or three orders'
Ashlar	Masonry-type, stone blocks cut to uniform size, dressed and laid in regular courses
Chamfering	Applied most often to ribs and arch rings, the removal of corners for decorative purposes, often a marker for a medieval bridge
Clapper Bridge	A bridge comprising one or more flat slabs laid across the tops of abutments and often one or more piers forming rectangular water channel(s) (The term clam bridge is used in some areas where there is a single slab)

Flood Arch	An arch designed to accommodate flood water only, often in an approach causeway
Hood Mould	A protruding layer of thin stones immediately above, and following the full shape of an arch ring
Impost	Ledge on a pillar or abutment from which an arch springs
Intrados	Also soffits, and vault, the under-surface of an arch
Jambs	Vertical walls in the lower part of an arch
Packhorse Bridge	A bridge which is on a pre-19 <sup>th</sup> century route, and often too narrow for carts to cross (< 1.5m)
Pilasters	Shown in the diagram, but not labelled, they are mini-columns often rising above the cutwaters, usually found in post-1700 bridges
Refuges	Outward protrusions in the parapets, enclosing side extensions of the carriageway, usually triangular or rectangular, and most often upward extensions of the cutwaters
Ribs	Common in the soffits of larger medieval bridges they protrude downwards, but follow the arch shape, and can be the main support members
Rise	Can refer to the height of a single arch above the impost, or the difference in level between the ends and centre of a bridge carriageway; where the latter is significant, the bridge is termed 'crowned', 'humped', or peaked
River Arch	An arch spanning a water course
Rubble	Masonry type made up of individual stones or blocks which are non-uniform, but can range from regular layers of roughly squared blocks to completely random arrangements of stones varying in size and shape
Stilted	Refers to a bridge in which arches spring from high above the water level, supported on long jambs
String Course	A horizontal row of protruding tiles or thin stones, found above an arch, for purely decorative purposes

## 6. References and Bibliography

Such is the importance to any student of English and Welsh old bridges of the five books produced by Jervoise, one, utilising information collected by Henderson, and a sixth on Cornish Bridges written by the latter, that I begin my listing with them, and then revert to the normal alphabetical ordering by author's name. There is an eclectic mix of books and published papers dealing generally with the subject; some consider bridges in a county or along a river, and some describe single bridges. I have referenced only documents which I have found worthwhile, or specifically useful, so there are omissions which might surprise. There are many books which follow the course of a river, and mention or picture old bridges crossing it, but they rarely contribute much detail, so I have omitted them. There is an excellent series of regional books on the Civil Engineering Heritage which have useful entries on bridges amongst much else, but I do not make specific references to them as they mainly carry information obtainable elsewhere. I include a number of web sites which I have found useful, and would highlight especially those for Listed Buildings, PastScape and the Scottish and Welsh equivalents of the latter.

BOOK/ PAPER TITLE	AUTHOR(S)	DATE	PUBLISHER	COMMENTS
The Ancient Bridges of Mid and Eastern England	Jervoise E.	1932	The Architectural Press	Everything published since on the topic owes a large debt to the 'Jervoise books', though the absence of maps, the poor quality of the photographs and the quirky nature of the information presented, mean that they do not represent a last word. Also, they date back 80+ years.
The Ancient Bridges of Wales & Western England	Jervoise E.	1976 reprint	EP Publishing Ltd	
The Ancient Bridges of the North of England	Jervoise E.	1973 reprint	EP Publishing Ltd	
The Ancient Bridges of the South of England	Jervoise E.	1930	The Architectural Press	
Old Devon Bridges	Henderson C, & Jervoise E.	1938	A. Wheaton & Co.	I often refer to Jervoise on information sheets because he actually wrote the book.
Old Cornish Bridges & Streams	Henderson C. & Coates H.	1972 reprint	D. Bradford Barton	
Bridgend Bridge, Dundrennan – A Monastic Structure	Anderson A. & Williams J.	2007	Learned Paper, Dumfries and Galloway Natural History and Antiquarian Society	
Historic Bridges of Shropshire	Blackwall A.	1985	Shropshire Libraries	The first chapter is relevant
The Bridges of Wales	Breese G.	2001	Gwasg Carreg Gwalch	The book reads like a critique of Jervoise, but there is useful information, even if it is hard to access
Walking on Bridges	Bray R.	2009	Hayloft Publishing Ltd.	Locates Lake District Bridges
The Medieval Bridge & St. Gabriel's Chapel, Bishop's Clyst	Brown S.	1982	Devon Arch. Soc: Proc. No. 40	Good description of important old bridge
The Exe Bridge, Exeter	Brown S.	2010	Exeter City Council	Informative, good photographs

<b>BOOK/ PAPER TITLE</b>	<b>AUTHOR(S)</b>	<b>DATE</b>	<b>PUBLISHER</b>	<b>COMMENTS</b>
Bridges of the River Wear	Cockerill K.	2005	The People's History, Ltd.	Describes all river bridges, including the medieval ones.
Medieval Bridges	Cook M.	1998	Shire	Excellent summary
Bridges on the River Wye	Crow A.	1995	Lapridge Publications	Descriptions and photographs of over 70 bridges, workmanlike
Bridges of Breconshire	Davies D.	1992	Cambrian Printers	Interesting details
From Trackways to Motorways	Davies H	2006	Tempus	Sets bridges in context
The River Bridges of Northumberland, 3 booklets	Dickens T	1975 - 1981	Various	Describes the few medieval bridges on the Rivers Coquet, Aln and Till
Medieval Bridges in Northamptonshire	Goodfellow P.	1985/86	Journal of the Northants. Record Society	Comprehensive Gazetteer
Bridges in Hampshire of Historic Interest	Grayling B.	2000	Hampshire County Council	Shows the few pre-1700 bridges in Hampshire and many others
The Bridges of Medieval England	Harrison D.	2004	Oxford University Press	Scholarly, very informative, not afraid to theorise
An illustrated Guide to the Packhorse Bridges of the Lake District	Hartwell M.	1994	Ernest Press	Good sketches of 21 bridges, and access information, little detail about the bridges
Swarkeston Bridge and the Stanton Causeway	Heath G.R.	1994	Footprint Press Ltd.	Clear history
A Guide to the Packhorse Bridges of England	Hinchcliffe E.	1994	Cicerone Press	Excellent. Describes and locates 190 bridges, most complete for the north.
Excavation of a Medieval Bridge at Waltham Abbey, Essex in 1968	Huggins P.J.		Learned Paper, Medieval Archaeol 14, 1970 (1971) 126-47	
The Ancient Bridges of Scotland and Their Relation to the Roman and Medieval Bridges of Europe.	Inglis H.R.G.	1912	Society of Antiquaries of Scotland Learned Paper	Interesting general survey in introduction.
The Roads and Bridges in the Early History of Scotland	Inglis H.R.G.	1913	Society of Antiquaries of Scotland Learned Paper	Pioneering collection of information and analysis
The Most Ancient Bridges in Britain	Inglis H.R.G.	1915	Society of Antiquaries of Scotland Learned Paper	Extends analysis from Scotland to Northern England
Cornwall's Bridges & Viaducts Heritage	Kentley E.		Twelveheads Press	Adds little to Henderson save some better photographs but nicely produced
The Bridges of Britain	Maré E. de	1954	Batsford	The best 'popular' account I have read, though the author is unashamedly more interested in bridges post-1700
Jaggermen's Bridges on Packhorse Trails	McEwen C.	2008	Sledgehammer Engineering Press	Describes over 70 Packhorse Bridges in the North of England. Good B/W photographs, chatty accounts, some measurements. A really nice book
An Encyclopaedia of British Bridges	McFetrich D.	2010	Priory Ash Publishing	Unique source, though smaller old bridges, mainly absent; accounts of 1650 bridges and much else

<b>BOOK/ PAPER TITLE</b>	<b>AUTHOR(S)</b>	<b>DATE</b>	<b>PUBLISHER</b>	<b>COMMENTS</b>
Discover Dorset - Bridges	McFetrich D. & Parsons J.	1998	The Dovecot Press	Good descriptions and photographs of medieval bridges in Dorset
Ditchford Bridge, Irchester, Northamptonshire	McKeague P.	1988/1989	Learned Paper, Northamptonshire Archaeology 22	
Discovering Bridges	Metcalfe L.	1970	Shire	Much information in a small space
The Brig of Ayr and Something of Its Story	Morris J. A.	1912	Stephen & Pollock	Focus on 18 <sup>th</sup> and 19 <sup>th</sup> century history of a famous bridge
Irish Stone Bridges – History and Heritage	O’Keeffe P. & Simington T.	1991	Irish Academic	A wonderful book, comprehensive and inspirational.
Some Yorkshire Bridges of Beauty and Romance	Patchett A.N.	1992	The Pentland Press	Idiosyncratic, but informative, describes a good proportion of Yorkshire medieval bridges
A Heritage of Bridges between Edinburgh, Kelso & Berwick	Paxton R. & Ruddock T.		The Institution of Civil Engineers	Informative, but mainly chooses better known bridges
Cam Bridges	Pierpoint R.J.	1976	The Oleander Press of Cambridge	Interesting, but bridges are mainly post-1700
Fords, Ferries, Floats and Bridges near Lanark	Reid T.	1913	Learned Paper obtained from Internet	Eccentric, but informative
The River Wey Bridges between Farnham and Guildford	Renn D.F.		Learned Paper reprinted from Research Volume of the Surrey Archaeological Society	Good detailed engineering account of unique set of medieval bridges
Clopton Bridge	Ribbans M.	2005	RFP	Comprehensive account of famous Stratford-upon-Avon bridge.
Medieval Bridges	Salter M.	2015	Folly Publications	Very brief accounts of c500 bridges in the UK with some small photographs & a good introduction
Bridges of Bedfordshire	Simco A. & McKeague P.	1997	Bedfordshire County Council	Excellent county survey of historic bridges, no other comparable
Monnow Bridge and Gate	Rowlands M. L. J.	1994		
The Bridges of Lancashire and Yorkshire	Slack M.	1986	Derek Doyle & Associates	Informative, if by no means comprehensive, a good snapshot
The Clapper Bridges of Dartmoor and Some Myths and Tall Tales of the Moor	Stuart J.		Orchard Publications	Excellent pictures, not over-informative
Bridges on the Teign Rivers	Thomas D.L.B.	1997	Trans. Devon Ass. 129 ps. 145-183	Comprehensive data on bridges of R. Teign & its tributaries. Excellent
Dorset Bridges - A History and Guide	Wallis A.J.	1974	The Abbey Press, Sherborne	Written by bridge maintenance engineer, good descriptions
Moulton Packhorse Bridge	Watkins A.A.	1932	Learned Paper, PDF Suffolk Institute	Some useful general and local information
The Long Bridge of Bideford through the Centuries	Whiting F. E. & Christie P.	2006	Lazarus Press	
The Town Gates and Bridges of Medieval Leicester	Wilshere J.	1982	Chamberlain Music & Books	Unfortunately none of those dealt with have survived

BOOK/ PAPER TITLE	AUTHOR(S)	DATE	PUBLISHER	COMMENTS
A Century of Bridges - An Illustrated Guide to all the Bridges that Cross the Severn	Witts C.	1998	River Severn Publications	Sketches and brief notes on all, though only one, at Bridgnorth falls tenuously into my domain
Crossing Places of the Upper Thames A History and Guide	Woolacott A.	2008	Tempus	Idiosyncratic, but informative, some important bridges not photographed
Bridges of Britain, A Pictorial Survey	Wright G.N.	1973	D. Bradford Barton Ltd.	Excellent photographs
The Bridges of Wiveton	Wright J	2001	Learned Paper, PDF from The Glaven Historian	Much about an important Norfolk bridge
Bridges Explained	Yorke T.	2008	Countryside Books	Principles underlying the construction of masonry bridges simply explained

**Amongst relevant web sites are;**

[www.britishlistedbuildings.co.uk](http://www.britishlistedbuildings.co.uk)

Indispensable but not infallible, and the names by which bridges are known are sometimes a puzzle

<http://www.pastscape.org.uk/default.aspx>

English Heritage site

[www.transportheritage.com](http://www.transportheritage.com)

Brief accounts of many old bridges

[www.engineering-timelines.com](http://www.engineering-timelines.com)

Similar entries to above

[www.scotlandsoldestbridges.co.uk](http://www.scotlandsoldestbridges.co.uk)

Information on the majority of old bridges in Scotland

<http://www.rcahms.gov.uk/>

Official Scottish buildings site

<http://www.oldroadsofscotland.com/index.html>

Places some old Scottish bridges in context

[www.british-history.ac.uk](http://www.british-history.ac.uk)

Variable, with not all areas covered, and some county authors seeming less interested in bridges, but some excellent accounts and pictures

[www.somersetivers.org](http://www.somersetivers.org)

Every bridge in county

[www.bridgesonthetyne.co.uk](http://www.bridgesonthetyne.co.uk)

Most on main rivers in England north of Tees

[www.ceh.ac.uk/index.html](http://www.ceh.ac.uk/index.html)

Centre for Ecology and Hydrology, gives river discharge rates

[www.geog.port.ac.uk/webmap/thelakes/html/topics/bridgef.htm](http://www.geog.port.ac.uk/webmap/thelakes/html/topics/bridgef.htm)

Every bridge in Cumbria, locations, dates and relevant Listed Building entries.

<http://www.coflein.gov.uk/>

Official Welsh buildings site

<http://www.riverchew.co.uk/index.htm>

About a river near Bath with a number of old bridges

<http://wantage-museum.com/wp-content/uploads/2013/04/Medieval-Bridges-in-Oxfordshire.pdf>

Useful listing of Medieval bridges in Oxfordshire

<http://www.glen-johnson.co.uk/cardigan-bridge/>

Informative History of Cardigan Bridge

## APPENDIX – Old Bridges in Great Britain, Identified but not Visited

These bridges fall into two categories, namely those which I term compendium bridges, i.e., those which appear in the Tables as ‘not yet visited’, and those which seem inaccessible because they are on private land.

### 1. Compendium Bridges not yet Visited

	Region	No.	Bridge	OS Location	Post Codes	Comments
1	Scot.	O1	Birsay Bridge	HY 248 276	KW17 2LX	
2	Scot.	H1	Huna Mill Bridge	ND 372 733	KW1 4YR	
3	Eng. N.	C8	Dean Calva PH Br.	NY 059 265	CA13 0UW	Nr. Workington, E. of A595
4	Eng. N.	C17	High Sweden Bridge	NY 379 068	LA 22 9LX	
5	Eng. N.	C35	Slaters Bridge (1) & (2)	NY 312 030	LA 22 9PA	W of A593 to Little Langdale, S
6	Eng. N.	C38	Throstle Garth Bridge	NY 228 038	CA19 1TH	
7	Eng. N.	C42	Willy Goodwaller Bridge	NY 322 087	LA 22 9QL	
8	Eng. N.	NY42	Ling Gyll Bridge	SD 803 789	BD23 5JP	Pennine Way
9	Eng. N.	Y15	Newsholme Dean Brs.	SE 019 405	BD22 0QA	Doubtful access through farm
10	Eng. E.	DE14	Edale PH Bridge	SK 088 862	S33 7ZJ	
11	Eng. S.	LN2	Hanwell Bridge	TQ 151 801	W7 2NJ	Uxbridge Rd.- Paddington Line
12	Eng. S.	IW1M	Carisbrooke Castle Br.	SZ 486 878	PO30 1XY	
13	Eng. S.	DO4	Corfe Castle Bridge	SY 955 815	BH20 5HE	W of West St., S of last house
14	Eng. S.	DO20	Sharford Bridge	SY 967 847	BH20 5DN	400m E of rd. N from Corfe
15	Eng. S.	SM5	Bolters Bridge	ST 606 334	BA4 6SG	800m N of Alford Church
16	Eng. S.	SM22	Kentsford Bridge	ST 058 426	TA23 0JR	800m from B3190
17	Eng. S.	SM27	Lyncombe PH Bridge	SS 876 361	TA23 0JD	
18	Eng. S.	SM30	Pill Bridge	ST 500 234	BA22 8UA	1km W of Pill Bridge Lane
19	Eng. SW.	DV12	Bicknor Bridge	SS 738 279	EX36 3HG	No nearby road
20	Eng. SW.	DV36	Foxworthy Bridge	SX 757 820	TQ13 9UY	On a farm track
21	Eng. SW.	DV43	Hatch Bridge	SX 714 472	TQ7 4AJ	W of A381, poor access
22	Eng. SW.	DV85	Topsham Bridge (Avon)	SX 733 511	TQ7 4DR	Access from B3196 very poor
23	Eng. SW.	DV1M	Hartland Abbey Bridge	SS240 249	EX39 6DT	
24	Eng. SW.	CW6	Camborne Mill Clap. Br.	SW 632 387	TR14 0QH	via Roskilly Rd., poor
25	Eng. SW.	CW12	Gweek New Road Br.	SW 703 265	TR12 6UF	
26	Eng. SW.	CW17	Lady Vale Clapper Br.	SX 100 667	PL30 4AL	
27	Eng. SW.	CW25	Polyphant Bridge	SX 266 823	PL15 7PT	W of A30
28	Eng. SW.	CW30	St. Levan Clapper Bridge	SW 402 228	TR19 6HJ	Access from B3315
29	Wales	GY1	Afon Trwsgl Clapper	SH 546 493	LL55 4UU	No nearby road
30	Wales	GY13	Pont Gweirglodd Gilfach	SH 888 260	LL23 7DF	E of A494
31	Wales	PO7	Pont-y-Clochydd	SH 990 120	SY21 0NT	N of A458, Banwy, distant from road
32	Wales	GW3	Devil's PH Bridge	SO 215 125	NP7 0LW	S of A465

### 2. Inaccessible Bridges on Private Land

The bridges in the following table are on private land, and are not visible from outside the boundary or a right of way. Some of the sites in question are private houses open occasionally, whilst others are conference and wedding venues, open to those with business there. Some may be visited in the future, but they cannot be targeted. They have been numbered amongst the compendium population.

	Division	No.	Bridge	OS Location	Date	Comments
1	Scotland	T9	Panmure Castle Bridge	NO 535 382	17 <sup>th</sup> C	Behind locked lodge gates
2	England - North	D1M	Low Butterby Bridges	NZ 276 394	17 <sup>th</sup> C	Farm, no ROW
3	England - North	NY1M	Dinsdale Manor Ho. Br.	NZ 346 110	15/16 <sup>th</sup> C	Private House
4	England - North	Y5	Harden Beck Footbridge	SE 099 385	17 <sup>th</sup> C?	Private Golf Course
5	England - East	NT1M	Hodsock Priory Bridge	SK 611 855	16 <sup>th</sup> C	Wedding Venue
6	England - East	BE1M	Bletsoe Castle Bridge	TL 025 584	16 <sup>th</sup> C	Private House
7	England - East	CA1M	Haslingfield Manor Br.	TL 405 523	17 <sup>th</sup> C	Private House



8	England - East	NF1M	Attleborough Hall Bridge	TM 050 963	16 <sup>th</sup> C	Farm, no ROW
9	England - East	NF4M	Hunstanton Hall Bridge	TF 692 418	14/15 <sup>th</sup> C	Privately owned
10	England - East	NF6M	Stanfield Hall Bridges	TG 144 010	16/17 <sup>th</sup> C	Private House
11	England - East	SF1M	Crows Hall Moat Bridge	TM 192 628	16 <sup>th</sup> C	Wedding Venue
12	England - East	SF5M	Kentwell Hall S. Moat Br.	TL 863 479	16 <sup>th</sup> C	HHA Open infrequently
13	England - East	SF6M	Little Haugh Bridge	TL 953 666	16/17 <sup>th</sup> C	Privately owned
14	England - East	SF7M	West Stow Hall Bridge	TL 816 709	16 <sup>th</sup> C	B&B
15	England - East	ES2M	Latchley's Manor Bridge	TL 671 396	16 <sup>th</sup> C	Farm
16	England - East	ES4M	Takely Warish Hall Br.	TL 568 221	17 <sup>th</sup> C	B&B, maybe visible
17	England - W. Midlands	CH1M	Chorley Hall Bridge	SJ 838 782	16 <sup>th</sup> C	Private House
18	England - W. Midlands	CH2M	Holford Hall Bridge	SJ 709 755	17 <sup>th</sup> C	Wedding Venue
19	England - W. Midlands	CH3M	Hulme Hall Bridge	SJ 725 724	15/18 <sup>th</sup> C	Private House
20	England - W. Midlands	CH5M	Lower Huxley Hall Bridge	SJ 498 623	14/15 <sup>th</sup> C	Private House
21	England - W. Midlands	CH6M	Lymm Hall Bridge	SJ 684 871	17 <sup>th</sup> C	Privately owned
22	England - W. Midlands	ST1M	Caverswell Castle Bridge	SJ 951 428	17 <sup>th</sup> C	Privately owned retreat
23	England - W. Midlands	ST2M	Eccleshall Castle Bridge	SJ 828 295	14 <sup>th</sup> C	Wedding Venue
24	England - W. Midlands	WA18	Stoneleigh Coach Bridge	SP 338 722	1679	Pr. Golf Course
25	England - South	SY1	Abbey Mill Bridge	TQ 051 671	1500	Pr. Nursing Home
26	England - South	OX1M	Beckley Park Moat Bridge	SP 577 120	16 <sup>th</sup> C	Privately owned
27	England - South	OX3M	Compton Beauchamp Bridge	SU 280 869	16 <sup>th</sup> C	Private House
28	Wales	GY2	Bedgellert Roman Bridge	SH 648 527	15 <sup>th</sup> C	Private Camp Site
29	Wales	GY21	Tan-y-fynwent Clapper Bridge	SH 330 816	14/15 <sup>th</sup> C	Private Land