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## Sensing the Invisible

### *Plant Form and Landscape Transformation*

How do plants come to be political? How do they come to appeal to human imaginations, to inspire changed cultivation practices, landscape transformations, and diverse forms of social life and politics? To answer these questions, we need to pay attention not only to the legal, social, and discursive effects of plants, but also to how they respond to encounters with other beings, from humans to fires and diseases. The best way to notice the power of plants in our daily lives is to attend to plant morphology and the shape of landscape itself. By attending to plant form we can learn to notice landscape politics in a different and unexpected way. Let us consider how a particular plant, the sweet chestnut, *Castanea sativa*, responds to human cultivation practices of grafting, pruning, and terrace building. In the Apennine landscapes of Central Italy, chestnut was formerly a subsistence food crop for millions of people. Because of its economic importance, early modern Italian states taxed, regulated, and recorded the smallholder chestnut groves that were the basis of peasant agriculture in the middle hills.<sup>1</sup> This bureaucratic history provides a way of following plant care and landscape transformation over the past few hundred years. By moving between present-day cultivation practices and historic literary accounts and legal codes, we can learn how peasant farmers have attended to plant and landscape forms over the *longue durée*. By noticing and caring for the morphologies of plants that they cared about, peasant cultivators in Italy became attuned to the sensory responses of these plants to their environments. Plant responses inspired

peasants to reshape and replumb the landscape, engaging in a mundane and largely invisible biogeomorphological politics.

Plant morphology records the responses of plants to their environment. Because plants do not walk around, their movement is recorded in their growth patterns, as they respond with exquisitely attuned senses to their surroundings. Plant morphology is a kind of biography of where plants have been and where they are going and of what kinds of other beings they have encountered along the way. Plants are strange beings that may appear to many of us to grow so slowly that they seem to barely change at all. If you pay attention, however, you will notice how plants unfurl new leaves in a few hours, and trees and shrubs change shape dramatically over years. There is a long tradition in Western philosophy and social theory of thinking of plants as passive.<sup>2</sup> This is not something that farmers have ever believed in. Farmers and gardeners, from Italy to California, know that plants are sensitive, responsive, and ultimately puzzling and mysterious. By watching plants closely, humans have learned to notice how they grow toward nutrients, light, and water and how they recoil from dry and poor soils. The morphologies of trees record their biographies of encounters with fire, cutting, pruning, and diseases, experienced years or decades in the past. In Italy, peasant cultivators have become attuned to the lives of plants through their interests in the taste of seeds and fruits, the colors and textures of bark, the architecture of fruit trees.

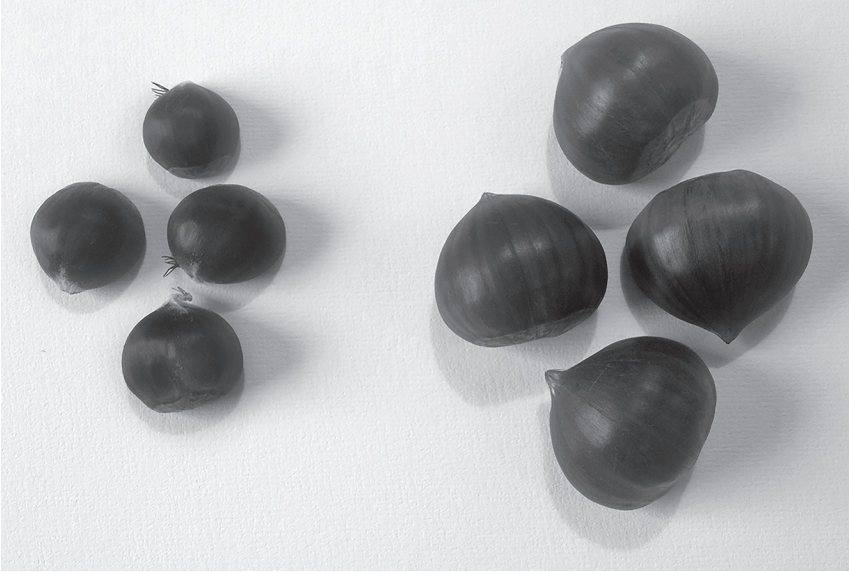
Peasant and farmer knowledge and response to plant form are an informal biogeomorphological politics that is part of the background of daily life for most literati, both in the past and in the present. Across the Mediterranean, caring for plant forms has given rise to collective projects of building terracing and drainage systems that transform landscapes. Archaeologists have found evidence of terracing in Liguria, in Central Italy, from around 1000 BCE, but literary accounts and legal documents record only indirect evidence of terracing from the classical period until the Middle Ages. It is only in the sixteenth century that we see a flowering of agronomical treatises in which terracing systems and various kinds of complex polycultures of trees, vines, and grains are explicitly mentioned. The plant/soil/water politics of peasant landscape shaping took place with relatively little attention

from elites. Recognizing the power of peasant practices of attending to the responsiveness of plants and soils is a decolonizing practice that draws our attention to work that has been largely ignored.<sup>3</sup>

Over the past two millennia, across the Mediterranean, peasant farmers built drainage and terracing systems to sustain the health of the plants they cared about and depended upon. Chestnut and other tree crops directed the attention of cultivators to largely invisible processes of soil formation and to the dangers of flooding and erosion that would denude roots and prevent plants from flourishing. This history of tree/soil/water care has reshaped the imaginative and material landscapes of Italy and of other Mediterranean hill landscapes, with continuing consequences for official and popular responses to climate change. Through their ability to sense soil fertility and water movement, plants have drawn human attention to largely invisible processes. This capacity of long-lived trees to act as proxies for invisible processes is suggestive of how we might be able to confront global environmental change, including climate change. Plants can act as sentinels for the invisible flows of carbon from the atmosphere, even as people continue to understand trees as beings who stabilize hillsides. Historic interactions between people, plants, and soils have large-scale consequences for the form of landscapes and for how people in Italy make sense of contemporary environmental politics, including climate change. Let us turn therefore to the history and present relations of one particularly charismatic tree crop, the sweet chestnut. Although now in decline, this tree tells us why people in Italy continue to see tending forests as a way of stabilizing hillsides and regulating rivers.

### Cultivating a Charismatic Tree

This story begins with the slightly sweet and floury taste of roast chestnuts. For most Europeans and Americans, chestnut is a food that is eaten only a few times a year, perhaps as stuffing for roast turkey, perhaps as roast chestnuts purchased from a street stall, or perhaps (to my taste much too sweet) as *marrons glacés* in a holiday gift. In figure 2 you can see the difference between larger and sweeter cultivated chestnuts and the smaller but perfectly edible wild fruits. Peasant farmers have always paid attention to particularly



**Figure 2.** Wild (left) and cultivated (right) chestnut varieties, Lucca, 2013.  
(Author photograph)

desirable chestnut trees that they encountered in forests or on their neighbors' land. Cuttings from trees that produced particularly large or tasty fruits could be grafted onto a wild rootstock. Chestnut trees are, therefore, both domestic and wild, united by an uneasy graft union.

It may come as somewhat of a surprise that chestnuts were formerly a staple food crop that sustained millions of people across the Mediterranean. Chestnut cultivation has an ancient history, and chestnut is a major food crop in China, Korea, and Japan.<sup>4</sup> In Italy alone, over eight hundred thousand hectares of cultivated chestnut groves supported hundreds of thousands of smallholder farmers in 1800, and abundant medieval and early modern documents record legislation, charters, and legal protections encouraging chestnut cultivation. In Europe, chestnut was likely restricted to glacial refugia in the high Apennines of Italy, eastern Turkey, and the Balkans, and only began to become more widespread as a result of human cultivation in the first century CE. Chestnut is not particularly effective at spreading across



Figure 3. Chestnut grove near Fosciandora, Lucca, 2013. (Author photograph)

the landscape on its own accord, and human assistance was required to move chestnut beyond these narrow refugia. Too many animals like to eat chestnuts, and the fruits are too heavy to fall far from their parent tree. During the late antique and early medieval periods, humans planted chestnuts in hill and mountain areas across the Mediterranean, wherever the right combinations of moist well-drained soils with sufficient summer rain were available. By the year 1000, cultivated chestnut trees had become a prominent feature of the landscape, including particularly in the foothills of the Alps and in the Apennine mountains that stretch from Central to Southern Italy. Chestnuts were desirable for peasant farmers because of their versatility and the moderate labor required for cultivation. Chestnut could provide food or construction timber from groves (*selve*), poles (*vernacchiaia*), or firewood from a coppice (*ceduo*).

Look closely at the image of the chestnut grove in figure 3, and let me try to persuade you that this is a strange sight. This is a well-maintained *selva* in

the high Apennines, about twenty-five kilometers north of Lucca, at nearly eight hundred meters above sea level. The trees are well spaced out to favor fruit production, and are perhaps two hundred years old (they are sixty to eighty centimeters in diameter). In looking at this picture, you should imagine the continuous hard work of generations of peasant farmers. These trees' responses to human care have left a record in their morphology. None of these trees have shoots (suckers, *polloni*) at the base, which means that someone has cut them back quite recently. Without this continuous work of cutting, the shoots that emerge from the wild rootstock (*portainnesto*) will draw nutrients away from the grafted main stem, which will gradually lose vigor and die. The crown of the tree just to the right of center has been cut out. This required someone to climb a ladder and carry out a dangerous and laborious job of tree pruning. This kind of work needs to be done perhaps every twenty or thirty years. The low stone walls, known as *lunette*, retain soil around the roots of some of the trees. Terracing structures are a testimony to centuries of collective geomorphological work by peasant farmers, although present-day farmers no longer do this work. Finally, the orchard is clear and relatively grassy. This requires the work of sheep or goats to graze the grasses, but also of a farmer to rake up leaves and burrs. In the past the leaves might have been used for stable bedding, which could be combined with animal waste and made into fertilizer (*letame*) for spreading across fields. At present, in this area, leaves are usually burned, leaving patches of black mineralized soil. What cannot be easily seen in this picture are the graft scars, the material echo of a long-ago moment when a peasant farmer grafted a desired domestic scion (*marza*) onto a wild rootstock. So too, what remains invisible is the existence of different names for the numerous cultivated varieties and for the different parts of these trees.<sup>5</sup> Such names are more easily made visible by a diagram or drawing than by a photograph.

From the mid-nineteenth century, and increasingly rapidly since the 1950s, a combination of pathogen epidemics and the abandonment of agriculture by peasant farmers have caused a dramatic decline in chestnut cultivation. Water-powered industrialization, taking off in the nineteenth century, began to pull peasant farmers into paper and textile mills in steep mountain valleys. After World War II, many hill farmers abandoned their

land for jobs in pharmaceutical, paper, and other factories. Ruined chestnut groves have produced a landscape that is haunted by memories and traces of human cultivation. Across Italy about 8 percent of forest is still officially classified as chestnut forest, but only about a tenth of this, some sixty-eight thousand hectares, is still cultivated.<sup>6</sup> Most chestnut groves are in ruins; former groves have changed form to become firewood forests. In many places chestnut has been replaced by other species.

In Italy, as in many parts of the world, millennia of agricultural, pastoral, and forest management practices by peasants and Indigenous people have produced an infrastructure of cultivated and abandoned forests, of terracing and drainage systems. This infrastructure is material, linguistic, and imaginative. Collective understandings of tree and landscape form and of what forest protection is supposed to achieve inform popular expectations as to how the Italian state should confront climate change. Before we come to look at contemporary politics, however, we need to look more closely at the contact zones between people, plants, and soils, where cultivators interpret the gestures of plants toward soil, water, and disease.<sup>7</sup>

### Learning to Recognize a Good *Marza*

One morning in February of 2014 I visited the Uccelliera, a farm near the city of Lucca, where Giuseppe del Chiaro continued to practice the arts of grafting and growing fruit chestnuts. In this area, on the lower slopes of the Monte Pisano, chestnut cultivation has almost entirely disappeared over the past century. Giuseppe cultivated a particularly prized variety known as *Marone di Pozzuolo* on former olive terraces. He was eighty-five years old when I met him and his daughter Alessandra, but he was a ball of energy. Whenever the weather was good he was out on the land with a pruning knife in hand, too busy to talk to visitors for long. Too much was going on, and shaping trees was a passion. Walking with him I learned to notice the potential shapes that trees and plants might take. Giuseppe reminded me that trees move by means of their capacity to change form. Through his attention to plant form and to the responsiveness of plants to pruning and grafting, Giuseppe came to be involved with chestnut trees, olives, and vines. This



was a process of attunement, of coming to be affected by plants, of wishing to change and live with plants. These affective, sensory experiences gave rise to an acute interest in plants and to the morphologies and linguistic terms that Giuseppe and farmers like him were interested in.<sup>8</sup>

From Giuseppe, I learned how grafting worked. In so doing, I came to be more involved with plants. I learned to sense the world differently, to notice graft scars, and to become more alert to differences in plant forms, to the colors and textures of bark and buds. In the following section, Massimo, a biologist; Giuseppe, a peasant; and his daughter Alessandra try to teach me how to recognize a stem that would be a good scion.

*Massimo:* Here it is, no! [He gestured that I was looking at the wrong branch.] This branch here if you have to take scions, in theory you take it home, maybe even this one here, but . . . [He gestured toward the tree again. I still couldn't tell which one he meant!]

*Massimo:* The cuttings are these three here.

*Andrew:* These three here?

*Massimo:* Sure. Sure, these ones, do you see how beautiful? This one and this one are also beautiful. This one, is already more. . . . Do you see?

*Giuseppe:* In any case, [with] cuttings, there is one thing. When the buds have gotten bigger, the bigger you [graft] them the better it is.<sup>9</sup>

Alessandra ended up tying a pink ribbon to the “good scion” that I had so much trouble seeing. It is certainly hard for the camera to see, but it is hanging like a loop from the upper right branches in figure 4. Deciding which scion to take is tricky. Not just any branch will do. It has to be the right size, somewhat smaller than the rootstock, so that the cambium layers align with each other. More importantly, you have to look closely at the branches and pick out the right one. It has to be the right shape, nice and oblong with full buds, growing vertically and not horizontally. My eye did much better after this conversation, although I would have had to watch a real master like Giuseppe take many cuttings before I could trust myself.



**Figure 4.** Making cuts / distinguishing the good scion/*marza*, Pozzuolo, Lucca, 2014. The loop of ribbon in the upper right area marks the scion/*marza* that Giuseppe and Massimo thought was a good one. (Author photograph)

From learning to perceive differences in the shape of a branch, the direction it was growing in, and the color of a good bud, I also learned to describe some shoots as “good” and “bad” for the purposes of cutting scions. Massimo, Alessandra, and Giuseppe had succeeded in rewiring my senses. Following Karen Barad, we can see this noticing as a kind of agential cut that momentarily determined what the tree was, at that moment. My interest in grafting enacted branches as possible scions. Other branches could have been “good” for other purposes, such as weaving a basket or cutting a walking stick,

but they remained indeterminate, for now. Donna Haraway's thinking on partial and situated knowledges helps me understand how each way of knowing the chestnut tree does not fully define either what I can know or how the chestnut tree might respond to me. If you look closely at this picture, there is much more to know and to notice about branches and buds, but this excess does not matter, for now. There is an indeterminate field of shape, texture, and color for which specific terms are not necessary or available. The plant morphologies that we notice can be quite unstable as particular features of a plant change how we reassess its overall architecture.<sup>10</sup> When I learned to notice a graft scar, I came to see some trees as the meeting of two distinct individuals. I reassessed what I was seeing once again when I learned to notice the presence of plant disease.

The chestnut trees in Pozzuolo were involved in relationships that far exceeded the intentions of farmers or biologists. As we walked across the terraces, Giuseppe gestured angrily at his trees, telling me of the repeated failures of new grafts, as the orange blossom of chestnut canker *Cryphonectria parasitica* spread across the bark around the graft.<sup>11</sup> This fungus often kills trees. If you learn to recognize the tiny orange spores that grow across the bark, you might see a branch or an entire tree as doomed or dying. A particular detail can change your perception of the morphology of a whole tree, as you notice areas of dying or flourishing stems. Alternatively, however, I could learn to see signs of cankers that had calloused and healed over. Another being, *Cryphonectria hypovirus 1* (CHV-1), could infect the fungus and halt the disease. A dry callus on a formerly cankered trunk would reassure me that a tree was provisionally immune to the disease. From noticing a detail I might learn to see the morphology and destiny of the whole tree differently. This relationship between detail and overall morphology can cause sudden shifts in perception not only across a single tree, but across an entire landscape. Walking across the landscape, the lessons that I learned in Pozzuolo changed how I saw larger patches of forest. Some areas seemed likely to die; in other areas, calloused trees told of a more stable relationship between tree, fungus, and virus. Figure 5 shows a heavily infected tree that will likely die. Figure 6 shows a tree where the hypovirus has slowed down the disease and the tree has formed a callus; this tree will live.



Figure 5. Chestnut canker / *Cryphonectria parasitica* infected stem, Pozzuolo, Lucca, 2014. (Author photograph)



Figure 6. Chestnut tree infected by *Cryphonectria* that is itself infected with *Cryphonectria hypovirus 1*, Orecchiella, Lucca, 2015. (Author photograph)

### Grafting as an Encounter with Strangeness

Giuseppe went on to tell me of the skill required for different grafting techniques, but also something of the pleasure: “It was an entertainment to do these things, it was an entertainment,” he said. Some kinds of grafts were harder, and there was always the doubt as to whether the graft would take. The key skill lay in aligning the cambium layer of the scion (the grafted variety) with the cambium layer of the rootstock. Giuseppe called the cambium the “skin” (*pelle*) of the tree. Lining up the cambium of scion and rootstock involves the grafter imagining and sensing the cambium layer, the zone of active cell division that lies beneath the bark of the tree like an invisible glove. Grafters try to align the cambium layers of scion and rootstock so that the two can fuse into one organism with different genomes. It takes skills of visual perception and of touch to cut the bark to just the right thickness, to line up the ring of cambium layers so that they take. Timing is important: the weather has to be cold enough that the sap has not yet started rising, yet warm enough that the bark can easily be stripped away from the cambium beneath. Giuseppe tried to show me the technique called *a zufolo* (whistle), because it was both fun and difficult. The bark had to be slipped off the rootstock; a cylinder of bark with cambium would then be removed from the scion and slipped over the rootstock.<sup>12</sup> That day in Pozzuolo, I learned yet another way of appreciating the liveliness and strangeness of trees. Plants enact mundane but very strange ontologies. Even as farmers work pragmatically with them, they respect the uncertainty of how plants may flourish, die, or change shape. New pathogens have only accentuated the indeterminacy of what might come from grafting.

Grafting depends upon a tactile sense of the minutest details of texture. In figure 7 we see skilled hands aligning a plum bud (*gemma*) beneath a triangular incision in the bark of the rootstock. This grower grafts trees both for fun and to produce fruit.

Grafting is a moment of encounter, a partial coordination between the human grafter and two different plant varieties. The grafted tree is unstable, always open to collapse if the wild rootstock sends out shoots that humans fail to cut, or if a pathogen arrives and kills the tree. The tiny details of plant/human grafting encounters can have very long-term consequences, as ex-



Figure 7. Grafting a plum bud, Cappannori, Lucca, 2014. (Author photograph)

pressed across the life spans of chestnut, olive, or other trees, which can live for decades or centuries. The life or death of a grafted tree is always somewhat in doubt. A graft may take or it may die. In the long term, trees may live or die, or appear to die and then sprout from roots. Grafting encounters also produce aesthetic judgments. Neighbors comment on each other's plant care and pruning practices and about the forms of trees and grapevines.

It would be easy to think of grafting as a form of violent control of plants by humans. Recent work on domestication suggests that it is more helpful to see grafting as arising from long-term processes of different species coming into relationship with each other, with morphological and evolutionary consequences for both. There is certainly violence. Reproduction is affected, and diseases can spread more easily, but there is also a kind of symbiosis, as plants elicit ecological relationships with people, animals, and soils. Out of grafting relationships have come the chestnut forests that cover almost 8 percent of the Italian forest landscape. Out of grafting came the terracing systems that supported many chestnut groves, olive trees, and other fruit trees.

From the point of view of classic evolutionary biology, we might think of grafting as a kind of deception, where humans persuade the rootstock of the plant to send its nutrients into the genetically unrelated scion. A less competition-centered view of ecological relationships emerges from the observation that trees can graft roots with their neighbors, both of the same and of different species, and that they can share nutrients with their neighbors through networks of mycorrhizal fungi. In any case, grafting relationships are not unambiguously competitive and, like theories of symbiosis, they cause problems for competition-centered evolutionary biology. The relationship between people and plants that emerges through grafting is one in which different species sense each other and come into a closer relationship, without fully understanding or controlling each other. These encounters are brought into being by the capacities of humans to sense differences in plants, and of plants to respond to what people do to them.<sup>13</sup> Out of a more or less successful graft can come a healthy chestnut tree that can flourish for centuries if it is pruned and cared for. The relationships between grafter and plant are partial relationships: they do not fully define either the human or the plant. For humans, the capacity of the chestnut to graft is helpful if they want to shape chestnut groves, but of no interest if they wish to produce firewood. Human grafters have multiple other identities that emerge from their other social relations, as peasant, landowner, parent. In an analogous way, a chestnut tree takes different forms in relations to its encounters with other organisms, soils, fire, or weather. New ontologies emerge from relationships between beings.

### Grafting Diagrams

Walking around their farms with chestnut growers gradually gave me a way of noticing the impact of human care upon tree morphology. This kind of diagrammatic noticing highlighted coordinations between beings.<sup>14</sup> In a chestnut grove in Borgo a Mozzano, the farmer Stefano Fazzi pointed out the bark texture below and above a graft and named the parts of the tree for me. Let yourself look closely at the picture (figure 8), then look at the diagram (figure 9). Now go back and forth a bit and notice how your percep-



Figure 8. Graft scar on ancient chestnut tree near Borgo a Mozzano, Lucca, 2014. (Author photograph)

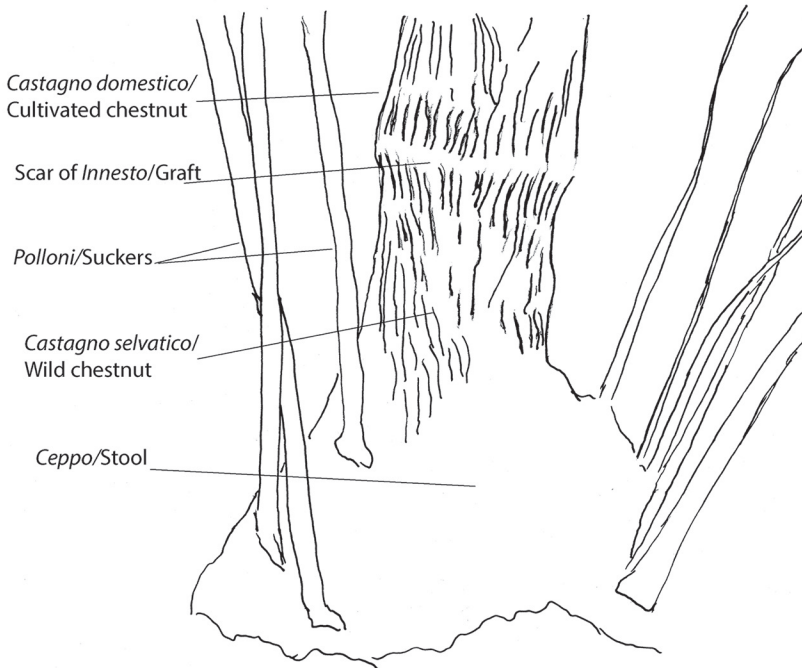


Figure 9. Drawing of a cultivated chestnut tree with named parts, 2015. (Drawing by author)



tions change. Some aspects of the tree are more noticeable, others less so. This is noticing that is both phenomenological and diagrammatic. You can notice much about the tree that is not relevant to this diagram. If you had been there on that day, as I was, you could have touched the mossy bark, you could have noticed the diamond-shaped braiding of bark patterns, the scars left from pruning branches.

### From Peasant Plant Care to State Landscape Stabilization

My encounters with chestnut farmers and the plant/soil/water terracing systems they managed helped me make sense of the efforts of early modern Italian states to manage forests and stabilize landscapes. Across central Italy, including in what are now the provinces of Firenze, Pisa, and Lucca, chestnut cultivation was protected and sponsored by early modern states that wished to sustain food supplies.<sup>15</sup> The city-state of Lucca, which remained independent from the Middle Ages until 1805, was particularly concerned with flood protection. Ruling a city on the floodplain of an active and mobile river, the Serchio, the oligarchy of Lucca was deeply concerned to use plants to stabilize slopes, terraces, and riverbanks. The city is only nineteen meters above sea level, surrounded by the mountain ranges of the Pizzorna, the Monte Pisano, and the southern edges of the Apuan Alps. Heavy rains on these mountains can cause the river to jump its banks or flood the network of drainage canals that spreads across the plain. This preoccupation with regulating the hydrology of coastal plains is quite typical across the Mediterranean, where short and torrential rivers have produced easily flooded landscapes that require intensive drainage if they are not to revert to swamps.

Writing at the end of the sixteenth century, the aristocratic Lucchese author Vincenzo Saminati summarized the perceptions of the ruling oligarchy about the importance of trees and other plants for preventing erosion and floods. “The slopes of the hills can be cultured so as not to allow the flowing rains to consume the soil. [These can be] remedied with grassy banks [*poggi herbosi*] across the slope, which will additionally give a reasonable yield of fruits and grass that can be gathered there. In that home can be raised trees and grapevines that the slope would make it difficult to cultivate.” At a time

when terraces were almost unknown to *litterati* (although no doubt well known to peasants), Saminati drew attention to the role of trees in stabilizing grassy banks (*poggi herbosi*, which might now be known as *zolle* or *cigliani*). He repeatedly called for attention to the role of trees as hedges and as a support for grapevines (*vite maritata*), but also to the role of banked terraces in sustaining olive trees, and of earthen banks (*poggi*) for encouraging chestnut trees in poor or dry soils. Saminati gives us a glimpse, however filtered, of peasant understandings of plant/soil/water relations. He describes plant/soil/water choreographies of trees, terraces, and drainage ditches as essential to sustaining cultivation and stabilizing the landscape. Saminati discussed how to recognize good and poor soils by color and texture and which soils were best suited to particular crops, and he saw soil quality as something that could be modified or transformed by careful cultivation, terracing, drainage, and fertilization: “The perfect agriculturalist knows how to give a healthy remedy to bring into cultivation any kind of soil even if it is wholly or partially defective.”<sup>16</sup>

This understanding of soil as being improvable through human care was widespread before the arrival of modern soil science, agronomy, and industrial fertilizers. Italy was a relatively poor country with little access to the imperial trade networks that supplied guano fertilizer to Britain and the United States in the nineteenth century. Italian agronomists continued to emphasize the use of plant and animal fertilizers as soil amendments until the arrival of chemical fertilizers after World War II. It was only in the 1950s that plant and animal fertilizers, and related practices of soil improvement, were displaced by modern soil science’s conception of soil as a relatively passive reservoir for inorganic nutrients.<sup>17</sup>

Elite concerns over landscape stabilization and food production had caused the Republic of Lucca to establish the *Offizio Sopra le Selve* (Office of Chestnut Groves) in 1487. In parallel with the *Offizio del Serchio* (Office of the [River] Serchio), this commission was responsible for protecting food production from chestnut trees and for stabilizing slopes and protecting the flow of the river. This alignment of peasant knowledge of grafting and landscape care with the interests of the Lucchese state in landscape stability and food production has produced a bureaucratic record of land use that I will explore in more depth in the following chapter.

## Final Thoughts

We can learn how plants inspire a practical geomorphological politics by being willing to expand our curiosity to notice how plant morphology emerges from encounters between people, plants, soils, and diseases. The long lives of some plants mean that biographies of encounter can have enduring consequences. The capacity of many kinds of grafted trees to flourish in particular soils has caused farmers to build terracing and drainage systems across the Mediterranean over the past two millennia. The capacity of plants to sense soil quality is part of what teaches humans to classify soils and to build and fertilize terraces. The historical record demonstrates how people can come to notice invisible processes through the sensory capacities of the beings they care about. Soil formation and changing tree shape are much too slow for our senses to perceive. Long-lived trees and old terracing systems are proxies: they direct us to consider processes that are too slow for us to notice easily. This capacity of humans to communicate with nonhumans (as with grafting) or to sense them indirectly (as with soil quality) appears to be a ubiquitous part of the anthropological and historical record. Classic studies of Indigenous or peasant ecological knowledge provide clues for how humans might respond to the invisibility of climate, a mathematical construct that we cannot experience directly. Humans care intensely about the cattle, rice, or chestnut trees that they depend upon to make a living.<sup>18</sup> By attending to these beings, we can experience invisible processes such as climate change.

By tacking back and forth between present-day grafting practices and former state policies of regulating and protecting chestnut trees, I have shown how the sensory texture of human/plant encounters can give rise to distinctions, words, bureaucratic classifications, taxation regimes, and projects of reshaping landscapes. Because of the historical accident of the importance of sweet chestnut to the Lucchese state, I focused upon chestnut cultivation, but very similar processes of grafting, soil care, and terrace building took place in response to olive, fruit trees, and grapevines. The horticultural terraced landscapes of Central Italy, and of the Mediterranean more broadly, emerged from the unstable unions between biological individuals that are produced by grafting. Terracing systems and grafted trees are linked with each other.

At the beginning of this chapter, I asked the question, “How do plants come to be political?” Part of an answer is that it is through relations with plants that people come to form ideas of care for plants, soils, and landscapes. The shape-shifting capacities of trees and other plants persuaded people to re-shape landscapes. As we shall see, questions of proper plant and landscape care have come to affect contemporary environmental politics in Italy.

In mundane practices of grafting and care through pruning, chestnut trees are long-lived alien beings that can only provisionally be described. Precisely because description is always provisional, new words are always potentially coming into being and going away. It is never clear whether a graft will take, whether a tree will live or die, whether a new plant variety is present or not, and our descriptions of shape-shifting plants are also provisional. A new disease might cause a plant to die, but the apparently fatal disease could be halted by a new pathogen. In Deborah Bird Rose’s terms, these trees “shimmer,” always at the edge of transformation, of life or death.<sup>19</sup> We can describe such beings even while we remain aware that our descriptions are fallible, limited, both focusing our attention and failing to completely persuade us.

Plants can inspire human cultivation and landscape transformation, and humans can notice plant sensing by paying attention to plant morphology. Plants can change their morphologies in response to people, fires, and disease. Morphology is a different kind of evidence from the interviews or archives that anthropologists are familiar with. Thinking morphologically requires us to use drawings and photographs as primary evidence rather than as illustration. It also requires us to trust our senses and to be alert to the analytic and conceptual relations that emerge with particular perceptions. Morphologies are potentially unstable in relationship to the details that they contain: noticing traces of disease on a tree trunk leads me to reconsider how I see the whole tree or a broader landscape. Morphologies have other properties: they are particularly good ways of looking for evidence of past events, from forest fires, to disease, to human care. Rapid disasters, such as forest fires, or the slow disasters of disease or toxicity, leave morphological traces upon human or plant bodies that can make us attend to other temporalities. Morphologies are empirical evidence of ontologies that emerge through relations between beings. A tree can be a source of firewood, of food, a host of

disease, or a survivor of fire. Morphology is a kind of evidence that anthropologists, with our commitment to ethnographic detail, are uniquely well suited to notice. We are, or should be, open to noticing “critters and processes, qualities and quantities,” what anthropologist Eduardo Viveiros de Castro calls the “ontological anarchism” of the world. This requires us to be willing to add to our traditional interest in what people say and do, by using our senses to notice the effects that nonhumans have upon each other. We can draw examples from this ontological anarchism, but examples are not enough if they remain unique conjunctures. We risk remaining like Jorge Luis Borges’s character Funes the Memorious, who is alert to the uniqueness of the world but is unable to make sense of it.<sup>20</sup> We need to be bold enough to move from our sensory experiences of plants, animals, soils, and people to larger scales in time and space.

My walks across chestnut groves with farmers drew me into thinking about the broader landscapes of the Monte Pisano and the Pizzorna, minor mountain ranges near Lucca. Attunement to the morphologies of individual trees drew my attention to larger-scale landscape structures. Patterns such as areas of burned and unburned landscape are landscape structures, “form coming into being.”<sup>21</sup> In my walks across the landscape, I engaged in a practice of speculative noticing, where I tried to imagine the histories that had left traces in plant morphologies and landscape structures. Cultivated chestnut forests have given way to fire-blasted and disease-haunted postindustrial forests. As we shall see, a historical ecology of landscapes allows me to bring slow processes of soil formation and tree growth in conversation with rapid processes of capitalism, forest fires, and plant disease. I invite you first to change pace and spend some time learning to notice the relationships between plant morphologies and the biogeomorphologies of terracing and drainage systems.<sup>22</sup>