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THE AFON CYNFAEL: A RIVER'S PART IN THE COSMOLOGY OF THE MABINOGI

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The Afon Cynfael

The Afon Cynfael is a small wandering river in North Wales which begins near Llyn Morwynion, the Lake of the Maidens. It then flows in a northerly direction for about five kilometres through a steep and narrow rocky path that winds around small hills. As it works its way through its stony route, it produces three small waterfalls. Eventually, at its end, it flows into the Ffestiniog Valley where, for a few hundred yards, it winds between two grassy meadows, finally joining the much larger Afon Dwyryd which dominates the valley. The Ffestiniog Valley itself is a long wide valley that runs for about 12 miles from the coast at its western end to deep into the Snowdonia Mountains towards the east. It therefore offers easy walking access to inland North Wales and provides good farming and places for communities along the broad base of the valley floor. This small mountain river is like many others in the area; however, this river holds a special place in the Welsh mythological stories known as the Mabinogi.

The Mabinogi

The stories of the Mabinogi appear in either or both of two medieval Welsh manuscripts: *White Book of Rhydderch* or *Llyfr Gwyn Rhydderch*, written c. 1350, and the *Red Book of Hergest*or or *Llyfr Coch Hergest*, written c. 1382–1410. The tales are thought to be much older than the existing manuscripts, but there is no agreement concerning their age. Sioned Davies wrote,

> Their roots lie in oral tradition, and they evolved over centuries before reaching their final written form: as such, they reflect a collaboration between the oral and the literary culture and give us an intriguing insight into the world of the traditional storyteller.[1]

Davies pointed out that all the stories are set in a pre-Christian period and in the distinct geographical landscape of Wales.[2] Supporting this claim is the nature of the society described in the stories. The archaeological record indicates that in Europe around 600–300 BCE, the iron plough caused an agricultural revolution. Barry Cunliffe commented that in the west of Britain this produced regionalisation in the way of a proliferation of hill forts in the landscape.[3] He argued that these forts provided the living space for a 'larger community, comprising a group of lineages, designed to express its social cohesion and its ownership of a territory'.[4] Culturally, socially, and physically, this is the landscape of the Mabinogi, a culture embedded in regionalism, which used hill-forts, was involved in territorial conflicts, and subscribed to clan lineages and the use of the clan to maintain social cohesion. Based on this evidence, the narrative of the Mabinogi, at least in its origins, reflects the material evidence of the nature of the society that existed in Wales from around 600–300 BCE up to the century before the Roman conquest.

There are eleven stories that make up the Mabinogi and four of them fall into a group that is known as *The Four Branches of the Mabinogi*, so called because each of these stories end with the line 'and so ends this branch of the Mabinogi'.[5] The four branches are: *Pwyll Pendefig Dyfed* ('Pwyll, Prince of Dyfed'), *Branwen ferch Llŷr* ('Branwen, Daughter of Llŷr'), *Manawydan uab Llŷr* ('Manawydan, Son of Llŷr'), and *Math fab Mathonwy* ('Math, Son of Mathonwy'). Of these, the Fourth Branch, *Math uab Mathonwy*, contains what Karen Bek-Pedersen argued are 'intriguing details potentially pertaining to ancient cosmological ideas'.[6] The Fourth Branch is set around the area of the Llŷn Peninsula in North Wales and is a story of lust, rape, murder, magic, species morphology, shape changing, revenge, and trickery. The complexity is summed up by Sarah Sheehan, who remarked that throughout the story, 'Instability haunts bodies in the Fourth Branch' as they can be transformed with 'a wave of a magic wand or the thrust of a spear'.[7] All of these varying elements are held together with a thread of cyclic time, repetition of events, annual returns that must be measured to the exact day, and the story of a non-human hero whose role is to return balance to the world by his 'death' and then his retribution on the banks of the Afon Cynfael.

Sky stories in mythology

Arguing that any myth has sky origins can be problematic. In discussing folklore, Alan Garner pointed out that the times within a story of greatest confusion or absurdities, where characters take unexpected or non-logical actions, are the times when there is a hidden necessity at work.[8] He described this as the

story being forced to fit the material facts which, for him, were to do with landscape and locations. Garner's arguments can be extended to the necessity produced by the sky, the inevitability of its regular clock-work motion. If a story describes naked-eye astronomy, then the characters will be forced to comply with celestial mechanics and any absurdities in the story will therefore have a sky-logic. Indicators of such a logic are the presence of an exacting string of details which sweep up the characters into a proscriptive and inevitable cyclic pattern reflecting some or all of the sky's regularity.

Extending Garner's thinking, such absurdities can be characters that are fixed in relationship to each other or fixed to a place, which implies that the story may refer to constellations, as the stars do not change their relationship to each other. Alternatively, if a story contains shifts, comings, and goings in a repeating cyclic pattern between characters, it could potentially represent the movement of the sun and the moon. If, however, characters in the myth take a fixed, unswerving path, regardless of its outcome, the story could be speaking of a comet. Stories of death, the underworld, and eventual rebirth can be motifs describing the phases of the stars or planets. Finally, stories of a person's soul soaring to the heavens as a great bird or on a ladder suggest that the a description of the movement of stars.[9] Thus, absurdities in a story can be interpreted as important markers, showing the workings of a hidden necessity. If this hidden necessity is caused by the sky, then the absurdities will conform to a sky-logic and the potential cultural relevance of the myth can be linked to calendar, seasons, lunar phases, or extraordinary sky events.

The story of the Fourth Branch

There are different story threads within the Fourth Branch. All are interwoven and held together by complex characters, which suggests many layers of meanings. However, the focus of this chapter is the thread which involves the Afon Cynfael and it is as follows. The setting is the kingdom of Gwynedd in North Wales where Lleû, one of the central characters, was born from a divine woman as a tiny light. He was not human but took human form. He was raised by Gwydion, a druid sorcerer. As the story develops, the teenage Lleû was cursed by his mother and not allowed to marry a human woman. To resolve this problem, Gwydion and the king, Math, created a woman from flowers. Her name was Blodeuedd and she became Lleû's flower bride. Blodeuedd, however, was unfaithful with the hunter, Gronw, who had just killed a stag on the banks of the Afon Cynfael.

As the lovers Gronw and Blodeuedd plotted to murder Lleû. Blodeuedd used her charms as Lleû's wife to ask him if there is any way that he could be killed. With no concern for his safety, Lleû described the requirements:

> By making a bath for me on a river bank, and making a vaulted frame over the tub, and thatching it well and snugly too thereafter, and bringing a he-goat', he said, 'and setting it beside the tub, and myself placing one foot on the back of the he-goat and the other on the edge of the tub.[10]

It was by being in such a position, Lleû stated, that he could be killed by a magical spear.[11] The story then imposes an element of time and annual cycles, for the spear must be made over the course of an entire year and could only be worked on a Sunday, when people were at Mass. The inclusion of Mass is possibly a Christian overlay placed into the oral tradition. So Gronw worked one day a week for the whole year and finally completed the spear. The two lovers then went to the 'shadow of the hill on the banks of the Afon Cynfael'.[12] Blodeuedd prepared a bath and brought a collection of he-goats and ask Lleû to show her exactly what he meant by standing on the edge of the bath and on the back of a he-goat. Lleû obligingly balanced between the bath and the goat and Gronw hurled the magical spear, hoping to strike Lleû dead. Lleû, however, having been struck by the spear, screamed and transformed into an eagle that flew high in the sky and disappeared. Gronw and Blodeuedd considered that Lleû had been killed and Gronw took over as ruler of Lleû's lands.

Nevertheless, Gwydion, the druid sorcerer, knew that Lleû was not dead. Sometime later, Gwydion went looking for him in the dawn light and found him high in a magic Oak Tree, a tree that had no need for water or sunlight and existed in a place beyond the seasons. Gwydion sang to the eagle to call it back to earth. After each verse of his song the eagle dropped down a level in the tree until finally it landed on Gwydion's knee and transformed into a very weak and faltering Lleû. Later that year Lleû was restored to his adult strength and sought retribution against Gronw. He asked Math, the king, that he be allowed to do to Gronw exactly what had been done to him. On the king's command Lleû and Gronw returned to the banks of the Afon Cynfael and now the events were reversed. It was Gronw who balanced between tub and he-goat, while Lleû stood in the place first occupied by Gronw and hurled the magical spear that took a year to make. Gronw, being mortal, was killed by Lleû's spear. The story ends with 'Lleû Llaw Gyffes subdued the land a second time and ruled over it prosperously. And as the tale tells, he was lord thereafter over Gwynedd'.[13] Order is restored to the land and the reader is told 'and so ends this branch of the Mabinogi'.[14]

Approaching the Fourth Branch

The different threads of story contained in the Fourth Branch have been approached using different methodologies to reveal their cultural meaning. Sheehan pointed out that medieval Celtic studies have, in the past, tended to focus on language and issues of translation, but in recent times the Fourth Branch has been approached using methods from gender studies, the critical tools of psychoanalysis, and even queer theory. Sheehan herself looked for meaning in the story of the Fourth Branch using feminist literary scholarship.[15] Emily Lyle, however, suggested a different approach. She argued that such 'stories can, and should, be studied in the light of the periods in which they were set down' while also suggesting that such studies, if employing a 'ground-up' methodology, could prove fruitful for making connections to other Indo-European sources.[16] It is a 'ground-up' methodology that this work adopts by employing a cultural astronomy approach. Cultural astronomy is the study of the role of the sky in a culture and its methodologies, by definition, must be sensitive to the beliefs of the people who created the story or structure being studied.

Approaching the text of the Fourth Branch employing a cultural astronomical methodology means that the text is examined for signs of naked-eye astronomy, but any findings need to be relevant to how the creators of the story would have actually used the sky. Furthermore, with the cultural environment of the story being one of pre-Christian Celts, Jones and Jones argued that the Celts were a decentralised culture and embedded their gods and stories into 'specific natural features such as a mound or a stream' which reinforced their own as well as their god's local character.[17] The Afon Cynfael is such a stream and its geographical location thus needs to be a part of the sky, land, mythic picture.

The balance of light and dark: a brief journey into naked-eye astronomy

If the sky is observed from the same place for a year, one of the first things to be noticed is that the location of the rising or setting sun shifts along the horizon. For the northern hemisphere, as the winter approaches, the sun will keep rising further south until at the winter solstice it will rise at a place on the horizon at its extreme south east position (Fig. 1). Six months later it will rise in the north east at the summer solstice. When it rises halfway between these two extreme horizon points it will mark the time of the equinox, when day and night are equal, either at spring or at autumn. By watching the sun's rising or setting location on the horizon moving from south to north and then returning north to south, it becomes apparent that a horizon calendar can be created, with points along the horizon marking the individual days of the year. Many megalithic sites exemplify this type of sun-watching. Stonehenge, for example, has markers

which point to the place on the horizon where the summer solstice sun will rise, while Newgrange in Ireland has a light box which captures the rising sun's light at the winter solstice by allowing a beam of sunlight to penetrate the centre of the structure and shine on a carefully placed carved stone. In contrast, at the equinox, the main cairn at a Neolithic cemetery at Loughcrew in County Meath in Ireland, captures the light of the rising sun, which shines on a carved stone deep inside the tomb.

This method of using the horizon to measure the key times of the year naturally divides the local horizon into zones: the north west/east is the part of the horizon marking the summer solstice rise and set positions, and can be thought of as the 'light' part of the horizon; the south west/east is then the 'dark' part as it marks the winter solstice rising and setting positions; and the midway point is linked to the balance of light and dark of the equinoxes. But these markers on the horizon are also linked to the moon. Both luminaries, the sun and the moon, are of equal size in the sky and share the role of producing light; in the summer, the sun is high in the sky while the full moons are low and spend little time above the horizon. The situation is reversed in the winter. When the sun is low and spends only a short time above the horizon the full moons are higher in the sky. This natural balance is further enriched by the local landscape, for the place on the horizon of the rising summer solstice sun is the same, with small variations, as that of the rising full moon at the winter solstice, and the position of winter solstice sunrise is the same as the rising full moon at the summer solstice (Fig. 1). The same applies to the setting position of the solstice sun and the opposite season's (six months later) full moon.

The landscape also pulls together the light and dark seasons. For a given location the position of the summer solstice sunset, to take one example, will be directly opposite the horizon place of the winter solstice sunrise (Fig. 2). Hence in any landscape there are two straight imaginary lines; indeed, they could be thought of as the magical spear which takes a year to be made, as these lines link the light and dark times of the year. The landscape, therefore, holds a calendar and the places of the greatest darkness and the greatest light are linked by straight axes.

This rhythm is embedded into any landscape, a rhythm which unites place and time with light and dark, sun and moon, all played out over the course of an exact year. Such landscape features, as evident by the orientations of earlier megalithic sites, were just as much part of the natural world as a stream, rock or mountain to the eyes of Iron Age people. Furthermore the night sky also held patterns of stars, and particular patterns held or marked the places where the sun or full moon were located at the time of the solstice. Thus these star patterns

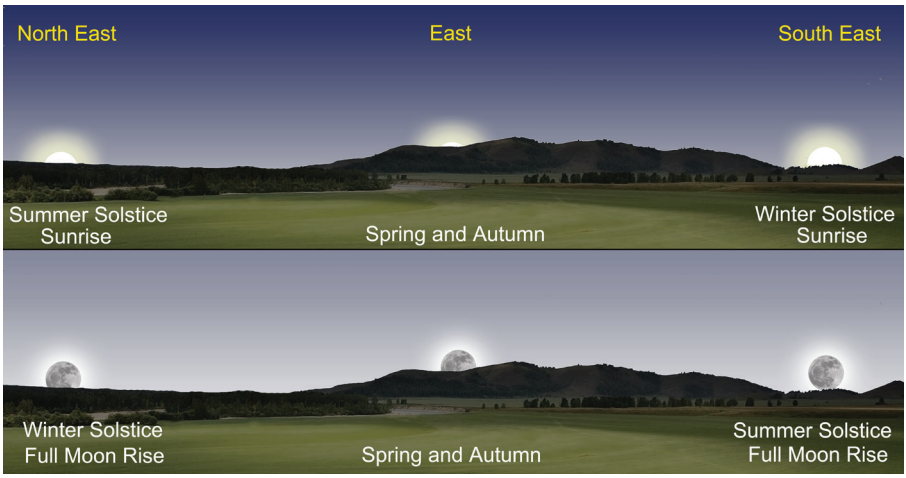

Figure 1: Viewing the eastern horizon over the course of the year will show that the summer solstice sunrise location is also, with small variations, the winter solstice full moon rise location; similarly, in the south east the place of the winter solstice sunrise is the same horizon location, with small variations, of the summer solstice full moon rise. Image by author.

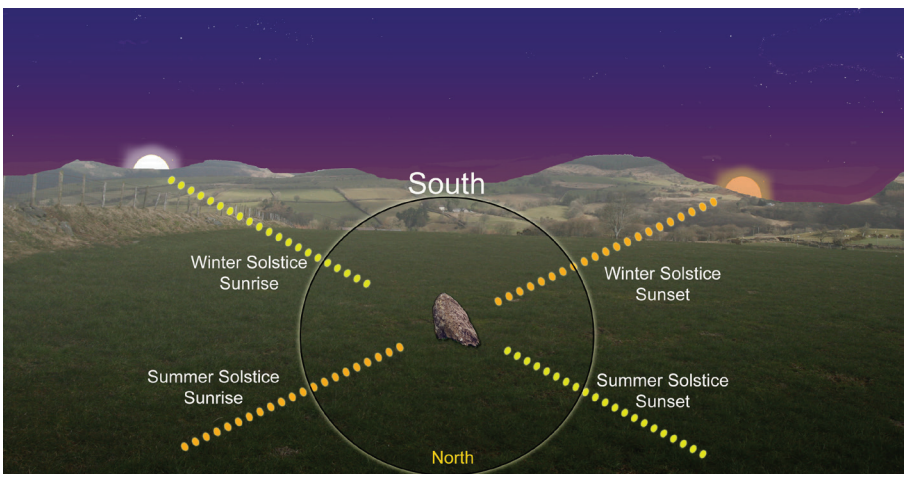

Figure 2: In an open landscape, the position of the sunrise and sunset at the winter solstice are opposite the horizon positions of the summer solstice sunrise and sunsets.

also touched the horizon at the same locations in the landscape calendar. Hence the sun, moon, stars, and landscape are all united in an exacting annual rhythm telling the story of a year.

The Greco-Roman constellations

Constellation imagery is remarkably consistent across time and across Western cultures. The classical images that populate the modern sky emerged partly from Greece and partly from Mesopotamia. For example, the Babylonians of the second millennium BCE had the sky deity, Pabilsag. He was a half human, half horse figure who stood holding his bow and arrow and who is, with few variations, our contemporary constellation of Sagittarius. Granted the constellation may have undergone name changes, but the actual imagery has been, at least in the west, carried across thousands of years by a wide variety of cultures.[18] These constellations consisted of the twelve zodiacal constellations and the thirty-six constellations described by the poet Aratus in his sky poem, *Phaenomena*, in the third century BCE.[19] By the first millennia BCE, as evident through the works of Homer and Hesiod, the classical constellations were embedded in the Mediterranean cultures.[20] The Celtic peoples, from the third to the late first millennia, would also have encountered these constellations, as they lived in areas stretching from the Mediterranean into western Northern Europe.[21] Some of these constellations are visible in the story of the Fourth Branch and begin to make sense of the absurdities of the bathtub and the he-goat.

Figure 3: The bathtub and the he-goat, the constellations of Aquarius and Capricorn, the markers of the winter solstice around 600–400 BCE. Image by author.

The constellation Aquarius is associated with measuring water; to the Babylonians he held a towel as he poured bath water.[22] He stands beside the he-goat, Capricorn (Fig. 3). In the period of around 600 BCE, these two constellations were visible on the horizon just after sunset on the day of the winter solstice, the day of the greatest darkness. When the sun was with these constellations, it was on the 'edge' of a void, its extreme southerly horizon position. If these two constellations are the bathtub and the he-goat of the Fourth Branch it is not surprising then that the listener is explicitly told that Lleû can only die if he stands in *this* place.

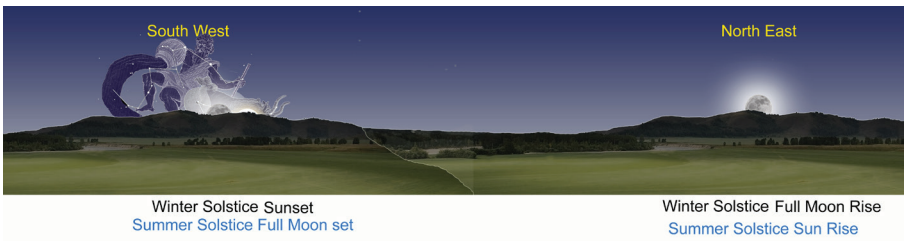

Figure 4: The western horizon (an imaginary location) view for the day of the winter solstice for the latitude of North Wales (530 North), 600BCE. The full moon around the winter solstice would have risen in the north east, directly opposite the horizon place of the setting sun. Image by author.

The exact reverse of this situation is when the full moon set between the he-goat and the bathtub, for then it was the time of the summer solstice – the longest day. If one considers that Lleû represents the light, then Lleû is threatened as he balances between the bathtub and the he-goat, but is at his strongest at the time of the reversal when the full moon stands in this *very* place. Furthermore, to restate, these points on the horizon are linked by an imaginary straight line as shown in Figure 2 – a spear throw.

Calendar as story

There is a cultural comparator to support this understanding of the Fourth Branch. The Coligny Calendar is an engraved bronze plate found in fragments in Coligny, France, in 1897 that represents a Celtic calendar from the pre-Roman conquest period. Although fashioned around the first-to-second centuries CE, it is generally agreed that it portrays the Celtic approach to calendar from an earlier period of the third to first centuries BCE.[23] The calendar that is revealed is one which seeks to harmonise the lunar calendar with the solar seasons.[24] There is a basic problem with a lunar year as it slips backwards against the solar

year. In terms of whole days, the moon completes twelve lunar phases in 354/5 days, which is eleven days short of the length of the solar year. Therefore, after three years any particular lunar month would have slipped against the seasons by approximately thirty-three days. A lunar month which contained the summer festivals would thus quickly begin to occur in spring rather than summer, while the lunar months which held the festivals to mark the beginning of darkness would begin to occur in high summer. There are different methods of balancing the lunar calendar with the solar year, all of which involve the use of inserting leap months. The problem is to know when to insert a leap month. The Coligny calendar shows the Celtic approach to this problem and it reflects a culture that sought to maintain the balance of light and dark. The Celts injected their lunar leap months over a five-year cycle. One lunar leap month was added to the month before the lunar month of *Samon*, 'summery' (around the summer solstice) and the other was added to the dark part of the year before the lunar month of winter *Giamon*, 'wintery' (around the winter solstice).[25] Thus over a five-year cycle both the light and the dark were kept in balance with equal lunar months.

The evidence of the Coligny Celtic calendar's juggling of leap months fits into the narrative of the Fourth Branch. When the sun was between the 'bath tub and the he-goat' (Aquarius and Capricorn and thus around the winter solstice) it was a time when a lunar leap month could be added. Then thirty lunar months later (two and a half years later), when the full moon was seen between the 'bath tub and the he-goat' and which is the full moon closest to the summer solstice, another lunar leap month would need to be inserted. Granted the Fourth Branch does not refer to this thirty-month gap but it does focus strongly on the exact reversal between the sun and the moon and the timing of a year. This is the observation of the landscape calendar which is required to ensure that, over the course of the passing years, there is always a balance between the number of light and dark months of the cycle.

Hence the story of the Fourth Branch appears to be the same type of calendar portrayed in the Coligny calendar; however, instead of the calendar being hammered out in bronze, it is held in story. The two-and-a-half-year gap between the reversal of Gronw with Lleû is not in the narrative, but the fact that time has passed is clearly indicated. For Gwydion must first wait for Lleû's return and then he must recover to full strength; only then does Lleû ask for, and is granted, retribution. The spear, with its association to the notion of a year, is potentially a reference to the landscape positions of the solstice sun being opposite that of both the full moon at that time as well as the other solstice sun horizon position. The spear is an example of what Jones and Jones (cited earlier) referred to as the Celtic tendency to embed story into landscape.

An important aside, which lies beyond the scope of this work on the Afon Cynfael, is that the addition of leap months over a five-year period did not perfectly align the lunar calendar to the agricultural solar year. To avoid calendar drift, it was necessary to remove leap days at different times in the cycle. The judgment of those times is reflected in the Coligny calendar and required an experienced sky-watcher using either solar or stellar observations.[26] In that regard, the other main story lines in the Fourth Branch, which are beyond the scope of this paper, appear to describe how the sky-watcher, Gwydion, tests different ways to find the best method of keeping the solar agricultural calendar aligned to the lunar calendar.

The Ffestiniog Valley and the river

The question remains as to the role of the Afon Cynfael, and it is the wide and long Ffestiniog valley which offers an answer. If a person stands at the mouth of the Afon Cynfael, where it joins the Afon Dwyryd, then he or she is standing at a slight bend in the Ffestiniog valley. The observer's view is directed west and east by the path of the valley. Looking towards the western end there is a notch where the shape of two hills overlap. The orientation of this notch is such that the sun will set into it on 31 October, one of the cross quarter days in the Celtic year and the beginning of the season of darkness.[27] If one then turns to look up the line of the valley, towards the east, at the far end there is another notch between the hills. This notch directly captures the rising Summer Solstice sun (Fig. 5), and hence it will also capture the rising Winter Solstice full moon.[28]

Without doubt, if the banks of the Afon Cynfael had not been named by the story teller, this valley's orientation would remain a curiosity. However, the banks of Afon Cynfael are named and the Ffestiniog Valley is unique in North Wales for its size and roughly east/west orientation. There may be other locations along the 12 miles of the valley where one can see these two significant horizon calendar points highlighted by the topography. However, the mouth of the Afon Cynfael lies at a gentle bend in the Ffestiniog Valley and produces a clear view of these two key seasonal solar and lunar events.

Conclusion

As already noted, there are different threads of stories within the Fourth Branch and this work has only focused on one thread, that which is linked to the Afon Cynfael. Using the methods of cultural astronomy, the absurdities of the nature of Lleû's attempted murder and the description of his revenge are no longer absurd but are instead the necessity that the sky casts into story. The bathtub and the he-goat are direct statements about the constellations that are the

Figure 5: The solar events of the Ffestiniog Valley. TOP, left and right, views east and west generated by Google Earth, from the banks of the Afon Cynfael. BOTTOM left and right, photos by the author, 2012, of the same views. LEFT: The summer solstice sun will rise in the notch between two hills at the end of the valley. RIGHT: On 31 October the sun will set directly in the notch between the two hills. A tree in the centre of the image blocks a clear view of the notch in the western hills.

markers for the winter solstice, the spear (rather than Gronw using a sword or other weapon) is tagged with the theme of a year and is potentially a reference to the axes that the solstice and full moons make in any landscape.

The idea of the reversal is evident in both a horizon calendar of sun and moon and the approach to calendar evidenced in the Coligny Calendar. This bronze calendar showed that the pre-Roman Celtic people, over the course of a five-year interval, added leap months to their lunar calendar in a way that ensured the light part of the year was of equal length to the dark part over any five-year interval. Lleû's attempted murder is the insertion of one lunar leap month, with the exact reversal required some time later and portrayed as Lleû's retribution, which was the restoration of balance of the second lunar leap month in the other part of the year.

Finally, the role of the Afon Cynfael was to embed the story into the calendar, in order to act as a marker to its listeners. The wide Ffestiniog valley would have been a busy route from the coast to the middle of the Snowdonia Mountains, as well as a major farming area; thus the Iron Age Celts would have been aware of the horizon calendar features of the orientation of the valley, features which

became visually marked by notches at each end at the valley when an observer stood at the mouth of the Afon Cynfael. These 'absurdities' within the Fourth Branch offer evidence of the role that the sky played in maintaining the Celtic calendar: a calendar that was placed into story to ensure that it passed from generation to generation amongst the Iron Age Celts of Wales.

Notes

1. Sioned Davies, *The Mabinogion* (Oxford: Oxford University Press, 2007), p. ix.
2. Davies,*The Mabinogion*, p. xxv.
3. Barry W. Cunliffe, *Britain Begins* (Oxford: Oxford University Press, 2013), p. 247, pp. 51–8, p. 305.
4. Cunliffe, *Britain Begins*, p. 305.
5. Davies, *The Mabinogion*, p. x.
6. Bek-Pedersen, 'Insular Celtic Religion', pp. 278–90 (p. 287).
7. Sarah Sheehan, 'Matrilineal Subjects: Ambiguity, Bodies, and Metamorphosis in the Fourth Branch of the Mabinogi', *Signs* 34 (2009): p. 319.
8. Alan Garner, 'Oral History and Applied Archeaology in East Cheshire', in *The Voice That Thunders: Essay and Lectures* (London: Harvill, 1997), pp. 65–79 (p. 71).
9. Bernadette Brady, 'Star Phases: The Naked-Eye Astronomy of the Old Kingdom Pyramid Text', in Fabio Silva and Nick Campion, eds, *Skyscapes: The Role and Importance of the Sky in Archaeology* (Oxford: Oxbow, 2015), pp. 76–86, pp. 81–83.
10. Gwyn Jones and Thomas Jones, *The Mabinogion* (London: Everyman, 1949 [1993]), p. 60.
11. Gwyn Jones and Thomas Jones, *The Mabinogion* (London: Everyman, 1949 [1993]), p. 60.
12. Davies,*The Mabinogion*, p. 61.
13. Jones and Jones, *The Mabinogion*, p. 63.
14. Davies, *The Mabinogion*, p. 64.
15. Sheehan, 'Matrilineal Subjects: Ambiguity, Bodies, and Metamorphosis in the Fourth Branch of the Mabinogi', p. 320.
16. Emily B. Lyle, *Ten Gods: A New Approach to Defining the Mythological Structures of the Indo-Europeans* (Newcastle: Cambridge Scholars, 2012), p. 69.
17. Jones and Jones, *The Mabinogion*, p. 14.
18. Bernadette Brady, 'Images in the Heavens: A Cultural Landscape', *Journal for the Study of Religion, Nature and Culture* 7 (2013): p. 3.
19. Aratus, *Phaenomena* (Baltimore, MD: John Hopkins University Press, 2010).
20. Homer, *The Odyssey* (Penguin Books, 1986), p. 95; Hesiod, 'Shield of Heracles ', in Hugh G. Evelyn-White, ed., *The Homeric Hymns and Homerica* (Cambridge, MA: Harvard University Press, 1914), pp. 216–25.
21. Cunliffe, *Britain Begins*, pp. 242–43.
22. Richard Hinckley Allen, *Star Names Their Lore and Meaning* (New York: Dover Publications, Inc., 1963), p. 45.
23. Garrett Olmsted, *The Gaulish Calendar: A Reconstruction from the Bronze Fragments from Coligny with an Analysis of Its Function as a Highly Accurate Lunar/Solar Predictor as Well as an Explanation of Its Terminology and Development* (Bonn: Habelt, 1992), pp. 73–75.

24. Adolfo Zavaroni, *On the Structure and Terminology of the Gaulish Calendar* (Oxford: Archaeopress, 2007), p. 18, p. 89.

25. Zavaroni, *On the Structure and Terminology of the Gaulish Calendar*, p. 18.

26. Zavaroni,*On the Structure and Terminology of the Gaulish Calendar*, p. 30.

27. This notch, measured from the mouth of the Afon Cynfael, has an azimuth of 249° and the notch is at 0° of elevation. For the latitude of that location (52.956064 north) this produces a declination of -12.5, the declination of the setting sun in last few days of October.

28. This notch in the hills is at an azimuth of 57° and an elevation of 5° which produces a declination of 23.4, which is the summer solstice sunrise.