Dossier

Political climate in the Carolingian world

David J. Patterson [*]

[*] Pesquisador associado de pós-doutorado. Princeton University. Princeton (NJ), EUA.
E-mail: patters@umich.edu

ORCID: https://orcid.org/0000-0002-1554-6933

Abstract: This article examines a theory of kingship that grew popular at the ninth-century court of Charlemagne. Suited to Carolingian articulations of power, it centered the emperor in a cosmic sense. This included long-term weather trends, a concept I argue is akin to climate. Since a bad ruler could produce poor weather, the theory was a double-edged sword, providing opportunities for political critique. Carolingian courtiers viewed atmospheric events as a mirror for the political drama of the period. I examine the close links they drew between weather, power, and divine judgement. I argue that an anonymous biographer of Louis the Pious drew complex connections between the madness of the weather (in the form of climatically unusual floods) and the madness of rebellion. I also describe the climatic dimensions of Nithard's *Histories*, which argue for a long-term deterioration of weather (over 30 years or more) linked to royal instability.

Keywords: Carolingian kingship; Climate history; Paleoclimatology.

Clima político no mundo carolíngio

Resumo: Este artigo examina uma teoria da realeza que se tornou popular na corte de Carlos Magno no século IX. Adequada às articulações carolíngias de poder, ela centralizava o imperador em um sentido cósmico. Isso incluía tendências atmosféricas de longo prazo, um conceito que argumento ser semelhante ao clima moderno. Como um mau governante poderia produzir mau tempo, a teoria era uma arma de dois gumes, oferecendo oportunidades para a crítica política. Os cortesãos carolíngios viam os eventos atmosféricos como um espelho para o drama político da época. Examinamos as estreitas ligações que traçaram entre clima, poder e julgamento divino. Argumento que um biógrafo anônimo de Luís, o Piedoso, traçou conexões complexas entre a loucura do tempo (na forma de cheias climaticamente incomuns) e a loucura da rebelião. Também descrevo as dimensões climáticas das *Histórias* de Nitardo, que argumentam a favor de uma deterioração atmosférica de longo prazo (mais de 30 anos) ligada à instabilidade real.

Palavras-chave: Realeza Carolíngia; História do clima; Paleoclimatologia.

Artigo recebido em 28 de dezembro de 2023 e aprovado para publicação em 02 de abril de 2024.

DOI: 10.1590/TEM-1980-542X2024v300208
e300208

Tempestarius rex?

To fend off meteorological maladies, the medieval Frankish ruler Charlemagne (r. 768-814) sometimes turned to mundane preventative measures. In his *Capitulare de villis*, gardeners on royal estates were instructed to grow houseleeks on the roofs of buildings, an ancient prophylactic against lightning.[1] Yet the king's efforts to prevent bad weather could also take more sweeping legislative form. In a capitulary of 789, Charlemagne outlawed the storm-conjurers known as *tempestarii*, ambiguous figures often blamed by rustic peasants and elites alike for the devastation of crops. Not all weather magicians were nefarious, for some repelled storms and defended farmer's fields.[2] Yet citing biblical prohibitions against other forms of sorcery, Charlemagne made clear that a prohibition was theologically necessary.[3]

Indeed, weather problems often called for theological solutions: when drought and failed harvests (among other calamities) stunned the Carolingian world in 805, Charlemagne instructed bishops to institute a three-day fast in order to obtain divine forgiveness for the Frankish people. Another capitulary issued probably the same year specified that "if other disasters happen, no one should wait for a royal decree but rather should seek God's mercy immediately."[4] The management of inclement weather and its side effects could thus be reactive and directed from the center of power, or preventative and implemented at the periphery. All such measures rested on the assumption that human beings felt the effects of weather, but also in turn could reach out and exert their own influence on the skies, perhaps with divine or (in the case of nefarious *tempestarii*) demonic help. While human meteorological agency was a widespread notion in the medieval imaginary, Charlemagne and his heirs – the builders of the vast Carolingian empire – made control over weather a significant component of their articulation of power.

At the Council of Paris held in 829 during the troubled reign of Charlemagne's heir, Louis the Pious (r. 814-840), the condemnation of storm-raisers was renewed. Among the concerns of this reform-minded ecclesiastic council was the proper conduct of the emperor. Drawing extensively on a political treatise of Hibernian origin, the assembled bishops proposed a di-

[1] *Capitulare de villis vel curtis imperii* (ed. Boretius, 1883, p. 90) 70; see Beck (2000, p. 384).

[2] *Liber contra insulsam vulgi opinionem de grandine et tonitruis* (Agobard, 1981; henceforth *De grand.*). This strange episode has drawn a fair amount of scholarly attention, most notably Dutton (2004, p. 169-272); more recently Meens (2012, p. 157-166).

[3] *Admonitio generalis* (ed. Boretius, 1883, p. 58-59) 65; Deut. 18:10-11; Lev. 19:26.

[4] *Capitulare missorum in Theodonis villa datum secundum, generale* (ed. Boretius, 1883, p. 122-123) 4. The link between poor weather and subsistence crises varies. Newfield and Labuhn (2016) argue that a mixture of factors both endogenous and exogenous should be favored over monocausal explanations.

vine contract between the Frankish ruler and heaven. If he upheld justice, the entire world would benefit. Tranquility of seas, fertility of the land, and temperateness of weather (*temperies aeris*) could all be obtained through the conduct of an upright ruler.[5] Though this ideal king was, in a strange sense, a *tempestarius rex* – able to affect the weather and (over the longer term) something we might recognize as 'climate' – he was in fact to be a staunch opponent of *tempestarii* and their ilk. In order to attain environmental order and abundance, a ruler had first to be a defender of the church and a punisher of the wicked, not attending "to the superstitions of the magicians, the soothsayers, and the sorceresses" but rather – as Old Testament examples made clear – punishing impiety wherever it arose.[6] The benign natural order that resulted from the reign of a good king thus depended on divine judgment rather than magic, and in fact required the suppression of weather magic and other illegitimate forms of human power over the natural world, which was God's creation.

This view complemented the Carolingian drive toward centralized authority: if the problem was a diverse set of nefarious actors (including weather magicians), then the solution lay with their suppression and other measures taken by the ruler, who could thereby attain the very *temperies aeris* magicians sometimes promised. The waxing agency of the Carolingian king and his widening cosmic purview began to eclipse not only that of the despised *tempestarii*, but even that of holy men and women who had long worked weather wonders of their own. Contemporary saints and their miracles could be charismatic competitors to imperial authority (Gibson, 2015, p. 631; Fouracre, 1999, p. 150; 163-164). Waning, therefore, were the weather miracles of Merovingian hagiography, in which saints like Martin of Tours and Genevieve of Paris tamed hail and rescued crops from storms.

What was the origin of the Carolingian drive toward a centralized meteorology? Paul Dutton has traced Charlemagne's legislative program against weather wizards to the epistolary urgings of one Cathwulf, an otherwise unattested Anglo-Saxon cleric apparently active on the continent (Dutton, 2004, p. 173). In a laudatory letter addressed to the young Frankish king probably early in 775, Cathwulf counseled vigilance against '*tempestarios*' and other unsavory sorts.[7] It was Charlemagne's duty, he advised, to correct such evils wherever they arose. A sort of *speculum principis* (mirror for princes) preserved in one manuscript copy, this effusive and exhortative letter enjoyed only limited circulation, though it has

[5] *Concilium Parisiense* of 829 (ed. Werminghoff, 1908, p. 650; henceforth *Con. Par.*). Devroey (2019, p. 415; 424-425) argues this synod helped establish a complete theory of Christian governance. See also Anton (1982, p. 569-574).

[6] *Con. Par.* 2.1 (ed. Werminghoff, 1908, p. 650-651). Parallels include 1 Chronicles 10:13-14; cf. Exodus 22:18; Leviticus 20:27.

[7] *Letter to Charlemagne* (Cathwulf, 1895, p. 504). Cathwulf's name is Anglo-Saxon, his sources Irish; see Story (1999, p. 1-21).

fascinated scholars of the formative years of Charlemagne's reign.[8] Cathwulf listed storm-raisers among a variety of evil-doers and apparently felt no need to explain in detail who they were or what they did. For the Anglo-Saxon cleric, it was self-evident that *tempestarios* and *homicidas* belonged on the same list. Perhaps this is because Frankish clerics were already well acquainted with the sin of storm-raising, long condemned in penitential manuals. Cathwulf's letter was more novel in describing the king himself as something of a weather maker. In enduring terms (similar to those used decades later at the Council of Paris, and probably derived from the same source), Cathwulf explained how the king's actions, if just, could bring harmony and abundance to the world, including tranquil weather and good harvests; and again, how an unjust king would provoke havoc and disorder, including stormy weather and damaged crops.[9] This wisdom, attributed by Cathwulf to St. Patrick, connected the king's role as *minister Dei* to eight metaphorical pillars or columms which together upheld God's *castra*.[10] If this idea was new to the Frankish court, it nevertheless drew on biblical and patristic precedent. The formula evoked clear Old Testament parallels. In Deuteronomy 28, Israel is enjoined to maintain God's commandments lest the fruits of the earth wither and the heavens turn to brass, offering no rain. While such national punishments applied to all, early Christian commentators laid the blame at royal feet. In such biblical droughts, concluded Ambrose, "the people were made responsible for the sacrilege of their kings."[11]

In this way the seed of a biblical and patristic idea, long popular in the insular world, found fertile ground in the court of Charlemagne and his successors. Amid the accelerating literary output of the "Carolingian Renaissance" – a period of increased cultural production in all spheres, but centered particularly on moral and educational reform – the ideas presented in Cathwulf's letter appeared frequently in the works of other court-connected scholars. Heaping lavish praise on Charlemagne following the conquest of the Avars in 796, Theodulf of Orléans attributed seasonal significance to the king's victories, proclaiming the arrival of a "new spring." The seasons had been renewed according to eternal laws, the elements maintaining the order of seasonal succession, because proper order had been

[8] Story (1999, p. 21) argues that he wrote in Francia, perhaps even in proximity to the king. Ullman (1969, p. 49ff.) gave Cathwulf greater prominence in the development of Carolingian kingship than had previously been recognized.

[9] *Letter to Charlemagne* (Cathwulf, 1895, p. 503).

[10] Cathwulf draws on a seventh-century Hibernian treatise, *De XII Abusiuis Saeculi* (Pseudo-Cyprianus, 1909, p. 32-60), attributed variously to Patrick, Cyprian, Isidore, and Augustine. See Grigg (2010, p. 27-52); Meens (1998, p. 345-357); see Meens (2000, p. 1-19) on an intermediary text in Francia as early as the first half of the eighth century.

[11] *Hexaemeron* (Ambrose, 1896, p. 55) 2.4.15-16.

restored to the world.[12] In his meditation on the rewards of good kingship, Theodulf focused on spring (the joyous season of growth, suited to a poem of praise and celebration) but placed it within a larger cosmic framework, the cyclical decline and renewal of all the seasons. As the regularity of the elements had been maintained, it followed that winter, fall, and summer would each have their turn; and this usual progression of the seasons was itself something to be noted and celebrated. Elemental cooperation with eternal laws was guaranteed in part by Charlemagne's kingship.[13] Implicit was the notion that elements and seasons might *not* cooperate, could conceivably even become chaotic, if a king failed to maintain the proper order.

Others at Charlemagne's court agreed. In 793, following the Viking sack of Lindisfarne, Alcuin of York – the leading scholar of the late eighth century and another insular transplant –admonished the Northumbrian king Aethelred in similar terms. Alcuin advised that "the goodness of the king equates to the prosperity of the people, to military success, to a tempering of weather (*aeris temperies*), to earthly abundance, the blessing of children, and the health of the people." A king's prayers and vigils before God, Alcuin argued, ought to be performed with all the greater urgency in that they were not for himself alone, but rather for everyone.[14] As Alcuin's admonishment suggests, the cosmic centrality of rulers could be a double-edged sword, wielded deftly by courtiers seeking openings for criticism.

Such critiques could take direct form, as we will see, but they could also be delivered obliquely. During the tumultuous reign of Charlemagne's successor, Louis the Pious, the prominent courtier Einhard took a decidedly indirect approach in his account of the relics of saints Marcellinus and Peter. In an arresting digression, Einhard described the possession of a young German girl by a demon naming itself 'Wiggo.' In perfect Latin (a language Einhard claimed the girl did not know), the demon confessed to destroying "grain, wine, and all the crops that come from the earth for human use" at God's command.[15] 'Wiggo' does not explain how he destroyed these diverse harvests, though his alarming visitation coincided with a well attested period of excessive rainfall, cold weather, and prodigious storms, of which we will learn more shortly. For Einhard, however, the message was clear: Wiggo had been permitted to run wild among the Franks "so that they might pay the penalty for their lack of faith." An endless multitude of sins were committed each day "both by

[12] *Ad Carolum regem* (Theodulf, 1881, p. 484-485). Trans. Godman (1985, p. 153). Blan (2018, p. 232-233) discusses this passage in the context of Charlemagne's environmental stewardship.

[13] *Ad Carolum regem* (Theodulf, 1881, p. 485).

[14] *Letter to Aethelred* (Alcuin, 1895, p. 51).

[15] *Translatio et miracula sanctorum Marcellini et Petri* (Einhard, 1888, p. 253; henceforth *TeM*) 3.14. Trans. Dutton (1998, p. 104). Devroey (2019, p. 208-209) notes Einhard's emphasis on a return to abundance through the correction of sin and voluntary payment of tithes.

the people themselves and by their rulers." Rulers were singled out because they had not bothered to punish the rampant crimes that inspired divine wrath in the first place, and their justice was available only to those who could pay. "What a miserable state of affairs," Einhard concluded, "that it is not good people, but rather evil demons who now instruct us."[16] It was Einhard, of course, who wished to instruct, and his lesson connected political turmoil and poor rule with failed harvests and suffering.

The Irish monk Sedulius Scottus, prominent at the ninth-century courts of Charles the Bald and Lothair II (sons of the Louis the Pious) likewise saw weather as a potential scourge for wicked rulers.[17] His *De rectoribus Christianis*, an early "mirror for princes" likely tailored to Charles, warned that a glorious kingdom – like a glorious rainbow – could fade very quickly indeed. A corrupt ruler might find his peace quickly turned to the "deadly tempests of discord."[18] Yet the realm of a clement king would have suitably clement weather: cloudless skies, a placid sea, and bountiful fields.[19] Among the model kings who obtained both earthly and political serenity, Sedulius highlighted Charlemagne, but also Theodosius the Great, who – a true *tempestarius rex* – prayed for "storms, lightning, and thunder" to vanquish his enemies. Here, Sedulius, via Augustine and Orosius, drew on the poetic verses of Claudian: "O greatly beloved of God, the sky fights for you, and the leagued winds come at the war-trumpet's call!"[20] Through the elements, God could enact miracles for upright rulers. Sedulius returned to this theme repeatedly, drawing on Leviticus' injunction that Israel obey God's commands in order to receive "rain in due season" and other divine gifts.[21]

If at times it appeared that only one side of this bargain were being upheld, Sedulius advised rulers not to lose hope, but to bear in mind that (as the metaphor of the rainbow made clear) all earthly kingdoms were destined to shine gloriously for a time and then fade. The fickle world could not compare to the heavenly kingdom, which alone was eternal, for "just as tranquility is often restored after storms of adversity, so tranquil times are again changed into storms."[22] No earthly kingdom could hope to endure this constant weathering. In the final chapter of his 'handbook' Sedulius followed Cathwulf in reminding his princely reader of the benefits that accrued to good kings, and the terrible divine

[16] *TeM* 3.14 (Einhard, 1888, p. 253).

[17] Sedulius (ed. Dyson, 2010, p. 19) argues that the text was most likely written for Charles the Bald after 843.

[18] *De rectoribus Christianis* (Sedulius, 2010, p. 64; henceforth *DRC*) 3. Trans. unless otherwise noted from the same edition.

[19] *DRC* 9 (Sedulius, 2010, p. 100-102).

[20] *DRC* 15 (Sedulius, 2010, p. 146). The formula first appears in *De tertio consulate Honorii panegyricus* (Claudian, 1922, p. 276).

[21] *DRC* 15 (Sedulius, 2010, p. 152-154). Lev. 26:3-17; 26:23-25.

[22] *DRC* 16 (Sedulius, 2010, p. 158-160).

punishments wielded against the wicked, including (naturally) meteorological maladies. The air itself "has many times fought against the rebellious with winds, clouds and hail," he observed, while "the sky has pealed above the enemy with avenging flames and thunders and the oceans have released the most violent tempests." This elemental retribution could occur because all of Creation, including the elements, remained subject to rulers only to the extent that rulers "themselves remained subject to the Creator."[23] For all its rich metaphor, then, this model took seriously the link between good kingship and tranquility of the elements.

The rarified courtly ideal of cosmic kingship and the 'rustic' belief in weather magic both rested on an assumption that human beings held some influence over the workings of the atmosphere, for good or ill. Both also implied a kind of socio-environmental feedback loop; one in which God and Creation responded to human influence, and in turn exerted potent influence on human endeavors. As we moderns have come to learn, they were in a sense correct: humans *do* hold power over our atmosphere (if in a very different way) and the resulting changes in weather and climate are reshaping our human world.

Making weather, imagining climate

The concepts of 'climate' and 'weather' are closely related but distinct. Generally, 'weather' denotes day-to-day atmospheric changes, while 'climate' refers to meteorological averages over a defined period (30 years, according to NOAA [National Oceanic and Atmospheric Administration]). Climate is therefore an accumulation of weather, an atmospheric *longue durée*.[24] Put simply, climate is what we expect and weather is what we get.[25] Both are to some extent physical phenomena: weather, as the medievalist Paul Dutton has suggested, is "the atmosphere in contact with us," forceful in its immediacy. Yet weather is also a cultural construct, imbued with symbolic, metaphorical, and theological values. Climate, too, is both physical and cultural. Materially, it impedes or nourishes agricultures and shapes landscapes human and natural. Culturally, climate relies on agreement about what is normal or usual, and how that should be determined or measured over time (Squatriti, 2010, p. 808).

The Aristotelian *climata* – zones of distinctive weather encircling the Earth – were

[23] *DRC* 20 (Sedulius, 2010, p. 194).

[24] In this metaphor weather might be *l'événement*, El Nino and other teleconnections *conjoncture*.

[25] Herbertson (1901, p. 142) appears to be the first use of a variant of this phrase often attributed to Mark Twain.

transmitted to the Middle Ages by Isidore of Seville.[26] Yet something like our own idea of climate (as a long-term average of weather) also existed, though of course it was not associated with instrumental records. Rather, some early medieval texts describe what could be called weather trends: a deterioration or worsening, or extended periods of favorable weather. And rather than a 30-year period, such a trend might be associated with a series of political events or the reign of a particular king. In what follows, I focus on two ninth-century narratives that took this decidedly longer-term perspective on weather. Emanating from Carolingian courts, they elucidate the development of a set of ideas connecting both short- and long-term weather with kingship.

The first occurred during a dramatic rebellion of the sons of Louis the Pious in 833-834. Infamously abandoned by his men at the "Field of Lies," Louis was deposed, compelled to perform public penance, and taken into custody by his eldest son, Lothar. Yet by March, 834, with the support of loyal bishops, Louis had regained his imperial title. According to his anonymous biographer (usually called "the Astronomer" because of his interest in the stars) Louis's restoration was met with atmospheric approbation. "In this affair," the Astronomer reported,

> the exaltation of the people rose to such an extent that even the weather, which seemed to have suffered an injury with Louis, now rejoiced in his restoration. For up to that time such powerful winds and driving rains had settled in that a superabundance of water far beyond the norm (*extra solitum*) rose up, and gales of wind rendered rivers impassable for boats. But the elements seemed somehow to have conspired in his absolution, so that soon the thrashing winds mellowed, and the conditions of the sky reverted to an old but long unseen serenity.[27]

This evocative passage casts weather as a participant in human drama, an environmental reflection of political turmoil. Certainly, this is Dutton's "atmosphere in contact with us." Yet it also reveals an understanding of climate in the sense of long-term norms: Louis's shameful treatment caused notably unusual weather, while his restoration brought the joyful return of harmonious elements that had previously been the norm – evidence, surely, of the wrongs he had suffered.

These unusual atmospheric theatrics might be understood as a miracle, a momentary suspension of the normal operations of nature. Yet rather than a divine agent, the Astronomer emphasized the atmosphere itself as the scene of the dynamism, and the human drama playing out below as its immediate cause. In short, a divinely ordained climat-

[26] *Etymologiae* (Isidore, 1911) 3.44.1.

[27] *Vita Hludowici imperatoris* (Astronomus, 1995, p. 488-490) 51. Trans. Noble (2009, p. 284).

ic norm had been temporarily altered in response to human outrages. The resolution of the political drama brought a return to "old, but long unseen" atmospheric peace. As Cathwulf might have expected, the Frankish ruler was at the center of this meteorological drama.

The idea that meteorology and long-term weather norms could be thrown into disarray by political events finds even richer expression in Nithard's *Histories*.[28] A grandson of Charlemagne, Nithard was attached to the entourage of his cousin Charles the Bald, whom we have already encountered. Apparently at the latter's request, Nithard produced a contemporaneous account of the turbulent period of internecine conflict between Louis's sons following their father's death. Though partial to Charles, Nithard grew increasingly critical of his patron and cousin in the later chapters of this work. Most pessimistically, he ascribed a severe snowfall and lunar eclipse in March 843 to a "just judgment of God," and suggested that this unseasonable weather had caused the Frankish people to "lose the last hope of any good to come."[29]

Within the *Histories*, that terrible winter served as the climax to a series of unfortunate meteorological events, including a summer that was extremely cold (*nimis frigida*) in 841, coinciding with the Battle of Fontenoy that pitted the grandsons of Charlemagne against one another. The poor weather delayed the harvest considerably, and severe cold persisted into October of that year.[30] The same month, as he sat writing about the dreadful battle, Nithard noticed the appearance of an ominous eclipse.[31] A comet that had sojourned for several months in the skies above Francia faded suddenly following the conclusion of the Oaths of Strasbourg, which cemented an alliance between Charles the Bald and his brother, Louis, against their elder sibling, Lothar. In the same month (February 842) Nithard reported an abundant snowfall and severe cold spell.[32] In Nithard's fourth and final book, the dire portents only escalated: in the midst of resumed (but failed) negotiations among the brothers, in November 842, an earthquake improbably struck "most of Gaul;" and that winter was again excessively cold and long, with catastrophic agricultural consequences.[33]

If the sky was a potential medium of divine communication, it was carrying increasingly urgent messages. Read sequentially, a progression of dire natural events from 841 to 843 evoked a growing sense of natural disorder tied to political and social upheaval.[34] It culmi-

[28] *Historiarum libri IIII* (Nithard, 1829, p. 649-672; henceforth *HL*). See Nelson (1985, p. 259-593).

[29] *HL* 4.7 (Nithard, 1829, p. 671-672).

[30] *HL* 3.5 (Nithard, 1829, p. 664-646).

[31] *HL* 2.10 (Nithard, 1829, p. 661).

[32] *HL* 3.5 (Nithard, 1829, p. 666).

[33] *HL* 4.5 (Nithard, 1829, p. 671). The *Annals of St. Bertin* specify that "Western Gaul" was struck.

[34] Newfield (2013, p. 137) points to wide-ranging documentary sources indicating famine in both northern and southern Europe ca. 841-845.

nated in the ominous spring snowfall of 843 that caused a loss of hope among the Frankish people, and this depressing forecast was the denouement Nithard chose for his work as a whole. Forcefully drawing a connection between socio-political disorder and meteorological upheaval, he noted evils of every kind (*omnigena mala*) being sowed everywhere. "Here let it be understood," Nithard scolded, "by what madness one neglects the common welfare; how insane it is to follow personal or selfish desires, when [what results] from both offends the Creator so much that He even turns all of the elements against the same madness."[35]

Sedulius hinted that a rebellious ruler might find the elements ranged against him, the air itself waging war "with winds, clouds, and hail."[36] Nithard perceived these very consequences playing out in the atmosphere and sought to convince his readers in part with reference to historical weather "still known to nearly everyone." For in the days of Charlemagne, "because this people walked the one and only right path (and through this the public road approved by the Lord), for these people peace and harmony were everywhere." In contrast,

> the opposite situation now prevails, because each walks the path as he desires, and everywhere disagreements and discord arise. Before [...] the elements themselves were harmonious with everything. Now, the elements everywhere are turned against all things, as Scripture, offered by divine gift, testifies: 'and the whole world will wage war against the mad.'[37]

The natural world (God's creation) could either cooperate with human needs or throw up obstacles and exact punishments depending on the righteousness of the people, and especially that of the ruler.

Early in his reign, Charlemagne had received a sunny forecast from Cathwulf: provided that he upheld the pillars of good kingship, he would receive "tranquility of air and weather."[38] These felicities were the fruits of good kingship; in contrast, misrule would lead to various calamities, including stormy weather and failed harvests.[39] This insular forecast, redolent of Old Testament kingship, made a lasting impression on the Frankish intelligentsia. By Nithard's time, it was possible to retrospectively evaluate the results. In contrasting the tranquil, cooperative elements of Charlemagne's reign against the disorder and calamity of the mid-ninth century, Nithard produced a fulfillment of Cathwulf's most dire

[35] *HL* 4.7 (Nithard, 1829, p. 672).
[36] *DRC* 20 (Sedulius, 2010, p. 194).
[37] *HL* 4.7 (Nithard, 1829, p. 672). Cf. Wisdom 5:21.
[38] *Letter to Charlemagne* (Cathwulf, 1895, p. 503).
[39] *Letter to Charlemagne* (Cathwulf, 1895, p. 503).

predictions. Worse, through a kind of feedback loop, environmental instability was provoking further social disorder, and even the loss of hope for any good to come.

Telling the truth about weather

Was this pathetic weather merely an artful atmospheric cloak for dangerous political criticism? Or did the conditions described by the Astronomer and Nithard reflect real environmental changes? Paleoclimate proxy data – indirect evidence from the "archives of nature" such as tree rings, ice cores, and lake sediments – typically reveal past weather conditions at broader temporal and geographical scales than historians might wish. The Astronomer's account of wet and windy conditions in the winter of 834, for example, is unlikely to turn up reliably in natural records.[40] Nithard's specific claims – an unusually cold and dry summer, fall, and winter 841-842, and a cold winter the following year (culminating in the unseasonable snowfall of March 843) – might be more fruitfully investigated.[41] The Old World Drought Atlas shows a dry signal for 841, though this only reflects conditions during the summer growing period (Cook, 2015). Nithard's larger claim – that weather in general had deteriorated since the days of Charlemagne – can be assessed with greater confidence, since long-term trends are (ever) clearer in the paleoclimate record. Setting Nithard's short-term weather aside for the moment, can we make some sense of his climate?

The period from the second quarter of the eighth century to the first quarter of the eleventh has been characterized as a relatively neutral climate epoch, a "Medieval Quiet Period," sandwiched between two more dynamic periods of variability (Bradley, 2016, p. 990-993). The earlier of these more dynamic periods the "Late Antique Little Ice Age," or LALIA, an episode of abrupt cooling caused by a series of volcanic eruptions in 536, 540, and 547. Complex ocean and sea-ice feedback loops, along with another eruption ca. 626 and reduced solar activity, may have allowed cold conditions to persist well into the seventh century (Büntgen, 2016, p. 231-236).[42] The latter phase of dynamism is the "Medieval Warm Period" (now more commonly called the "Medieval Climate Anomaly" or MCA, because of its global heterogeneity) from the tenth century on (Neukom, 2019, p. 550-554).[43]

[40] Documentary records are not as reticent; the *Annales Bertiniani* (ed. G. Waitz, 1883, p. 8; henceforth *AnB*) offer another account of unaccustomed (*insuetus*) flooding in early 834.

[41] *AnB* (ed. Waitz, 1883, p. 29) connect the hardships to social unrest and brigandry rather than bad weather.

[42] Harper (2017, p. 44-45), who connects this cooling with the decline of the post-Roman West, discusses the evidence for reduced solar activity.

[43] Guiot (2010) suggests increasing warmth in southwest Europe as early as 800; in some areas, the "Quiet Period" thus overlaps with the MCA.

In contrast, the climatically quiet era after LALIA and before the MCA – coinciding with the rise of the Carolingian dynasty – may have been favorable to demographic and economic expansion.[44] These benign conditions might have resulted from a relative lack of volcanic activity, since volcanoes (which eject material into the atmosphere that can block solar radiation) sometimes cause episodes of dramatic cooling. Greenland ice cores suggest that a period of reduced volcanic activity may have gotten underway by the eighth century (Bradley, 2016, p. 991-992).[45] At a macro level, then, the contours of medieval climate variability derived from proxy data line up nicely with Nithard's image of a meteorological golden age – or at least a relatively placid one – in the era of Charlemagne; however, it would also seem to apply to the politically tumultuous era of his grandsons, an era Nithard conversely characterized as climatically unforgiving.

That is the very big picture, however. At decadal and annual scales, shifting conditions certainly made themselves felt. As we have seen, documentary sources furnish several examples of bad weather toward the end of the eighth century and beginning of the ninth. Einhard tells us that Charlemagne's Fossa Carolina, designed to bridge the Rhine and Danube river basins, failed due to ceaseless rains in the autumn of 793 (see Squatriti, 2002, p. 11-65). Paradoxically, in 794 the *Annales Mosellani* mentioned drought amid ongoing food shortages (ca. 791-794); this dearth, whether from too much rain or too little, seems to have spanned most of Carolingian Europe and beyond, including northern England (Newfield, 2013, p. 130). In 800, remarkable June frosts drew notice in the Royal Frankish Annals, though harvests were reportedly unaffected.[46] The three-day fast of 805, mentioned above, was intended to address drought and other catastrophes, and Charlemagne's instruction that bishops should seek God's mercy in case of local disasters (rather than waiting for another royal decree) amplifies a sense of growing unease.[47] The Lesser Lorsch Annals, the Annals of Xanten, and the Royal Frankish Annals each recorded another exceptionally cold winter in 810/811.[48]

Proxy data reinforce this picture. A temperature reconstruction based primarily on tree rings suggests that 800-801 was the coldest year of Charlemagne's reign, probably due to a large volcanic eruption (Sigl, 2015, p. 545, fig. 3). Indeed, the summer of 800 may have been

[44] Verhulst (2002, p. 135) charts a "nearly continuous upward movement" for the European economy from the eighth century. McCormick (2012, p. 205) makes the explicit connection with climate.

[45] Toohey (2017, p. 821) suggests a "Quiet Period" starting ca. 1000, increasing overlap with the MCA. Büntgen (2020, e125757) suggests the MCA was indeed volcanically quiescent.

[46] *Annales regni Francorum* (ed. Kurze, 1895, p. 110; henceforth *ARF*).

[47] *Karoli ad Ghaerbaldum episcopum epistola* (ed. Boretius, 1883, p. 245-246).

[48] *ARF* (ed. Kurze, 1895, p. 134); *Annales Xantenses* (ed. Von Simson, 1909, p. 4); *Annales Laurissenses minores* (ed. Pertz, 1826, p. 121).

the coldest since LALIA, and was unsurpassed in its frostiness until the mid-fifteenth century (Büntgen, 2020, p. 7, fig. 4). Meanwhile, a composite of Northern Hemisphere tree rings suggests that the entire decade from 800-809 (the last full decade of Charlemagne's reign) was the fifth coldest of the past two millennia (Büntgen, 2020, p. 6, table 1). Jean-Pierre Devroey points to proxy evidence for cooler and wetter springs in northern Francia during the second half of Charlemagne's reign, while more southerly regions were spared (Devroey, 2019, p. 69-71). Despite a favorable (or at least quiescent) trend at larger climatic scales, the documentary and proxy records for Charlemagne's reign suggest that short-term meteorological shocks and regional problems were ever a concern.

Yet there is a case to be made for some deterioration after 814, when Louis inherited his father's empire. If weather always presented challenges to an agrarian society, it offered an especially large number of them in the 820s. In a pioneering 2007 study, historians and paleoclimatologists together highlighted the ample proxy and documentary evidence for a series of volcanic eruptions early in Louis's reign that resulted in markedly poor weather (McCormick, Dutton, Mayewski, 2007, p. 865-895). Updated data from Greenland ice cores reveals a large sulfate spike from an eruption that occurred ca. 817, with another spanning ca. 822-823 (probably a continuous or dual eruption) (Sigl, 2015, p. 543-549). Abundant documentary sources paint a picture of the fallout (McCormick, Dutton, Mayewski, 2007, p. 881-884). In 820, the Royal Frankish Annals implicitly blamed continuous rain for a "widespread pestilence affecting both men and cattle." Rain and a lack of warmth also spoiled the grape harvest, and what little wine could be produced was "sour and tart." Grain and vegetables lay spoiling in the fields. Even worse, low-lying areas were so inundated with water that new crops could not be sown, ensuring the continuation of dearth into a successive year even if the weather had improved.[49] As it turned out, the following winter was so cold that the Rhine, Danube, Elbe and Seine completely froze for more than a month, while autumn harvests and sowing were again hindered by rain.[50] A volcanic eruption can block solar radiation by throwing ash and other ejecta into the atmosphere, suppressing summer temperatures for one or two years, and could account for some of these phenomena. Cool temperatures in turn may have reduced evaporation, increasing the impact of excessive rains.

The prodigies recorded in the Royal Frankish Annals for 823-824 are more difficult to attribute to volcanism, though they coincide with the largest volcanic sulfate signature in Greenland ice cores for the ninth century (McCormick, Dutton, Mayewski, 2007, p. 883). In 823, damaging hailstones were said to fall frequently from the sky, destroying crops,

[49] *ARF* a. 820 (ed. Kurze, 1895, p. 154).

[50] *ARF* a. 821(ed. Kurze, 1895, p. 157).

while (more strangely still) an epidemic of lightning burned entire villages. This lightning sometimes erupted unnaturally from a clear sky, a detail perhaps included to hint at divine wrath. As if to cap it all off, another pestilence followed.[51] In 824, an extremely cold winter – more plausibly linked to volcanism – killed both people and animals amid ongoing famine. Perhaps strangest of all, a block of ice said to be fifteen feet long, seven feet wide, and two feet thick fell during a hailstorm at Autun.[52] Even a "Quiet Period" had its moments of upheaval. Since this series of unfortunate meteorological events occurred in the decade following Charlemagne's death, keenly attuned observers at court must have wondered about their cosmic significance.[53]

For Nithard, nearly two decades later, meteorological disruptions again took center stage. As in the 820s, volcanism may have contributed, though the evidence is hazier. Modest sulfate spikes caused by northern hemisphere eruptions appear in Greenland ice core data in 835, 837, and 841 (Sigl, 2015, Suppl. Data 5). Reconstructions of European summer temperature based on tree rings from Scandinavia and the Austrian Alps show a slight negative anomaly in 841 (the summer of the Battle of Fontenoy), and an even smaller one in 843 (the year of Nithard's hopeless spring snowfall) (Pages 2k Consortium, 2013, p. 339-346). While actual weather conditions – including short-term events that do not appear in the paleoclimate proxy record – may have contributed to Nithard's sense of meteorological decline, we have seen that such disruptions also occurred in the age of Charlemagne. A degree of selectivity is apparent in Nithard's climatological memory, foregrounding patterns that reinforced his understanding of the contemporary *political* climate. For though he had earlier placed great hope in Charles the Bald, by the time he sat down to write the fourth book of his *Histories*, Nithard's attitude had become so pessimistic that Janet Nelson has speculated it was written for a different audience entirely: not for Charles's court, but for Nithard's inner circle in his semi-retirement as lay abbot of Saint-Riquier (Nelson, 1985, p. 281).[54]

Confirmation bias may be a modern term, but it is probably not a modern phenomenon. I do not mean to suggest that the environmental elements of these early medieval narratives were invented from whole cloth. The Astronomer and Nithard had contemporary

[51] *ARF* a. 823 (ed. Kurze, 1895, p. 163-164).

[52] *ARF* a. 824 (ed. Kurze, 1895, p. 166-167).

[53] Devroey (2019, p. 415) connects poor harvests during this period with a sense of divine disfavor and the series of reform-minded councils including Paris in 829.

[54] Nelson (1994, p. 440) reconsiders this position, suggesting that Nithard may also have hoped to reach Charles with a constructive, if strident, critique. On the other hand, Nithard's phrasing – particularly in the conclusion – does not admit much hope for change. Booker (2023, p. 127) argues that these final passages are influenced by (and adopt language from) Boethius's *Consolatio Philosophiae*, with its bitter lament for justice and the public good.

readers in mind, who would be familiar with weather "on the ground." Like many authors before and after, they emphasized certain elements and perhaps ignored others; but they are unlikely to have described entirely invented weather trends. Instead, they used the scaffolding of real meteorological events – ones that many would still remember – to build a convincing rhetorical edifice. By selectively choosing from an ongoing rush of subjectively experienced weather events, the Astronomer and Nithard could be truthful in their meteorological observations even as they constructed a case, establishing their particular views of the political world in which they lived.

Final considerations

Early in Charlemagne's reign, the Anglo-Saxon cleric Cathwulf advanced the notion that by upholding the columns of God's *castra*, a good king would bring beneficent weather and abundant harvests to his people. This idea, ultimately an insular twist on Old Testament kingship and patristic commentary, made central the power of the Christian ruler, striking a chord in Carolingian intellectual circles. By the middle of the ninth century, it took on new critical significance as the columns of empire threatened to crumble. At an early stage in the Carolingian project, it had been possible for Cathwulf to offer a sunny outlook to a promising young king. Yet Cathwulf also offered a darker mirror image to his readers, that of a negligent ruler who failed to uphold universal order, and thereby brought innumerable evils – including deleterious climatic changes – thundering down on his people. Nithard, too, presented a dual vision, in which a good king's climatic optimum was explicitly compared to the bleak meteorological upheaval of internecine Carolingian conflict. Indeed, in the mid-ninth century, Nithard could present these competing visions not as a guide or warning for the future, but as a retrospective lament for the past. It is not surprising that Charlemagne retained his role as the "good king", but it may have surprised Charles the Bald to learn that he had assumed center stage as the negligent one, the type who invited elemental rebellion. In critiquing his patron, Nithard chose a *speculum* carefully: what better mirror than the sky itself, remote yet visible to all, and ostensibly clear in its judgements?[55]

The ancient concept of isomorphism posited an intimate link between micro- and macrocosm, so that nature at its smallest scales could be understood to reflect and influence the universe at its largest (and vice versa). For Jean-Pierre Devroey, Christianity intro-

[55] Glacken (1967, p. 161ff.) observes that scriptural passages (like Romans 1:20) made clear that aspects of the divine were discernible in the natural world.

duced an original dimension to this ancient paradigm, making sinful humanity a prime mover and shaker in natural (dis)order at much larger scales (Devroey, 2019, p. 81). The elite intellectual tradition of royal climatology that Nithard chose as a framework for his critique allowed him to bridge the smallest of scales to the largest; from the individual figure of the ruler and the singular meteorological event to the fate of an empire and its long-term climatic trend. This elite understanding of weather was paralleled by the longstanding folk tradition, proscribed in law, that envisioned weather magicians wielding direct control (malign or benevolent) over elements at a smaller scale. In this way, the king's influence on weather – and over the longer term, something like climate – was paralleled by the magical practices of much more accessible, and much more localized, folk practitioners. These parallel concepts, though at odds, had very similar ends: to offer some explanation for, and some interface with, the inscrutable yet inexorable forces that exerted influence over life in an agrarian society.[56] It would have been difficult for people to imagine that such influence traveled in only one direction.

In one sense the unseasonable snowfall of March 843 was merely a weather event, one that surely brought a degree of immediate suffering to the people. Yet what troubled Nithard more deeply was what it said about long-term trends. An unexpected deviation from the norm, from the tranquil climate of the past, was an indication that the Carolingian Empire was on a dangerous trajectory; even, perhaps, that it did not enjoy divine favor. In this way, a short-term weather event could cause long-term hopelessness; indeed, a "loss of hope for any good to come." Read together, short-term weather and long-term climate offered an epistemological framework for remembering the political past, for understanding the political present in relation to it, and for forecasting the future.

In these early medieval conceptions of a reciprocal relationship between human beings and their environment we find some surprising affinities with present concerns. In recent decades, weather – long considered a banal or even boring topic of conversation – has again become an object of intense interest and anxiety. We in the 21st century have begun to rediscover something of the fascination and fear with which medieval observers must often have looked to the skies. We now consider that we *do* in fact have an impact on our climate, and that there is indeed some moral dimension to this relationship – even individual responsibility in terms of the choices we make. Certainly, many of us accept the idea that kings (or heads of state) have an especially large effect on climate change through their decisions and actions; or that some countries, even individual corporations, have

[56] Dutton (2004, p. 185) argues that belief in *tempestarii* "allowed Carolingian farmers to achieve some small measure of control over their relations with the divine in matters meteorological." The same could not be said for cosmic kingship, though it did allow human agency.

made outsized contributions to the problem (Page, 2008, p. 556-575; Heede, 2014, p. 229-241). Most of all, we are becoming intimately familiar with the idea, long promoted by environmental historians, that societies are deeply enmeshed with the natural world around them, which they shape, and in turn are shaped by, in complex and sometimes surprising ways. The geographer Mike Hulme has observed that climate change in the 21st century, "far from simply being a change in physical climates," has become "an idea that now travels well beyond its origins in the natural sciences" (Hulme, 2009, p. xxvi). This is certainly true; yet long before it was an object of the natural sciences, climate change was also a social and cultural phenomenon.

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