HABITUAL MASONRY STYLES AND THE LOCAL ORGANISATION OF CHURCH BUILDING IN EARLY MEDIEVAL IRELAND

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Abstract

The results of a masonry analysis of the majority of Irish pre-Romanesque churches are presented. A number of local styles are identified in high-density areas, mostly in the west of the country and it is shown that the differences between these styles were not determined by geology. It is argued that these styles represent habitual variation and are therefore indicative of local groups of masons working over a relatively short period of time. This assessment is supported by an analysis of stone supply that suggests that quarrying was organised in an ad hoc manner to supply local needs. These churches are normally placed within a broad timeframe spanning the tenth to early-twelfth centuries but a number of factors combine to suggest that the habitual styles are a relatively late development, perhaps mainly from the mid-eleventh century onwards. Some of the implications of this proposed refinement of the existing chronology are briefly discussed.

Introduction

The vast majority of the stone pre-Romanesque churches of Ireland are simple, unicameral structures with little or no sculptural embellishment. They can be divided into two main groups based on the presence or absence of antae: pilaster-like projections of the side walls beyond the end walls that most authors agree are 'translations into stone of the corner posts of timber prototypes' (Leask 1955, 56; see also Harbison 1982, 624; Hamlin 1984; see O'Keeffe 1998; 2003, 70–1 for an opposing view). Apart from these types, there is a substantial group of relatively early drystone churches mainly confined to peninsular Kerry that appear to have developed in or around the eighth century (see White Marshall and Walsh 1998, 106; see also Harbison 1991, 82; 1999, 194; O'Keeffe 1998; Ó Carragáin 2003; 2005b), and a small number of late-eleventh-/early-twelfth-century nave-and-chancel and barrel-vaulted churches, mainly in the Dublin/Wicklow area. I would agree with O'Keeffe (1998, 122; 2000, 315; see also Stokes 1875, xxv; Leask 1955, 79; Ó Carragáin 2005a) that these Dublin/Wicklow churches should not be categorised as pre-Romanesque given that they represent the arrival in Ireland of technology associated with Romanesque churches abroad. Nonetheless they are included in the present study because they are broadly contemporary with many of the pre-Romanesque churches in the area (see below). It may be that the simplicity of the unicameral mortared churches arises from a desire to emulate earlier buildings associated with the heroic age of church foundation (Petrie 1845, 192; Dunraven 1875; Radford 1977, 5; Harbison 1982, 624). In many cases remarkable care is taken in their construction, their fabric comprising large and/or carefully-fitted blocks

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(on the varying degrees of care taken with masonry in Anglo-Saxon churches see Taylor 1978, 980; Rodwell 1986). This practice produces a style that is generally termed 'cyclopean'. Strictly speaking, cyclopean masonry is 'composed of irregularly-shaped very large blocks, sometimes approximating to polygons, dressed sufficiently for them to fit tightly together, without mortar' (Stevens Curl 1999, 188). The Irish examples are mortared and only a minority are characterised by all the other traits listed in this definition; nonetheless, I would disagree with Macalister's suggestion that the term should be abandoned altogether (Macalister 1928; see also Leask 1955, 53) It is useful, as it allows us to distinguish churches that incorporate some cyclopean characteristics, though, as shown below, a number of quite distinct sub-styles fall into this category.

Some have argued that cyclopean masonry has implications for the dating of churches. For Petrie (1845) it contributed to the 'antiquity of character' that led him to ascribe unacceptably early dates to many churches. Stokes (1878, 49, 54–5; 1887, 167) expressed scepticism about the use of church masonry as a dating tool; but she obviously saw more potential in round tower masonry because she attempted to define particular styles and to date them by associating them with particular aperture types. Several decades later Phipps (1939, 58, 61–3) made an equally unconvincing attempt to date churches using the same method. Though Leask stated that the use of large slabs is 'an undatable building custom' (1955, 53. See also 1955, 61, 67; 1929, 25) he tended to see non-cyclopean churches like the diminutive tomb-shrine of St. Ciarán at Clonmacnoise as relatively late. But in fact radiocarbon dating has since revealed that St. Ciarán's and some of the other tomb-shrine churches are likely to be among the earliest mortared structures in the country (Berger 1992; 1995; Harbison 1991, 151; O'Keeffe 1998; see also Manning 2003; MacDonald 2003). Leask's theory is also undermined by his own dismantling of St. Molua's, Co. Clare (in advance of the Shannon hydro-electric scheme). This revealed that the non-cylcopean nave was earlier than the chancel, forcing him to abandon his previously-stated opinions about the church (Leask 1930, 130). Clonmacnoise Cathedral, our earliest historically-dated (*c.*909) stone church, (Manning 1998), is also non-cyclopean. This led Manning (1995, 16) to suggest that cyclopean masonry is 'largely a phenomenon of the later-tenth and eleventh centuries.' I would broadly agree with this statement but only insofar as it seems to be generally true of mortared congregational churches (as opposed to tomb-shrines). If we accept the current consensus that such churches only began to be built at major sites from *c.*900 (e.g. Manning 2000a; see further below), then there is annalistic evidence to suggest that cyclopean masonry developed quite early in the sequence. There are just five tenth-century annalistic references to stone churches (extant or otherwise) and remarkably two of the three that still survive have masonry with cyclopean traits: namely Tuamgraney, probably built before 964 (*Chronicon Scotorum*; see Hennessy 1866), and Dulane, which Manning (2000a, 49; see also Harbison 1970, 49) himself believes is the church mentioned in 920 in the *Annals of Ulster* (see Mac Airt and Mac Niocaill 1983, 370). Both churches incorporate some massive blocks and feature the rising and dipping of courses characteristic of the cyclopean style. It is argued below (see also Manning 1998, 76) that deep antae are indicative of an early date, and in this context it is significant that Dulane has the deepest extant antae in the country (approximately 0.74m); those of Tuamgraney are also relatively deep (approximately 0.59m). It must therefore be

concluded that the style cannot of itself be used to date churches within the tenth- to early-twelfth-century period, though it is argued below that distinct local variants of the style have chronological implications.

Generally, cyclopean masonry is explained in purely functional or environmental terms. For example, Leask (1955, 51) suggested that large blocks were used in areas where they were readily available in order to save mortar. The same explanation was offered by Morris for the reuse of large blocks from Roman buildings 'of monumental character' in pre-twelfth-century Yorkshire (1988, 193). In the Irish case, such conclusions are entirely negated by the copious use of mortar in the rubble core of cyclopean buildings, which, as Brash (1868, 152) noted, essentially makes them compound walls of masonry and mortar. In fact we have no reason to doubt that, like the Romans, the Irish and Anglo-Saxons chose large blocks in order to lend a monumental quality to their churches. Bede's description of the building of Cuthbert's hermitage is one of a number of insular texts that show how the use of large stones could exemplify the power of God as mediated through a saint and his successors:

> Some of these stones were so great that it would seem to have been scarcely possible for four men to have lifted them, but nevertheless he was found to have brought them thither from elsewhere with angelic aid, and to have placed them in the wall (Colgrave 1940, 97; see also 217; for other examples see Petrie 1845, 174; Plummer 1910, clvi; Bitel 1990, 59; Ó hÓgáin 1999, 180–1).

However, Irish cyclopean masonry is not solely characterised by the use of large blocks. Many examples comprise modest but irregular blocks, individually-shaped and carefully-fitted in rising and dipping courses. This is an aesthetic somewhat removed from the sense of order that monumental Roman masonry conveys. Even where the jamb stones of doorways are chosen to mirror those of the opposite jamb, the result is a rough-hewn symmetry that paradoxically draws attention to the slight irregularities that remain (see Pl. I). The effect of this masonry is to highlight the fact that a church is made up of many individual blocks. This obviously underscores the effort it took to build it. It also brings to mind the emphasis on the materials used in church construction in documentary sources such as the following quatrain about the building of a wooden church at Rathan (cited in Petrie 1845, 353–4, emphasis added; for other examples see Ffrench 1892, 378; Herren 1974; Scully 2001; see the excellent discussion of this theme in O'Keeffe 2003, 65–7; see also Ó Carragáin 2002, vol.1, 170–5, 187–91, 229–31):

> O my Lord! what shall I do
> About these *great materials*?
> When shall be seen in a jointed edifice
> These ten hundred boards?

This preoccupation with materials should, perhaps, be seen in the context of early church writings by Eusebius, Isodore and Ambrose, for example, in which the very fabric of the church becomes a symbol for the body of the faithful with its strong and weak members (Williamson 1990; see also Doherty 1985, 47; O'Reilly 1994, 359–60; 1995, xxii–xxiii). These writers were drawing primarily on two scriptural

PL. I—View of the west façade of Kiltiernan, Co. Galway.

texts: I Peter 2:5, which calls on Christians to be 'as living stones built up, a spiritual house', and Ephesians 2:20–21, which describes the formation of a new people of God 'built upon the foundation of the apostles and prophets, Jesus Christ himself being the chief cornerstone in whom all the building framed together grows into a temple.' Irish ecclesiastics were obviously very familiar with this metaphor, and there may even be a visual representation of the 'living stones' under the Temple in Book of Kells, Folio 202v (O'Reilly 1994, 359–60). This symbolic link was made explicit in the public dedication ceremonies of Carolingian churches. Repsher comments that it taught the congregation, through the living liturgy, that the *ecclesia* is the people, and that it existed as living stones, thereby solidifying all Christians into one body (1998, 120). This was a clear statement of the fact that church buildings were conceived of as microcosms of the world, as well as ante-types of the world to come (see for example Hani 1990, 33–41). Similar cosmological overtones have been recognised in the overall layout of Irish ecclesiastical sites (Doherty 1985; Aitchison 1994); and, while most of the details of Irish church-dedication ceremonies do not survive, it seems likely that they too made this symbolic link between fabric and congregation. It is possible that the more carefully-built cyclopean churches were simply whitewashed so that the masonry remained visible on completion. However, we should bear in mind that render probably obscured the masonry of most mortared churches. Original render was preserved between the two early medieval phases of the non-cyclopean church at Friar's Island (Leask 1930, 131, 134), and possible instances have also been noted on other non-cyclopean churches (Manning 1998, 63, fig. 9; White, Marshall and Rourke 2000, 85–6). Even so, we should not underestimate the impression that the transportation and skilled fitting of these blocks would have made on both lay and clerical audiences, even where the blocks were eventually

covered in render. The act of building, and especially church building, was significant in itself. It was an expression of social power that utilised considerable resources and arcane knowledge in a very public manner (e.g. Markus 1993). In light of the symbolism referred to above, it must also be seen as an act of creation that recalled the pre-eminent cosmogonic act, the creation of the world (see Eliade 1954, 17–19; 1957). The aesthetics and iconography of these buildings merit more detailed treatment, but these are not the principal concerns here. Rather, this paper presents the results of an analysis of the masonry, both cyclopean and non-cyclopean, of most extant pre-Romanesque churches. Though geology obviously influences masonry style, it is argued that cultural factors are even more influential. These include the conscious decision to build in the cyclopean style; but even minor variants of that style are the product of cultural processes, namely the development of habitual practices among groups of craftsmen. Particular attention will be given to the chronological implications of these local styles.

Methodology

To date Ní Ghabhláin's study of the diocese of Kilfenora is the only one to attempt a systematic masonry analysis of Irish churches (Ní Ghabhláin 1995, 94–105; for a comparable treatment of Cashel masonry styles see Blair Gibson 1990, 241–304). It therefore merits detailed discussion here. Her aim was to differentiate statistically between masonry of different periods as a way of dating churches without surviving apertures. She identified three period-specific styles and her characterisation of them can be summarised as follows:

TABLE 1: The masonry styles identified by Ní Ghabhláin (1995, 94–105) in the churches of Kilfenora

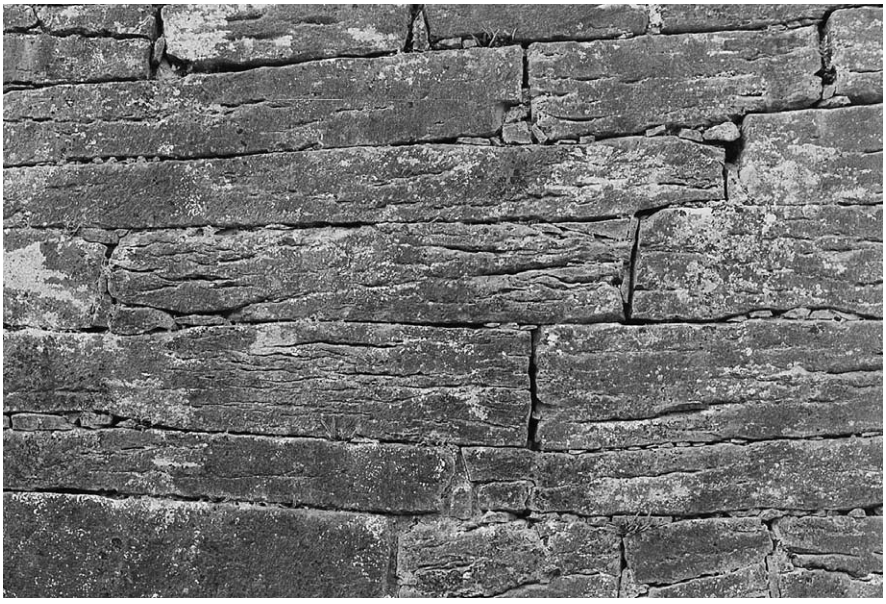
Pre-Romanesque	1m–3m long blocks	few spalls	well fitted
12th/13th century	0.5–1.0m long blocks	some spalls	moderately well fitted
15th/early-16th century	blocks under 0.5m long	frequent spalls	poor fitting

Her method involved subjecting twenty-five two-metre-squared sample wall sections to two-phase Student T-Squared tests of variance involving three main variables: block length, block breadth and standard deviation of the first two. The effectiveness of such statistical tests is determined by the degree to which the variables chosen for testing characterise the data set. Inevitably the number of variables must be limited if the statistics are to remain manageable (in the absence of a computer programme that can automatically recognise particular characteristics). In this case the three variables chosen were those that describe block size and shape. Thus other important factors such as the fitting of blocks and the number of spalls employed could not be taken into account. These omissions led to a few datings with which the present author disagrees. For example, Ní Ghabhláin's test places the nave of Drumcreehy in the early group (Ní Ghabhláin 1995, 132). This nave is primarily of quite large blocks, but nonetheless the blocks are smaller on average and not as well-fitted as those of the

thirteenth-century chancel, which was not subjected to analysis. The prevalence of spalls and interstitial mortar (i.e. mortar visible between blocks) is uncharacteristic of early masonry in the area and, in the present author's opinion, it is late medieval. Ní Ghabhláin's method also identified Kilmacreehy and Kilmoon as pre-Romanesque, and she also suggested that Kilcorney is early (1995, 132, 441) but, though the first two in particular incorporate a few massive blocks, the overall character of their masonry suggests that these three churches are high or late medieval.

These criticisms aside, Ní Ghabhláin's study is groundbreaking and in general successful. Because Kilfenora is geologically quite homogenous, differences in block size usually do correspond to changes in masonry style over time and they are therefore useful for dating. However, it will immediately be apparent that such statistical tests would not be as effective in attempting to define regional styles within the pre-Romanesque period. The number of churches means there would be a prohibitive amount of data involved in analysing just two or three traits; and we have already seen that even in a geologically-discrete area, this number of variables is not always sufficient to assign buildings to the correct group. It would certainly be insufficient over a wider area where other factors come into play—including the influence of geology on variables such as block size and shape. For example, the early church at Templemore, Co. Clare, only a short distance outside the boundaries of Kilfenora, is built of small to medium-sized, poorly-fitted blocks and could not, therefore, have been dated using Ní Ghabhláin's method. Therefore the present study is based on the consideration of a much wider range of traits than statistical analysis would reasonably allow. In recent years most theorists have been critical of New Archaeologists' over-reliance on statistical methods. They argue that statistics are part of a mathematisation of the discipline that is often falsely equated with achieving objectivity (see Shanks and Tilley 1992, 35–6, 57) but that in practice, often results in 'a fog of normative descriptions rather than a clarity of explanation' (Barrett 1981, 214). However, acknowledging these criticisms does not necessarily mean a total abandonment of quantitative or statistical methods; they have been employed in several studies characterised by a theoretically-sophisticated approach (for example, see Hodder 1982; 1991, 134). The reasons for not employing them here then are practical rather than theoretical.

In this present study, the masonry was analysed using dedicated masonry shots taken exactly three metres from the wall face (see Pls II–XI). These were taken with a standard 50mm lens and represent an area of 1.85m by 1.25m. The photographs are of the lower wall courses because the upper courses and gables are rarely built with the same degree of care. However, care was taken not to allow a few large blocks set on edge at the wall base to give a false impression of the masonry's character. These shots allow some degree of objectivity when comparing masonry from different churches, especially when studied carefully in conjunction with general shots and detailed field notes. Thus, though labels such as 'poor' and 'very good' are not inherently well-defined, the careful comparison of photographs means that here they represent quite consistent, albeit relative, categories. To date, most discussions have given the impression that the cyclopean style is homogenous, but closer inspection shows this to be incorrect. Individual analysis of a range of traits should result in a much clearer understanding of stylistic variability than has hitherto been possible (see, for example, Goodby 1998 who has devised a similar methodology for attribute analysis of pottery). The information has been summarised in Table 2, and Figs 1–3 represent three of the traits in map form.



Pl. II—Masonry shot of Oughtmana, Co. Clare. Example of the north Clare/southwest Galway style.

Pl. III—Masonry shot of Killeelig More, Co. Galway. Example of the north Clare/southwest Galway style.

Pl. IV—Masonry shot of Temple MacDuagh, Co. Galway. Example of the Aran Islands style.

Pl. V—Masonry shot of Kilcanonagh, Co. Galway. Example of the Aran Islands style.

PL. VI—Masonry shot of Kilkeeran, Co. Galway. Example of the Lough Corrib/Lough Mask style.

PL. VII—Masonry shot of Portacarron, Co. Galway. Example of the Lough Corrib/Lough Mask style.

Pl. VIII—Masonry shot of Kilsheelan, Co. Tipperary. Example of the East Munster style.

Pl. IX—Masonry shot of Tybroughney, Co. Kilkenny. Example of the East Munster style.

PL. X—Masonry shot of Mungret, Co. Limerick. Example of the Limerick style.

PL. XI—Masonry shot of Killulta, Co. Limerick. Example of the Limerick style.

TABLE 2: Characteristics of Masonry in Irish Pre-Romanesque Churches

Name	County	Stone used	Coursing	Rise/ Dip	Block Size Range	On Edge	Shape	Fitting	Joggle Joints	Spalls	Visible Mortar
Killevy	Armagh	Granite	No original masonry								
Agha Ph. 1	Carlow	Granite	Coursed	No	Small to medium	No	Roughly-sq. Rounded corners	Poor	None	Few	Liberal
Agha Ph. 2	Carlow	Granite	Some rough coursing	No	Small to q. large. A few v. large	No	Mostly irregular	Very poor	None	Very freq.	Quite liberal
Killoughternane	Carlow	Granite	Predom. uncoursed	No	Small to large	A few	Irreg. Some roughly squared	Fair	None	Q. frequent	Moderate
St. Mullin's T. More	Carlow	Granite	Roughly coursed	No	Medium. A few large	No	Often irregular	Gen. poor	None	Q. frequent	Quite liberal
St. Mullin's Well (Totally rebuilt)	Carlow	Granite	Coursed (rebuilt)	?	Medium to quite large	No	Roughly sq. Rounded corners	?	None	?	?
Aughinis Ph. 1	Clare	Limestone	Coursed	Some	Most large. Some v. large	Subs. Proport	Roughly to quite well sq.	Quite good	None	Very few	None
?Bishop's Island	Clare	Millstone grit	Not analysed								
Friar's Is. Ph. 1	Clare	Sandstone	Roughly coursed	No	Most medium. A few large	No	Roughly squared	Fair	None	Few	Quite liberal
Friar's Is. Ph. 2	Clare	Sandstone	Uncoursed	No	Small to medium	No	Mostly irregular	Fair	None	Few	Quite liberal
Inisdadrum	Clare	?	Not analysed								
Inishcealtra	Clare	Sandstone	Roughly coursed	Slight	Medium to large	No	Irreg. and roughly squared	Fair	None	Q. frequent	Quite liberal
Kilfenora	Clare	Limestone	Roughly coursed	Slight	Q. large to v. large. Some massive	Good proport.	Many irregular	Fair	None	Moderate	Moderate
Killaloe	Clare	Sandstone	Coursed/ roughly coursed	Slight	Most medium	No	Most roughly squared	Fair/ q. good	None	Quite few	Liberal
Nougaval	Clare	Limestone	Roughly coursed	?	Q. large to large	A few	Some shaped to fit.	Excellent	Yes	Few	Little to none
Oughtmana	Clare	Limestone	Coursed	Yes	Most large to massive	Some	?Squared and shaped to fit	Excellent	None	Few	None
Scattery Is. Cathedral	Clare	Coal Measures	Coursed in places	No	Small to large	Some at base	Mostly irreg. Some v. thin	Very poor	None	Very freq.	Moderate
Scattery Is. Temple Aird na nAingel	Clare	Coal Measures	Uncoursed	No	?Small to large. Not analysed	?Some	Mostly irregular	?Good	?None	?	?
?Temple Cronan	Clare	Limestone	Largely rebuilt	?	Medium to massive	?Some	Many irregular	?	None	?	?

Table 2: *Continued*

Name	County	Stone used	Coursing	Rise/ Dip	Block Size Range	On Edge	Shape	Fitting	Joggle Joints	Spalls	Visible Mortar
Templemore	Clare	Limestone	Coursed	No	Small to medium. Some q. large	No	Most roughly squared	Poor	None	Few	None
Tomfinlough 1	Clare	Limestone	Coursed	Yes	Most medium to massive	No	?Squared and shaped to fit	Good	?Natural	Few	None
Tuamgraney	Clare	Sandstone	Roughly coursed	Yes	Medium to large. A few massive	Some at base	Irreg. and roughly squared	Quite good	None	Few	Quite liberal
Ardskeagh (Totally rebuilt)	Cork	Sandstone	Some rough coursing	No	Medium to q. large. Some large	?Some	Some quite irregular	Fair	None	Quite few	Liberal
Brigown (Rebuilt)	Cork	Sandstone	Coursed	Slight	Medium to q. large. One large	Few	Squared	Excellent	None	Very few	Little
Britway	Cork	Sandstone	Roughly coursed	Yes	Med. to q. large. A few large/v. large	?Some	Squared and shaped to fit	Excellent	Yes	Very few	Little to none
?Coole Parish Church	Cork	Sandstone	Coursed (?roughly)	Slight	Medium to q. large	?Some	Quite well squared	Good	None	Few	Little
Coole Subsid. Church	Cork	Sandstone	Coursed/ roughly coursed	Some slight	Predom. medium. Some q. large	No	Q. irreg. to q. well squared	Fair to q. good	None	Few	Mod. to q. liberal
Croagh	Cork	?Sandstone	Uncoursed	No	Predom. small to med. some q. large	No	Variable	Poor	None	Q. frequent	None
Killeenemer (Rebuilt)	Cork	Sandstone	Roughly coursed	Slight	Medium to q. large. Some large	?Yes	Roughly	Excellent squared	?None	Few	Little
Labamolaga (Rebuilt)	Cork	Sandstone	Coursed	No	Small to medium. A few q. large	No	Roughly squared	Poor (Rebuilt)	None	Few	Liberal
Skeam W.	Cork	?Sandstone	Most roughly coursed	No	Medium to q. large.	No	Most thin Some v. large	Most q. good	None	Mod. to q. few	Little
Maghera	Derry	?Basalt	Uncoursed	No	Predom. medium to q. large	No	Irregular	V. poor	None	Frequent	Liberal
Rathlin O'Birne	Donegal	Granite analysed	Roughly coursed	Not	At least one massive						
Derry	Down	Shale	?V. roughly coursed	No	Small to medium. A few large	No	Predom. irregular	Fair to poor	None	Moderate	Liberal
Nendrum	Down	Shale	Little original masonry								
St. John's Point	Down	Shale	Roughly coursed	Yes	Medium to q. large. Some v. large	Esp. at base	Most roughly squared	Quite good	None	Quite few	Quite liberal
Dalkey Island	Dublin	Mostly granite	Roughly coursed	One instance	Small to q. large. Some v. large	A few	Irreg. and roughly squared	Fair	None	Q. freq. to freq.	Quite liberal

TABLE 2: *Continued*

Name	County	Stone used	Coursing	Rise/ Dip	Block Size Range	On Edge	Shape	Fitting	Joggle Joints	Spalls	Visible Mortar
Killiney	Dublin	M.sch./granite	Some rough coursing	No	Small to large	?No	Irreg. and roughly squared	Fair	None	Mod. to q. freq.	Quite liberal
Kill of the Grange	Dublin	Granite	Coursed	No	Small to medium	No	Irregular	Poor	None	Few	Liberal
Kiltiernan	Dublin	Granite	Uncoursed (?rebuilt)	No	Medium. A few large	No	Quite irregular	Fair	None	Quite few	Moderate
Palmerstown Ph. 1	Dublin	MC limestone	Uncoursed	No	Small to q. large. Some large	A few at base	Often irregular	Fair	None	Q. frequent	Moderate
Palmerstown Ph. 2	Dublin	MC limestone	Uncoursed	No	Most medium. Some q. large	Few	Often irregular	Fair	None	Moderate	Quite liberal
Rathmichael	Dublin	Granite/schist	Roughly coursed	No	Small to quite large	No	Often irregular	Poor	None	Frequent	Quite liberal
St. Doulagh's	Dublin	LC limestone	Some rough coursing	No	Small to quite large	No	Irreg. Some roughly squared	Fair	None	Moderate	Quite liberal
?St. Michael le Pole	Dublin	MC limestone	Little original masonry	?	?Small to medium	?No	?	?Fair	?	?	?
?Tully	Dublin	Granite	Little original masonry	?	?	?	?	?	?	?	?
Inishmacsaint	Fermanagh	LC limestone	Some rough coursing	No	Predom. medium to large	Some	Most roughly squared	Quite good	None	Quite few	Moderate
Boleyvaunaun	Galway	Limestone	Predom. uncoursed	Slight	Most q. large. Some med. to v. large	A few	Some roughy sq. Many irreg.	Quite good	None	Few	Little
Castleturvin	Galway	Limestone	Generally coursed	Slight	Medium to large. A few very large	A few	Most roughly squared	Good	None	Quite few	Little
Chapel Is.	Galway	Granite	Not analysed								
?Clonfert	Galway	Limestone	Coursed. Little visible	No	Most medium and q. large	No	Most roughly squared	Fair	None	?Moderate	Quite liberal
Crump Is.	Galway	Ordovician	Not analysed								
Donaghpatrick	Galway	Limestone	Some rough coursing	No	Most q. large/med. Some v. large	Just one	Many roughly squared	Quite good	None	Few	Moderate
Drumacoo	Galway	Limestone	Some rough coursing	No	Medium to large. One massive	Some at base	Some roughly sq. Many irreg.	Some q. good	None	Few low down. Q. freq. higher	Moderate
High Island	Galway	?Schist	Not analysed								
Inchgoill Ph. 1	Galway	?Sandstone	Some rough coursing	No	Medium to large. Some very large	Yes	Irreg/r. sq. Some shaped to fit	Good	Yes	Moderate	Very little
Kilcanonagh	Galway	Limestone	Some rough coursing	No	Q. large to v. large. Some massive	No	Irregular or roughly squared	Fair	None	Q. frequent	Quite liberal

Table 2: *Continued*

Name	County	Stone used	Coursing	Rise/ Dip	Block Size Range	On Edge	Shape	Fitting	Joggle Joints	Spalls	Visible Mortar
Kilgobnet	Galway	Limestone	Predom. uncoursed	No	Medium to large. One v. large	No	Irregular or roughly squared	Poor	None	Frequent	Little
Killagoola	Galway	Limest/granite	Predom. uncoursed	No	Most medium to large	?Some	Irregular or roughly shaped	Good	None	Moderate	Little
Killeelig More	Galway	Limestone	Roughly coursed	Yes	Most q. large to v. large. Some massive	Some	Squared and shaped to fit	Excellent	Yes	Very few	None
Killeenamunterlane	Galway	Limestone	Footings only	?	Most quite large	At base	Roughly squared	?	?	?	?
Killinny Ph. 1	Galway	Limestone	Most roughly coursed	Yes	Most med. to q. large. Some v. large	*c.*40%	Squared and shaped to fit	Excellent	Yes	Few or none	None
Killursagh	Galway	Limestone	Roughly coursed	No	Predom. q. large. A few large	No	Many irregular	Fair	None	Moderate	Quite liberal
Kilmacduagh. Cathed	Galway	Limestone	Uncoursed	No	Most medium to v. large	?Some	Many irregular	Very good	None	Frequent	Very little
Kilmacduagh St.John's	Galway	Limestone	Some rough coursing	Yes	Medium to large. Some massive	A few	Many irregular	Fair	None	Moderate	Moderate
Kiltiernan Ph. 1	Galway	Limestone	Most roughly coursed	Yes (esp@W)	Medium to v. large. Some massive	Some	Squared and shaped to fit	Excellent	Yes	Pract. none	None
Kiltiernan Ph. 2	Galway	Limestone	?Roughly coursed	No	Medium to large. A few v. large	Few	Irreg. and roughly squared	Quite good	No	?Few	Little
Mason Is.	Galway	Granite	Not analysed								
Omey Is.	Galway	Granite/schist	Uncoursed	No	Medium to quite large. A few massive	A few	Irreg. and roughly squared	Quite poor	No	Q. frequent	Liberal
Portacarron	Galway	Limestone	Predom. coursed	No	Predom. q. large. A few large	Good proport.	Q. well squared	Quite good	None	Few	Little or none
Rosshill Abbey	Galway	Limestone	Roughly coursed	No	Medium to q. large. Some large	No	Irreg. and roughly squared	Fair to q. good	None	Moderate	Moderate
St. MacDara's Is.	Galway	Granite	Uncoursed	No	?Med. to v. large. Some massive	Yes	Often irreg. and shaped to fit	Quite good	Not analysed		
Temple Benan	Galway	Limestone	Roughly coursed	No	Predom. q. large to v. large	Some	Squared	Good	None	Moderate	Moderate
Temple Brecan	Galway	Limestone	Predom. uncoursed	No	Medium to massive	Yes	Irreg. and roughly squared	Good	?Yes	Moderate	Quite little
Temple Chaomháin	Galway	Limestone	Predom. roughly crsd.	Yes	Medium to massive	One or two	Squared and shaped to fit	Good to v. good	None noted	Mod. to q. freq	Quite little
Temple MacDuagh	Galway	Limestone	Uncoursed	No	Predom. quite large to massive	Yes	Many roughly squared	Quite good	None	Frequent	Moderate

TABLE 2: *Continued*

Name	County	Stone used	Coursing	Rise/ Dip	Block Size Range	On Edge	Shape	Fitting	Joggle Joints	Spalls	Visible Mortar
Templenaneeve	Galway	Limestone	Some rough coursing	No	Predom. q large. Some med./massive	Quite a lot	Many roughly squared	?Fair to q. good	None	Q. frequent	Moderate
Templesoorney	Galway	Limestone	Some rough coursing	No	Medium to v. large	?No	Many roughly squared	Poor	None	Frequent	Liberal
Tighlagheany	Galway	Limestone	Coursed	No	Large to massive	Two+	Squared	Quite good	None	Moderate	Moderate
Ardfert	Kerry	Limestone	Roughly coursed	?No	Medium to massive	No	Many irregular	Quite good	None	Q. frequent	Moderate
Ballywiheen	Kerry	Sandstone	Uncoursed	No	Small to medium. Bigger in offset	No	Irregular	Poor	None	Quite few	None
Beginish	Kerry	Sandstone	Uncoursed	No	Predom. small to medium	No	Irregular	Poor	None	Few	None
Cappanagroun	Kerry	Sandstone	Some rough coursing	No	Predom. medium. Some q. large	No	Most roughy rectilinear	Quite good	None	Quite few	None
Church Is.	Kerry	Slate	Roughly coursed	No	Small to quite large	No	Roughly shaped. Thin	Fair	None	Q. frequent	None
Cloghanelinehan	Kerry	Sandstone	Uncoursed	No	Mostly medium. Some q. large	?No	Irregular	Poor	None	Quite few	None
Feaghmann W	Kerry	Sandstone	No original masonry	?	?	At base	?	?	?	?	?
Gallarus	Kerry	Sandstone	Predom. rough coursed	No	?Small to v. large. Some massive	No	Predom. irregular	Good	In door jambs	?Quite few	None
Illauntannig 1	Kerry	Limestone	Uncoursed	No	Small. Some med. and q. large	?No	Predom. irregular	Poor	None	?Quite few	None
Illauntannig 2	Kerry	Limestone	Some rough coursing	No	Small to med. Some large. 2 massive	At base	Predom. irregular	Poor to fair	No	Quite few	None
Inishfallen	Kerry	Lmst. (+ORS)	Coursed	No	Small to quite large. A few v. large	No	Most roughly squared	Fair	None	Moderate	Moderate
Inishtooskert	Kerry	Sandstone	Not analysed								
Inishvickillane	Kerry	Silurian shales	Uncoursed	?No	?Small to large (Not analysed in field)	?No	Mostly irregular	?Poor	None	Quite few	None
Illaunloughan	Kerry	Sandstone	Uncoursed	No	Small to medium	No	Irregular	Poor	None	Q. frequent	None
Kildreelig	Kerry	Sandstone	Uncoursed	No	Small to medium. Some q. large	No	Irregular	Poor	None	Moderate	None
Kilfountan	Kerry	Sandstone	Uncoursed	No	Small to medium. Some q. large	No	Irregular	Very poor	None	Quite few	None
Kilkeaveragh	Kerry	Sandstone	Uncoursed	No	Small to medium. Some q. large	No	Irregular	Quite good	None	Q. frequent	None
Killabuonia 1	Kerry	Sandstone	Uncoursed	No	Small to q. large. A few v. large	No	Irregular	Very poor	None	Few	None

Table 2: *Continued*

Name	County	Stone used	Coursing	Rise/ Dip	Block Size Range	On Edge	Shape	Fitting	Joggle Joints	Spalls	Visible Mortar
Killabuonia 2	Kerry	Sandstone	Uncoursed	No	Small to q. large. A few large	No	Irregular	Poor to q. good	None	Few to q. freq.	None
?Killeennamoyle	Kerry	Sandstone	?Some rough coursing	No	Small to q. large	No	Variable	Quite good	None	Few	None
Killelton	Kerry	Sandstone	Uncoursed	No	Small to q. large. Some large	No	Irregular and roughly squared	Fair to q. good	None	Moderate	Very little visible
Killemlagh	Kerry	Sandstone	No original masonry			At base					
Killoe	Kerry	Sandstone	Uncoursed	No	Small to medium. A few q. large	No	Irregular	Poor	None	Q. frequent	None
Killogrone	Kerry	Sandstone	?Uncoursed	No	Small to quite large	No	Irregular	Fair	None	Few	None
Kilmalkedar	Kerry	Sandstone	Uncoursed	No	Predom. small. Some medium	No	Irregular	Quite good	None	Frequent	None
Lateevemore	Kerry	Sandstone	Uncoursed	No	Small to quite large	No	Mostly irregular	Gen. poor	None	Q. frequent	None
Loher	Kerry	Sandstone	Uncoursed	No	Small to medium. One or two q. large	No	Irregular	Poor	None	Quite few	None
Ratass	Kerry	Sandstone	Roughly coursed	No	Medium to v. large	Some	Well squared	Good	Yes	Few	Moderate
Reask (Rebuilt)	Kerry	Sandstone	Uncoursed	No	Predom. small to medium	?	Irregular	?	?	?	?
Reencaheragh	Kerry	Sandstone	Sod-covered								
Skellig Michael 1	Kerry	Sandstone	Not analysed								
Skellig Michael 2	Kerry	Sandstone	Not analysed								
Skellig Michael 3	Kerry	Sandstone	Not analysed								
Skellig Michael 4	Kerry	Sandstone	Not analysed								
Temple Cashel	Kerry	Sandstone	Some rough coursing	No	Small to large	No	Quite well shaped	Gen. good	None	Mod to q. few	None
Temple Geal	Kerry	Sandstone	Uncoursed	No	Small to medium. Some q. large	No	Irregular	Poor	None	Moderate	None
Templemartin	Kerry	Sandstone	Uncoursed	No	Predom. medium. Some q. large	No	Irregular and roughly squared	Fair	None	Quite few	Very little
Confey	Kildare	Limestone	Coursed	No	Mostly medium. Some q. large	No	Quite well squared	Fair to q. good	None	Q. frequent	Moderate
Kilteel	Kildare	Shale(+granite)	Predom. rough coursed	No	Predom. small to med.	No	Often irregular	Poor	None	?Moderate	Liberal

TABLE 2: *Continued*

Name	County	Stone used	Coursing	Rise/ Dip	Block Size Range	On Edge	Shape	Fitting	Joggle Joints	Spalls	Visible Mortar
Moone	Kildare	Shale	Some rough coursing	No	Small to large. A few very large	No	Often irregular	Fair	None	Frequent	Moderate
Clara	Kilkenny	MC limestone	Generally coursed	No	Most med. to q. large. A few large	Few	Squared and irreg. Not v. thick	Fair. Some q. g	None	Moderate	?Moderate
Clonamery	Kilkenny	Granite	Generally coursed	No	Small to medium. Some q. large	Few	Squared and irregular	Fair	None	Q. frequent	Quite liberal
Donaghmore	Kilkenny	Limestone	No original masonry								
Kilree	Kilkenny	LC limestone	Roughly coursed	No	Small to q. large. Some v. large	No	Irregular and roughly squared	Poor	None	Frequent	Moderate
Sheastown	Kilkenny	MC limestone	Roughly coursed	No	Most med. to large. Some v. large	No	Irreg. and roughly sq. Q. thin	Most fair	None	Medium	Quite little
Tibberaghney	Kilkenny	Sandstone	Coursed	Slight	Most q. large. A few very large	Some	Shaped to fit	Excellent	None	Few	None
Tullaherin (lower wall)	Kilkenny	LC limestone	Some rough coursing	?No	Mainly quite large and large	Yes	Mostly irregular	Quite good	None	Moderate	Little
Tullaherin (upper wall)	Kilkenny	LC limestone	Generally coursed	No	Small to medium	No	Mostly irregular	Poor	None	Frequent	Moderate
Fenagh	Leitrim	LC limestone	Roughly coursed	No	Predom. quite large to v. large	No	Roughly squared and irreg.	Quite good	None	Quite few	Moderate
Ardpatrick	Limerick	Sandstone	Coursed esp. at south	No	Medium to q. large. One massive	Some	Most roughly squared	Gen. q. good	?Yes	Mod. to q. freq.	Little
Cloncagh (Largely rebuilt)	Limerick	Sandstone	Uncoursed	No	Small to q. large. Some large	?	Mostly irregular	V. poor to poor	None	V. frequent	Little to moderate
Clonkeen	Limerick	Sandstone	Some coursing	Yes	Most med to q. large. One massive	A few	Variable	Fair	None	Mod. to q. few	Quite liberal
Clonshire	Limerick	Limestone	Coursed	No	Medium to q. large. A few large	No	Most roughly squared	(?V) Good	None	Q. frequent	Quite little
Donaghmore	Limerick	Limestone	Coursed	Some slight	Most medium. Some q. large	No	Roughly squared	Fair	None	Mod. to freq.	Little to moderate
Dysert Aenghusa	Limerick	Limestone	Coursed	No	Most medium to v. large	Some	Quite well squared	Quite good	None	Few	Little to moderate
Kilfinny	Limerick	Limestone	Predom. uncoursed	No	Medium to q. large. A few large	A few	Mostly irregular	Good	None	Frequent	Little
Killulta	Limerick	Limestone	Coursed	No	Small to medium. A few large	A few	Most roughly squared	Fair	None	Moderate	Moderate
Kilrush	Limerick	Limestone	Coursed	No	Medium to v. large. Some massive	No	Quite well squared	Quite good	None	Few	Moderate

Table 2: *Continued*

Name	County	Stone used	Coursing	Rise/ Dip	Block Size Range	On Edge	Shape	Fitting	Joggle Joints	Spalls	Visible Mortar
Mungrets St. Nessan'	Limerick	Limestone	Coursed	No	Small to medium. ?A few q. large	No	Most roughly squared	Fair	None	Frequent	Q. liberal
Mungret Small	Limerick	Limestone	Roughly coursed	No	Most med. to large. A few v. large	No	Quite well squared	Quite good	None	Moderate	Moderate
Agharra	Longford	Sandstone	Generally coursed	No	Medium to large. A few massive	No	A few shaped to fit	Quite good	None	Moderate	Very little
Ardagh	Longford	Sandstone	Roughly coursed	In places	Predom. large to massive	Some	Well squared or shaped to fit	Most v. good	In SW anta	Quite few	Little
Cloondara	Longford	LC limestone	Coursed	Yes	Predom. med. to q. large. A few v. large	Few	Some irreg. and shaped to fit	V. good	No	Quite few	None
Inishcleraun	Longford	Limestone	Coursed	No	Small to medium	No	Quite well squared	Good	None	Very few	?Quite little
Caher	Mayo	Ordovician	Not analysed								
Croagh Patrick	Mayo	?	Not analysed								
Duvillaun	Mayo	?Schist	Not analysed								
Inishglora T.na Naomh	Mayo	Schist/gneiss	Not analysed								
Inishglora, St. Brendan's	Mayo	Schist/gneiss	Not analysed								
Kilcummin	Mayo	L. Avonian	Coursed	Yes	Quite large. A few massive	Good proport.	Variable	Q. poor to q. good	No true examples	Q. freq. to q. few	None
Kilfraochaun	Mayo	Limestone	Roughly coursed	Yes	Med to large. One or two v. large	Good proport.	Squared and shaped to fit	Excellent	Yes	Pract. none	None
Kilkeeran (L. Carra)	Mayo	LC limestone	Coursed	Slight	Medium to large	A few	Some irregular	Quite good	No	Quite few	None visible
Kilkeeran (L. Corrib)	Mayo	LC limestone	Coursed	Slight	Medium to large. One or two v. large	Few	Some irregular	Good	No	Few	Very little visible
Killursagh	Mayo	LC limestone	Roughly coursed	No	Medium to q. large. One or two large	Some	Some irregular	Fair to q. good	No	Quite few	Little
Kilmoremoy	Mayo	?Granite	Some rough coursing	Slight	Quite large to large	?No	Shaped to fit	Very good	No	Few	No
Oughaval	Mayo		No original masonry								

TABLE 2: *Continued*

Name	County	Stone used	Coursing	Rise/ Dip	Block Size Range	On Edge	Shape	Fitting	Joggle Joints	Spalls	Visible Mortar
Dulane	Meath	Sandstone	Roughly coursed	Yes	Medium to large. A few massive	?No	Most squared and shaped to fit	Good to v. good	None	Moderate	Little
Kells	Meath	Shale	Roughly coursed	No	Medium to quite large. Some large	No	Irregular or roughly squared	Fair	None	Q. frequent	Moderate
Clonmac. Cathedral	Offaly	Sandstone	Coursed	No	Small to quite large	No	Most roughly squared	Quite good	None	Moderate	Quite liberal
Clonmac. T. Ciarán	Offaly	Sandstone	Roughly coursed	No	Small to medium	No	Most roughly squared	Quite good	None	Moderate	Moderate
Clonmac. T. Dowling	Offaly	Predom. limestone	Roughly coursed	No	Medium to large. One or two v. large	Some	Some roughly squared	Q. good to good	None	Quite few	Predom. little
Clonmac. Nun's Ch. 1	Offaly	Limestone	Coursed	No	Mainly quite large. A few v. large	No	Some roughly squared	Fair to q. good	None	Few	Little
Clonmac. Nun's Ch. 2	Offaly	?	No original masonry								
Kilclonfert	Offaly	Lst+?volcanic	Coursed	Yes	Medium to q. large One or two large	Good proport.	Some irreg. Some squared	Quite good	None	Q. frequent	Little
Lemanaghan	Offaly	Sandstone	Uncoursed	No	Medium to q. large. Some large	A few	Mostly irregular	Poor	None	Q. frequent	Little
Lynally Glebe	Offaly	Limestone	Coursed	No	Medium to large	?No	Some roughly squared	Quite good	None	Q. frequent	Moderate
Inishmurray Temple M.	Sligo	Sandstone	Some rough coursing	No	Medium to large. A few massive	Esp. at base	Many naturally squared	Quite good	None	Moderate	Very little
Inishmurray Teach M.	Sligo	Sandstone	?Coursed/ roughly coursed	No	Medium to q. large. A few large	No	Most squared	Quite good	None	Quite few	Moderate
Templeboy	Sligo	LC limestone	Some rough coursing	No	Medium to q. large. One massive	No	Most squared	Fair	None	Moderate	Very little
Derrynaflan	Tipperary	UC. limestone	Coursed	Slight	Medium to quite large	Yes	Well squared	Very good	None	Few	Little
Kilcash (Largely rebuilt)	Tipperary	OR Sandstone	Some rough. coursed	No	Most med. Some q. large. A few large	?No	Most irregular	Fair to q. poor	None	?Mod. to q. freq.	Quite liberal
Kilsheelan	Tipperary	?LC limestone	Coursed	Yes	Medium to q. large. A few large	?Some	Shaped to fit	Excellent	None	Few	Very little
Liathmore Large	Tipperary	LC limestone	Roughly coursed	No	Small to large	No	Predom. irregular	Poor	None	Q. frequent	Quite liberal
Liathmore Small	Tipperary	LC limestone	Coursed	No	Small to quite large	?No	Irreg. or. roughly sq.	Poor to fair	None	Moderate	?Moderate

TABLE 2: *Continued*

Name	County	Stone used	Coursing	Rise/ Dip	Block Size Range	On Edge	Shape	Fitting	Joggle Joints	Spalls	Visible Mortar
Longfordpass	Tipperary	LC limestone	Predom. coursed	No	Predom. quite large and large	Yes	Irregular and roughly squared	Fair to q. good	?None	Quite few	Very little
Lorrha	Tipperary	Limestone	Coursed	No	Most medium to large	?Some	Many irregular	Poor	None	Frequent	Quite liberal
Terryglass	Tipperary	Limestone	Coursed	No	Most medium to large. Some v. large	?None	Roughly squared	Fair	None	Moderate	Quite liberal
Ardmore Cathedral	Waterford	Sandstone	Coursed	Yes	Medium to large	Good proport.	Squared and shaped to fit	V. good/ excel.	Rough	Few	Little
Ardmore, St. Declan's	Waterford	Sandstone	Roughly coursed	No	Medium to quite large. Some large	?No	Irregular and roughly squared	Fair/ q. good	None	Moderate	Moderate
Kilbarrymeaden	Waterford	Rhyolite	Coursed	Slight	Medium to quite large. Some large	Some	Squared and shaped to fit	Gen v. good	None	Quite few	Little
Waterford, St. Peter's	Waterford	Ordovician	Not analysed								
Fore	Westmeath	MC limestone	Some rough coursing	No	Medium to large. A few massive	A few	Irreg. and roughly squared	Fair	None	Q. frequent	Quite liberal
Churchtown	Wexford	Limestone	Coursed	No	Medium to q. large. Some large	No	Most irreg. and flat	Poor to fair	None	Q. frequent	Little (repointed)
Glendal. Cath. (reuse)	Wicklow	Mica schist	Coursed	No	Quite large to massive	Mostly	Very well squared	Excellent	?None	Very few	Very little
Glendal. Cath.	Wicklow	M.sch./granite	Roughly coursed	No	Small to large. Some v. large	No	Irregular	Fair	None	Frequent	Liberal
St. Kevin's Ph. 1	Wicklow	M.sch./granite	Roughly coursed	No	Medium to large. A few v. large	Some	Most roughly squared	Fair	None	Q. frequent	Quite liberal
St. Kevin's Ph. 2	Wicklow	M.sch./granite	No original masonry								
St. Kevin's Ph. 3	Wicklow	M.sch./granite	Uncoursed	No	Small to medium	No	Irregular	Poor	None	Frequent	Liberal
St. Kieran's	Wicklow	M.sch./granite	?Uncoursed	No	Predom. small to q. large. Rebuilt	?No	Most irregular	Fair to poor	None	Mod to q. freq.	Moderate
Reefert	Wicklow	M.sch./granite	?Random rubble	No	Small to large	No	Irregular	Fair	None	Q. frequent	Moderate
Trinity Ph. 1	Wicklow	M.sch./granite	Some rough coursing	No	Medium to large. A few massive	Some	Most irregular	Fair to q. good	None	Predom. mod.	Moderate
Trinity Ph. 2	Wicklow	M.sch./granite	Uncoursed	No	Small to q. large. Some large	Some	Most irregular	Fair	None	Moderate	Quite liberal
St. Mary's	Wicklow	M.sch./granite	Some rough coursing	Slight @ N	Small to large. Some v. large	Some	Irreg. and roughly squared	Fair	None	Q. freq. to freq.	Quite liberal

TABLE 2: *Continued*

Name	County	Stone used	Coursing	Rise/ Dip	Block Size Range	On Edge	Shape	Fitting	Joggle Joints	Spalls	Visible Mortar
Temple na Skellig	Wicklow	M.sch./granite	Uncoursed	No	Predom. small to q. large	No	Most irregular	Fair	None	Q. frequent	Little
Kilcroney (Largely rebuilt)	Wicklow	Various	Uncoursed	No	Small to large	No	Irregular	Poor	None	Frequent	Liberal
Killegar	Wicklow	Granite	Coursed	No	Small to medium	No	Irregular	Poor	None	Quite few	Liberal

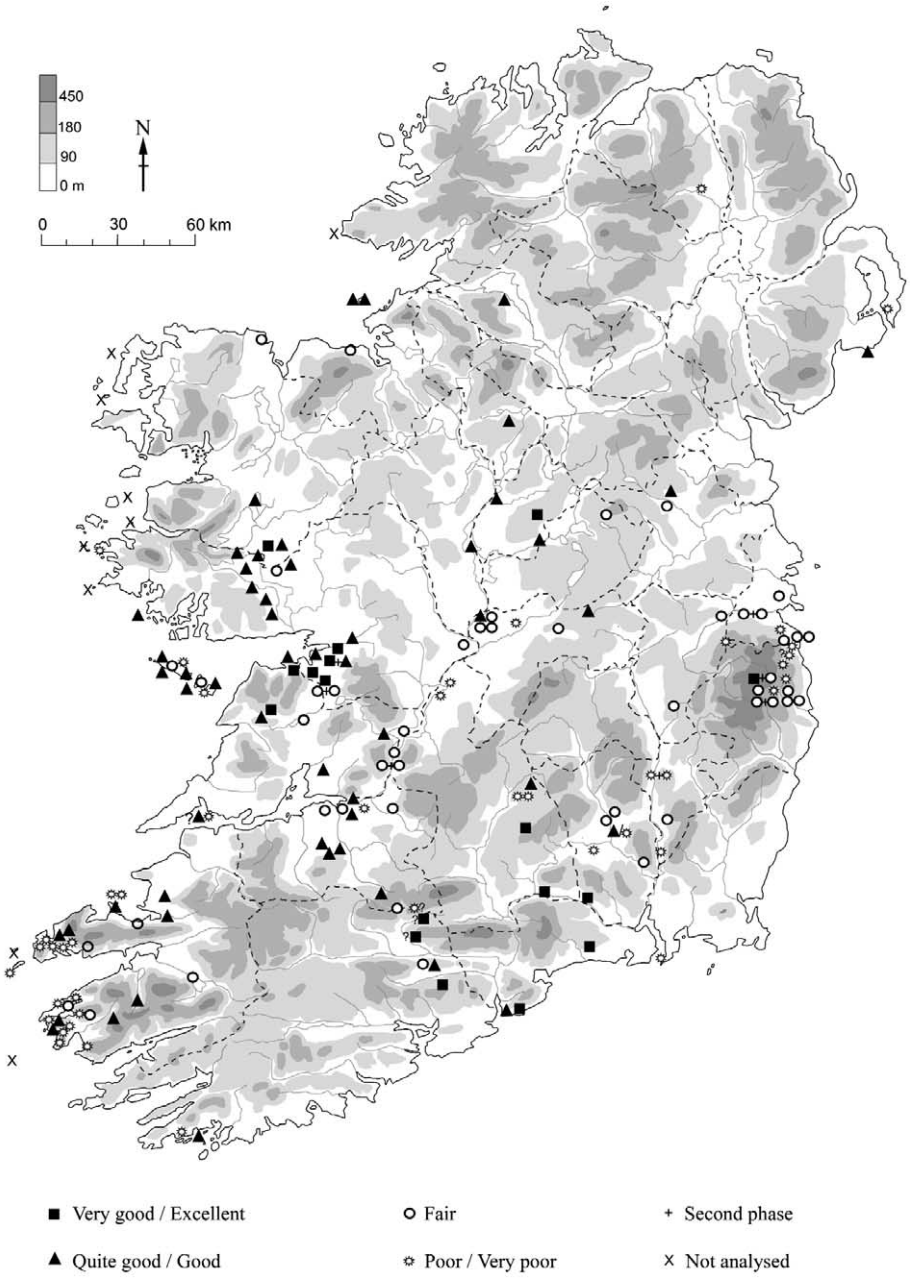


FIG. 1—Quality of Block Fitting. A few churches are characterised by variable block fitting (see Table 2) but this is not depicted on the map.

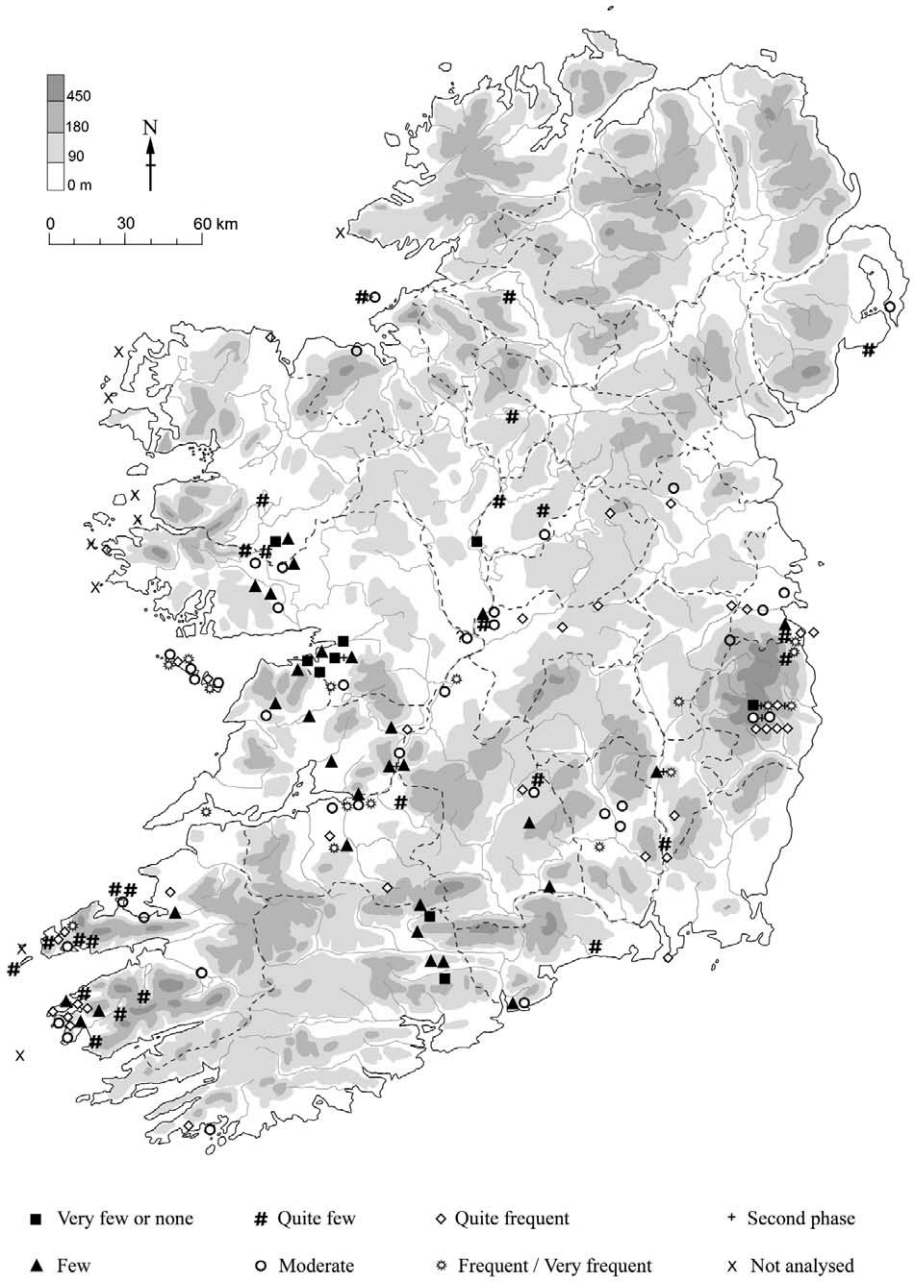


FIG. 2—Frequency of Spalls. A few churches are characterised by variable spall frequency (see Table 2) but this is not depicted on the map.

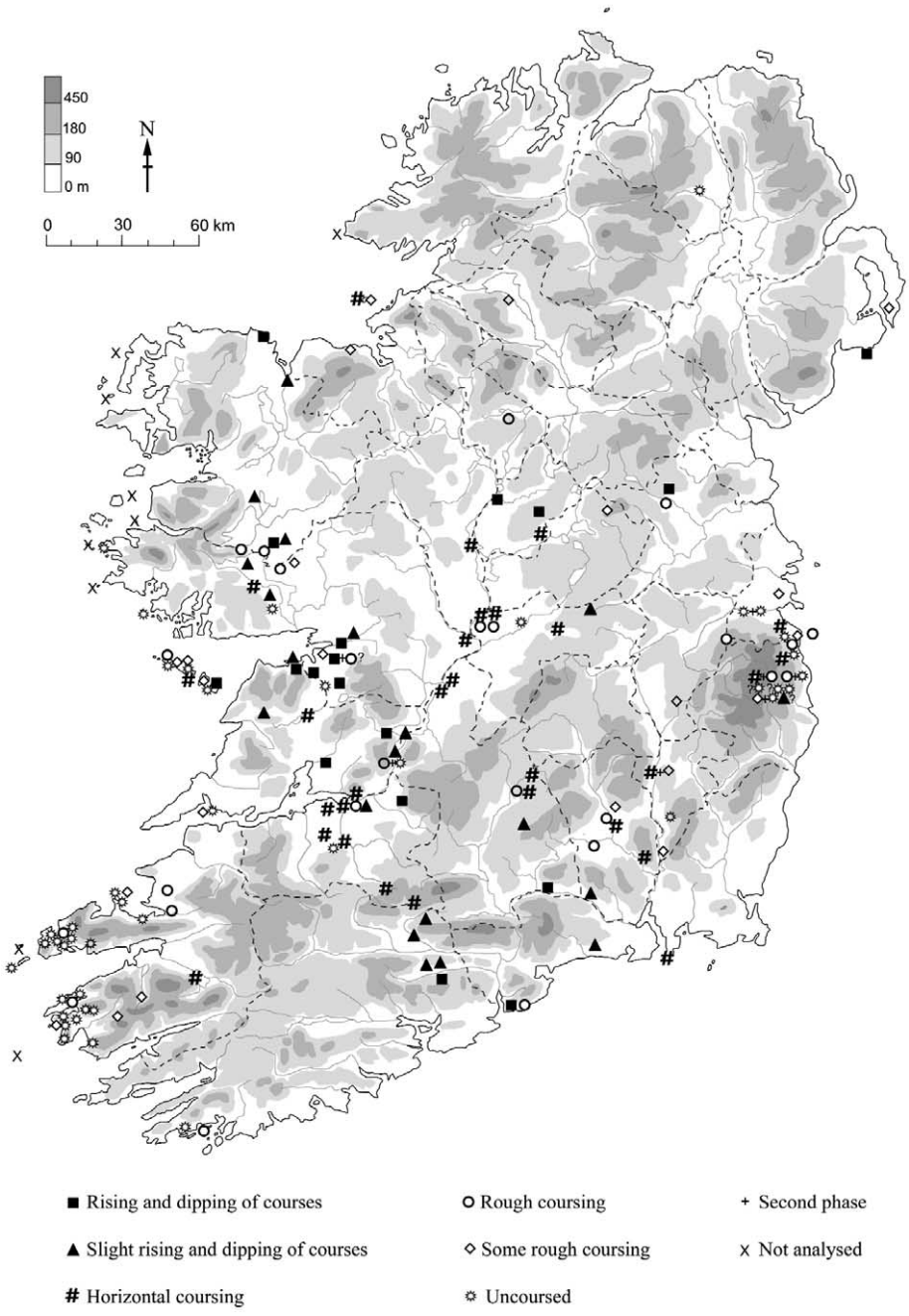


FIG. 3—Coursing in pre-Romanesque masonry.

Characteristics Chosen for Analysis

Coursing. Leask (1955, 51) was correct in stating that 'the general style of masonry is what would be known technically in modern times as uncoursed rubble, i.e. unwrought or roughly-dressed stones not laid in regular courses.' But his hesitation suggests that he realised that modern categories of masonry (e.g. Stevens Curl 1999, 573) do not cater for the variation encountered in pre-Romanesque churches. Specifically they do not make a distinction between random rubble, which is completely uncoursed, and what I would term roughly-coursed rubble in which a clear attempt at coursing is made. This latter differs from coursed, random rubble and squared, coursed rubble (see Stevens Curl 1999, 573) in that the courses are not always level (i.e. they may rise and dip), they do not always coincide with quoin height, and they may be interrupted by large blocks set on edge. Taking this category into account the main possibilities are: uncoursed, some rough coursing, roughly-coursed, and coursed. Courses always vary somewhat in height and so there are no instances of true ashlar masonry (see Stevens Curl 1999, 39–40; *pace* Harbison 1972a, 7), though the first phase of Glendalough Cathedral could be termed quasi-ashlar (see Leask 1955, 71; Manning 1996; 2002). Ashlar walling is rare throughout Europe before the advent of the Romanesque (Fernie 1983, 149; Gem 1988, 25; Rodwell 1986; Vergnolle 1996) and it remains rare in the Irish Romanesque (examples include Clones, the chancel of Tuamgraney and Cormac's Chapel). Most instances of regularly-coursed masonry in Irish pre-Romanesque churches are in fact characterised by relatively poor shaping and fitting of blocks.

Rising and Dipping Courses. This is arguably the most characteristic of all 'cyclopean' traits. It occurs where blocks that vary in height along their length are chosen or shaped so that their ends are the same height as those of adjacent blocks. Oftentimes this means that successive blocks on a course become gradually higher. This is sometimes compensated for in the next course with blocks being chosen so that the course becomes gradually lower, in some instances petering out altogether. In other cases the next course comprises blocks of roughly equal height, fitted to perpetuate the heightening of the course below. This has the effect of making the course rise and/or dip along its length. Rising and dipping can occur in both coursed and roughly-coursed masonry. It is usually confined to pre-Romanesque masonry and is, for example, the main trait distinguishing the fine early masonry of Oughtmama, Co. Clare from the exterior east wall of nearby Corcomroe Abbey, a Transitional building. Some slight rising and dipping has been noted in later buildings including the Romanesque church of Aghowle, Co. Wicklow and in the Transitional phases of Drumcreehy and Killeany, Co. Clare (for a Continental example see Altet 1997, 108–9).

Size Range of Blocks. This is the characteristic most influenced by geology. For example the easy availability of limestone in northwest Clare/southwest Galway must have encouraged the use of larger blocks than one finds in east Munster, an area that in other respects has a very similar masonry style (see below). It is interesting to note, however, that the portal tombs and wedge tombs of northwest Clare/southwest Galway are built of relatively modest slabs compared to most of those elsewhere in the country, not least the portal tombs of Co. Waterford in east Munster. In Table 2 the predominant range of blocks is stated first, followed by any block sizes that occur in relatively small numbers. The masonry of gables was not considered

because these rarely survive and are usually built of relatively small blocks. For reasons of manageability, block length is used as an approximation of block size: small: 0.10–0.25m; medium: 0.25m–0.50m; quite large: 0.50m–0.75m; large: 0.75m–1.10m; very large: 1.1m–1.5m; massive: greater than 1.5m.

Edge-Set Slabs. For Leask (1955, 51) the occurrence of large, thin slabs set on edge was a key characteristic of cyclopean masonry. However, such slabs are absent from many cyclopean churches and where they do occur they usually make up only a small portion of the wall face. These slabs are unusual in that their bedding planes are often set vertically rather than horizontally so that they form part of the wall surface. In some cases, such as Kilfraochaun, Co. Mayo and Aughinish, Co. Clare, blocks set on their sides (sometimes with vertical bedding planes) make up a substantial portion of the fabric. However, most of these are relatively small and not very thin. I am therefore inclined to place less of an emphasis on this characteristic than previous writers have done.

Shape. The categories are irregular, roughly-squared, squared, or shaped-to-fit. In the latter, somewhat irregular blocks are individually shaped on site to closely fit adjacent blocks.

Fitting. Leask (1955) gives the impression that edge-set slabs and excellent fitting usually occur in tandem, but this is not always so. For example, the most dramatic instances of edge-set slabs occur at Templemacduagh and Temple Benan on Aran, churches that are characterised by only quite good and good fitting, respectively, while phase 1 of Oughtmama (i.e. the eastern two-thirds of the north wall) has few edge-set slabs but is characterised by excellent fitting. Some cognisance was taken of the size of the blocks when assessing fitting quality because it was felt that merely comparing interstices regardless of block size would give a misleading impression of churches built of relatively small blocks with little regard to fitting. The categories are: very poor, poor, fair, quite good, good, very good and excellent.

Joggle Joints. These result when a rectilinear or sub-rectilinear section is removed from a block to facilitate close fitting with another block. They are usually found in churches characterised by good to excellent fitting. A few instances occur in Romanesque churches, including Clones, Co. Monaghan, but they are generally rare in high-medieval wall fabric (*pace* Hare and Hamlin 1986, 139 who use the occurrence of joggle joints in Kilcloona round tower to support their unconvincing suggestion that it is thirteenth-century).

Spall Frequency. Ní Ghabhláin omits spall frequency from her analysis because of the difficulty in differentiating spalls from small blocks and also because she concluded that 'any measurement of the size of stones used in construction would be an indirect measure of the number of spalls used' (1995, 100). This would usually be the case using Ní Ghabhláin's statistical method because where small blocks are used more interstices are visible in the masonry shots thereby increasing the likelihood that spall numbers will be high. But in reality there is not always an indirect correlation between block size and spall frequency. For example Templemacduagh on Aran has a high proportion of massive blocks but also features frequent spalls while Templemore, Co. Clare is primarily of moderate blocks and has few spalls.

This variability was taken into account when comparing masonry shots, and an attempt was made to assess the two characteristics independently. It is also implicit in the literature (e.g. Leask 1955) that spall frequency is inversely proportionate to the quality of fitting. While this is generally true, there are exceptions to the rule. For example though Kilmalkedar (dry-stone church), Kilfinny and Kilmacduagh all feature frequent spalls they are characterised by quite good, good and very good fitting, respectively. This is because many of the spalls themselves have been carefully chosen to fit into the interstices between blocks. The categories for spall frequency are very few, few, quite few, moderate, quite frequent, frequent, or very frequent.

Interstitial Mortar. Finally, the amount of interstitial mortar is a significant variable, albeit one that generally correlates with the quality of block fitting. Again there are a few exceptions to this correlation, including Kilgobnet on Aran where there is very little interstitial mortar despite poor block fitting. It should be borne in mind that this characteristic can be radically affected by weathering or restoration work. The categories are: none, very little, little, moderate, quite liberal, liberal, or very liberal. Dressing patterns vary from light pockmarks produced with a pick or hammer, to horizontal or (less commonly) vertical or diagonal chisel marks that are quite different in character from the diagonal tooling found in many Romanesque churches (on this subject see de Paor 1997, 193–5; Hourihane 2000, 17–18. On dressing in Anglo-Saxon churches see Jope 1964, 113–14). However, because dressing is only visible in a minority of churches, it is not a suitable variable for analysis.

Identifying Masonry Styles

As Figs 1–3 illustrate, the masonry is characterised by considerable variability and regionalisms are rarely clear-cut; for example no substantial area is characterised by a single quality of block fitting. Nonetheless, patterns do emerge: it is notable in particular that with just three exceptions—phase 1 of Glendalough Cathedral (excellent), Dulane (good/very good) and St. John's Point (quite good)—fitting in the eastern counties of Wexford, Kilkenny, north Tipperary, Carlow, Kildare, Wicklow, Dublin, Meath, Westmeath and in Ulster is very poor to fair. In contrast, a high proportion of churches in the rest of the country (excluding the dry-stone churches of Kerry) feature quite good to excellent fitting. Analysis of the other characteristics reinforces this pattern and also results in the delineation of a number of subtle sub-regions mainly in the western half of the country. These five local masonry styles will be discussed first.

Northwest Clare/ southwest Galway excluding the Aran Islands (*Pls II and III*). Most commentators identify this region as the *locus classicus* of cyclopean masonry. The majority of churches here are characterised by good to excellent fitting and four, or possibly five, feature joggle joints. Quite a high proportion of the masonry is coursed with few spalls and little or no visible interstitial mortar, and some rising and dipping of courses occurs in most cases. In a number of examples a significant minority of blocks are set on edge, but only in phase 1 of Aughinish are the majority edge-set. While most churches incorporate at least one massive block, such blocks are in the predominant block range of only two churches. The use of very large and massive blocks was facilitated by the ready availability of Lower Carboniferous limestone in the area. It must be stressed that none of the areas discussed had an entirely homog-

enous style and this region is no exception. For example, fitting is only fair to quite good in the case of St. John's at Kilmacduagh, Drumacoo and especially Kilfenora; Kilmacduagh cathedral differs more significantly still being characterised by frequent spalls and a general lack of coursing (see further below). Nonetheless this area is generally characterised by a higher degree of rising and dipping of courses, a higher standard of block fitting and concomitantly fewer spalls than in the adjoining areas of Aran and Lough Corrib/Lough Mask.

The Aran Islands (*Pls IV and V*). The masonry of Aran differs from that discussed above in a number of respects, despite the fact that the regions are geologically very similar. The most notable difference is that a much smaller proportion of the masonry is coursed and only one church (Temple Chaomháin) features rising and dipping of courses. Furthermore, a higher proportion of churches feature massive blocks in their predominant block range (as opposed to their maximum block size) and on Inishmore in particular, a high proportion of these are edge-set with their bedding planes set vertically to form part of the wall surface (e.g. Templemacduagh, Temple Brecan and Temple Benan). Leask, therefore, is incorrect to state that the masonry of Templemacduagh is 'very similar' to that of Kiltiernan on the Galway mainland (1955, 68). It is also notable that none of the Aran churches have excellent block fitting and many are characterised by relatively generous use of interstitial spalls and mortar. For example, the fitting in the three Aran churches just mentioned is only quite good to good. Even churches lacking massive edge-set slabs such as Templenaneeve and Kilcanonagh are not characterised by very careful fitting. Although the poor block fitting of Templesoorney may have resulted from rebuilding, that of Kilgobnet is clearly a characteristic of the original structure. This latter church has less in common with the dictionary definition of cyclopean masonry than any of the others; and again it is important to highlight the fact that significant variations occur within the group. Arguably the church on nearby St. MacDara's Island should be considered part of this grouping: it features a number of massive, edge-set blocks that are only quite well fitted and it is 'notable for a plentiful use of spalls in the wider joints' (Leask 1955, 45). In contrast, Temple Chaomháin is an Aran church but with masonry very similar to that of the mainland. Its courses rise and dip in places and are characterised by good to very good fitting—with a joggle joint in one case—though there are more spalls than in many of the northwest Clare/southwest Galway churches. No systematic attempt has been made, even from published sources, to assess whether the local styles described here are also characteristic of round towers in these areas. However, it is interesting to note in passing the contrast between the poor block fitting of Killeany round tower on Aran and the excellent block fitting of the towers at Ardrahan, Kilmacduagh and Kilcoona on mainland Galway.

Lough Corrib/Lough Mask (*Pls VI and VII*). Kilfraochaun is the only church in this area to combine all the features that characterise the masonry of northwest Clare/southwest Galway including excellent fitting, rising and dipping of courses and joggle joints. Indeed it is debatable whether many of the churches in this area should be described as cyclopean at all. They are often coursed with, at most, only slight rising and dipping of courses, and fitting is generally quite good to good rather than very good or excellent. They tend to have slightly more spalls and visible interstitial mortar than in northwest Clare/southwest Galway but less than on

Aran. Predominant block size never extends to very large, probably because of local geology, with only Inchgoill featuring any massive blocks. While a few churches, notably Kilfraochaun, feature several blocks that are technically edge-set, only at Inchgoill are these relatively thin with a large surface area. As with all the areas described, the masonry here is by no means entirely homogeneous. Instances of nonconformity to the general style include the limited amount of coursing at Killagoola and the fair quality of fitting at Killursagh, Co. Galway.

East Munster: *East Cork, Mid and South Tipperary, Waterford and Tibberaghney, Co. Kilkenny (Pls VIII and IX)*. Northwest Clare/southwest Galway is, in many respects, more akin to East Munster than to Aran or Lough Corrib/Lough Mask. East Munster churches are of good to excellently-fitted blocks, often individually shaped-to-fit in slightly rising and dipping courses. Spalls and interstitial mortar are sparingly used and in two cases joggle joints are employed. The most significant contrast with northwest Clare/southwest Galway is the relatively small size of the blocks, a feature that is obviously influenced by geology. 'Large' is the most common maximum block size. Sandstone is the most common stone used but a few are of limestone. Unfortunately Brigown, Killeenemer, Ardskeagh and Kilcash have undergone substantial rebuilding and in the latter two cases the original character of their masonry is not now discernible. Generally speaking, the blocks of the east Cork churches tend to be more regularly squared than those further east such as Ardmore cathedral, Tibberaghney and Kilsheelan but, where discernible, the quality of fitting is equally good in both areas: thus these churches are treated as one group here. Only the foundation course of the original cathedral at Cashel survives;[1] but if the masonry of the contemporary round tower there is any indication (on its date see Stalley 1985, 8; Manning 2000b, 34), the cathedral may well have belonged to this group. Longfordpass, Co. Tipperary and Ardpatrick, Co. Limerick are geographically on the edge of this group, and do not really belong to it stylistically either because they lack careful fitting. Contrast, for example, the fair to quite good fitting of Longfordpass with the very good fitting of nearby Derrynaflan. Arpatrick features one joggle joint but generally its blocks are only quite well fitted and its courses do not rise and dip.

Limerick, excluding Clonkeen and Ardpatrick (Plates X and XI). County Limerick emerges as a region with a distinct, essentially non-cyclopean, masonry style between the two main cyclopean areas discussed above. Blocks are smaller than in northwest Clare/southwest Galway but comparable to those of East Munster and Lough Corrib/Lough Mask. However, here (with the exception of Dysert Aenghusa) courses tend to be lower with blocks usually being laid flat. Generally, courses do not rise and dip, and there are considerably more spalls and interstitial mortar than in the adjacent cyclopean areas. Furthermore, fitting in the region is at best good, with no joggle joints and few or no instances of blocks being individually shaped-to-fit. The Limerick masonry is similar in many respects to that of Lough Corrib/Lough Mask, the main differences being the more generous use of spalls and interstitial mortar and the lack of rising and dipping. (Indeed it should be emphasised again that rising and dipping is not ubiquitous or pronounced in Lough Corrib/Lough Mask either). One minor instance of non-conformity to the

[1] According to Brian Hodkinson (pers. comm.) this was revealed during his excavations in and around Cormac's Chapel. Its position is not marked in Figs 1–3.

general style is the slight rising and dipping of courses in the west wall of Donaghmore; but much more anomalous is Kilfinny, which is the only example of uncoursed masonry in the area. It comprises irregular blocks set haphazardly with copious spalls: this results in a vertical crazy paving effect paralleled only in Kilmacduagh cathedral, Co. Galway. Cloncagh is also uncoursed but this may be due to rebuilding. Clonkeen and Ardpatrick are in Co. Limerick, but are both geographically and stylistically outside the main Limerick group.

Other Mortared Churches. Elsewhere, the distribution of churches is usually too sparse for local styles to be recognised. There are several relatively isolated churches with varying masonry styles, some of which, including Cloondara and Ardagh, Co. Longford, Dulane, Co. Meath and St. John's Point, Co. Down are cyclopean, to a greater or lesser extent. Apart from the Limerick group, other non-cyclopean limestone churches occur along the Shannon Basin (Lorrha and Terryglass) and at Liathmore, Co. Tipperary and Inishfallen, Co. Kerry. There are four in Co. Kilkenny that are quite similar to the Limerick churches, though they tend to be roughly coursed rather than coursed, and do not form a coherent enough group to merit separate treatment. The masonry of the four extant congregational churches of north Mayo and Sligo—Kilmoremoy, Kilcummin, Temple Molaise on Inishmurray and Templeboy—is more variable still. The lack of local styles in areas such as these may be partly because of differential survival; but it seems likely that many areas never experienced the level of church building necessary for local styles to develop (see further below). This cannot be said of south Dublin/east Kildare/north Wicklow, which has one of the highest densities in the country. The churches here are all non-cyclopean but lack a coherent masonry style. They are also relatively diverse architecturally, suggesting influences from a range of sources, including some from abroad; and it is possible that the masonry is indicative of a group of masons with diverse backgrounds. However, the geological diversity of the region was probably a more important factor with churches being built of shale, mica schist, limestone and granite. There is some degree of coherence to the masonry of the seven Glendalough churches, most of it being of uncoursed adequately-fitted blocks with moderate to quite frequent spalls. This coherence may be partly due to nineteenth-century 'restoration' (see Colles 1870). St. Mary's, Glendalough and Dalkey Island, Co. Dublin do feature some slight and localised rising and dipping of courses but could not be described as cyclopean.

Tomb-Shrines. As mentioned above, there is radiocarbon evidence (Berger 1992; 1995) to suggest that some diminutive tomb-shrines are among the earliest mortared churches in the country. This suggestion would seem to be broadly supported by the masonry evidence, insofar as tomb-shrines tend to share certain characteristics and they differ from nearby congregational churches. The most convincing examples are of relatively small, roughly-squared blocks laid flat in courses without much concern for close fitting. This appears to be have been true of Teach Molaise, Co. Sligo (where only the lower portion of the east wall is original), St. Ciarán's at Clonmacnoise, St. Diarmuid's on Inishcleraun and Labamolaga, Co. Cork, though the latter in particular has been substantially rebuilt. St. Declan's, Ardmore has also been rebuilt and its masonry is not properly coursed; but the blocks are much smaller and not as well fitted as those of the adjacent cathedral, which is in the east Munster style. St. Ciarán's is quite similar to the adjacent early

tenth-century cathedral, though it is built of smaller blocks on average. The small to medium-sized blocks of St. Diarmuid's are very unusual in an early limestone church and find no parallel in the later churches on the island, or in the other pre-Romanesque churches of Co. Longford. The masonry of these tomb-shrines does not form a cohesive style; but the similarities that exist are at least consistent with the hypothesis (Harbison 1991, 151; O'Keeffe 1998) that they were built in roughly the same period when relatively few builders in Ireland were working in mortared stone. In two instances, Inishcleraun and St. Ciarán's, a cross section of their walls is visible and it is apparent that they lack the mortar and rubble core that, as Brash (1868, 152) noted, is so characteristic of later pre-Romanesque churches.

Other sites with *relatively* small churches in secondary positions include Liathmore, Co. Tipperary, Derry, Co. Down and Tighlagheany on Aran; and in the latter two cases a specific association with the founding saint (Waterman 1967, 53; Manning 1985) raises the possibility that they are tomb-shrines. There are some similarities between Derry and St. Ciarán's, including the use of putlogs, and its masonry does contrast with that of the nearby congregational church of St. John's Point; but its blocks are uncoursed, poorly fitted and often irregular. In general the masonries of these churches are not closely related either to each other or to those of the five just discussed above. One possibility is that they are somewhat later because as St. Molaise's, Devenish illustrates, tomb-shrines were still being built in the twelfth century. This tomb-shrine has been extensively conserved but was built primarily of quite large to very large, somewhat irregular blocks, many of which were set on edge. The effort expended in the construction of this church, and especially its stone roof, brings to mind Fernie's (1986, 407) description of St. Rule's in Scotland: 'it was first and foremost a shrine for St. Andrews relics…not an undersized cathedral but a huge casket.'

Barrel-Vaulted Churches. It is now realised that the barrel-vaulted churches traditionally categorised as pre-Romanesque actually represent the introduction of Romanesque technology to Ireland, probably in the late eleventh century. As one would expect, they have greater than average wall thickness (with the exception of Trinity, Glendalough phase 2), and generally comprise small to quite large blocks laid flat and not carefully fitted, with quite frequent spalls and quite liberal interstitial mortar. It is notable that Killaloe, the only western example, features slight rising and dipping of courses as well as quite good fitting in places; this suggests that some local masons were involved in its construction, though its doorway is clearly the work of someone trained abroad (see Gem 2001).

Dry-Stone Churches. The masonry of the relatively early dry-stone churches of peninsular Kerry is obviously dissimilar to that of mortared churches. It is usually of uncoursed, poorly-fitted, small to medium-sized blocks laid flat with few spalls. Exceptions include a few examples of good (e.g. Gallarus) and one of very good (Templecashel) fitting. Gallarus and one of the Illauntannig churches incorporate some massive blocks.

Stone Supply

Before considering the significance of these styles, I wish to look briefly at the sources of stone employed and in particular, to gauge the extent to which non-local

stone was used. This should allow us to determine whether there were major quarries in operation supplying extensive regions; or whether, as seems more likely, quarrying and stone supply was organised at a local level. It must be stressed that these findings are provisional. In order for stone to be confidently assigned to a specific source its lithology must be closely matched to that of a quarry or rock outcrop, always bearing in mind that the character of stone may vary greatly through the depth of a quarry (Jope 1964, 95–6; Hudson and Sutherland 1990, 16–17). This would require an intensive programme of fieldwork in full collaboration with a geologist. Nonetheless, broad patterns emerge by using Geological Survey maps[2] to ascribe churches to one of the general rock groups such as Lower Carboniferous limestone, of which there are in fact a number of variants. While the specific sources cannot be identified in this way, minimum distances from the source to the church can at least be estimated. We can usually be more confident about the source of stone on island sites; for example quarries that are probably early medieval can still be seen on High Island (Colin Rynne, pers. comm.) and Skellig Michael.

Five instances of the use of non-local stone have previously been noted (Petrie 1845, 169; Dunraven 1875, 193–5; Macalister 1929, 20; O'Kelly 1958, 61; Manning 1982, 186); but the only general statement on the subject comes from Leask (though he gives no specific examples): 'Instances of the use of stone from a distance for…[door and window surrounds] are not uncommon when, for instance, the locality did not afford stone of the large size and fine quality desired for such features' (1955, 51). In the present survey, thirty-five examples of the use of substantial amounts of stone other than the underlying bedrock were identified. Fifteen of these churches were built almost entirely of the 'imported' stone, but in most of these cases the stone employed forms the bedrock less than three kilometres away from the church—no more than one would expect to travel to find a suitable rock-outcrop (see Jope 1964, 109). This is true of Brigown, Labamolaga, Friar's Island, Inishcealtra, Tuamgraney, Maghera, Inchgoill, Church Island, Ratass, Tiberraghney, Clonkeen, and Agharra, which (except for Maghera) are all built of nearby sandstone. The only instances of wall fabric being transported over greater distances are the cathedral and St. Ciarán's at Clonmacnoise, which (unlike most other buildings at the site) are built of sandstone from a very manageable four or five kilometres away, and Kilmoremoy, which appears to be of granite from at least ten kilometres to the south.

Twenty churches employ some 'non-local' stone for apertures and/or quoins or antae (for later medieval instances of this see Stalley 1987, 97, pl. 65; McNeill 1997, 103). At Templemore, Co. Clare the dressed stone is of a distinct finer-grained variant of the local limestone, but at Gallarus the capstones, holed stones, heel stones, window surround, and some of the quoins and door-jamb stones are of rougher sandstone than most of the fabric, possibly the Glashabeg Conglomerate Formation that occurs a short distance west of the site (see 1:100,000 Geological Survey map). In the case of five churches at Glendalough the fabric is mica schist but much of the dressed stone is of granite, possibly from erratics in some cases though it seems like-

[2] The following maps were used: 1":1 mile; 1:750,000; and, where available, the new and hugely superior 1:100,000 series. Dr. D.I. MacCarthy of the Geology Department, U.C.C. kindly gave the author advice about several sites and though this was invaluable, it was also necessarily provisional in many instances, as it was based on photographic evidence rather than rock samples.

ly that some was deliberately transported from higher up in the valley. The earliest church at the site, the cathedral (Manning 1996; 2002) is also the only one built almost exclusively of schist. Granite was also favoured over local stone for the apertures of Kilteel, Co. Kildare and Kilcroney, Co. Dublin. The stone was transported at least 4.5 kilometres in both cases. The granite dressed stone at St. John's Point, Co. Down appears to have been transported by sea for a minimum of seventeen kilometres. In contrast, at Omey Island the fabric is of local granite but the dressed stone is of schist and/or gneiss from at least four kilometres away. This reversal of the practice in Kildare and Dublin serves as a reminder that the choice of dressed stone may have been influenced by factors other than purely practical considerations. In five or six cases sandstone is employed instead of local limestone for the apertures, including Churchtown, Co. Wexford, Inishfallen, Co. Kerry and three examples in Limerick: Clonshire, Dysert Aenghusa and Mungret. In this last example sandstone blocks alternate with limestone ones in the jambs of the east window. Obviously sandstone is easier to shape than limestone, but this benefit would have been offset by the cost of transporting it. Aesthetics and the prestige associated with using non-local materials must also have been important. Certainly the contrast between red and white stone now adds considerably to the impact of some of these churches, though it should be remembered that most of them would originally have been rendered. This effect seems to have been especially favoured in Limerick: in addition to the examples already cited, the door-jambs of the limestone church at Donaghmore are also of reddish stone, apparently volcanic rock from about half a kilometre away.

In addition, twelve other churches incorporate one or two 'non-local' blocks, including Clara, Co. Kilkenny where a sandstone ogham stone is reused as a windowsill; St. MacDara's where limestone was imported for the finial (Bigger 1896, 108); and Templemacduagh, a limestone church with a granite (?erratic) door lintel (Petrie 1845, 177). A number of dry-stone churches incorporate some locally-available quartz, including those at Skellig Michael, Illauntannig and Killelton. Some jamb-stones at Croagh and Skeam West, Co. Cork and Cloghanelinaghan, Co. Kerry are faced with quartzite; at Agha, Co. Carlow large, quartz blocks form the threshold. Finally, it is no accident that the granite door lintel of Dalkey Island is bisected on its exterior face by a horizontal band of quartz. White signalled sacredness and purity in the Christian tradition generally (see Ferguson 1954) and in Irish texts in particular (Warren 1881, 124). For example, in a passage on liturgical vestments in the Leabhar Breac white is seen as helping to keep the priest's mind 'pure…like the froth of the wave, or like the *cailc* on the *bendchobar* of a church, or like the colour of the swan before the sun' (translated by Petrie 1845, 350; see also Mould 1955, 16). In addition to whitewashing, incorporating quartz into a doorway would have served as a reminder that only those in a state of grace should enter a church (see for example Hill 1997, 472; Ó Carragáin 1998; White Marshall and Walsh 1998, 106; and White Marshall and Rourke 2000, 111 on quartz in early medieval burials and other ritual foci).

The most important conclusion to be drawn from this provisional assessment is that quarrying in Ireland was organised in an ad hoc manner. The evidence just outlined and the dearth of stone churches over large areas of the country (see further below) indicate that consignments of stone were rarely transported more than a few kilometres from their source. It is striking for instance that St. John's Point is the only likely example of a substantial amount of stone being transported over ten kilometres. A similar situation seems to have pertained in Early- and Middle-Saxon

England where church builders relied heavily on reused Roman materials. Indeed according to Parsons, 'little or no original quarrying was taking place' (Parsons 1990, 5; see also Morris 1988, 195). Parsons (1990, 9) found that though quarrying for stone sculpture was relatively well developed, it seems to have been organised quite separately from quarrying building stone; and there is evidence to suggest that this was also the case in Ireland. Most high crosses are of local stone, and their design was sometimes affected by geological constraints (see Kelly 1991); but, in contrast to the churches, some high crosses at sites such as Iona (Campbell 1999, 47) and Clonmacnoise (Heather King, pers. comm.) are of stone that was transported over considerable distances. This is also true of some grave-slabs. For example, many of the Clonmacnoise grave-slabs are of coal-measure sandstone from south Clare (Lionard 1961, 145; see also Edwards 1998, 102), and two of the slabs at High Island are of limestone from about eighty kilometres away (see White-Marshall and Rourke 2000, 112–13; on trade in other stone objects see for example Jope 1966, 131; Hodges 1982, 123–4; Moore 1984; see also Henry 1964, 15–16). Quarrying for building stone became more organised in tenth- and eleventh-century England, especially south of the Humber. In particular, features such as pilaster strips and long-and-short quoins were cut and dressed at quarries by professional masons and transported substantial distances, often more than sixty kilometres (Jope 1964). Indeed Morris (1989, 301–4; see also Jope 1964, 93) has argued that stylistic innovations often originated at quarries rather than at centres of royal or ecclesiastical patronage, with differences between the churches north and south of the Humber being largely determined by the reach of this nascent quarry industry. Most authors agree that even these developments pale in comparison with the surge in quarrying activity after the Conquest (e.g. Morris 1989, 195, 311–13; Parsons 1990, 9). Clearly, nothing comparable developed in contemporary Ireland. Even in high-density areas like northwest Clare/southwest Galway, where easy availability of stone encouraged its widespread use in the eleventh century (see below), the individual fitting of irregular blocks in apertures and quoins as well as wall fabric indicates that most of the finishing was done on site rather than at a quarry (see Ó Carragáin 2005a; on the later medieval period see Hourihane 2000). Clearly then, quarrying was undertaken when it was required for local needs, quite possibly by the masons themselves. In the next section, it is argued that this view of a locally-organised building industry is strongly supported by the masonry analysis outlined above.

Discussion

The Influence of Geology

It has usually been assumed that variations in pre-Romanesque masonry are 'largely dictated by the nature of the stone available' (Champneys 1910, 34; see also Dunraven 1875, vol. 1, 165–8; vol. 2, 193–5; Stokes 1878, 49) and therefore develop 'according to local supplies' (Hughes and Hamlin 1977, 62) or 'depending on local geology' (Ní Ghabhláin 1995, 118). Needless to say, geology did have a major influence, not least on the size of blocks employed; but the present study also makes clear that it by no means determined the style of masonry employed. For example, geology does not explain why the shale churches of Co. Kildare and Derry, Co. Down are of poorly-fitted blocks laid flat, though Derry's neighbouring church at

St. John's Point, Co. Down has some cyclopean traits. The granite used in Dublin, Wicklow and Carlow churches appears to derive mainly from loose blocks and erratics (see Kinahan 1889, 408–9); this explains the small size of the blocks used. However, the choice of stone does not explain the total lack of concern with block fitting in the fabric of these churches. At Kilmoremoy, Co. Mayo, granite of a type that is particularly hard to cut (Kinahan 1889, 448–9) was used to produce excellent cyclopean masonry; but the masons working in granite in Dublin, Wicklow and Carlow were clearly not interested in achieving this effect in their wall fabric, despite their ability to shape and fit granite very accurately for apertures. In addition, masonry styles do not always neatly correspond to geological areas. For example, though the geology of northwest Clare/southwest Galway and that of the Aran Islands are essentially the same, significant differences were identified between their masonry styles. Further, while the masons of East Munster tended to favour sandstone, even where Lower Carboniferous limestone was the local stone, it would be incorrect to see the availability of this easily-worked stone as 'explaining' the cyclopean masonry of the area. In fact a number of churches that belong to this group are of different stone types: Kilbarrymeaden is mainly of local rhyolite; Derrynaflan is of Upper Carboniferous limestone; Kilsheelan is of Lower Carboniferous limestone like the non-cyclopean churches further east. Only rarely is more than one rock type used for a substantial amount of a building's fabric but where this does happen, the similar treatment of the different rock types confirms that geology is not the only factor influencing masonry style. A good example is the round tower at Cashel that is built quite uniformly in the east-Munster style, though both sandstone and limestone blocks are used even in individual courses. As noted above, the areas where a local style can be recognised are not characterised by entirely uniform masonry. Nonetheless, in each of these areas only one or two churches have masonry that differs radically from the norm. In the present context, these are important because they can be seen as exceptions that prove the rule that these styles were not determined by geology. Finally, the marked contrast between the masonry of pre-Romanesque and later medieval buildings in a given area further supports these observations. This contrast is evident right across the country, even in areas like north Clare where a few cyclopean traits persist in Romanesque and Transitional churches. Most later-medieval masonry in Ireland is poorly-fitted random rubble. It seems that masonry lost whatever aesthetic or symbolic connotations it had in the early medieval period (see above) and this lack of attention makes it unlikely that distinct local masonry styles will be recognised in later medieval buildings.

Habitual Variation

Clearly, then, cultural factors must have come into play in the formation of the five pre-Romanesque masonry styles. It is suggested here that they are indicative of locally-based groups of masons, though the term 'school' is avoided because it suggests a degree of organisation that is unlikely to have pertained. This conclusion requires thorough substantiation, however.

In the past archaeologists have often assumed that localisation in the form of a particular artefact or monument is indicative of localised production and a standard form over a large area is the result of production by a small group of craftsmen either working at a centralised industrial site or else leading a nomadic lifestyle. However Hodder's (1982, 62–3, 118–19, 144) ethno-archaeological studies have categorically

shown that there is not a universal correlation between variability in material culture and scale of production but rather that variability depends on the particular social significance of the characteristic in question. For example, in Baringo in Kenya, Hodder found that some objects produced by non-specialists in their own homes were uniform over wide areas but spearheads produced by smiths and traded over considerable distances exhibited localisations in form, sometimes marked but often quite subtle because consumers in particular areas demanded particular forms. *Prima facie* this raises the possibility that Irish masons may have plied their trade over large areas (a scenario favoured by Brash 1868, 155). For example, it implies that the northwest Clare/southwest Galway, Aran and Lough Corrib/Lough Mask churches might have been built by a single group of masons who altered their style according to the wishes of patrons in these different areas. It also raises the possibility that long periods separated the erection of churches within a particular masonry group. For example, the main church at Coole, Co. Cork could theoretically be early tenth-century; while Britway, with its round-headed doorway, could be early twelfth-century. It might be argued that in this case, their masonries are similar because the patron at Britway encouraged his mason to emulate the particular style of masonry at Coole. If this were so, these styles would be of limited value in addressing issues such as chronology or the extent of the areas over which particular masons or groups of masons operated.

However, a clear distinction must be made here between the consciously articulated variations in spearhead form described by Hodder and the various local masonry styles identified in the present study. I would suggest that the variations in masonry style discussed here are largely habitual in nature. Habitual variations are embedded within the consciousness of artisans at a non-discursive level rather than consciously chosen as part of a specific social strategy (Shanks and Tilley 1992, 144; see Hodder 1982, 53–4 for a discussion of an ethno-archaeological example; see also Leroi-Gourhan 1993; Jones 1997, 114; Gosden and Lock 1998, 3). Habitual variation is closely related to Sackett's (1982) concept of 'isochrestic style', which he distinguished from conscious signals of identity or 'iconological style'. Sackett sees isochrestic variation as the result of entirely passive enculturation that can nonetheless subsequently serve to 'identify' particular groups (Sackett 1986, 269; see also Goodby 1998, 162; Cameron 1998). However, other authors have been critical of this rigid dichotomy between habitual and iconological variation. They quite rightly emphasise the fact that 'both practical and discursive consciousness are intimately linked in the production, reproduction and transformation of social life' (Shanks and Tilley 1992, 144–5; see also Gosden 1994, 16; Jones 1997, 122). The status of masons in Irish society (see Kelly 1988, 61) was based on arcane knowledge that they would have guarded closely (see Hodder 1982, 59–62). These acquired skills are alluded to in the incidents in Irish literature and hagiography involving the Gobbán Sáer, the archetypal wise master-mason, where they are clearly distinguished from the supernatural powers of saints. For example, when asked by St. Moling to turn a church upside down the Gobbán did not call on angels to help him but 'applied *machinery and force* to the oratory' (quoted from the Book of Mulling by O'Curry 1873, vol. 3, 34–5, emphasis added). This practical knowledge was passed from one mason to another through observation and especially through active and repeated imitation. Leroi-Gourhan (1993) has shown that such imitation is essential in the development of habitual styles because it is through this process that the body is taught to act in customary ways. As a result, technical acts that are not always articulated at a discursive level are nonetheless profoundly social. Thus, habitual masonry

styles, even though on one level they were not consciously developed for the purpose, can be seen as embodying the communal identity of particular groups of masons: an identity that was based on perpetuating a set of skills among themselves, but also on limiting the understanding of those skills in society at large. The unarticulated nature of these styles is crucial for our purposes because it makes them particularly useful for the study of how church building was organised.

Clearly, the initial decision to build in a cyclopean manner was a conscious one, and as noted above the style had symbolic resonance. However, it is unlikely that the masons who built, say, the Lough Corrib churches consciously set out to produce a slightly different style from that employed in the northwest Clare/southwest Galway area. It is possible that the massive edge-set slabs of some of the Aran churches were a conscious attempt to distinguish these buildings from churches on the mainland. But other characteristics, including the generous use of spalls and the relatively poor fitting of blocks, make it highly unlikely that they were built by the same masons who built churches such as Oughtmama, Co. Clare or Killinny, Co. Galway. These are not the sort of variables that one would expect patrons to concern themselves with and it is because of this that we can suggest that the local styles represent the areas in which particular groups of masons operated. A passage in the genealogical compilation by Dubhaltach Mac Fhirbhisigh raises the possibility that masons were sometimes permanently employed by particular kings:

> These are the names of some of the craftsmen who are called 'the craftsmen of the principal stone structures': [...] Ciongdhorm the castler of Cú Raoi, Gol of Clogher, the castler of Nad Fraoich...' (Ó Muraíle 2003, vol.1, 173)

Michelli (1996, 9) also discusses evidence for long-term associations between families of craftsmen and patrons, most notably the Mac Aeda family who lived for at least two generations at Kells during which time they were patronised by the Ua Dómnaill sept. However, like the masons' marks of the later-medieval period (see Hourihane 2000, 25), the masonry styles identified here are not usually confined to a particular secular kingdom or ecclesiastical territory. For example, there is no meaningful distinction between the masonry of Uí Fidgente and that of the Hiberno-Norse hinterland of Limerick, while the east Munster style spans several distinct kingdoms including Déisi Muman, Eóganacht Chaisil and several of its subsidiaries, and possibly south-west Osraige.[3] Nonetheless, these styles suggest that towards the end of the early-medieval period (see below), sufficient numbers of stone churches were being commissioned in parts of the country for groups or families of builders to operate within quite discrete areas where they would presumably build other types of structure also (see Kelly 1988, 61 and Petrie 1845, 346–7 on how a wide range of skills enhanced the status of a builder). The local variations now becoming evident in mills and souterrains (Rynne 1998, 92; Clinton 2001, 39) support this view of how the profession was organised, though it should be noted that most of these variations are more marked and therefore not strictly habitual.

[3] The Lough Corrib/Lough Mask churches occur primarily in Uí Briúin Seóla and in at least one subsidiary túath, Conmaicne Cúile Tolad; the northwest Clare/southwest Galway group spans Corco Mruad in Munster and Uí Fiachrach Aidne in Connaught.

Some of the church masonry styles are concurrent with minor architectural features, especially hollow-chamfered gable corbels in northwest Clare/southwest Galway and round-headed doorways in east Munster; but, if anything, the conclusion that building was organised at a local level makes the uniformity of this architecture all the more remarkable (see further Ó Carragáin forthcoming).

Chronological Implications of the Local Masonry Styles

Apart from what they tell us about the organisation of church building, the local styles may also have chronological implications. All of the churches in question belong to the unicameral, mortared group generally dated to between *c.*900 and the first few decades of the twelfth century (e.g. O'Keeffe 1998; Manning 2000a). In the absence of closely-dateable architectural details and structural timbers suitable for dendrochronology, the annals are our most useful source in establishing these broad chronological parameters. In light of the pre-occupation with materials discussed above, it is perhaps not surprising that the two most common words for church specify whether it is of wood (*dairthech*) or of stone (*damliac*). This fact allows us to sketch the slow spread of mortared stone construction from about 900 onwards (Manning 2000a, 51; see also MacDonald 1981, 305–9; Harbison 1982; Hamlin 1984). There is likely to have been a substantial overlap between these plain churches and the churches with Romanesque sculpture that start to make an appearance in Munster in the first decades of the twelfth century (see O'Keeffe 1994). This makes it more difficult to establish a cut-off point for their construction but I would suggest that the majority are earlier than *c.*1130 or 1140.

Almost all of the Romanesque churches in the west of the country date to the latter half of the century; and even then there is no reason to assume that all new churches had to be decorated in this way. However, I would not accept Harbison's (1972b, 5; see also 1982, 623; 1991, 95) argument that in some western areas the buildings under consideration here were simply plain alternatives to Romanesque and even Transitional (i.e. late twelfth-/early thirteenth-century) churches. Harbison's suggestion was based partly on the fact that large blocks, characteristic of pre-Romanesque masonry in the west, are used in some Romanesque churches such as Templecronan, Co. Clare. However, as Ní Ghabhláin (1995, 124; see also Champneys 1910, 104; Ó Carragáin 2002, vol. 1, 40) shows, the overall style of masonry at Templecronan is very different from that of pre-Romanesque churches in the area. In fact no Romanesque or Transitional churches known to the present author conform to one of the local pre-Romanesque styles. Furthermore, a number of plain churches in the west of the country were excluded from the present analysis despite the fact that some of them have round-headed windows not unlike those of the early churches and certainly squatter than those of the Transitional period. Their masonry, and sometimes certain other details including slightly longer proportions, set them apart from the pre-Romanesque group. In south Co. Galway alone these include plain unicameral churches at Rosscahill, Cloondergan and Mainin, and plain nave-and-chancel churches at Cloonif, Killamoran and Caherdrine.[4] Clearly, there is

[4] Not enough survives of the chancel of Caherdrine to determine whether it belongs to the local masonry style. The nave may be an addition and certainly it does not conform to this style. I am grateful to Olive Alcock of the Archaeological Survey of Ireland for giving me access to files that were invaluable in tracking down some of these churches.

no shortage of churches, both plain and decorated, that are likely to belong to the middle and later decades of the twelfth century. The differences between them and the churches under discussion here suggest an earlier date for this latter group.

This evidence supports the widely accepted tenth to early-twelfth century timeframe for these churches. I would like to propose that masonry analysis can help us to narrow the date range further. In particular, I will suggest that the habitual masonry styles are indicative of the development of local building 'industries' in certain areas during the eleventh century, perhaps especially from the mid-eleventh century onwards. It can be argued that habitual styles have chronological implications because of the fact that they are the result of active and repeated imitation and can therefore only be developed and sustained amongst craftspeople who work together regularly (see above; Leroi-Gourhan 1993). Thus, where such a style is apparent in a relatively small group of structures it is usually indicative of quite a short period of production, perhaps no more than two or three generations. Most of the local masonry groups now comprise about ten churches, making it highly unlikely that they were built over the full tenth- to early-twelfth-century period. Even if there were twice as many originally, this would mean about one church per decade: hardly enough for the development of habitual styles. As for the relationship between the groups, the fact that they are geographically as well as stylistically discrete does not prove that they are roughly contemporary but it does strongly support this possibility.

A number of factors, both archaeological and historical, combine to suggest that the main period of construction was in the latter half of the tenth- to early twelfth-century timeframe. One strand of evidence is Berger's (1992; 1995) radiocarbon dating of mortar. Apart from tomb-shrines (see above), Berger's samples were from relatively minor churches on the west coast, including five in the Aran masonry group. These determinations are affected by a plateau in the calibration curve that cannot be compensated for when using mortar, and therefore they do not allow us to distinguish between eleventh- and twelfth-century churches (see Berger 1970; 1992, 884; Stuiver and Pearson, 1986). However, they can be seen as strongly favouring the possibility that these churches were built some time after the turn of the millennium. Berger did not date churches from any of the other groups, but architectural evidence is illuminating in some of these examples. In particular, O'Keeffe (1998, 121) has convincingly argued that the round-headed, cross-decorated doorways of Killeenemer and Britway that belong to the east-Munster group, are late-eleventh or early-twelfth century. While most of the other churches lack specific architectural features that are useful in dating, it is possible that some general characteristics of these buildings changed over time. Leask (1955, 6, 49, 60) championed proportions as a dating indicator: the shorter the length:breadth ratio, the older the church. This writer found no evidence to support this argument (Ó Carragáin 2002, vol. 1, 48–55). Pre-Romanesque churches generally have shorter proportions than Romanesque ones (mostly between 1:1.4 and 1:1.7), but there is no discernable chronological trend within the pre-Romanesque group itself. Instead, proportions relate primarily to the size of the church: larger churches generally have longer proportions, possibly because the length of the timbers available for rafters limited the breadth of the larger churches.[5]

[5] I am grateful to Professor Roger Stalley for this suggestion. Symbolically significant proportions were sometimes used (e.g. Manning 1998), but only in a minority of cases (Ó Carragáin 2002).

However, another variable does seem to change quite steadily over time. In a discussion of the Clonmacnoise churches Manning (1998, 76) remarked that the antae of Temple Dowling are 'shallow in comparison with the cathedral and Temple Ciarán, which might indicate that it is of later date.' This suggestion that antae generally became shallower over time is supported by this writer's analysis of the forty-eight churches of known antae depth, ranging from 0.74m at Dulane to 0.15m at Churchtown, Co. Wexford (Ó Carragáin 2002, vol. 1, 55–9). Assessment of this possible dating indicator was complicated by the fact that antae depth can also be influenced by the overall size of the building; but the proportionately deep antae of some small churches (e.g. Labamolaga and St. Declan's, Ardmore) and the shallow antae of some relatively large churches (e.g. Britway and Brigown) show that antae depth is not entirely determined by church area. It was found that buildings that are independently dated to before *c.*1000 by historical or radiocarbon evidence (i.e. the tomb-shrines) generally have unusually deep antae. In contrast, churches with shallow antae are much more likely to have other architectural features that support a late date, including round-headed doorways, round-headed windows with minor sculptural embellishments and true arches (as opposed to monolithic lintels), and gable-headed windows. Significantly, the few instances of Romanesque antae are also usually shallow. For example, the pre-Romanesque antae of Clonkeen, Co. Limerick are 0.66m deep; those of its Romanesque extension are 0.30m deep. As this example illustrates, not all churches with antae are earlier than those without; but the general trend does raise the possibility that churches without antae are a relatively late phenomenon (see further Ó Carragáin 2005a). The areas where such churches predominate are poorly served by the annals but it is still worth noting that the earliest reference to an extant church that may lack antae is to Kilfenora in 1055 in the Annals of Inishfallen (Mac Airt 1944); and even in this case the extent of rebuilding means that we cannot be sure that it did not have them (see Ní Ghabhláin 1995; see Ó Carragáin 2002, vol. 2, 16 for details of a pre-Romanesque door lintel lying north of the church). Kiltiernan, Co. Galway and Agha, Co. Carlow are the only two churches with antae that were extended in the early medieval period; and significantly both extensions themselves lack antae. This argument about the date of antae further supports the suggestion that the five local masonry styles are a relatively late phenomenon, because the vast majority of churches belonging to one of these styles lack antae, while the others have antae that are invariably shallower than average and, in many cases, are amongst the shallowest extant examples (i.e. most of the east Munster group, three on Aran and Kiltiernan in southwest Galway).

I would suggest that a late date for these habitual masonry styles is also supported by the fact that virtually all churches in question are relatively small churches at sites of only local or, at best, regional importance. Apart from the broad chronological framework outlined above, the annals also give us an indication of the type of site where stone churches occurred. Manning's thorough study led him to conclude that they spread 'mainly to centres of *great importance*, from around 900 only to become the commonest type of new church at *relatively important* centres by the late eleventh century' (2000a, 51; my italics). Of course, annalistic coverage is skewed towards sites of 'great importance', and it is interesting to note that the lesser sites mentioned often have links with centres of annal compilation. For example, Kilcullen (see Gwynn and Hadcock 1970, 42), Duleek and Down had links with Armagh, Tuamgraney (see Gwynn and Hadcock 1970, 46; Byrne 1973, 242) and

Gallen had links with Clonmacnoise, and Dulane and Ardbraccan (Gwynn and Hadcock 1970, 35; Herbert 1988, 82, 89) had links with Kells. Despite this, the general trend that Manning proposes is very convincing. It is therefore significant that the areas with distinct masonry styles account for a high proportion of the mortared churches at relatively minor sites; many of the others are in the architecturally diverse south Dublin/north Wicklow area. Elsewhere in the country, the density is generally lower and, where they occur, mortared churches are more likely to be at relatively important sites. This is especially true in the moderate-density area comprising the east midlands and middle reaches of the Shannon. Ardmore and Mungret are the most important sites with principal churches belonging to one of the local styles (the east Munster and Limerick styles respectively); both sites were important enough to aspire to episcopal status in the twelfth century.[6] In the areas with distinct masonry styles, the principal church survives at just two other sites of regional importance: namely Kilfenora and Kilmacduagh, the chief churches of Corco Mruad and Uí Fiachrach Aidne respectively. Their importance is reflected in the relatively large size of these churches: along with Mungret and Scattery Island, they are by far the largest extant churches in the west of the country. But unlike Mungret, it is notable that they do not conform to the local northwest Clare/southwest Galway style (see above). One possible explanation for this is that they were relatively major, once-off commissions undertaken before the local style developed. Perhaps these styles emerged at a slightly later date when sites of lesser importance began to commission churches in sufficient numbers to keep a group of local masons regularly employed, though probably not on a full-time basis. A similar pattern may have emerged in east Munster had the principal churches at Cork, Emly and Lismore survived.

Dating the Remaining Churches

It can therefore be argued that the five habitual masonry styles are indicative of the development of local building 'industries' in certain areas during the eleventh century. Given that these styles are likely to represent a relatively short building period, and one that probably extended into the first few decades of the twelfth century (see above), it may be that this development was primarily from the mid-eleventh century onwards. Outside of these areas, churches are even more difficult to date; but elsewhere I have argued that the current tenth- to early twelfth-century timeframe is simply too broad for the architectural patterns evident in this group of churches to be interpreted satisfactorily (Ó Carragáin 2005a). In a bid to break this impasse, this section focuses on the churches that do not belong to one of the local masonry styles. Using some of the dating indicators discussed above, an attempt will be made to distinguish between those that are earlier or later than the mid-eleventh century (see Fig. 4). The choice of 'mid-eleventh century' was influenced by the impression, gleaned from the annals and from some archaeological evidence outlined above, that mortared churches were quite rare even at relatively important sites until well after the turn of the millennium. Only five stone churches are referred to for the first time between 1000 and 1045, but after that there is a glut of such references: eight in the following decade alone (see Manning 2000a, 42–5, table 1). This pattern

[6] The small size of the first phase of Ardmore cathedral is also anomalous given the site's importance.

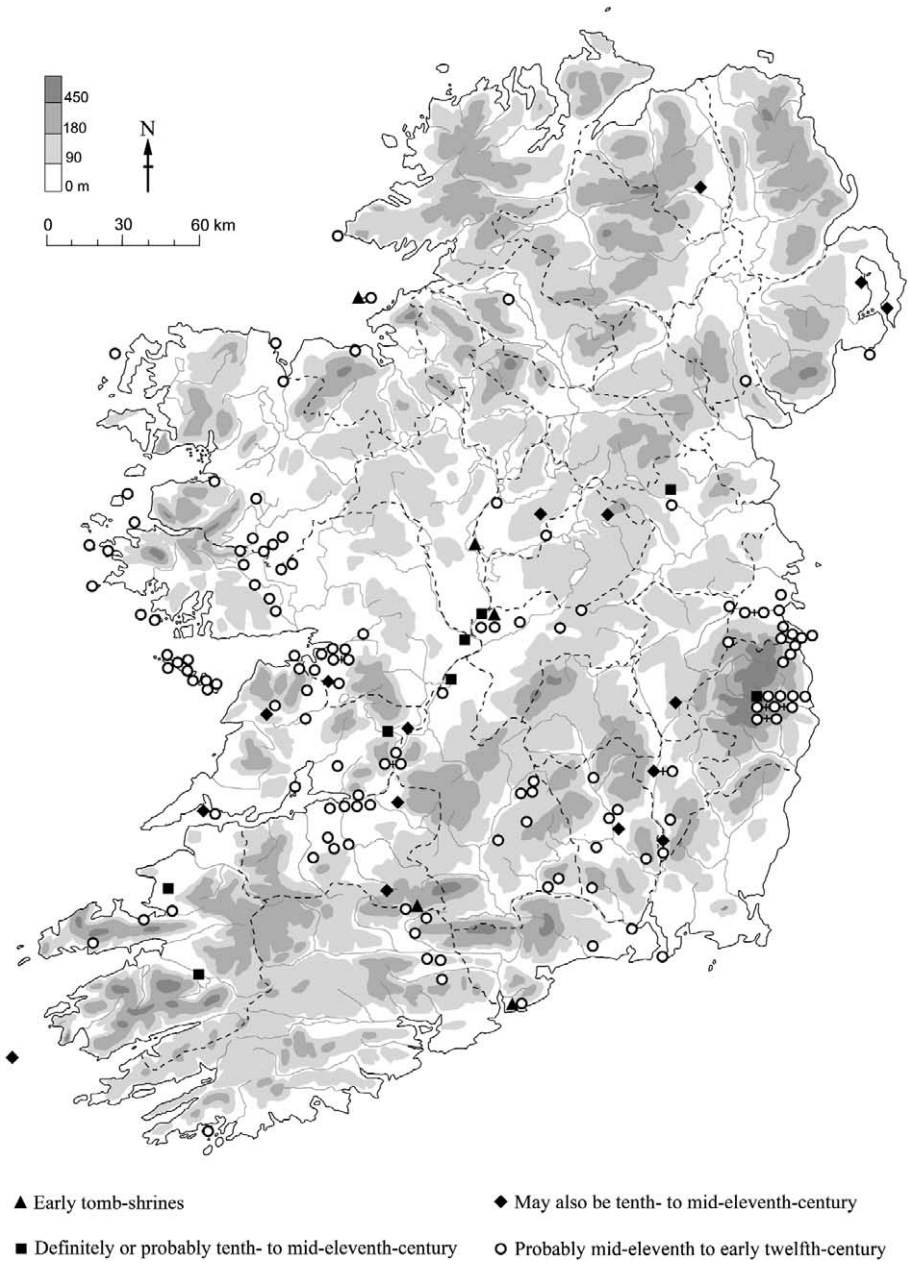


FIG. 4—Likely date-ranges for the mortared churches (dry-stone churches omitted).

is strengthened considerably if we accept Manning's argument that *temple* usually refers to a stone building (Manning 2000a, 39) because the term is very rare before the mid-eleventh century but quickly thereafter becomes the most common term for church. The following is forwarded not as a definitive chronological framework based on clear-cut dating criteria, but rather as an interpretative model that will need further substantiation and refinement.

Five tomb-shrines can be placed in the earlier group on radiocarbon evidence (see above). The annals indicate that Clonmacnoise cathedral, Dulane, Tuamgraney, Lorrha and Ardfert also belong to this group. Most of the nave at Clonfert probably represents the *damliac* referred to in 1045 (Clapham 1952, 19; Henry 1970, 159; Radford 1977, 3; Manning 2000a, 41), though its unusually long proportions suggest it was extended at some stage. Remarkably, this small group of historically-dated congregational churches includes three of the four largest extant churches. Clonmacnoise cathedral was built *c.*909 (Manning 1998), apparently making it the oldest surviving congregational church in the country. It is also by far the largest pre-Romanesque church: almost one-and-a-half times the size of the next largest, Glendalough cathedral (the main stone church at Armagh may have been larger but nothing of this survives). If this is any indication, large churches at important sites are generally earlier than small ones at minor sites and there is architectural evidence to support this conclusion. There is no significant difference of plan or even aperture position between Clonmacnoise cathedral and churches like Britway, Co. Cork that were built around two-hundred years later. Though it is possible that there were differences in internal layout due to liturgical developments, the overall architectural form and aesthetic are unchanged: a reflection, perhaps, of the relative conservatism of the Irish Church during these two centuries (see, for example Bethell 1971, 114–15; Ó Corráin 1978, 6; Ó Croinín 1995, 229–32; Charles-Edwards 2000, 592). There was little reason to alter or replace these churches once built (except perhaps a marked improvement in the fortunes of a site); the vast majority are single-phase, and it seems likely, in the absence of evidence for reused materials, that most represent the first stone church at a particular location.[7] Therefore, not only do the annals give us a broad outline of the spread of mortared stone from major to minor sites (see above), it can also be claimed that the surviving churches reflect this process quite transparently because they were not usually rebuilt before the later medieval period.

It is notable that the congregational churches that definitely belong to the earlier group are concentrated in the east midlands and Shannon basin. This pattern is reinforced when we consider the stone churches in the region at Clonard, Ardbraccan, Durrow, Kilcullen, Roscommon and Kells that have not survived but that are referred to in the annals before 1050 (see Manning 2000a, 42–5, table 1). This unusual number of references to early stone churches must partly reflect the fact that this area enjoyed relatively good annalistic coverage (see Hughes 1958, 269; 1972, 129, 134–7, 142). However, the architectural, masonry and radiocarbon evidence all hint that the pattern may not be entirely misleading; in fact it seems likely that this area was where mortared stone construction was first employed on a regular basis in Ireland (see further Ó Carragáin 2005a). The area was culturally vibrant with an unparalleled con-

[7] The only known instance of a principal church being entirely replaced by a larger one is Glendalough Cathedral (see Manning 1996; 2002). Extensions to churches are also rare.

centration of important ecclesiastical sites (see Charles-Edwards 2000, 554; Smyth 1982, 86–90; see also Ó Riain 1972; 1995) and much of it was dominated by what was still the most powerful polity in Ireland throughout much of the tenth century: the Southern Uí Néill. Competitive emulation (see Renfrew 1986) would have encouraged rival sites to erect large, stone churches, as would strong affiliations between sites. For example, the hagiographical and annalistic evidence suggest that Clonmacnoise had formal unions with Glendalough and probably also with Scattery Island during the tenth and early eleventh centuries (see Mac Shamhráin 1994; Bradley 1998, 51); it is tempting to date the large churches at these sites to this period. One might also speculate that other churches in the east midlands and Shannon basin area, at Moone, Inishcealtra, Fore and Ardagh, and outside it, at Maghera, Ardpatrick, St. Mullin's, Tullaherin, and Inishfallen, are also relatively early. They are all at sites of considerable importance and, where discernible, their antae are of well-above-average depth (antae depth is not discernible at Maghera, Ardpatrick or St. Mullin's; on the latter see Manning 1999). It is also worth noting that three churches at less important sites also have unusually deep antae: Agha, Co. Carlow; Clonkeen, Co. Limerick, which does not conform to the local Limerick masonry style (see above); and Nendrum, Co. Down, which has the second-deepest antae of any extant church and had close links with Armagh (see Charles-Edwards 2000, 28). Finally, while antae-less churches appear to be quite a late phenomenon, the large example at Kilmacduagh and the possible one at Kilfenora may nonetheless belong to the earlier group. As noted above, they do not conform to the local masonry style and there is a reference to the latter church in 1055.

Conclusion

The principal hypothesis forwarded in this paper is that in certain areas mortared church construction became more common from the mid-eleventh century with local groups of masons rebuilding the churches of even quite minor sites in stone. I have also attempted to distinguish between churches that are earlier and later than the mid-eleventh century in other parts of the country. Though speculative, these conclusions are extrapolated from definite patterns in the historical and archaeological record. They have wide-ranging implications for our understanding of these buildings that cannot be properly explored here (see Ó Carragáin 2005a; 2005b). One is the realisation that building rates could vary markedly, both temporally and spatially. In the tenth and early-eleventh centuries, several important sites in the east midlands and Shannon basin commissioned large stone churches. It is notable, however, that such churches are rare at minor sites in the area, probably because the variable quality and relative inaccessibility of the limestone bedrock (e.g. Kilanin 1889, 179, 185, 194; Hammond 1981) encouraged them to continue using wood. Conversely, although early stone churches were rare elsewhere in the country, parts of the west and south experienced a surge in construction during the later eleventh century. While environment alone cannot account for this development, it was obviously facilitated by the accessibility of stone and lime for mortar in these areas. A provisional geological analysis (see above) suggests that church building, including quarrying and stone transportation, was organised at a local level; this is supported by the highly-clustered distribution of the later churches (Fig. 4) and by the recognition that these clusters are characterised by distinct masonry styles. These styles are essentially habitual, and in fact this is what makes them useful for dating; but it is important to recognise that they would prob-

ably not have developed at all were it not for the particular importance of materiality in the aesthetics and iconography of Irish architecture during this period. We can sometimes recognise the output of certain later medieval workshops, or even individual masons, by the style of decorative sculpture they employed or, indeed, by their masons' marks (e.g. Stalley 1971, 67, 75; 1994, 39; Hourihane 2000). In contrast, the local groups of masons that operated in early medieval Ireland expressed themselves most clearly in the very fabric of the churches that they built.

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