From the harvest moon to the Milky Way

The Quern-Dust Calendar: Raghnall MacilleDhuibh

In my last article I presented some traditions about the harvest moon; now for the science of the thing, if I can manage it. Why exactly is the harvest moon so different? Well, the moon shines by reflected sunlight, which is white; when seen in the dark night sky, the white takes on a yellowish tinge.

When near the horizon the moon is orange or red, just as when near the horizon the sun is orange or red. This is because the earth's atmosphere scatters the blue rays, removing the blue light (which gives the daytime sky its colour) from the white. Thus the light which still comes through is predominantly red or reddish. Similarly, at twilight there is a moment when the moon is a beautiful pure yellow, and partly this is simply by contrast with the remaining blue in the sky.

So the moon has a yellow, orange or reddish colour when seen near the horizon or at twilight. When do these two circumstances happen together, coinciding also with the moon being full and therefore most noticed?

The answer is, at the spring and autumn equinoxes. The reason for this is that the moon when full is at the opposite point in the sky to the sun. The sun travels along the ecliptic (or zodiac) during the year. For one half of the year (March to September) the sun is above the equator of the sky and spends more than twelve hours above the horizon; for the other half of the year the reverse is the case. As a result there cannot normally be a fullmoonrise coincident with a sunset, or a fullmoonset coincident with a sunrise. But at or near the equinoxes the full moon rises just as the sun sets, and sets as the sun rises. These are the optimum circumstances for seeing a yellow or orange full moon.

The next point to explain is why the harvest moon (around the autumnal equinox) should be more notable than the spring full moon. The reason, I am told, is geometrical. The moon travels about 13 degrees eastwards in the sky per day, and the effect is that she rises about 52 minutes later each evening. However, this time interval is not constant, because in spring she is moving southwards, while in autumn she is moving northwards.

In the first quarter of a moon her course falls lower until she is as low in the south as the sun in midwinter. Every night after that, however, she climbs a little higher, the autumnal moon moving upwards a few degrees in the direction of the North Pole of the sky. Being higher up she rises earlier, and this effect counters that of the eastward motion.

The result is that for several nights in a row the autumnal moon, when nearly full, rises at approximately the same time — in fact fullmoonrise at this time of year can vary by as little as 20 minutes per night for a fortnight, in contrast with the moon of the spring equinox, which can rise more than 70 minutes later each night. Near the last quarter, the

harvest moon is as high as the sun in the middle of summer, and her first rays have moved from the east to the north-east.

This, then, is the harvest moon — a full moon at the autumnal equinox which is very conspicuous because she rises in the same place and at the same time evening after evening. (The October moon follows the same pattern, although not so marked.)

Now the next bit is for those readers who receive their *WHFP* on Thursdays. Tonight is the night of the full harvest moon; not only that, but in the early hours of the morning (to be precise, from 01:12 to 06:36 BST on Friday 27 September) she is going to be eclipsed. At 01.12 the moon will touch the outer fringe of the earth's penumbral shadow. At 02:12 she will begin to move into the umbra, and will be lit only dimly by light straying around the edge of the earth.

Total eclipse, with the whole disc of the moon within the earth's umbra, will last from 03:19 to 04:29. At that point the moon will be situated 25 degrees above the south-western horizon. You can expect to see her take on a dull copper glow, the southern part of the disc, closest to the umbra's core, being the darkest. She will leave the umbra at 05:36 and be free of the penumbra at 06.36.

Now I am no astronomer. The people I have to thank for that information are Dr Máire Brück (formerly Lecturer in Astronomy in Edinburgh University, a fluent Irish speaker from Co. Meath) and Alan Pickup of 'The Scotsman'; for any misunderstandings I am to blame. But my postbag over the years is witness to the fact that at the point where the Gaelic language and astronomy meet, people's ears seem to prick up. Especially when the subject is the stars. So it was with great interest that I picked up the spring issue of 'Gairm' earlier this year and found the Rev. Girvan MacKay, a Glasgow man living in Tullamore, Co. Offaly, introducing a fascinating two-part series called *Reul-Eòlas airson Luchd-Tòiseachaidh* — 'Astronomy for Beginners'.

Mr MacKay kicks off by remarking that there is very little knowledge of the stars to be found in Gaelic tradition. I know what he means — very little has been written about it, and much has certainly been lost, hence our readers' apparent 'star-hunger'. Yet Gaelic speakers were second to no-one in their knowledge of the night sky — they had to be, their lives depended on it often enough — and the stars and their names were certainly the topic of countless céilidh discussions and stories. There is a bit of a mystery here, and I think part of the answer is that the sky was shared by everyone and that astronomy, rather like medicine, tended to be outward-looking and cosmopolitan in nature, star-names and star-stories being shared and freely translated. So Gaelic material is there, but one has to look a little harder for it than for other kinds of traditional information.

Curiously, the summer issue of 'Gairm' — which carried Mr MacKay's second piece — offered an example in the shape of a poem contributed by Iain MacAonghuis under the title 'Sgrìob Chlann Uisnich'. This is the Milky Way, and its name recalls the Children of

Uisneach who met their tragic fate in the ancient story of Deirdre and Naoise. The poem ends:

'S chan eil furtachd no bàidh ann a' falamhachd na h-iarmailt
Ged is àlainn an oidhche le cuid roinn dhe na seudan,
Tha Sgrìob Chlann Uisnich os cionn Cille Bhrìghde
Agus geamhradh àrd, uasal, buan nan reultan.

This is what I make of it: 'And there's no comfort or love in the emptiness of the sky / Though lovely's the night with its constellations of the heroes, / The Milky Way is above Kilbride / And the high, noble, eternal winter of the stars.'

In his first article Mr MacKay introduces the solar system and the stars. In his second he discusses current issues in astrophysics, the theories of Einstein and Hawkins, black holes, space-time and imaginary time, and offers a useful two-page glossary of Gaelic astronomical terms. He also talks of William, 3rd Earl of Ross, who in 1840 built the world's largest telescope at Birr in Co. Offaly. "It is so big," he says, "that an old picture shows a bride and bridegroom standing in the telescope's mouth."

Now this is a coincidence because, thanks to Dr Brück, I have received a copy of a book from its publishers in Ireland which happens to contain a photograph, taken around 1860, of that very telescope. I see no bride, but there are men in top hats, and the thing is truly enormous. The caption says that there are plans to restore it to its original condition, and that is a point made by Mr MacKay as well.

The book is 'Foclóir Réalteolaíochta: Dictionary of Astronomy', published by An Gúm for the Irish Ministry of Education, and for me there are two kinds of stimulation in it — reading the excellent introduction (in Irish) by Dr Bearnárd Ó Dubhthaigh, and browsing through the words themselves. Not only that, but the frontispiece is very familiar to me — a photograph of a medieval Gaelic manuscript in the National Library of Scotland (Adv. MS 72.1.2) showing an astrological text exuberantly embellished with the signs of the zodiac.

Dr Ó Dubhthaigh points out that this dictionary includes some of the oldest technical terms in Gaelic, and from medieval literature he cites terms like *rétlu mongach* which became *réalta mhongach* (a comet) and *airdubad* which became *urú* (an eclipse). He also shows how some terms borrowed from Latin have been in Gaelic for a very long time, for example Latin *crystallum* gave *criostal* which appears as *cristall* in the ancient tale 'Táin Bó Cuailnge', and Latin *eclipsis* gave *éiclips* which appears in the Gaelic 'Corpus Astronomiae' of 1694.

He also talks of early medieval Irish writers on astronomy, such as an 8th-century bishop in Salzburg called Fearghal who wrote that the sun and moon travel under the earth and that there must therefore be people living on the other side of the world.

He discusses the old texts and some of the terms they placed on record. "Our ancestors marvelled at the night sky," he says, "and so bestowed many a name upon the heavenly bodies."

One example he gives is that of the Pleiades, to which I have devoted an article or two on this page in the past: he has ten different names for them, including *Na Cearrbhaigh*

from Donegal, said to be the pack of cards which *an Cearrbhach Mac Cába* had to throw away when he went to Heaven.

Another example is the Milky Way itself. Chaucer mentions it in 1384: "Se yonder loo the Galoxie Whiche men clepeth the melky weye." Ó Dubhthaigh compares this with the Irish name, *Bealach na Bó Finne* — the Way of the White Cow. Both were used of pilgrimage roads, and the same can be said of many of its names in English (*Watling Street*, *Walsingham Way*, *the Way of St James*), Italian (*Strada di Roma*, *Via di san Jacopo*) and Spanish (*Via de Santiago*).

For the Milky Way Irish also has *Bealach na Bó Báine* (again the Way of the White Cow), *Ceann Síne* (Storm's End?), *Síog na Spéire* (the Stripe of the Sky), *an Láir Bhán* (the White Mare), *Eireaball na Lárach Báine* (the White Mare's Tail) and *Claí Mór na Réaltaí* (the Big Dike of the Stars). And Scottish Gaelic, Dr Ó Dubhthaigh points out, has *Geal-Shruth nan Speur* (the White Stream of the Skies), *an t-Slighe Bhainneach* (the Milky Way!), *Slighe Chlann Uisnich*, *Sgrìob Chlann Uis*, and *Bogha Chlann Uis*. These last three represent respectively the Way, Track and Arch of the Children of Uisneach.

These are dictionary terms, and frankly that is the right place to start. A glance through the body of the book brings home to me that we have plenty to say for ourselves in Scotland. For 'leap year' the Irish have *bliain bhisigh*; the term known to me (from the poet Iain Dubh mac Iain mhic Ailein, in 1716) is *bliadhna leuma*. Again, for Sirius, the dog star, we have *reul an iuchair*, *reul a' choin* or *reul a' mhadra*. Sorley Maclean speaks in one of his poems of *Betelgeuse nan reul*; in this book, too, Betelgeuse is *Betelgeuse*, but it is in the constellation called Orion — in Irish *an Bodach*, but in Scottish Gaelic *an Sealgair* 'the Hunter', and if you are one of those who think we have no traditions here about stars, just look up Dwelly under *sealgair mór*.

Finally back to tonight: the Sabhal Mór people are no slouches in these matters, their 'Stòr-Dàta Briathrachais Gàidhlig' gives no less than six terms for an eclipse. But this Irish series of thematic dictionaries, of which astronomy is no. 17, shows them the way to go next. The next Irish one will be television; in 1993 the Sabhal Mór promised one on broadcasting terms. Will we see it soon?