THE 'LOST' IRISH 84-YEAR EASTER TABLE REDISCOVERED

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ABSTRACT. The Paschal controversy in the British Isles centred on the use of an 84-year Easter table, which was abandoned by Iona only in AD 716. Previous discussions of the Irish table have been hampered by the fact that no manuscript copy was known. This paper announces the discovery of such a manuscript (Padua, Biblioteca Antoniana, MS I. 27) and offers, for the first time, an authentic Irish Easter table for AD 438–521.

KEYWORDS. Anatolius, annals, British Easter, Columbanus, computus, chronology, Easter, Gildas, Irish 84-year Easter table, Irish Paschal forgeries, *latercus*, Munich Computus

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INTRODUCTION

Writing to the Gallican bishops in AD 603 on the subject of the Easter controversy, Columbanus remarked defiantly that he had 'more confidence in the tradition of my native land in accordance with the teaching and reckoning of eighty-four years and with Anatolius . . . for the celebration of Easter, than in . . . Victorius'.[1] It is generally acknowledged that the Irish—and British—churches of the sixth century and earlier reckoned the date of Easter by means of an 84-year cycle.[2] That cycle, however, has long been given up for lost, and despite the efforts of Bruno Krusch,[3] Bartholomew MacCarthy,[4] and Daniel O'Connell[5] to retrieve it from references in secondary sources, principally the so-called Munich Computus, no convincing reconstruction has ever been possible. 'Thatsächlich ist kein einziger Ostersonntag der irischen Observanz bekannt', was Eduard Schwarz's verdict in his magisterial survey of 1905,[6] and nearly forty years later the doyen of modern computists, Charles W. Jones, was driven to the same conclusion.[7] Jones, moreover, did not believe that the Irish table could be reconstructed from the available evidence, and until now no new evidence has been brought to light.[8]

The Irish 84-year Easter table is not lost. A copy of it has come to light in Padua, Biblioteca Antoniana, MS. I. 27, and what follows in this article is a description and restoration of the table, together with some comments on the implications of the discovery for early Irish history and chronology. These comments must, of necessity, be of a preliminary nature; the full impact of this discovery will have to be worked out in the years to come.

DESCRIPTION OF THE MANUSCRIPT

Padua, Biblioteca Antoniana, MS I. 27 (*saec. Xin*) was written in northern Italy (possibly Verona) in the early years of the tenth century, to judge from the script and from the presence of dating clauses for AD 879 and 881. The codex has 133 folios, measuring 270 × 210 mm, written by several hands in long lines (except f 130^{v}-133^{r}, which are in double columns). A full list of the contents will be found in the works listed in the note;[9] we give here a summary description.

The manuscript is a miscellany, mostly computistical. The principal text is Hrabanus Maurus, *Liber de computo* (f 1^{r}-44^{v}), and this is accompanied by excerpts from Macrobius, Isidore, and Bede, as well as anonymous computistical argumenta, verses, tables, and *rotae*, plus church canons (including a previously unidentified set of excerpts from the *Collectio canonum Hibernensis*).[10] Buried in the mass of anonymous computistical material (f 76^{r}-77^{v}) is our 84-year table. None of the modern cataloguers recognised it for what it was, and consequently none provided any details.[11] The data in the table, the heading attached to it, and the context in which it is found all combine to prove that the table is Irish. The restoration and discussion below will demonstrate that it is one of the oldest documents to survive from the early Irish churches.

The table has the rubric INCPTLTRCSIET TNCLTS, to be expanded tentatively as INCIPIT LATERCUS, ID EST LATENS CULTUS.[12] Both the term 'latercus' and its etymology are attested in seventh-century Irish sources. The 84-year table known to and described by the compiler of the Munich Computus (AD 718) was contained in a latercus, and Irish computists of the seventh-century and after who adopted the 'orthodox' Alexandrian reckoning referred to their more conservative fellow-countrymen as 'laterci sectatores'.[13] The etymology of 'latercus' as 'latens cultus' also occurs in the seventh-century Irish *De ratione conputandi*, and nowhere else, to my knowledge.[14] The bare rubric of the text, and the absence of any indication of date or place of origin, are also in keeping with Cummian's statement (c. 633) that the Irish 84-year cycle championed by Iona was one 'whose author, place, and time we are uncertain of'.[15]

It is perhaps significant that the table is preceded in our manuscript (f 71^{v}-75^{v}) by the sixth-century Irish computistical tract *De ratione paschali* attributed to Anatolius, bishop of Alexandria.[16] Every Irish writer, from Columbanus in AD 600 to Colman at Whitby in AD 664, and beyond, defended the Irish use of an 84-year cycle by reference to Pseudo-Anatolius, and the principles followed in the table are also to be found in the pseudepigraphical work. That the Irish 84 circulated together with Pseudo-Anatolius is more than likely, therefore,[17] and the fact that our manuscript combines the two is evidence for the relative archaism of its contents, since subsequent collections, while retaining the text of Pseudo-Anatolius, invariably jettison the 84-year table as obsolete.[18]

Also of some significance, as indicating a possible Irish provenance for part of the contents of the manuscript, is the inclusion (f 66^{r}-71^{v}) of excerpts from Macrobius's *Saturnalia*, excerpts which circulated only in Irish or Irish-related manuscripts under the title *Disputatio Cori et Praetextati*.[19] The Padua

manuscript contains the best and most complete text of the *Disputatio*—further evidence that the compiler had access to good, early Irish materials.[20]

LAYOUT AND CONTENTS OF THE TABLE

We proceed now to a discussion of the table itself, and an explanation of its layout and contents. It is arranged in six columns and is extended for a period of eighty-four years.

Col. 1 This marks the Kalends (kl), or incidence of 1 January every year; there is no AD date, and therefore no era.[21] Attached to the Kalends is the ferial for that date. The ferial number denotes the weekday on which 1 January falls: 1 = Sunday (Dominicus), 2 = Monday, and so on, up to 7 = Saturday (sabbatum). If each year consisted of 52 weeks and a day, the sequence would recur in order every eighth year; but the insertion every fourth year of the leap-year day (bissextus) interrupts the sequence, so that the recurrence is every 28 years (7 × 4). Hence in the subjoined 84-year table the sequence of ferials is the same at cyclic numbers 1–7, 29–35, 57–63, and again at year 1 of the next cycle.

Col. 2 This is prefixed by 'L' for *luna* and gives the moon's age or epact on 1 January. In the lunisolar reckoning of the computists the solar year = 365 days and the lunar year = 354. Assuming the solar and lunar years begin on 1 January, the second lunar cycle will begin eleven days before the solar one and will thus be eleven days in advance of the solar year on the 1 January next following. On 1 January of the third year the lunar cycle will be twenty-two days in advance, and so on; these incremental days are the epacts.

Col. 3 This is prefixed by 'P' for *Pascha* and gives the date of Easter Sunday in the Roman calendar.

Col. 4 This is prefixed by 'L' for *luna* and gives the age of the moon on Easter Sunday.

Col. 5 This is prefixed by 'Ini[tium]' and gives the date of the beginning of Lent in the Roman calendar.

Col. 6 This is prefixed by 'L' and gives the moon's age on the first day of Lent.

Since the data here listed are interdependent, each column provides a cross-check on the data in the other columns, and confirms their interrelationship. Hence errors in one column can be detected and corrected by reference to the other columns.

RESTORATION OF THE FERIAL AND LUNAR DATA

It may be remarked, as a working principle, that tables of Roman numerals are always susceptible to errors in transcription. That said, however, we must assume that the majority of entries are in fact sound, and that as few emendations as possible should be made to the received text. Single digit errors are possible and likely (e.g. xvii in place of xviii, or iii in place of ii; but xiiii in place of xv is less likely).[22] It is also possible that the scribe transposed numbers or lines, particularly from the line immediately above or below the line being copied; several instances of this are found in our manuscript.

Starting with the ferials on 1 January, since the ordinary year has 365 days, which when divided by seven leaves a remainder of one, the ferial should increase by one each year. The incidence of a leap-year, however, increases the number

by two. Thus we expect a pattern of three single increments of one followed by an increment of two, and examination of the eighty-four entries shows this to be so in all but two cases (cyclic numbers 6 and 23), where in both cases the ferial of the preceding year has been accidentally repeated. When the necessary correction is made, a regular pattern of three single increments followed by a double increment is obtained for the entire table.

Since the ferial of the first entry is 'S' = 7 = sabbatum, it must have Dominical Letter B or BA (the latter in a leap-year).[23] However, the pattern of double increments in the ferial data shows that the bissextile or leap-year incidence occurs in the third, seventh, eleventh and corresponding years, so that the first year in the table cannot have been a bissextile year. Thus the first year must have Dominical Letter B, equivalent to year eighteen in the 28-year solar cycle.[24] Although the table has no initial AD year, the epact and the ferial number for the first year are sufficient to enable calculation of a small number of possible starting years for the cycle, as will be discussed presently.

Turning next to the moon's age or epact on 1 January, we expect to see this increment by eleven every year, except in the years following the saltus or moon's leap, when the number advances by twelve. The sequence of epacts in the table shows eleven errors (cyclic numbers 4, 9, 24, 29, 40, 48, 49, 52, 66, 74, and 84); in every case the error is clearly due to scribal lapses, and the correction required is mechanical: [x]xii for xii; xvi[i] for xvi; ii[i] for ii; xxvii[ii] for xxvii; xx[x] for xx; xxviii[i] for xxviii; x(xi) for xxi; [x]iii for iii; xviii(i) for xviiii; xvi[i] for xvi; and vi[i] for vi.

Cyclic numbers 15, 29 (corrected), 43, 57, and 71 all show an epactal increment of twelve, compared to the normal increment of eleven. Since 15 = 1 + 14, and the other numbers follow at fourteen-year intervals, it seems safe to conclude that the saltus was inserted at fourteen year intervals. With the minor corrections just described, we find that the data of col. 2 present a smooth pattern of epacts, representing an 84-year cycle with insertion of the saltus every fourteenth year. This is the typical arrangement of the Irish cycle.

RE-CALCULATION OF THE PASCHAL AND INITIUM DATA FROM THE RESTORED FERIALS AND EPACTS

Since the Paschal and Initium dates and moons all derive from the ferials and epacts of 1 January, the next step is to compare the values recomputed from the restored ferials and epacts with the data in cols 3–6.[25] The rule is as follows: if E is the epact, then 45 *minus* E gives the date of the Paschal full moon in either the second half of March or the first half of April. When this Sunday falls on or before 25 March the calculation 74 *minus* E gives the date of the next full moon, in the second half of April, and similarly the next Sunday on or following that date is taken as Easter Sunday. The ferial of 1 January is then used to calculate the day of the week on that date, and the first Sunday on or after that date is taken as Easter Sunday, providing it occurs after 25 March, the date of the vernal equinox according to the old Roman reckoning. Once the weekday of

the full moon is known the Paschal moon is readily computed. The Initium is then reckoned as occurring forty days before Easter Sunday, counting inclusively.

To eliminate the possibility of error in the calculation, all the manuscript data were carefully transcribed to a computer file with the corrections described above. A computer program was then written which read this file, recomputed the Paschal and Initium data, and printed the recomputed and original manuscript data side-by-side so as to facilitate comparison. When the recomputed (hereafter R) and manuscript (hereafter MS) data pairs were examined it was found that they could be readily grouped into three classes:

Class 1: Pairs that matched exactly

Class 2: Pairs that varied in minor ways (e.g., for Paschal dates we found No. 30, vi. Id. Ap. (MS) compared with v. Id. Ap. (R); or No. 18, xv. K. Ap. (MS) compared with xv. K. Mai. (R); while for Paschal moons we found many differing by just one, e.g. No. 1, xvi. (MS) compared with xv. (R)

Class 3: Pairs that did not match at all

Preliminary analysis of the Paschal dates produced 62 Class 1 entries, 9 Class 2, and 13 Class 3 entries; for the Paschal moons the results were 10 Class 1, 61 Class 2, and 13 Class 3 entries. When the 61 Paschal moon entries of Class 2 were examined it was noticed that in *every* case the manuscript Paschal moon was one day older than the recomputed moon. When the 13 Class 3 Paschal moon entries were examined it was found that in *every* case the Paschal moon was xiiii compared to a recomputed moon of xx. Finally, when the 13 Class 3 Paschal dates were examined it was found that in *every* case the manuscript date was one week in advance of the recomputed date, and for both moons and dates the Class 3 entries were identical. Corresponding discrepancies could be seen in the Initium data.

It is clear from this analysis that the manuscript Paschal and Initium data do not reconcile well with the manuscript ferial and epactal data, and amendments on a wholly improbable scale would be required to restore the table to some sort of coherence. However, it was also clear that the difference between the two sets of data was somehow systematic, for if the discrepancies were due to random scribal error we could never expect to find 61 cases where the Paschal moon differed by one day, nor 13 cases where the Paschal dates differed by a whole week. Consequently an alternative explanation was sought for the systematic discrepancies. It was soon realised that if the epact for 1 January was incremented by one, it would increment all the recomputed Paschal and Initium moons as well, bringing them into line with the original manuscript entries; in the case of the Class 3 entries, the recomputed moon would increase to xxi (that is, one day beyond the

traditional Irish limit), allowing the Paschal date to move back one week to moon xiiii, in line with the original manuscript entries and with known Irish practice.

On the basis of this premise, the Paschal and Initium data were recomputed with the epacts all increased by one, and the results from this operation were much more encouraging, as the following table shows.

Table 1. Counts of the correspondence classes for MS. vs. incremented epacts

	MS Epacts			*Incremented Epacts*		
	Class			Class		
Table entry	*1*	*2*	*3*	*1*	*2*	*3*
Paschal date	62	9	13	73	11	–
Paschal moon	10	61	13	76	8	–
Initium date	38	22	24	44	30	10
Initium moon	3	56	25	65	19	–

The results are particularly satisfactory for the Paschal dates, which all now come into line, or differ only in trivial details, and for the moons, where in both cases more than sixty entries came into line with the manuscript data. However, the Initium dates, which still show ten entries completely out of line, seem to have been less carefully copied, showing more omissions and scribal amendments.[26] The statistical evidence of these revised data is overwhelming, and we are driven to conclude that the Paschal and Initium data were in fact computed from epact values one higher (E *plus* 1) than those actually shown in the manuscript. The table below is based on this discovery.

DATING THE TABLE

It is naturally of crucial importance to know what historical years the table entries refer to, and we have here to guide us (a) the historical evidence and the manuscript context, (b) the ferial data, and (c) the epactal data. Regarding (a), we have seen that the preservation of the table together with material of demonstrable seventh-century Irish origin suggests a date no later than then. In any event, the 84(14) cycle is known to have been relinquished finally on Iona in AD 716, and it seems reasonable to take this as a terminus post quem non.[27] Regarding (b), the ferial data in the manuscript, we have noted above that the table commences with ferial number 7 (S = sabbatum) = Saturday, with the bissextile intercalation occurring two years later. This tells us that the Dominical Letter for the year is B, giving solicyclic number 18 (i.e., the remainder when the AD is divided by 28 must be 18). Finally, turning to (c), the epactal data, we may first observe that there is very good discrimination at twenty-eight-year intervals, because in twenty-eight years the epact increments 28×11 and there are two insertions of the saltus, so the epact advances by $28 \times 11 + 2 = 310 = 10$ modulo 30. That is, if in a given year the epact is about correct, then it will be 10 less twenty-eight years before and 10 greater twenty-eight years subsequently, so there is no serious possibility of confusing successive occurrences of a given solicyclic number.

With these points in mind we turn now to the epacts that the Irish were using in the period AD 400–700. O'Connell considered this question carefully and showed clearly that the Irish epacts lay between the Alexandrine and Roman epacts,[28] and on this basis he constructed a table of the possible Irish epacts for the period AD 432 to AD 720.[29] This table was searched for those years containing the data in our table, solicyclic number 18 and initial epact 20. The solicyclic restricts the search to the years 438, 466, 494, 522, 550, 578, 606, 634, 662, 690, and 718. However, only the following years have epactal ranges including 20: 438 (20–21), 522 (18–21), 606 (16–21), and 690 (15–21), where the figures in brackets show the range between the Alexandrine and Roman epacts. Which of these years is most appropriate to our table?

To decide which of these years 438, 522, 606, or 690 is the initial year of the Padua table we commence by considering the only other Irish 84-year latercus known, that described in the Munich Computus. This has been fully discussed by Krusch, MacCarthy, Schwarz, and O'Connell; Schwarz and MacCarthy dated it independently to AD 718, while the latter showed that it was based, in part at least, on materials dated AD 689; all writers are agreed on the Computus's Irish origin. Both Schwarz and O'Connell rejected Krusch's reconstruction of the Munich latercus, while MacCarthy's, which is based completely on the improbable assumption that a fourth-century Roman catacomb inscription provided epacts which matched the Irish ones exactly, was likewise rejected by O'Connell. To O'Connell's arguments for rejection we may add the fact that MacCarthy's initial year AD 381 has epact 20 in the Victorian cycle, not epact 19 as the Munich Computus requires. However, by careful analysis of the ferial and epactal data described in the Munich Computus O'Connell established that the only possible initial years are 522, 541, and 560;[30] based on his assumption that the Latercus derived from the Victorian table O'Connell then selected AD 560 as his initial year.

We now consider the discrepancy that exists between a lunar calendar based upon a cycle of 84-years with six salti and the real moon. As O'Connell showed,[31] after 84 years the calendar moon is about 1.28 days ahead of the real moon, so the epact should be reduced by one to bring them back into line. That this was known in the fifth century and earlier is proven by the reduction in the Zeitz table's epacts relative to the Supputatio Romana such that its epact for AD 365 was two less than that of the Supputatio, 'thus correcting for a time (about 447) the error that had been building up'.[32] O'Connell also remarked on similar effects in the two tables described by the Carthaginian computist of AD 455, adding that 'the epacts of these [84-year] cycles were altered so as to bring the cyclic [i.e. calendar] moon nearer to the actual'.

Thus we see that both the theory and practice of an 84-year cycle with six salti require that the initial epact should be reduced from time to time in order to keep calendar and real moons in synchronism. This then provides the most likely explanation as to why the epacts of the Padua table have all been decremented by one subsequent to the calculation of the table. Furthermore, and finally,

we see that if the Munich Computus refers to an Irish latercus commencing with epact 19 and dating from somewhere in the first half of the sixth century, as O'Connell demonstrated, then the Padua table, with initial epact 20, must refer to an earlier date. We are forced, therefore, to rule out the years 690, 606, and 522 as possible initial years for the table and conclude that AD 438 is the only year compatible with the ferial and epactal data and O'Connell's dating of the Munich latercus.

Is there any independent confirmation of this dating available? The only documentary evidence available regarding Irish epacts is the annals, the oldest being the Annals of Inisfallen and the most comprehensive the Annals of Ulster.[33] Both have been partially labelled with ferial and epactal data and the latter derive from the 19-year Alexandrian cycle adjusted to the Roman year (i.e. with epact for 1 January). Although their respective series of epacts are incomplete, these have been restored and correlated with AD dating.[34] Both annals are found to have the same sequence and both explicitly give epact 20 for AD 438, and it naturally follows from their 19-year cycle that they do *not* give epact 20 for the years 522, 606, or 690. It must be acknowledged that the epactal sequences of these annals were inserted retrospectively, most probably superseding earlier 84-year cycle epacts, but they do confirm that whoever added them accepted epact 20 for AD 438.

Hence we see that the documentary evidence does support our derivation of epact 20 for the year AD 438, and we feel confident accordingly in presenting the following *latercus* of Irish Easters for the years AD 438 to AD 521 based on this dating.

Table 2. Reconstructed *latercus* of Irish Easters for the years AD 438 to AD 521

Cyclic No	*AD*	*Ferial*	*Epact*	*Paschal Date*	*Moon*
1	438	7	20	27 Mar	16
2	439	1	1	16 Apr	17
3	440	2	12	7 Apr	19
4	441	4	23	20 Apr	14
5	442	5	4	12 Apr	16
6	443	6	15	4 Apr	19
7	444	7	26	23 Apr	20
8	445	2	7	8 Apr	15
9	446	3	18	31 Mar	18
10	447	4	29	20 Apr	20
11	448	5	10	4 Apr	14
12	449	7	21	27 Mar	17
13	450	1	2	16 Apr	18
14	451	2	13	1 Apr	14
S 15	452	3	25	20 Apr	16
16	453	5	6	12 Apr	18
17	454	6	17	28 Mar	14
18	455	7	28	17 Apr	16
19	456	1	9	8 Apr	17
20	457	3	20	31 Mar	20
21	458	4	1	13 Apr	14
22	459	5	12	5 Apr	17
23	460	6	23	27 Mar	19
24	461	1	4	16 Apr	20

continued on next page

Table 2—*continued*

Cyclic No	*AD*	*Ferial*	*Epact*	*Paschal Date*	*Moon*
25	462	2	15	1 Apr	16
26	463	3	26	21 Apr	18
27	464	4	7	12 Apr	19
28	465	6	18	28 Mar	15
S 29	466	7	30	17 Apr	18
30	467	1	11	9 Apr	20
31	468	2	22	21 Apr	14
32	469	4	3	13 Apr	16
33	470	5	14	5 Apr	19
34	471	6	25	18 Apr	14
35	472	7	6	9 Apr	15
36	473	2	17	1 Apr	18
37	474	3	28	21 Apr	20
38	475	4	9	6 Apr	15
39	476	5	20	28 Mar	17
40	477	7	1	17 Apr	18
41	478	1	12	2 Apr	14
42	479	2	23	22 Apr	16
S 43	480	3	5	13 Apr	18
44	481	5	16	29 Mar	14
45	482	6	27	18 Apr	16
46	483	7	8	10 Apr	18
47	484	1	19	1 Apr	20
48	485	3	30	14 Apr	15
49	486	4	11	6 Apr	17
50	487	5	22	29 Mar	20
51	488	6	3	17 Apr	20
52	489	1	14	2 Apr	16
53	490	2	25	22 Apr	18
54	491	3	6	14 Apr	20
55	492	4	17	29 Mar	15
56	493	6	28	18 Apr	17
S 57	494	7	10	10 Apr	20
58	495	1	21	26 Mar	16
59	496	2	2	4 Apr	16
60	497	4	13	6 Apr	19
61	498	5	24	19 Apr	14
62	499	6	5	11 Apr	16
63	500	7	16	2 Apr	18
64	501	2	27	22 Apr	20
65	502	3	8	7 Apr	15
66	503	4	19	30 Mar	18
67	504	5	30	18 Apr	19
68	505	7	11	3 Apr	14
69	506	1	22	26 Mar	17
70	507	2	3	15 Apr	18
S 71	508	3	15	30 Mar	14
72	509	5	26	19 Apr	16
73	510	6	7	11 Apr	18
74	511	7	18	27 Mar	14
75	512	1	29	15 Apr	15
76	513	3	10	7 Apr	17
77	514	4	21	30 Mar	20
78	515	5	2	12 Apr	14
79	516	6	13	3 Apr	16
80	517	1	24	26 Mar	19
81	518	2	5	15 Apr	20
82	519	3	16	31 Mar	16
83	520	4	27	19 Apr	17
84	521	6	8	11 Apr	19

COMMENTARY

A few comments are called for regarding this table. Firstly, it has been presented so as to enable the reader to reconstruct the original manuscript entries by reference to Appendix 1, which shows every amendment made to the ferial, epactal, and Paschal data in the original Roman notation, except that the increment applied to every restored epact is not marked. Thus when amendments are shown to the epacts, it must be remembered to first subtract one from the epact given in col. 4 before applying that amendment. For example, cyclic number 24 shows epact 4, from which one must be subtracted (= iii) before applying the amendment E ii > iii, indicating that the manuscript actually has epact ii. Note also that with the single exception of cyclic number 48, where luna xiiii is amended to luna xv, all the other amendments involve only the insertion or deletion of one or two repeated digits.

Secondly, the table has been presented so as to facilitate comparison with O'Connell's reconstructed Irish table, where all the numeration is in Arabic numerals and dates are in the modern format; it is for this reason that the Roman calendar notation of the original has been dispensed with and the restored table converted to modern notation.

Thirdly, upon comparing this table with O'Connell's reconstruction over the years AD 438–521, four discrepancies emerge as follows.

Table 3. Discrepancies between Padua MS Paschal data and O'Connell Table 1, AD 438–521

AD Year	*Padua MS*	*O'Connell*
444	23 Apr, l.20	26 Mar, l.21
479	22 Apr, l.16	25 Mar, l.17
490	22 Apr, l.18	25 Mar, l.19
501	22 Apr, l.20	25 Mar, l.21

It should be noted that, with the exception of the date for AD 444, which has been emended from 24 April to 23 April, these are the dates actually shown in the Padua manuscript, and it is clear that whoever drew up the table rejected 25 March and luna xxi as possible criteria. His lunar limits are xiiii-xx and his Paschal limits are 26 March to 23 April, which incidentally fully accord with the limits in Pseudo-Anatolius.[35] O'Connell himself took his limits from the so-called 'Acts of the council of Caesaraea', otherwise known as Pseudo-Theophilus,[36] and the so-called Pseudo-Athanasius, both Irish forgeries of the sixth century;[37] he thus decided to accept 25 March and luna xxi as possible criteria.[38]

The manuscript entry we have dated to AD 444 provides further corroborating evidence when compared with the Annals of Inisfallen. The annals s.a. AD 454 have the entry 'l.xxvi. P. viii. K. Mai'. Mac Airt, in his footnote,[39] inferred that the entry alludes to the compromise Roman Easter of AD 455, which was celebrated on 24 April (three days beyond the Roman limit). But there are difficulties with this proposal, for as Mac Airt also pointed out, the epact xxvi is incorrect for both AD 454 and AD 455. He referred to the Alexandrine epact for

these years, xvi and xxvii respectively, and remarked that the annal entry may be easily amended to either. However, this does not reconcile with O'Connell's tabulation of the Roman epacts,[40] which he gives as xviiii and xxx for AD 454 and 455 respectively, neither of which readily amends to xxvi. Furthermore, the epacts in the Annals of Inisfallen follow a 19-year cycle commencing with epact 9 in AD 437 and proceeding through 20, 1, 12, 23, 4, 15, 26, etc., which would place the entry under discussion here at AD 444; furthermore, Mac Airt's apparatus for the years AD 444 and 445 suggest that an entry has indeed been moved out from the chronicle at AD 444. Relocating it here we need only amend the date with a single digit, reading 'l. xxvi. P. viii[i] K. Mai', in order to obtain our *Table 2* entry, and the amendment listed in Appendix 1 shows that the Padua manuscript in fact exactly matches the data in the Inisfallen entry. It seems, on the face of it, more likely that the Irish annals would refer to an extreme Irish Paschal date, rather than a Roman compromise with Alexandria at a time when, so far as we know, the Irish were not involved in controversy with either.

In conclusion we may point to the following results of our enquiries: (1) the Padua manuscript provides conclusive evidence for an Irish 84-year Easter cycle with a 14-year saltus, and with lunar limits 14–20 and Paschal limits 26 March–23 April; and (2) for the first time we now have a list of Irish Easter dates, commencing in AD 438 and running to AD 521.

THE 84-YEAR EASTER CYCLE IN BRITAIN AND IRELAND

In all the references to Easter practices in the British Isles that occur in early writers the Irish and British churches are invariably linked together. In his Paschal letter addressed to abbot Ségéne of Iona (AD 633), Cummian twice remarks on the fact that the Irish and British stand out alone in their unique observances, describing them once as 'an insignificant group of Britons and Irish who are almost at the end of the earth, and, if I may say so, but pimples on the face of the earth';[41] on the second occasion he asks sardonically: 'What, then, more evil can be thought about Mother Church than if we say Rome errs, Jerusalem errs, Alexandria errs, Antioch errs, the whole world errs; the Irish and British alone know what is right'.[42] That the Irish and British were at one in their observances is also stated by Aldhelm, in his letter to the British king Gerontius,[43] and by Bede.[44]

Given the direct and continuous involvement of the British church in the establishment and consolidation of early christianity in Ireland, conformity of Easter practices seems, on the face of it, very likely, even if we are unable to confirm it with technical evidence. But the persistence of the statements, coming, as they do, from all sides, would appear to justify us in accepting the case as proven. That much having been said, it remains to see what the evidence of the rediscovered Irish 84-year Easter table can tell us about sixth- and seventh-century Irish and British chronology.

This subject is too vast to allow for detailed examination here, but a possible starting-point is the dating of Gildas's *De excidio Britanniae*, the only important

literary survival from sixth-century Britain.[45] Apart from inferential deductions based on the supposed historical background of Gildas's account, the only data which might allow an accurate dating of the work are contained in a 'dating-clause' which has defied interpretation up to now. The passage in the *De excidio* of concern to us reads as follows:

> Ex eo tempore nunc cives, nunc hostes, vincebant, ut in ista gente experiretur dominus solito more praesentem Israel, utrum diligat eum an non, usque ad annum obsessionis Badonici montis, novissimaeque ferme de furciferis non minime stragis, quique quadragesimus quartus (ut novi) orditur annus, mense iam uno emenso, qui et meae nativitatis est[46] 'From then on victory went now to our countrymen, now to their enemies: so that in this people the Lord could make trial (as he tends to) of his latter-day Israel to see whether it loves him or not. This lasted right up till the year of the siege of Badon Hill . . . That was the year of my birth: as I know, one month of the forty-fourth year since then has passed already'.

The traditional interpretation of this passage has understood it to mean that the battle of Mons Badonicus took place in the year of Gildas's birth, forty-four years before the time of writing.[47] An alternative interpretation has been proposed by Ian Wood, but though this received guarded approval by one other writer[48] his view has been subjected to vigorous criticism by both Thomas Charles-Edwards and the late J.M. Wallace-Hadrill,[49] principally on the grounds that Woods's translation is incompatible with the syntax of the clause.

As an alternative solution to the problem I should like to suggest that Gildas's 'forty-fourth year' refers, not to a unique chronology based on the date of the battle of Mons Badonicus, but to a universal chronology, such as would have been provided by an Easter table. In other words, Gildas's reference is to the forty-fourth year of an 84-year Easter cycle. Assuming that cycle to be identical to the Irish table recovered in the Padua manuscript, with initial yead AD 438, we can deduce that Gildas means that the battle of Mons Badonicus took place in February of AD 482.[50] Any further inference about the absolute date of the *De excidio* would then depend on Gildas's age when he composed it. But it seems to me in the circumstances that the wording used by Gildas in this crucial passage is most naturally interpreted as referring to a *cycle* of years, and the only such cycle with any claims to validity for the period is the Irish/British 84-year Easter table.

The full implications of the rediscovery of the Irish/British 84-year Easter table will need to be worked out elsewhere. For the present it must suffice to say that its potential importance for the reconstruction of early Irish chronology, especially in terms of controlling and, where necessary, correcting the evidence of the Irish annals, can hardly be exaggerated. In the broader field of computistics we are now, for the first time, in a position to test the statements of writers such as Cummian and Bede, and relate their comments to our new under-

standing of the evidence. Only with this new discovery can the full story of the Easter controversy in the British and Irish churches be told. The publication of the long-lost Irish 84-year Easter table opens a new chapter in that story.[51]

APPENDIX 1

A LIST OF THE AMENDMENTS MADE TO THE PADUA MS

The purpose of this Appendix is to list all the amendments made to the Padua manuscript in the course of making the reconstructed table given in Table 2 above, and thus enable the reader to derive the original manuscript readings from that table. The amendments are given by manuscript column, left to right, and each entry is identified by its cyclic number. The following conventions are employed: brackets [ ] denote digits that have been excised, while parentheses ( ) denote digits that have been added. For simplicity, the abbreviations 'f' [= feria], 'L' [= luna], 'P' [= Pascha], and 'In' [= Initium] have been omitted.

Column 1: Ferials

6. vi[i]
23. vi[i]

Column 2: Epacts

Only those amendments that were made in order to obtain a smooth arrangement of epacts are given below. Subsequently all entries in this column were incremented by one, as discussed fully in section 3 above.

4. x[x]ii
9. xvi[i]
24. ii[i]
29. xxvii[ii]
40. xx[x]
48. xxviii[i]
49. x(xi)
52. [x]iii
66. xviii(i)
74. xvi[i]
84. vi[i]

Column 3: Paschal Dates

7. viii[i] K.M.
15. x[ii] K.M.
18. xv K.(Ap.)[M.]
30. v(i) Id.Ap.
38. vii[i] Id.Ap.
59. xviii [K.M.]
65. vii(i) Id.Ap.
71. iii(i) K.Ap.
75. xvi[i] K.(Ap.)[M.]
76. vii(i) Id.Ap.
81. xvii [K.M.]

Column 4: Paschal Moon

22. xvi[i]
27. xviii[i]
29. xvii[i]
36. xviii(i)
48. x(iiii)[v]
49. xvi[i]
61. xiii[i]
67. xviii[i]

NOTES

1. G. S. M. Walker (ed. and trans.), *Sancti Columbani opera*, SLH 2 (Dublin 1957, repr. 1970) 18.

2. Good general surveys are Joseph Schmid, *Die Osterfestberechnung in der abendländischen Kirche vom I. allgemeinen Konzil zu Nicäa bis zum Ende des VIII. Jahrhunderts*, Strassburger Theologische Studien 9/1 (Freiburg i. Breisgau 1907), and idem, *Die Osterfestberechnung auf den britischen Inseln vom Anfang des vierten bis zum Ende des achten Jahrhunderts: eine historisch-chronologische Studie* (Regensburg 1904). Alone amongst modern writers Alfred Anscombe denied that the Irish followed an 84-year cycle, but his views were demolished by Charles Plummer (ed), *Venerabilis Baedae opera historica* (2 vols, Oxford 1896; repr. London 1969) 348–54: 351 n 6. Plummer's 'Excursus' on the Easter question is still well worth reading.

3. Bruno Krusch, *Studien zur christlich-mittelalterlichen Chronologie* [1]. Der 84-jährige Ostercyclus und seine Quellen (Leipzig 1880) 10-23; idem, 'Die Einführung des griechischen Paschalritus im Abendlande', *Neues Arch Ges ält deut Geschichtskunde* 9 (1884) 101–169: 167.

4. Bartholomew MacCarthy (ed. and trans.), *Annala Uladh, Annals of Ulster* iv (Dublin 1901) p lxvi–lxxviii.

5. Daniel J. O'Connell, 'Easter cycles in the early Irish church', *J Roy Soc Antiq Ire* 66 (1936) 67–106.

6. Eduard Schwarz, 'Christliche und jüdische Ostertafeln', *Abh Akad Göttingen*, phil.-hist. Kl. NF 8/6 (Berlin 1905) 1–95: 102.

7. Charles W. Jones (ed), *Bedae Opera de temporibus*, Mediev Acad Am Publ 41 (Cambridge MA 1943) 93 n 1: 'there is no certain record of Irish Easters'.

8. The table in Knut Schäferdiek, 'Der irische Ostercyklus des sechsten und siebten Jahrhunderts', *Dtsch Arch* 39 (1983) 357–78: 372–74, is based on O'Connell's table, not on any new manuscript evidence.

9. Patrick McGurk, *Catalogue of astrological and mythological illuminated manuscripts of the Latin middle ages* 4: *Astrological manuscripts in Italian libraries (other than Rome)* (London 1966) 64–72; Giuseppe Abate and Giovanni Luisetto, *Codici manoscritti della Biblioteca Antoniana col catalogo delle miniature*, Fonti e studi per la storia del santo a Padova (2 vols, Vicenza 1975) 28–33. Wesley M. Stevens, *Hrabanus Maurus On reckoning* [Latin text with English analysis]. PhD dissertation, Emory University 1968 (Ann Arbor MI: University Microfilms Inc 1980) 178–88. On the dating of the manuscript see esp. Luigi Guidaldi, *I più antichi codici della Biblioteca Antoniana di Padova (codici del sec. IX)* (Padua 1930) 21–28 (with plates), and Augusto Campana, 'Veronensia', *Miscell. Giovanni Mercati* ii, Studi e Testi 122 (Vatican City) 57–91 (reference kindly supplied by Professor Bernhard Bischoff).

10. Professor Maurice Sheehy, University College Dublin, who is preparing a new edition of the Hibernensis, was unable to shed any light on the place of these excerpts in the transmission of the Hibernensis.

11. McGurk described it as 'Lunar tables(?)' and gave only the (unexpanded) rubric; Stevens is equally brief, while Abate and Luisetto describe it simply as 'Tavole da studiare. Forse un ciclo pasquale?', with no rubric and no further information.

12. It may have been the scribe's intention to provide the table deliberately with a cryptic heading or, alternatively, it may have been intended to add the missing letters in red (suggestion from Professor Bernhard Bischoff, Munich).

13. For example, in the anonymous seventh-century *De ratione conputandi* §99: 'Laterci enim sectatores, qui a .xiiii. luna usque ad .xx. septem aetates paschae numerant'; ed by Dáibhí Ó Cróinín in Maura Walsh and Dáibhí Ó Cróinín (ed), *Cummian's Letter 'De controversia Paschali', together with a related Irish computistical tract 'De ratione conputandi'*, Pontifical Institute of Medieval Studies, Studies and Texts 86 (Toronto 1988) 202.

14. De ratione conputandi §4 (Walsh and Ó Cróinín, *Cummian's Letter*, 118): 'Isidorus dicit: Latercus quoque ita quibusdam intellegitur uelut latens cultus; latet enim scientia istius rei nisi luculenta quadam ratione culturam habeat'. I have been unable to trace the citation in any genuine Isidorian work.

15. 'cuius auctorem locum tempus incertum habemus', Walsh and Ó Cróinín, *Cummian's Letter*, 86–87.

16. Edited by Bruno Krusch, *Studien*, 311–27; for commentary, see Charles W. Jones, *Bedae opera de temporibus*, 82–87; Walsh and Ó Cróinín, *Cummian's Letter*, 32–35.

17. This was suggested also by Knut Schäferdiek, 'Der irische Osterzyklus', 362.

18. The exemplar of the Munich Computus may once have contained an 84-year table, but it no longer survives.

19. An edition, by Dáibhí Ó Cróinín and Anna Carlotta Dionisotti, is in preparation.

20. The computistical item that immediately follows the table (f 77^{v}-78^{r}), beginning 'Nuper inuenit', is acephalous. What survives, however, is remarkable, for it is the only example known to me of Dionysius Exiguus's Easter table Prologue arranged in lemmata form with accompanying commentary.

21. The Kalends marks each successive year, and that is what Cummian meant when he remarked that the so-called Nicene cycle marked the Kalends of January and the moon of that day. The usage, which is peculiarly Irish (and which explains the use of KL in the Irish annals), confused C.W. Jones, *Bedae opera*, 93 n 3.

22. There is one example below, at cyclic number 48, where the moon's age is given as xiiii (for xv).

23. For the terminology and usage see MacCarthy, *Annals of Ulster* iv, p xvii–xxiii.

24. Note that the table entries marked 'B' (= bissextus) are misplaced up to year 31; thereafter they follow in the correct sequence.

25. For what follows see O'Connell, 'Easter cycles', 88.

26. This may be due to the fact that the *Initium* columns do not occur in standard 19-year tables, with which the scribe would have been more familiar (DOC).

27. See O'Connell, 'Easter cycle', 84.

28. O'Connell, 'Easter cycles', 95.

29. ibid. 97.

30. O'Connell, 'Easter tables', 88.

31. ibid. 74.

32. ibid. 75.

33. Seán Mac Airt (ed. and trans.), *The Annals of Inisfallen (MS. Rawlinson B. 503)* (Dublin 1951); Seán Mac Airt and Gearóid Mac Niocaill (ed. and trans.), *The Annals of Ulster (to AD 1131)* (Dublin 1983).

34. Mac Carthy, *Annals of Ulster*, p xx ff.; Paul Walsh, 'The dating of the Irish annals', *Ir Hist Stud* 2 (1941) 355–75.

35. See O'Connell, 'Easter cycles', 78.

36. These 'Acta synodi' are also called *Epistola Philippi de Pascha* in some manuscripts.

37. For discussion of these texts see C.W. Jones, *Bedae opera*, 51–53 and 87–89; Walsh and Ó Cróinín, *Cummian's Letter*, 37–39, 158.48.

38. For other arguments against these limits see Schäferdiek, 'Der irische Osterzyklus', 360 n 12 and 371.

39. *Annals of Inisfallen*, 58.

40. O'Connell, 'Easter cycles', 97.

41. Walsh and Ó Cróinín, *Cummian's Letter*, 72: 'Britonum Scottorumque particula, qui sunt pene extremi et, ut dicam, mentagrae orbis terrarum', whom he describes as 'simul in obseruatione precipuarum sollenitatum uniti'.

42. ibid. 80: 'Quid autem prauius sentiri potest de aecclesia matre quam si dicamus Roma errat, Ierosolimna errat, Alexandria errat, Antiochia errat, totus mundus errat; soli tantum Scotti et Britones rectum sapiunt'.

43. See Rudolf Ehwald (ed), *Aldhelmi opera*, MGH AA (Berlin 1919) 480–86.

44. See C.W. Jones, *Bedae opera*, 99-101.

45. See Michael Lapidge and David N. Dumville (ed), *Gildas, new approaches*, Studies in Celtic History 5 (Woodbridge 1984), and the reviews by Edward James in *Nottingham Med Stud* 30 (1986) 101–05, and Thomas Charles-Edwards in *Cambridge Med Celt Stud* 12 (1986) 115–20.

46. Theodor Mommsen (ed), *Gildae sapientis De excidio et conquestu Britanniae*, MGH AA 13 (Berlin 1898) 1–85: 40. The translation cited is by Michael Winterbottom (ed. and trans.), *Gildas: The ruin of Britain and other works*, History from the sources (London and Chichester 1978) 28.

47. Winterbottom, for example, in his introduction (2) dates the battle of Mons Badonicus 'in the 490s', in the belief that 'Gildas wrote his main work, the "Ruin of Britain", about 540 A.D. or just before, when he was forty-three years old' (1). This seems to be the view also of Patrick Sims-Williams, 'Gildas and the Anglo-Saxons', *Cambridge Med Celt Stud* 6 (1983) 1–30: 25 (repeating Winterbottom's translation).

48. Ian Wood, 'The end of Roman Britain: continental evidence and parallels', in Lapidge and Dumville, *Gildas*, 1–25: esp 22–23. Woods remarks (rightly, as it seems to me) that 'the phrase *mense uno emenso* also seems curious—why should Gildas bother about the month in which Badon was fought, or was he writing in February?'. But why would not Gildas be interested in the precise date of Mons Badonicus, particularly in a dating-clause?

49. Guarded approval of Woods's interpretation was expressed by James, *Nottingham Med Stud*, 104. According to Charles-Edwards, however, Woods's proposal 'only leads to syntactical or other absurdities' (118), arguing that 'we must either violate syntax . . . or we must violate common sense and suppose that Gildas was writing at the precocious age of one month' (119). The verdict in Wallace-Hadrill, *Bede's 'Ecclesiastical History of the English people'*(Oxford 1988) 215–16 is a counsel of despair: 'If the traditional translation is unacceptable, it is necessary to emend'. I do not understand the translation in J. N. L. Myres, *The English settlements*, Oxford History of England 1b (Oxford 1986) 222–23 (Appendix III).

50. Charles Edwards points out—quite correctly—that 'the whole structure has no chronological anchor' as hitherto interpreted. But since the purpose of the dating clause was obviously to provide such an anchor, it follows that the error is more likely to be in the interpretation than in the words of Gildas.

51. The computer program used in this study and the resulting printouts are available from Dr Daniel McCarthy, Department of Computer Science, Trinity College, Dublin 2.

ADDENDUM

Since the above article went to press, re-examination of technical data given by the author of the Munich Computus, but rejected by all modern commentators, points to the conclusion that the epactal sequence of the Padua *latercus* should, in fact, be allowed to stand unemended. This information will provide a greatly improved reconciliation of all the data in the table, in that it reduces substantially the emendments required of the manuscript. This revision does not alter in any way our conclusions regarding:

1. The dating of the table to AD 438;
2. The Easter dates provided by the table;
3. The authenticity of the table as a true record of British/Irish Easters.

A discussion of the technique described in the Munich Computus and realised in the Padua table will be presented in a forthcoming article.

DÓC/DMcC