

Agrilogistics and Pest Control in Early Modern Georgic

In 1962, Rachel Carson ignited the modern environmental movement with *Silent Spring*, a tour de force exposé of the invidious effects of the post-war pesticide industry. Yet ecocritics have seldom observed that Carson's quarrel was with the means not the ends of synthetic agrochemistry; indeed, *Silent Spring* concludes by outlining several organic alternatives to DDT. While it was the toxic concoctions of the twentieth century that alarmed Carson, defending the human food supply from other species has been a fundamental human pursuit since the agrarian revolution. Over 4,500 years ago, the Sumerians were experimenting with sulphur compounds to deter pests, and ancient Greek and Roman farmers deployed an arsenal of traps, nets, sprays, fumigants, birdlimes, and poisons to protect their crops (Flint and Bosch 1981, 51-53). Some of these techniques faded from memory in the West during the Middle Ages, but became increasingly commonplace in the Renaissance following the rediscovery and transmission of Virgil's *Georgics* (along with works by the likes of Cato, Columella, and Varro), which coincided with 'an awakening of interest in biological control' (Handley 2019 n.p.) of so-called vermin, as well as the advent of Paracelsian chemistry, facilitated by the growing availability of lead, mercury, and arsenic on the open market.

This begs the question of whether the georgic tradition sowed the dragon's teeth from which modern pest control science sprouted. While early agrarian texts endorse more biotic methods of deterrence and mitigation and hence preserve the ecological wisdom of a pre-industrial society, they can also authorise the eradication of certain species with a callous disregard for animal suffering. Georgic literature is justly celebrated for its vision of closeness to the soil, but it also displays an unfortunate tendency to pathologise and demonise creatures outside the pale of anthropocentric agronomy. This tendency is particularly marked in early modern texts that unabashedly wield the language of warfare and natural magic to

imagine a human-controlled environment. Examining the reception and translation of Virgil's *Georgics* alongside agricultural manuals that draw on them to think with and about pests, this chapter reveals a darker streak in these beloved poems, asking how we might read them and their legacy to problematise the agrochemical persecution of non-humans today.

Weaponising Virgil: Epic Georgic and Inter-species Warfare

Broadly speaking, ecocritical commentary on the georgic splits into two camps. The first berates georgic as anthropocentric, emphasising the continuity between Virgil's agricultural writing and his epic of imperial conquest: *labor omnia vincit* becomes in this reading a motto for the human subjugation of the earth, a corollary of the dominion mandate in Genesis 1:26, in which God grants humanity rule—the Hebrew *radah* literally means trample—over the fish, fowl, beasts, and 'every creeping thing', a category that encompasses insects and many species regarded as agricultural pests. Georgic cultivation and imperial annexation are entwined (as we shall see) in the work of Elizabethan poet and colonist Edmund Spenser, as they would later be in the West Indian plantation georgic of James Grainger's *Sugar Cane* (1764) which, incidentally, includes a versified recipe for rat poison (see O'Brien 1999, 16 and Sweet 2002) that betrays a toxic undercurrent in the georgic. In contrast, the second camp celebrates georgic as a 'light green' (to borrow a term from Bess 2003) literary mode, observing that its attention to the pragmatics of material entanglement, dwelling, and sustainability provide a much-needed corrective to the fetishising of wilderness and pastoral fantasies of nature as a pristine realm apart. The pro-georgic school garners evidence from the country house poem [playing up the link between its devotion to *oikos* or domestic economy and ecology (see Remien 2019, 1-32)], classic works by farmer-writers (ranging from Hector St John de Crevecoeur to Robert Frost to Wendell Berry), and the New Nature

Writing's advocacy of regenerative farming.¹ A compelling case for this more approbatory view of the georgic has been put forward by David Fairer, who argues that the genre rejects 'leisured consumption in favour of practical production' and dissolves capital-N Nature 'into discrete phenomena, ... [revealing] a commitment to the minuter readjustments and qualifications that allow life to continue' and thereby prefigures Timothy Morton's vision of 'ecology without nature' (2011, 212, 207). Both views are defensible, and Erin Drew (2015) rightly stresses the need for a complex understanding of georgic that balances its drive for dominance with its ethos of care. Yet attending to entrapment and poison in early modern texts necessarily results in a more sobering assessment that implicates the georgic in what Morton calls 'agrilogistics' (2016, 38), an agrarian society's intensive management of natural resources to maximise productivity for human purposes. Motivated by the desire to eliminate scarcity and stockpile food against dearth, agrilogistics conspires to ensure human flourishing in the short and middle term but in effect imperils it in the long term by reducing biodiversity and resilience. For all its commendable insistence on local dwelling and its pragmatic, hands-on approach to living off the land, the georgic is the genre of agrilogistics par excellence. While Virgil's foundational work, composed in the aftermath of Rome's civil wars to celebrate the *Pax Augusta*, glorifies agriculture as a benign alternative to warfare, its famous trope of hammering swords-into-ploughshares also betrays how certain agricultural methods represent a sublimation or redirection of violent propensities towards an adversarial, non-human world. If the pastoral idealises the countryside as the abode of innocence and serenity, the georgic, especially when allied with epic, sometimes configures it as 'the site of war ... between nature and man' (Thomas 2001, 124).

Gardens and fields are always contested spaces, so it is unsurprising that the first book of Virgil's *Georgics* reminds farmers to be vigilant against competition from other species in a passage that begins *tum variae inludant pestes* [divers plagues make mock of you]

(Fairclough 1965, I.181, 92-93). Much ink has been spilled on Virgil's love of bees, much less on the georgic grudge against other seed-devouring minibeasts and birds, as well as predators of livestock. Given the monumental significance of the *Georgics*, it is worth considering how Virgil's early modern translators reworked these verses to help pin down the elusive concept of vermin and rile public sentiment against these species.² As Mary Fissell notes, vermin is not a timeless or fixed category but 'a mix of projections, fantasies, identifications, and real flesh and blood animals with their own agendas and goals' (2002, 77-78). The range of species branded with this label and the degree of tolerance humans show towards them have fluctuated throughout history. Derived from the Latin for worm (*vermis*), a creature now recognised as a keystone species that plays a vital role in aerating soil for farming, the word vermin does not have an exact Latin equivalent and hence never appears in the *Georgics* — the closest Latin term *bestiolae* simply means little beasts. Virgil's term *pestes* literally signifies disease or pestilence and may have contributed to the pathologising of these species as comparable to blight or parasites. The same was once true of the English word pest, which originally meant disease and, according to the *OED*, only acquired the connotations of vermin — 'an animal, esp. an insect, that attacks or infests crops or livestock' — in the mid-eighteenth century when georgic literature reached new heights of popularity. Yet the convergence of the twain was already foreshadowed in early modern translations of Virgil. Abraham Fleming's 1589 version of the *Georgics* invests *pestes* with the double meaning of disease and nuisance species, deploying alliteration to make their lowliness the more emphatic:

Then diverse plagues (or vermine vile) deceive the husbandman:
The little mouse hath plast his house oft underneath the ground
And made his barns (or garners there) or else the moldwarps blind

Have diged them couches there to lodge, and in the hollow holes
The tode is found, and many monsters more the earth brings foorth:
The wevell (a devouring worm) destroies huge heapes of corne,
So doth the pismire, fearing much his needy, helpless age. (1589, 7)

Whereas Robert Burns would generously allow the mouse ‘a damien icker in a thrave’ (Kinsey 1969, 102) in his famous ode, Virgil denounces it as a thief; the contrast betrays the anthropocentric parsimony of much pre-Romantic georgic.

It should be noted that vermin do not figure prominently as villains in Hesiod’s *Works and Days*, Virgil’s chief prototype, first translated into English by George Chapman as the ‘georgicks of Hesiod’ in 1618. Hesiod is more worried about human thieves —the ‘day-sleep, wake-night man’ (1618, 28)—raiding one’s garners than grain-nibbling rodents or insects. His text contains no roll-call of undesirable species like that in Virgil, although it does recommend simple defensive measures to protect newly sown fields:

And thy Boy behinde,
That with his Iron Rake thou hast design'd,
To hide thy seed; Let from his labour driue,
The Birds, that offer on thy sweat to liue. (1618, 23)

Hesiod advises the farmer to shoo away birds, advice echoed by Virgil’s *sonitu terrebis aves* (1.156), but does not tar them or other seed-eating beasts as pests, which makes Virgil’s leap from ‘pests’ to ‘monsters’ (*monstra*) all the more noteworthy. Invoking Aristotle’s theory of spontaneous generation, Virgil’s poem denigrates insects and other creatures thought to reproduce asexually as inferior or abhorrent. It is their chthonic nature, born of the earth—

plurima terrae monstra ferunt (1.184-85)—and subterranean dwelling under it that makes the mouse and mole so repellent. Prior to the microscope, the development of germ theory, and the identification of insects and rats as vectors for disease, vermin in early modern England rarely incite feelings of disgust (Sarasohn 2021); they were despised because of their supposed greed or deviousness rather than their perceived filthiness. But Virgil’s conflation of pest with pestilence or plague (recall the Egyptian insect plagues in Exodus), and broadcasting of the bogus science that species classed as vermin—including snakes, amphibians, mice, and insects—reproduced spontaneously without maternal nurture underscored their alterity from mammals and hence their ontological monstrosity, thus making them easier to kill without compunction.

Although he retains the label monster, Thomas May’s 1628 translation sounds less vicious in that he characterises these creatures not as plagues or vermin but ‘mishaps’:

Many mishaps may fall; the mouse below
Oft makes her house, and garner underground,
And there as oft the blinde-borne moles are found:
There Toades, and many earth-bred Monsters ly:
There little Weeuills heapes of corne destroy,
And frugall Ants, that toyle for times to come. (1628, 10)

While May retains Virgil’s ‘monsters’ and emphasises the tiny weevil’s outsized appetite, ‘mishaps’ suggests a resigned acceptance of pests as an inevitable nuisance faced by farmers, akin to an unseasonable frost. The poem’s recognition of the domestic economy of the mouse (gendered female by May) and praise of the ant’s frugality and foresight insinuates that these

creatures with their stores and garners conduct their own form of agriculture and may be more like us than we care to admit.

If the workmanlike translation of the Cambridge-educated lawyer May does not savour of any intimate, first-hand knowledge of the soil, neither were the hands of John Dryden, Virgil's most admired early translator, hardened by the plough. His 1697 version would be applauded for its literary elegance but this quality arguably stems in part from a certain belligerence, the result of his grafting the georgic with the epic mode in an edition that printed the *Georgics* alongside the *Aeneid*. His influential and much more cavalier translation renders the passage on pests as follows:

For sundry Foes the Rural Realm surround:
The Field Mouse builds her Garner underground,
For gather'd Grain the blind laborious Mole,
In winding Mazes works her hidden Hole.
In hollow Caverns Vermine make abode,
The hissing Serpent, and the swelling Toad:
The Corn devouring Weezel here abides,
And the wise Ant her wintry Store provides. (1697, 57)

Although Dryden occasionally follows earlier translators, as documented by Hooker (1946), his version is remarkable for its explicit comparison of agriculture to military conflict, transmogrifying pests into 'foes' and monsters into 'vermin,' while adding in a 'hissing serpent' (not found in this passage in Virgil) for good measure. Gone are the allusions to spontaneous generation, debunked by Francesco Redi and John Ray in the 1660s; the pests of Dryden's *Georgics* are not monstrous freaks of nature but enemy combatants. This may

explain, assuming it is not a typesetting error, Dryden's curious substitution of 'weezel' in place of weevil. Perhaps he worried that mice and insects were not formidable enough foes, and that a battle with them might verge on mock-epic (reminiscent of the pseudo-Homeric *Batrachomyomachia, or The Battle of Frogs and Mice*), and therefore introduced the reptile and mustelid; never mind the facts that snakes would keep down the rodent population and carnivorous weasels do not eat corn. Whereas Fleming's Virgil enjoins the farmer in an earlier passage to 'follow [till] well the ground' (6) and May's version reads to 'exercise the soil' (9), Dryden interpolates phrases heralding an Iron Age of ecological warfare:

So that unless the Land with daily Care
Is exercis'd, *and with an Iron War,*
Of Rakes and Harrows, the proud Foes expell'd,
And Birds with clamours frighted from the Field;
Unless the Boughs are lopp'd that shade the Plain,
And Heav'n invoc'd with Vows for fruitful Rain,
On other Crops you may with envy look,
And shake for Food the long abandon'd Oak. (1697, 56)

The italicised section referencing 'Iron War' is not in the original. To be fair, Dryden elsewhere interpolates the word *pax*, as Melissa Schonenberger (2014) has noted, and also voices a sense of obligation or care for nature (Drew 2015). But in passages where vermin appear Dryden injects his *Georgics* with an epic strain, reminding us of the difficulty of co-existing with species that undermine or frustrate human control of nature.

A martial tenor is also audible in Dryden's translation of a passage from Book 3 on repelling serpents by burning scented woods such as cedar or juniper or killing them with

stones or clubs. Only the most passionate herpetologist would fault Virgil for urging one to rid one's barns of venomous snakes. Yet Virgil exacerbates prejudice against these reptiles by spreading the misinformation that adders nesting in thatch roofs drip down venom on the animals below or, as Fleming phrases it, 'sprincke hir strong poison upon cattell' (1589, 50). Interpreting Virgil's *pestis* in a more literal sense, May's version reads 'like a plague invade thy cattle' (1628, 93). Perhaps it was this passage in which Virgil dubs the adder *pestis acerba boum* (3.419) that emboldened Dryden to insert the 'hissing serpent' in the list of pests in Book 1. Dryden's rendering of the passage is more sweeping in its call to drive away 'the Viper's brood and all the venom'd Race' (1697, 115), and once again takes on overtones of epic combat:

Or with hard Stones, demolish from a-far
His haughty Crest, the seat of all the War.
Invade his hissing Throat, and winding spires;
Till stretch'd in length, th'unfolded Foe retires. (1697, 115)

Collating the early translations of the *Georgics*, it appears Dryden takes the most liberties in reworking Virgil's verses into heroic couplets, a form Dryden's *Aeneid* made synonymous with epic, and interpreting the sword-into-ploughshares motif in a more literal sense. Whereas Fleming's 1589 blank-verse translation of the *Georgics* prints them alongside the *Eclogues*, inviting readers to see the continuity between pastoral and georgic, Dryden's edition places them before the *Aeneid*, emphasising their affiliation with epic. Composed under the influence of epic, Dryden's version seems to mark an escalation in violent rhetoric against species that competed with humans over the food supply.

Of course, other writers before Dryden had hit upon the metaphor of pest control as interspecies warfare. The prolific agrarian writer Gervase Markham, for instance, describes newly sown seeds as ‘inuironed and begirt with manie Armies of enemies’ (1614, 43). Nor was Dryden the first to experiment with fusing georgic and epic. Inklings of their merger can already be glimpsed in the writings of Edmund Spenser. Commentators have long observed that Spenser patterned his poetic career on Virgil’s; the move from *The Shepheardes Calender* to *The Faerie Queene* duplicates Virgil’s progress from eclogues to epic. While Spenser never wrote a collection of georgic verse, he did dabble in this mode (see Sessions 1980, Wall 1996, Gregerson 2007, and Hiltner 2011) and Book 1 of his epic forms the missing piece of his Virgilian trilogy. Not coincidentally, it centres on the quest of the legendary St George, a ploughboy turned knight errant, whose name betrays his affinity with the georgic. George’s mission to slay a venomous dragon has been subject to a dizzying number of allegorical interpretations but a more literal reading might reframe it as a glamorised account of a vermin-killing couched in the language of chivalric epic. Spenser compares the monster Error in Canto 1 to an adder, whose ‘fruitfull cursed spawn of serpents small’ (1.1.22), are likened to the slime-born creatures of the Nile and to small ‘cumbrous gnats’ pestering a shepherd. Spenser also took an interest in vermin trapping, as evident from a passage in the ‘Cantos of Mutabilitie,’ when Diana apprehends a faun who has betrayed her, and the poet compares the enraged goddess to

An huswife, that with busie care,
Thinks of her Dairie to make wondrous gaine
Finding where-as some wicked beast unware
That brakes into her Dayr’house, there doth draine
Her creaming pannes, and frustrate all her paine;

Hath in some snare or gin set close behind,
Entrapped him and caught into her traine,
Then thinks what punishment were best assign'd
And thousand deathes deviseth in her vengefull mind. (7.6.48)

This remarkable passage is a salutary reminder that vermin killing was not an exclusively male enterprise in the early modern era; women willingly slaughtered or even tortured so-called pests to protect the fruits of their domestic labours. Given Spenser's participation in the Munster Plantation and its displacement of local pastoralism by English farming, it is impossible to ignore the parallels between his glorifying of George as heroic exterminator with his advocacy of genocidal policies against the Irish. The description of the Blatant Beast as both 'venemous' and a 'plague' (6.1.8) echoes the pejorative language used to malign so-called vermin, while Calidore's hunt after it recalls the efforts of English settler colonists to exterminate Ireland's wolves (see Hickey 2013). In brief, Spenserian georgic is implicated in imperial conquest (see Hiltner 2011, 156-73) and constitutes a bald assertion of the 'violence inherent in human cultivation' (Gregerson 2007) that harms both indigenous communities and wildlife.

Yet Spenser was hardly the only person in early modern England to support the eradication of vermin. Public opinion had hardened against agricultural pests long before *The Faerie Queene* or Dryden's *Georgics* thanks to the notorious Tudor vermin acts, a prime example of agrilogistics in action in which the dream of 'separability' (Laroche and Munroe 2023, n.p.) became government policy. The first legislation passed in 1532, in which Parliament imposed a bounty on seed-eating birds such as crows, rooks, and choughs, similar to Mao Zedong's 1958 'Kill a Sparrow' campaign. Three decades later, the 1566 Vermin Act (renewed in 1572 and 1598) greatly extended the number of species classified as

undesirables, including mice, rats, moles, stoats, weasels, polecats, wildcats, hedgehogs, otters, foxes, badgers, as well as kingfishers, bullfinches, jays, harrier hawks, bustards, cormorants, and ospreys. As this list reveals, early modern definitions of vermin encompassed a much broader range of species (including mammals) than the term typically connotes today, and almost quadruple the five suspects (mouse, mole, toad, weevil, ant) explicitly profiled in Virgil's poem. This legislation transformed vermin-killing in Tudor England from a defensive, ad hoc affair into something of a civic duty as well as an economic activity. Bounties allowed the poorest of the rural poor to supplement their meagre incomes while estate owners appointed salaried gamekeepers to rid their lands of 'nuisance' species that preyed on crops, livestock, or beasts of chase. In one of the best-selling georgic manuals of the sixteenth century, Thomas Tusser uses vermin as a verb meaning cleanse or eradicate when he advises the husbandman to 'Get warriner bownde / to vermyn thy grownd' (1573, H4^v). In an era when English farmers sought to convert more commons, heaths, and fens into arable land, pastures, and warrens, georgic writing helped to rally public support for and compliance with this crackdown on undesirable species, who were classified as little better than enemy combatants or traitors, forfeiting any regard for mercy or compassion. Viewed in this light, the martial metaphors in Dryden's translation of Virgil look less like poetic embellishments and more like a reflection of environmental realities.

The zeal with which these species were persecuted in early modern England would have varied from place to place, but Roger Lovegrove notes that around 50% of parishes record payments for vermin bounties by the end of the seventeenth century (2007, 84). The intensity of the persecution would almost certainly have fluctuated year to year along with the success or failure of the harvest. In the aftermath of the 1607 dearth, Arthur Standish, who has been rightly praised for his advocacy of a national tree-planting campaign, lamented that the current bounties on vermin were too low: 'so small allowance was made that no man

made accompt thereof; whereby allowing a good proportion for this businesse they may be soone destroyed' (1611, 24). Indeed, Standish even suggests that vermin-killing should be made compulsory by levying fines for failure to participate:

Buzzards, Kites, Ring-tailes, and Pyes, all which or the most part of them may easily be destroyed in three years onely, by the pulling downe of their nests, in breeding time not suffering any of them to breed, every man to undertake for his owne ground upon a penaltie, to the use of the poore of the Parish. (1611, 23)

The recommendation that 'all' be killed reveals how little extinction (not firmly established as a scientific fact until 1796 by Georges Cuvier) weighed on the conscience of agrarian improvers in a society prone to scarcity. The state-subsidised eradication of wildlife marks an important chapter in the advent of the Anthropocene in early modern England. To be fair to Virgil, this campaign was under way prior to the circulation of the *Georgics* in English. Furthermore, it should be noted that Virgil implies that humans can only achieve a temporary stalemate in their struggle against agrarian pests; he only speaks of frightening birds from the fields, for example, rather than exterminating them. Agricultural historians and careful readers of the *Georgics* might reasonably conclude that pest control in early modern England was more draconian than that of ancient Rome. Nevertheless, Virgil's poem provided a conduit or sounding board for agrilogistics and its dream of a human-controlled environment. By introducing the word vermin into their translations, Fleming and Dryden align the poem with early modern agrarian improvement, mobilising support for vermin-killing by lending a somewhat distasteful task the august imprimatur of a classical poet.

Commentary on English georgic often speaks of its 'lateness,' crediting Dryden's translation with kickstarting the vogue for this mode in the eighteenth century (Low 1985 and

Fowler 1986; for a corrective to this view, see McRae 2002). But this downplays the translations by Fleming and May, underrates the extremely popular poems of Tusser, ignores the georgic elements in Spenser, and assumes a hard distinction between literary georgic in verse and agricultural manuals in prose. Such a distinction is blurred, however, by the fact that quotations from Virgil pepper many farming treatises in prose from the Tudor era onwards. Writers might even be motivated to pen their own farming manuals to supplement or correct Virgil's influential account. Markham confesses that an encounter with a translation of Virgil (presumably by Fleming) prompted him to write *The English Husbandman* on the grounds that the original *Georgics* was 'a worke onely belonging to the Italian climbe, and nothing agreeable with ours' (1614, A1^r). While Virgil's impact on actual agricultural praxis is difficult to quantify and beyond the scope of this chapter, literary historians have demonstrated that many early modern agrarian writers cite Virgil as 'a moral and a practical authority' (McRae 2002, 204; also see Thirsk 1983). This includes writers with a documented interest in pest control. Leonard Mascall's *First Booke of Cattell* (1587) features no fewer than ten citations of *The Georgics* in English that predate Fleming's translation by two years. Unsurprisingly, the majority of the extracts are lifted from Book 3's commentary on animal husbandry, including the passage in which Virgil proffers advice on fumigating one's barn to expel snakes:

Let burne of Cedar odorant,
To fume the stall or stable:
To cause the serpents flie there fro,
And voide if thou be able . . .
Take stones or staues and kill them,
Ere they encrease and double,

For if they waxe and multiply,
Full oft they will thee trouble. (1587, 217-18)

The translation of this passage in *Booke of Cattell* takes on greater significance given that Mascall was the author of the most important Elizabethan treatise on pest control, *A Book of Engines and Traps* (1590). As clerk of the Kitchen to the Archbishop of Canterbury, Mascall would have been tasked on a regular basis with keeping animals out of his employer's gardens and storerooms and thus writes with a certain hands-on knowledge. His text features thirty-four contraptions (many of them inhumane by modern standards), ranging from simple basket-falls and nets to spring traps and iron gripping traps. Accompanied by remarkable woodcuts that illustrate the lethal efficacy of the devices, *A Book of Engines and Traps* is written in plain, laconic prose and, unlike the *Booke of Cattell*, does not cite the *Georgics* directly. This omission seems suggestive. A scientific approach appears to supplant ancient lore as modern methods and visual diagrams render classical poetry obsolete. But closer scrutiny of pest control in early modern England reveals that the emergence of chemistry and applied mechanics represents not so much a drastic rupture with Greco-Roman georgic as a gradual refinement of its tradition of agrarian magic.

Pest Control and Agrarian Magic: Rhyming Rats to Death

Much pre-modern pest control involved what we would now classify as biotic methods. As Virgil counsels, farmers kept dogs and cats to scare off predators and keep down rodents, or even hired young children with clappers, a common practice from the time of Hesiod's *Works and Days* (c. 725 BCE) to Hardy's *Jude the Obscure* (1895), as human scarecrows. Many early pest deterrents relied on pungent or noisome odours. In *The Gardener's Labyrinth* (1577), Thomas Hill recommends protecting seeds by steeping them in houseleek (aka

sengreen) or chimney soot, strewing the fields with allium or wild garlic, dousing the soil with olive oil, and pouring red ochre or cucumber juice down mole holes. The author of *Maison Rustique* similarly advises rubbing cow manure on grapevines to deter ants, mixing minced fox meat in chicken feed to keep other foxes at bay (1616, 70), and anointing one's tools with goat's blood, or rubbing them on a badger's scrotum (1616, 607). Exploiting the keen sense of smell possessed by many non-humans, such methods resemble the pheromone fumigants and traps deployed in modern pest control and may have been mildly effective. But this power to control the behaviour of other creatures at a distance through the invisible operations of scent and taste would have struck farmers in Augustan Rome and Tudor England as a form of natural magic.

It is easy for modern readers of Virgil to underestimate the extent to which he and other Roman agricultural writers were steeped in a tradition of agrarian magic. Consider the following:

So that there are no bugs in the house: Mix goat bile with water and sprinkle it. So that there are no fleas in the house: Wet oleander with salt water, grind it and sprinkle it. (Qtd. in Ager 2010, 214)

At first glance, these sound like mundane formulas for bug repellent. Yet they appear in an ancient Greek papyrus alongside miscellaneous notes on dream divination, love charms, scrying spells, and incantations to cure various medical ailments. Recipes from ancient herbals and instructions for various magical rituals found their way into Roman agricultural treatises by the likes of Cato, Varro, and Columella, as well as the *Geoponica* attributed to Apuleius (particularly section 13 'Of the animals and insects injurious to plants'). Renaissance writers dutifully copied down and circulated these formulas for magical

prophylactics against pests. Hill, for instance, lifts this bizarre method of exorcising one's fields from the *Geoponica*:

[Apuleius] further willeth that for a safety of the seeds bestowed a speckled Tode ... be drawn by a line in the nyghte time, round about the Gardene or field afore the earth be laboured or diligently digged and dressed of the Gardener; and the same after inclosed in an earthen potte to be buried in ye middes of the Garden or Falowe fielde, which, at the present sowing time approached, shall then bee digged furth and throwen or carryed from that place a great distance off. (Hill 1577, 33)

This ritual takes its impetus from folk beliefs in the toad's ability to absorb venom. The weird sisters in *Macbeth* mimic such agricultural practices when they retrieve a toad that 'under cold stone, / Days and nights hath thirty-one' (Shakespeare 2005, 4.1.6-7), which suggests how easily the magical thinking in pre-scientific pest control might be construed as witchcraft

It is telling that the same Thomas Hill who composed the horticultural text *The Gardener's Labyrinth* also translated a book on natural magic. Entitled *Naturall and Artificial Conclusions*, it includes a recipe to trap and kill fleas with the boiled fat of a fox, hedgehog, or goat (1581, C2^r) similar to the one from the ancient Greek papyrus cited above. The same book also features this 'pretty conceit, to catch Fowles without a Nette':

Take Arsenick, putting the same in water, and in that water boyle wheat, or any other grain, and cast the same forth vnto Fowls, and so many as eate therof, will not be able afterward to flye away. (1581, C8^f)

The toxic effect of arsenic is here presented as a wondrous feat. Chemicals allow humans to exert their will over other species from a distance without any visible mechanism.

Sadly, agrarian magic encouraged not only wildlife persecution but also animal torture, as in this grisly example from *Gardener's Labyrinth*: 'tak[e] a live mole and burning the powder of brimstone about him, being in a deep earthen pot through which he is procured to cry, all others in the meantime, as they report, are moved to resort thither' (1577, 66). At that point, the farmer may enjoy a game of whack-a-mole and slaughter them en masse. The same instructions appear in Mascall's *First Book of Cattell* (1587, 289). Torturing animals was justified by occult writers such as Cornelius Agrippa who insisted that any body parts—internal organs, testicles, teeth, nails, hair—used in charms or medicine had to be extracted from other creatures whilst still alive in order to retain or amplify their magical powers (Agrippa 1651, 1.21, 45-47). 'Sympathetic magic' was not always sympathetic in the modern sense of the word. Rather than minimising suffering during these procedures, some husbandry manuals imply that it is more effective to maximise it, mutilating an animal to terrify its companions. On such grounds, *The Experienc'd Fowler* prescribes the castration of captured weasels: 'his stones out, turn him loose, and the very sight of him will fright all that come near him to seek habitations elsewhere' (1697, 176). Hill, meanwhile, recommends soaking seeds in an infusion of wine and sneezewort to make birds fall down 'stark drunk,' so a farmer may then 'hang [them] up by the legs on a long rod stuck in the earth, to the terror and fearing away of all other birds coming to the place' (1577, 32). Even after their death the displayed corpses of slaughtered vermin were thought to act as a deterrent. *The Gardener's Labyrinth* offers assembly instructions for a macabre scarecrow capped with the skull of a she-ass, 'having bin couered of the male' (1577, 31), impaled on a stake or buried in the soil of the garden, while *The Vermin Killer* claims that setting the peeled head of a mouse or rat

beside its lair will make its companions flee ‘as if they were bewitched’ (1680, 5). Pest control in early modern georgic can have an unsettling resemblance to witchcraft.

In a piercing study of agrarian magic in antiquity, Britt Ager observes that Roman agricultural texts sought to ‘launder unfashionable beliefs through natural philosophy and so make them tenable for the educated elite’ (2010, 296). Something similar happened in the English Renaissance. Tudor writers on farming recirculated some of the magical lore of their ancient Greek and Roman predecessors to protect crops and livestock while simultaneously refining, combining, and supplementing these occult techniques with more mechanical and chemical methods. Even when the means differed, the ends remained the same. Insofar as agrarian magic promoted a will-to-operate upon nature, it appears to have stimulated rather than hindered advances in chemistry and botany that underpin modern pest control by making the public ‘more conscious of the need for and possibility of control’ (Dannenfeldt 1982, 559).

Can the same be said of georgic literature? Does its linguistic mastery over the farmstead provoke a desire for environmental mastery? It does seem telling that one of Virgil’s first translators was also Elizabethan England’s foremost authority on vermin-killing. As far as we know, no one ever claimed that Virgil had the power to curse pests to death, as Irish bards allegedly did to rats, a legend that fascinated Elizabethan writers (see Todd and Curry 1850). Philip Sidney invokes it in *The Defence of Poesy*, Shakespeare mocks it in *As You Like It*, and an author in Ben Jonson’s *Poetaster* (in which Virgil appears) threatens to rhyme his enemies to death ‘as they do Irish rats / In drumming tunes’ (2000, 99). While Virgil was no Irish bard, it is curious that the Renaissance thought of him not only as an agricultural guru and poet laureate of empire; he also enjoyed a reputation as a magician (see Rand 1930). The perception of Virgil as a sorcerer and prophet would have endowed his pronouncements on nature in the *Georgics* with a quasi-sacred authority.

To Elizabethan readers, Virgil's verses on expelling serpents by burning aromatic woods and oils may have smacked of magic (like the miracle attributed to St Patrick): doubly so if recited in the original Latin. Encountering Virgil in English today it is easy to forget the impact his hexameters would have had on a public accustomed to revering Latin as a sacred language. Prayers in Latin to protect crops and livestock were commonplace in England prior to the Reformation, particularly during the holiday known as Rogation, when communities perambulated the parish bounds to bless the fields, trees, and cattle. (For a discussion of Rogation in early modern literature, see Borlik 2011, 105-34.) The first English translations of the *Georgics* by Mascall and Fleming appeared in print at a time when the Rogation liturgy had been converted to English and stripped of its sacramental power, as Protestants cracked down on this custom as a remnant of popery. This same period witnessed a spike in harvest failures due to the turbulent weather of the Little Ice Age. In the absence of now taboo rituals of agrarian magic, early modern readers could turn to Virgil and georgic literature. Translating Virgil in post-Reformation England was not simply about making his poems more accessible: the reworking of Virgil into the vernacular would have conspired to disenchant the georgic by distancing it from magic while underlining the need for more material means of control. Ultimately, it was not magic but the Protestant work ethic that tamed the countryside, a development for which *labor omnia vincit* might serve as a slogan.

Shakespeare glances back at the tradition of agrarian magic in *A Midsummer Night's Dream*, when the faeries intone trochaic verses to protect the sleeping Titania from creepy-crawlies:

You spotted snakes with double tongue
Thorny hedgehogs be not seen;
Newts and blindworms do no wrong

Come not near our Fair Queen . . .
Weaving spiders come not here;
Hence, you long-legged spinners hence;
Beetles black approach not near;
Worm nor snail do no offence. (Shakespeare 2005, 2.2.9-12, 20-23)

This supernatural georgic constitutes a gentle parody of pre-Reformation spells for warding off pests. Revealingly, the faeries' charm fails, for Puck sneaks past. Poetry no longer functions as a verbal pest repellent and rat's bane proves more effective than rhyme. Nevertheless, these new methods were nurtured by the georgic revival and its popularising of the illusion that the environment might be brought under human dominion through language and the textual enclosure of nature.

What conclusions can we draw from this study of the war on vermin in early modern georgic? First, whereas recent criticism on pests, inspired by Michel Serres' theorisation of the parasite as 'always already there' (1982, 12), has stressed their resilience, a wider historical framework and a more capacious definition aligned with Tudor legislation reveals that human persecution was alarmingly effective. While lice, mice, and crows are still with us, polecats, stoats, weasels, otters, kingfishers, kites, and bustards were virtually wiped out and their present populations in Britain represent a mere fraction of what they were in 1600. The dream of creating an impenetrable cordon sanitaire between humans and vermin in georgic texts would lead to the outright extirpation of some species as humans devised more lethal methods for suppressing them and the expansion of farmland shrunk their habitats. The language of warfare in the georgics of Spenser and Dryden reflects an increasingly intolerant view of agricultural pests as obstacles to human empire.

Secondly, while these biotic control methods had a softer ecological impact than synthetic pesticides, many of them required the farmer to capture the quarry whilst still alive and to participate first hand in acts of animal slaughter or even torture. The influential historian Keith Thomas (1983) proposed that between 1500 and 1800 English attitudes towards animals gradually grew more humane, but this survey of pest control qualifies that verdict: not all God's creatures were viewed with the same compassion, and perhaps society only devised more sophisticated means to dispose of those classed as vermin. Most people in the twenty-first century would recoil at the thought of mutilating animals but few think twice about lacing their lawns or gardens with harmful pesticides. Although Renaissance georgic often advocates thrift and sustainability, it also licensed a greater physical brutality and viciousness toward non-humans that was eventually outsourced to chemicals. The wish to avoid inflicting pain directly on animals encouraged the use of pesticides that spread toxins more indiscriminately throughout the ecosystem. Sadly, greener is not always gentler, and vice versa.

Next, several methods employed by Elizabethan gamekeepers attribute not only appetite to the quarry but also the intelligence or reasoning necessary to 'interpret signs of deterrence' (Shea and Yachnin 2011, 114)—as well as emotional or mental states such as fear, distress, and compassion: qualities that trouble humanity's supposed entitlement to destroy them. This third finding is thus consistent with Karen Raber's observation that 'humans and vermin engage in a competition to out-trick, outthink, outsmart one another, but in their constant struggle, each becomes more like than unlike the other' (Raber 2011, 28). Consider Virgil's recognition of the ant's frugality, which renders the grain-storing ant virtually indistinguishable from the farmer who must garner a surplus for winter. Virgil's use of the verb *inludant*, meanwhile, implies that vermin 'play with' or trick the farmer, and therefore possess a modicum of intelligence, cunning — a defining characteristic of early

modern vermin (Fissell 2002, 89-95) — and even perhaps a delight in mischief. To modern readers, this anthropomorphism seems paradoxically inhumane in that it acknowledges yet disregards the suffering of a fellow sentient and semi-rational creature; in contrast, readers of texts like *The Vermin Killer* might conclude that the intelligence and cunning of the quarry made them fair game, as it were, and their elimination all the more urgent.

Lastly, while one might assume that pre-modern georgic captures a harmonious relationship with the earth, an organic golden age in comparison to the modern chemical age, this chapter has shown why this primitivism can be misleading. Virgil's pathologising of certain species as pests introduces a toxin into the georgic tradition at its source that was magnified by his translators in the early modern period under the pressure of the Little Ice Age and Parliament's vermin acts. Of course, sweeping declarations about a literary mode as storied and varied as the georgic are always dangerous, and it would be ill advised to reduce Virgil's poem to a few cherry-picked passages. A close reading of georgic metaphors can problematise the dominion they appear to grant, while focusing on other sections (such as apiculture) or tropes besides war and magic might result in a more lenient verdict. But returning to georgic's roots offers a reminder that the origins of environmental crisis reside much deeper in the past: the Anthropocene is in part the bitter harvest of agrilogistics, which fostered a systemic anthropocentrism that was gradually scaled up by population growth and industrialisation. Looking backwards at the past at texts that represent pest control science in terms of warfare and witchcraft can have the same effect as Carson's 'Fable for Tomorrow': to defamiliarise our current practices and enable us to reconsider the ethics of how we treat the planet. For modern georgic to become more biocentric, it must abandon the dream of a pyrrhic victory over nature and instead help us negotiate an ecological *détente* with other creatures. As a first step in this direction, we might stop calling them pests.

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¹ For more positive reappraisals of the georgic, see Garrard (2011, 119-29), McDonald (2015), Mannon (2016), Gifford (2020, 149-66), and Marland (2020).

² On the reputation of *The Georgics* prior to Dryden, see McRae (2002), and Wilson-Okamura (2014, 77-100). For constructions of the category of vermin in early modern England, see Fissell (2002, 77-114); Raber (2011, 13-32); de Saillan-Olsen (2019); and Laroche and Munroe (2023).