Chapter 2
Eternal Flame: An Introduction to the Fire History of the Mediterranean

Stephen J. Pyne

. . . And thus he speaks
And in his hands bears forth from inmost shrine
The Fillets that betoken Vesta's power,
And her undying fire.
– Vergil, The Aeneid*, Book II*

Fire, as is well known, seeks a void toward which and in which it can move.
– Theophrastus, De Igne

Abstract The physical geography of the Mediterranean renders it an ideal landscape for burning. But for thousands of years its fire regimes have been set directly and indirectly by humans. Because of the region's significance in Antiquity, it has been studied for a long time and has become for good or ill a paradigm for thinking about fire. In this regard the Mediterranean has been both a place to export ideas and a place to receive them. Today's thinking about the Mediterranean and fire is thus as complex as its intricate landscapes. But the fundamental reality remains, as first voiced by Theophrastus: fire is tame or feral as humans contain or unleash it, which they do not only by the torch but by close tending of the landscape.

2.1 De Igne

The landscapes of the Mediterranean burn. They have burned as long as people have recorded history, and they have continued to burn through wars, famines, droughts, floods, eruptions, epidemics, the advent of farming and livestock, and that wrenching upheaval in social order, economics, and fire practices known as industrialization. Today some 90% of the burned area of Europe resides within the

S.J. Pyne (✉)
Arizona State University, Tempe, AZ, USA
e-mail: stephen.pyne@asu.edu

E. Chuvieco (ed.), *Earth Observation of Wildland Fires in Mediterranean Ecosystems*,
DOI 10.1007/978-3-642-01754-4_2,

Mediterranean. Among the landscapes of Earth, the Mediterranean is a kind of prytaneum, the hearth for an eternal flame (Frazer 1885).

The Mediterranean is a place, a climate, a biota, and a paradigm. Its physical geography makes it practically a dictionary definition of a fire-prone environment. Its climatic pattern of annual wetting and drying, overlain by episodic drought ensures that there is always something to burn. The mountains that act as geographic spokes and rims create a kaleidoscope of niches that simultaneously provide points of ignition and baffles against spread. Its fabled winds – the mistral, the bora, the sirocco – can fan small flames into huge. An ancient, relentless drumbeat of disturbances has selected for a fire-tempered biota, for even where fire is not itself a dominant presence, it catalyzes and accompanies almost every other stress. What the region lacks is a routine source of kindling. Outside its high mountain fringe, the arc from the Pyrenees through the Alps to the Olympics, lightning is sporadic, even rare (McNeill 1992; Pyne 1997).

Its natural history, however, is not what has identified the Mediterranean universally with fire. That honor belongs to its human history. The Mediterranean is an utterly anthropogenic landscape. Its fire-sculpted biota is an artifact of human-wrought disturbances. For millennia people have determined the sizes, shapes, and arrangements of the biotic tiles that make up the landscape mosaic; they have set the tempo and rhythms for burning; they have established fire's regimes. For 10,000 years in its eastern lands and 4,000 years in its western, the natural history of the Mediterranean has been barely distinguishable from its social history. Together nature and culture have ensured that the Mediterranean endures as a *flamma aeterna*.

2.2 *Ager et Silva*: Fire in the Garden

The flora is rich, its history dense. Here, where Africa, Europe, and Asia meet, where violent fluctuations in climate have pumped in and flushed out species like a bellows, where many cultigens have originated and others have gathered, where civilizations have long flourished and decayed, where land use has alternated between warfare and gardening, the biota has proliferated, toughened, degraded, and endured.

Its diversity results as much because of that history as despite it. The typical Mediterranean biota is hardened against stresses of all kinds; drought, poor soils, browsing, and cutting, no less than fire. The flora is as durable as marble, as friable as limestone. It is protean, malleable, hard-used. Here, not surprisingly, the term "pyrophyte" originated. Its inventor observed that the Mediterranean biota was heavily pyrophytic, and in many regions, like his native Provence, almost wholly so. The maquis, in particular, distilled the pyric essence of the biota: it was the Mediterranean biota in miniature, capable of being compressed or released as pressures mounted or faded (Trabaud 1987a).

Whatever the "natural" biota might be, the singular fact of its Holocene history is that it has been selected, arranged, and burned according to human wishes. A domesticated biota has long replaced a wild one; in fact, "wild" might be better

characterized in such circumstances as "feral," which is to say, the domesticated shorn of its cultivators and leashes. In its raw state the biota can morph into many forms; and this is as true for the landscape as for its more robust species. Pushed one way, it tends toward shrubs; another way, to woods; yet another, to grasses and forbs. But whether farmed, grazed, logged, or cleared, it has been burned. The outcome is an environmental palimpsest, a biotic cognate to those ancient parchments rudely (and incompletely) erased and written over again. For the landscape fire often serves as both scraper and stylus, and it literally brands a chronicle of human occupancy onto the region.

By the time of the classic agronomists, the Mediterranean landscape had three basic parts, each one of which targeted for domestication a distinctive component of the biota (grass, shrub, or tree). The *ager* was the cultivated field. The *saltus* was the rough pasture. The *silva* was the woods, or in a still more domesticated variant, the orchard. The cultivation of the first yielded agriculture, and of the latter, silviculture (or arboriculture). The cultivation of the olive tree often serves as a working definition of the Mediterranean culture region. The cultivation of fruiting shrubs inspired viticulture. But it was the pasture that could never be yoked completely to the plow or the pruning hook. The Mediterranean fauna had an unfetterable mobility that its flora lacked (Kuhnholtz-Lordat 1958).

This arrangement displayed both geographic and seasonal preferences. The fields occupied the valleys, and where population pressures were intense, they sprawled up terraced hillsides. The flocks and herds migrated from summer to winter between valley and mountain pastures. They could supplement that natural fodder where the *ager* lay in a state of fallow, for there they could gather to feed and fertilize. At almost every site and every practice, somewhere, at some time, fire entered. But it was amid the mountain *saltus* that fire burned most widely, with the untrammeled mobility of the flocks, and in those remote regions as yet unyoked from even human herders.

Here free-burning wildfire might rage, as it did in Homeric similes: "Through deep glens rageth fierce fire on some parched mountain side and the deep forest beneath, and the wind, driving it, whirleth everywhere the flame." The Pyrenees received their name from their frequent fires; one, reportedly in 200 BC, fixed itself vividly in the imagination of the time. But already by Periclean times, Thucydides knew such heroic wildfires only as literary tropes, an allusion from "times past in the mountains." When Vergil likened the rush of Aeneas and Turnus to "fires lighted all about to burn/ A parching wood and rustling brakes of bay," he spoke in epic simile. When Lucretius imagined a "fierce conflagration, roaring balefully" that has "devoured a forest down to the roots," he was speaking hypothetically; the putative melting of rock, not the dynamics of the fire, commanded his interest. But such landscapes became rare, as humanity and its servant species absorbed or remade them and brought them under the domesticating hand of agriculture (Semple 1931; Thirgood 1981; Liacos 1973; Lucretius 1951).

This organization of the landscape to satisfy agriculture determined the larger dynamics of fire. People imposed an order, much as they built roads and turned hillsides into amphitheaters. Their resort to fire was not simply opportunistic or

slovenly: fire was an implement of domestication as fully as crock or scythe. It was herded, plowed, hoed, and harvested according to a calendar of cultivation. Even more, it was a universal catalyst that made other technologies work.

The patches of field and fallow traced the units of fire behavior; the cadences of sowing and fallowing dictated the rhythms of burning. Viewed another way, the whole enterprise was an expression of applied fire ecology. People were not simply tending the landscape as a means of controlling wild fire (outside the conifered mountains, there was little natural fire). Rather, they brought fire to an environment that could absorb it within a general suite of disturbances; they applied it for the fumigating and fertilizing effects it produced. They burned the land for the same reasons celebrated in their fire ceremonies, because fire promoted the good and purged the bad (Frazer 1923).

But to have fire, you need fuel, and in an agricultural system, this means cultivating combustibles as fully as other products. That was the purpose of fallowing. It ensured fuel would be present so that fire could adequately rekindle the site, and it defined the bounds of such burning. Even in classical times, agronomists raged against the practice, which they saw as wasteful, superstitious, and dangerous. But they misread its purpose, its role as a fire practice. The point was not to burn the fallow as you might garbage, but to grow fallow so that it might be burned. Almost alone did Vergil in his *Georgics* sing the praises of the burning field.

What joined all the parts into a coherent whole, or in pyric terms, what made the Mediterranean a fire domain, was the presence of the human hand and head. The anthropogenic landscapes of the Mediterranean favored pyrophytes as ancient sculptors favored marble. The actual composition and shapes of the Mediterranean mosaic were no more a product of lightning and wind than the temple at Delphi was the outcome of natural erosion. Everywhere human artifice dominated, and because human technology relied on fire, the biomes that resulted favored species that could endure fire or that flourished best under a regimen of regular fire.

When people were removed, a revanchist biota could blossom into a great stew of species that might require centuries to sort itself out. That happened on scales immense and minute as population swelled and collapsed, as famine, war, plague, and economic distress put land into and out of active cultivation. Once terraced hillsides might overgrow with shrubs; fields might blossom with weeds; orchards could crumble into tangles of branches and brush. What was farmed might be browsed, the *saltus* might be converted into *ager*, the *silva* might become *saltus*. To the climatic cadences of annual aridity and decadal drought were thus added the stochastic rhythms of business cycles and geopolitical movements. Bad behavior expressed itself as landscape: tyranny over one manifest as an oppressive tyranny over the other. The Fall of Rome acquired an environmental gloss that tracked equally the disintegration of an ecological order. Mediterranean fire began its career as a parable of human stewardship.

The cycle of fire came into alignment with the cycle of empires. In George Perkins Marsh's classic rendition, "The decay of these once flourishing countries is partly due, no doubt, to that class of geological causes, whose action we can neither resist nor guide, and partly also to the direct violence of hostile human force;

but it is, in far greater proportion, either the result of man's ignorant disregard of the laws of nature, or an incidental consequence of war, and of civil and ecclesiastical tyranny and misrule." The rot that became the later Roman Empire had an environmental expression, not simply as a simile but because the human hand made it happen. Thus, in Marsh's formulation, Rome overtaxed agriculture, which overstressed production; so conscripted labor for public works and military duty that the countryside went untended; ruined commerce, redirecting efforts away from use to extravagance. "Hence, large tracts of land were left uncultivated, or altogether deserted, and exposed to all the destructive forces which act with such energy on the surface of the earth when it is deprived of those protections by which nature originally guarded it, and for which, in well-ordered husbandry, human ingenuity has contrived more or less efficient substitutes." Oppressed societies created oppressed landscapes. Ruinous fires resulted from ruined places (Marsh 1865).

Over millennia, the Mediterranean became a vast Garden, or a patchwork quilt of gardened sites stitched together by related cultivations. Directly or indirectly, almost nothing remained outside this matrix. What was not *ager* was *saltus* or *silva*. What was not farmed was grazed, tapped for resin, harvested for wood, foraged for mast, fed into flocks. Sometimes the parts were separated by either geography or season, stitched to a common fabric by long threads of migrating livestock. Sometime they overlaid, so that farmers intercultivated cereals with olive groves, or grazed herds on stubble. No place was truly wild. And no place was wholly spared fire.

Fire appeared with every patch, with every interstitial wildland in chrysalis from one state to another. For the agriculturalists the torch was an implement of gardening like ax, plow, and rake. It broke new ground, recycled nutrients in fallow, removed waste, and fueled forge and hearth. Fire and ax readied sites for shifting cultivation, and then prepared them for the rotations of sedentary farming. Fire assisted the harvest of olives and chestnuts by clearing the ground of debris. Farmers burned old and diseased branches, overgrown ditches and canals, and agricultural residue as part of an annual cycle of cleaning. Fire cleared away overgrown thickets, pruned vines, and disposed of briars, tares, and stubble (Steensberg 1993).

Fire was present because people were, and people could inhabit the land because they could burn it. The Mediterranean was a manifestation of a pyric symbiosis between humanity and nature.

2.3 *Saltus et Transhumancia*: Fire and Flock

Of course the system did not always work as proposed by theory; and there was one component that could never be made to work even in principle. This was pastoralism. Small-scale husbandry – the milch cow or goat, the draft ox, the beast-of-burden donkey – these were working pets, amenable to integration into the close-cultivated landscape. Herds of swine or cattle, flocks of sheep and goats, that trekked between lowland and mountain pastures according to the rituals of *trashumancia*, could not. Transhumance decoupled flock from field. Transhumance was an

ecological circle that agronomy could never square (Semple 1931; Rafiullah 1966; Ruiz and Ruiz 1987; Le Houerou 1981; Kish 1954; Evans 1940).

Pastoral burning claimed the largest fraction of landscape burning, and it dominated the imagination of critics. The incendiary shepherd, promiscuous with fire, antisocial in behavior, became a stock figure in Mediterranean literature, sometimes celebrated in the pastorals of lyric poetry but more often denounced by intellectuals, farmers, and outsiders. He was the model for the satyr, the anarchic Pan, or the cloven-hoofed Satan. Amid a landscape dedicated to a gardened rigor, with every plant (and every person) in its appropriate place, he moved, and his flocks often trampled the fixity of the social order. So did his fires. Tradition and law sought to channel both flock and flame into regular routes and rhythms – the *calles publicae* of Rome, the *tratturi* of Italy, the *carraires* and drayes of France, the *cañadas* of Spain. Where close shepherding was possible, they succeeded, and where such tending was not, it failed.

Transhumance assumed several forms, and as typical for the Mediterranean, they varied not only by geographic features but social arrangements and especially politics. In its basic version transhumance bound villages to local mountains. Up the slopes the flocks went during the spring, and down they came in the fall. Where the central state was weak and the terrain rugged, transhumance never organized further. This was the case, for example, with autarkic Greece whose free-ranging goats seemed to critics to trample about the countryside like banditti. At the other extreme, Iberia combined a vast interior plateau (the *meseta*), the centuries-long history of the *Reconquista*, and eventually a powerful state to fashion a far-droving monopoly, the famous *Mesta*. The outcome was a seasonal pattern of almost migratory transhumance across the *Meseta*; these patterns had developed as an outgrowth of the seasonal fighting characteristic of the *Reconquista*. The flocks and herds accompanied the armies that advanced and retreated, laying down over the centuries great routes of annual movement, an ecological counterpart to Roman roads. As the advance pushed further, so the routes lengthened until they virtually crossed the plateau. By the 13th century the monarchy began organizing the sheep migration by granting a chartered monopoly, El *Honrado Concejo de la Mesta de Pastores*, which guaranteed revenue to the state. The *Mesta* evolved into a dominant institution and a major ecological presence that helped also to organize the lines and fields of Iberian fire. As befit its intermediate geographic status, Italy offered a mix of both models, including a Mesta-equivalent, the Dogana, installed when Alfonso V of Aragon ruled chunks of the peninsula (Kish 1954; Klein 1920).

The pastoralists burned, notably in the fall, ahead of the winter rains, and their fires often sprawled over landscapes as indifferently as the flocks. Most allusions to fire in classical literature refer to just such blazes. Silius Italicus thus described the "multitude of fire that the shepherd see from his seat on Mount Gargano (Apulia) when the grazing lands of Calabona are burned and blackened to improve the pasture." In the *Aeneid* Vergil turned such practices into epic simile:

> . . . when summer winds are risen
> In answer to his wish, at points apart
> The shepherd launches fires against the woods;

> And on a sudden, the mid spaces caught,
> Vulcan's grim line now spreads unbrokenly
> Across the stretching plain; he from high seat
> victorious views the triumphs of the flames (Pounds 1973; Vergil 1961).

The combination of burning and browsing shaped the indigenous biota into a spectacular shrub land. The generic maquis was a marvelously supple biome, dominated by pyrophytes; it was the indigenous flora boiled by pastoral burning into a biotic sap, and occasionally into a near-crystalline solid; it was the Mediterranean biota in miniature, capable of being compressed or released as pressures permitted. Some of those pressures resided in the peculiar terrain and weather of the region; some was coded into its hard-edged evolutionary ecology; and some – the fraction that was most responsive – was held in the fussy hands of humanity.

2.4 *Mediocritas* and Mediterreaneity

It was "well known," Theophrastus had asserted, that fire would "seek a void toward which and in which it can move." Untended, abandoned, overgrown sites were just such landscape voids; they would draw fire like air sucking into a vacuum. But under typical conditions there were few such vacuums. Instead intensive cultivation kept the scene clear. Debris was burned as trash, the land was fired in patches, the patches were kindled at different times. In principle, no one part of the tripartite division of the landscape would dominate the others. Society would remain orderly, its lands gardened and its fires tended. And in places it might be possible to abolish fire altogether by promoting biological or social surrogates (Theophrastus 1971).

But principle was never practice. The Mediterranean is not an environment best characterized by means, or the *mediocritas* beloved of ancient philosophers, but by nonlinearity and extremes, what has come to be called Mediterraneity. The temperate ideal was an even cadence: seasons varied by temperature, not by precipitation, and while precipitation might vary by type with seasons, it fell more or less constantly month by month, year by year. So was its agricultural landscape bound part by part, a cycle of herding, cropping, and manuring. In the Mediterranean, however, the defining processes came in bunches, the big and exceptional event had greater impact than many small ones, and the pieces never interlocked with the careful intricacy of temperate lands. The valences were looser, which is exactly what a landscape prone to sudden and extreme events needs if it is to recover (Kunholtz-Lordat 1938).

So, too, its human history has not been one of tempered evolution but of cadences of order and breakdown, not unlike the cosmological cycles conceived by the Stoics, each concluding with its world-reshaping Great Fire. Plagues, wars, droughts, famines, migrations, high winds – all kept the basin aboil. Sometimes pastoralism would dominate, sometimes farming, sometimes vines and olives. The extraordinary capacity of the landscape to support a mosaic of domesticated flora and fauna ensured that something was always available to fill the voids; but it was exactly

during those transitions from one state to another that Theophrastus' prophesy of fire filling the vacuums proved true.

2.5 Colonization north: from *Mare Nostrum* to *Europa*

Mediterranean agriculture spread north, first piecemeal through the Neolithic revolution that carried small-scale swidden and livestock into temperate Europe, and then, more formally, through the expansion of the Roman empire and its successor states through medieval Christendom.

Passage beyond the Mediterranean's mountain fringe, however, involved two transformations. First, it meant that cultigens forged in a Mediterranean climate of winter rains and summer drought had to adapt to a climate of summer rains, and of more or less constant precipitation (of some form) throughout the year. This demanded site preparation; specifically, it meant that the catalytic effects of fire required that landscapes not naturally prone to burning were put into a condition to burn. Slashing, browsing, and draining in patches accomplished this. Swidden cultivation fashioned microenvironments that permitted the exotic cultigens to thrive.

Second, the colonization north brought a change in how domesticated flora and fauna interacted. Transhumance persisted, particularly in mountainous regions like the Alps, Carpathians, and Nordic ranges (and in peculiar forms such as reindeer herding in the far north); but harsh winters forced livestock into barns, where they accumulated manure that was subsequently delivered to arable fields. In various ways pastoralism and farming forged a valence that defined a peculiar style of agronomy, one celebrated by academics and political ministers through the scientific revolution and its agricultural successor. It asserted that burning was a stigma of primitivism, and that manure and close cultivation might abolish the need for burning altogether.

This mattered particularly once central, or temperate, Europe became the defining core of *Europa*. The 8th-century Arab conquests sundered the northern Mediterranean rim from its southern; in fact, save for small enclaves like Venice, Europe ceased to have any direct contact with the Mediterranean. As Europe recovered, as it began various forms of reconquest and crusade over the next few centuries, it did so from a temperate interior; and beyond the northern fringe of Rome's *mare nostrum* and Iberia it never succeeded in reclaiming the old Roman imperium, as new waves of aggressive Moslems, notably the Turks, replaced the Arabs. The ancient link to an intrinsically fire-prone landscape broke. Instead, the European ideal became the cultivated landscape of central *Europa*. And as theorist after theorist insisted, this was a landscape for which fire did not intrinsically belong and from which it should be abolished (Pirenne 1939).

In truth, fire was all over central Europe: it was as much a part of agriculture as plows, and in many respects, more indispensable. But its use was ever-condemned by officials, academics, and an emergent profession, forestry. A spectacular illustration occurred in 1752 when Linnaeus, then at the height of his fame, was forced

to delete some passages favorable to burning from his royally sponsored travelogue to Skåne. Baron Hårleman, the minister of agriculture, demanded instead that Sweden's most renown naturalist insert a long text that celebrated manure. The central European Garden had no place for fire except in the hearth and forge (Weimarck 1968).

The obverse observation also came into vogue: the Mediterranean, rather than being an agricultural paradigm, was a backwater. Unable to reconcile its flocks with its fields, incapable of boosting output with manure or special breeding, unwilling to shut down fires, it lay outside the dominion of scientific agronomy and a capitalist economy, a relict from the past, as burdened with tradition and superstition as religious icons and no more capable of addressing contemporary needs than the aphorisms of Heracleitus the Dark. The Mediterranean's was a legacy landscape from Antiquity, as quaint as the physics of Aristotle. When, by the 18th century, temperate Europe became a global center for learning, industry, and imperial enthusiasms, its ideals prevailed, its norms got written into global institutions like forestry, and its values were disseminated around the world.

2.6 Colonization West: An Exchange of Fire

Before then, Mediterranean fire shipped westward with the Great Voyages. The Age of Discovery was overwhelmingly an Iberian project. The fire that Spain and Portugal exported across the world ocean was Mediterranean in its practices and its associations with introduced flora and fauna.

Fires were a means of contact, marking both points of departure and arrival. Columbus noted a beacon-like "great fire" on Tenerife as he sailed west from the Canaries, and that dark evening before landfall in the Bahamas, the seamen of the *Niña* noted a candle-like flame that beckoned them on. His ships of course carried fire in their holds; their fires met and engaged with the fires of indigenes. The discovered New Worlds became places that would involve an exchange of fire (Cohen 1969).

This was a vastly more complex process than the Neolithic settlement northward through Europe and its subsequent reorganization under the norms of Antiquity. In the discovered lands almost every place that could hold fire did, often within an agricultural matrix. What European *conquistadores* and *colonos* did was to upend the indigenous order, add livestock to that mix, and reconstitute the landscape under a regime of *mestizo* burning. The transplant was especially vigorous where the transfer was from one Mediterranean climate to another; these became hugely successful colonies, or to adapt Alfred Crosby's language, Neo-Mediterraneans (Crosby 1986).

Some unique practices and institutions, however, were transplanted, particularly those connected with herding for which the indigenous societies had no prior experience since, outside Peru, they lacked domesticated herds. Thus New Spain, after introduced plagues had depopulated immense landscapes of indigenes and put their fields to fallow, reclaimed those sites as pastures for sheep, horses, cattle, swine, goats, and donkeys, and even organized the Mexican altiplano along the lines of

the Spanish meseta, complete with a Mexican mesta. That tradition of long-distance droving pushed north, regrouping in south Texas before eventually extending over the Great Plains. Open-range herding dominated much of the piney woods of the American South. Semi-feral cattle claimed the Argentinean pampas, the llanos of Venezuela, and the cerrados of Brazil. Sheep and goats tramped over the Andes. Loosed goats remade islands from Santa Catalina to Juan Fernandez (Crosby 1986; Melville 1992).

Later, Basque shepherds brought their fire practices to the mountains of the American West, where their smokes flooded valleys and socked in summits (and where they became an object of fury to early conservationists like John Muir, for example, who raged not only against the "hooved locusts" but the landscape-trampling fires set by their nominal tenders as well). Foresters, in particular, viewed herders as their ancestral rivals, and saw burning to promote browse as a senseless transfer of bad habits from a landscape such practices had, to their minds, already trashed (the Mediterranean) to a place fresh with promise. Their ancient quarrel would extend into America as it did through the lands Europe colonized.

2.7 Colonization South: Imperial Forestry

Eventually, the expansion of Europe also turned south. This time the colonizing powers resided in temperate Europe; and they attempted to impose their own landscape ideal on the northern Mediterranean either outright through colonial institutions or covertly through the academic-sanctioned norms of forestry. The Mediterranean found itself in the backwash of Europe's second great age of discovery and the impulses that sent its imperium sprawling across the Earth's continents.

Perhaps the most interesting study is France's *grand traverse* from central Europe to central Africa. Expanding southward, France acquired Mediterranean lands within its national estate (through the one serious breach in the northern fringe of mountains). Its attempt to impose a normative landscape cultivated in the Paris basin when extended into Provence and Languedoc, not least because of endemic burning. Then France acquired Corsica in 1769, which became the scene of a ceaseless fire insurgency. Then Algeria, which became one long firefight. Then Morocco, another Mediterranean landscape, and a fire protectorate. And finally the Sahel and the equatorial tropics, subject to wet and dry seasons and hence to a predisposition to burn as robust as that of the Mediterranean. The colonial campaigns to eliminate fire that followed proved not only hopeless but damaging in their own right. The one great innovation that emerged was the stimulus Greater France gave to the first systematic attempt to tabulate fire throughout the Earth, Georges Kuhnholtz-Lordat's *Le Terre Incendiée* (1938) (Pyne 1997).

It matters that much of the supervision of this ordeal fell to foresters. They had become, by self-proclamation as much as any bona fide reason, the self-designated oracles and engineers of free-burning fire, which they hated and distrusted, seeing in fire a vital means by which farmers converted forest to field and pastoralists replaced

woods with forage. In both France and Germany forestry became an organ of the state, and as the state extended its reach to overseas colonies, foresters often became proconsuls of the environment. Some lands they seized and isolated as gazetted forests; others they sought to strip of burning, and hence to render them "modern" (they declared the explicit divide between a "rational" landscape and one based on inherited superstition was fire). Most especially they railed against transhumance, with its tendency to burn out long corridors across the landscape. They denounced rural burning, even the *petit feu* that had long characterized Mediterranean France. They demonized the goat (Grotenfelt 1899; Pyne 1997).

When Britain acquired Mediterranean colonies, as waystations to India (through the Suez Canal), it proceeded along similar lines. The islands became miniatures of Mediterranean fire history. As with the French colonies, British Cyprus soon sparked a ceaseless insurgency of folk burning in which every act taken to suppress fire only provoked an equal reaction to reinstate it. The land was intrinsically fire-prone; and so long as it was populated with a people who needed fire to make those scenes habitable for farming and especially grazing, it would burn, no matter how many firefighters foresters committed to the attack and how often foresters might condemn the burning as converting isles into cinders (Thirgood 1987).

But more powerful than direct rule was the indirect influence of modernity, particularly liberalism in both its political and economic avatars. Greece achieved independence from the Ottoman Empire, and then became subject to a renewal of ideas from the major European powers. Italy achieved union. Spain gradually sloughed off the most moribund of its monarchical state, and commenced *desamortización*, the Iberian cognate to Britain's enclosure movement, a shock treatment for the traditional subsistence landscapes, forcing them into a market economy. Apart from elitist theories and the fulcrum of commerce, there was forestry.

Even where foresters were not the direct hand of an imperial power, they were self-styled agents of modernity, engineers of wooded lands, and they came to advise the more progressive states about reorganizing their environment. They made the *silva* not merely one of three landscape modes but demanded that it be dominant. Where agronomists had once considered the *silva* as an appendage to farming, foresters now established the tree as the measure of environmental health and resurveyed the panorama of agriculture through the conceptual theodolites of silviculture. They saw the Mediterranean's fires, like its malarial swamps, as both a cause and a symptom of its immense malaise.

This frontier was first fought in Mediterranean France, particularly in Provence, where abundant shepherds littered the landscape with fire and the mistral could occasionally whip those benign flames into catastrophe. By the 1880s industrialization was already underway: steam was replacing muscle, commercial woods were competing with pasture, and foresters were actively squelching open fire on the land. France was the earliest and foremost of the Mediterranean forestry powers since it alone had a contiguity of land and institutions with the core of temperate Europe.

In 1887 Major Frederic Bailey led a cadre of forestry cadets from their classrooms at Nancy to the French showcase for fire control, the forest at Esterel. "Until we came to the Maures and Esterel, we had no idea that forest fires were such a

serious question in any part of France, or that such complete arrangements existed for their suppression." But a bout of drought, high winds, traditional burning, and a fast-changing countryside had sparked major outbreaks in 1870 and 1877, and the response was to enact legislation in 1870 (amended in 1883) that created a model for fire's control and hence for forestry's desired dominance over the countryside (Bailey 1887).

Fire protection resembled a gendarme, or an army of occupation, that sought to prevent bad behavior and enforce good. The new fire codes prohibited burning within 183 m of a forest boundary or outside the designated season, and then only with permits, with severe penalties for violations. To prevent accidental fires (or arson) foresters laid out a network of roads, trails, and 15–40 m wide firebreaks; and privately owned lands adjacent had to install similar measures. To detect fires foresters maintained a system of hilltop lookouts and ceaseless patrols during fire season. If a forest guard spotted a fire, he attacked it, and if unable to exert control, would sound an alarm for others, and then for neighboring villagers, and finally the army. If direct attack failed, then defenders resorted to counterfires, typically from roads or firebreaks.

There was one notable adaptation of traditional practice, "believed to be peculiar to the Maures and the Esterel," that involved *petits feux*, or small fires. Foresters divided areas into vertical strips, and then burned a strip from the top down, beginning with those adjacent to the cleared firebreaks. Each year, in December, January, or February, a new strip was burned (the whole cycle requiring six or seven years), and sometimes more frequently "to prevent the undergrowth of shrubs from becoming so dense and tall, that the entry of an accidental fire would be attended with disastrous consequences." Typical patches were one or two acres in size. The arrangement made the task of attacking potential conflagrations an "easy matter." Still, forestry dogmatism condemned the practice as "detestable from all points of view," and this was what was taught in the lecture halls of Nancy (Bailey 1887).

Despite its Cartesian logic, the system was rarely enacted outside special sites (the Esterel forest comprised 6,744 ha). Traditional fire practices coexisted uneasily with modern variants, and both survived because the general countryside was still sufficiently cultivated that opportunities for escapes and infernos were rare. Still, change was underway, and when the population could no longer contain the mixed Mediterranean biota, both the indigenous and the exotic plantations, fires could break free. They did so, spectacularly example, in 1918 and 1919 after war privations and a lessened on-site population allowed the maquis to run riot and the mistral blew *petit feu* into conflagrations (Pyne 1997).

Wild fires were thus an expression of social order – or, as critics saw it, of disorder. It was a perception that the unending recourse to incendiary warfare in the Mediterranean helped confirm. The felling and burning of Mediterranean woodlands, in particular, seemingly echoed the sacking and burning of its civilized citadels. Even Homer had likened an enraged Achilles to a conflagration. In a landscape of anthropogenic fire, the hand that holds the torch controls the shape of the countryside much as the chisel in the hand of a sculptor turns marble into statue.

2.8 Industrialization and the Great Delamination

In the 19th century the Mediterranean's characteristic disturbance regime commenced a slow but radical transformation. Industrialization and the controlled combustion of fossil fuels began deranging what millennia of Mediterranean agriculture had for so long and so meticulously ordered (Pyne 1997; Pereira et al. 2006).

The weapons of conquest were chemical fertilizers, electricity, the internal combustion engine, and mass commerce overseas, not for spice, bullion, and slaves, but for cotton, steel, oil, machinery, and televisions. Under such blows village life cracked; the countryside began to empty as urbanization replaced war, disease, and emigration as a demographic forcer; intensively managed garden plots became surplus and increasingly superfluous. Railroads replaced the hoof-worn routes of transhumance. Tourists substituted for agricultural laborers and shepherds moving with the seasons, while bird watchers and skiers supplanted the resin-tappers and charcoalers of the past. Forests rose, both deliberately and haphazardly, on abandoned vineyards and pastures.

At different places, at different rates, the old order began to crumble, dissolving like a fresco exposed to corrosive steam. The tiles of the old mosaic fell out. Many long-tended landscapes were left to the very old, the very young, the exurban, and the sightseer. If not truly empty, they were emptied of the fidgeting hands and busy hoofs that had so long shaped them. A resurgent biota fluffed landscape after landscape with combustibles. In this evolving scene the fuels were robust, the fires constant, and the ability to combat them insufficient. The old rural order of fire control by close cropping, browsing, and *petit feu* unraveled; a new one, based on air tankers and firetrucks (internal combustion engines all), foresters, and prescribed burning had not created a working surrogate. Feral fire replaced domesticated fire, blotching the littoral like a biotic rash. The greater the disintegration of rural landscapes, the more rabid the fires. The worst outbreaks have exhibited the environmental equivalent of a civil war.

The unraveling of Iberia has been especially notable. The collapse of the Salazar and Franco dictatorships, and the subsequent accession into the European Union, have unleashed economic forces that elsewhere came more incrementally. The traditional countryside found itself suddenly removed from an oppressive (or at least obsessive) order of regulation: the political liberation of society expressed itself environmentally as the countryside depopulated, workers poured into metropolitan centers, and the central state devolved power to the provinces. Equally, old emblems of forced change from the *ancien regime*, such as the attempt to replace communal lands with plantations of eucalypts, became sites of protest, and of political arson.

Untended, the countryside has overgrown with woody weeds, and where the climate supports lush growth, the outcome was a veritable riot of revanchist flora, followed by a plague of escalating burning that firefighting forces could neither prevent nor suppress. Regional terrorism pales in comparison to the damages. Portugal's Tras o Montes and Spain's Galicia have suffered particularly; probably no countries have endured catastrophic fires on a comparable scale. The old order was

unacceptable. A new one has not yet arisen to replace it. Simply investing more in fire suppression cannot hold the flames.

The observation of Theophrastus that fire would seek out the voids – the destitute sites, the emptied landscapes – has proved once again prophetic. Probably not since the plague of Justinian has the landscape known such a sudden vacuum. But this time the new landscape would not be built out of the materials of the old, as the stones of pagan temples had gone into erecting Christian cathedrals. Some new technologies would substitute. What stalled a complete disintegration, for example, was the European Union's general agricultural policy.

What endured was the requirement that the ecological order would be inextricably intertwined with the social order, that fire's regimes would reflect humanity's. Fire's ecology and fire management's precepts, both would derive from an underlying social substrate. That had been Europe's logic from ancient times; the Mediterranean, with its fire-enhancing climate and biota, displayed that understanding with rising flames.

2.9 *Vulcan et Vesta*: Mediterranean Europe, Fire, and Earth

What is fire to the Mediterranean, and the Mediterranean to fire?

It is a major biota, one extraordinarily rich in species, and one inextricably intertwined with fire dynamics. No explanation for the Earth's Mediterranean biomes can succeed without incorporating fire; and no theory of fire ecology can thrive without explaining those landscapes. The ancient observation of Theophrastus remains true: "(Only) fire is naturally able to generate itself and to destroy itself: the smaller fire generates the larger, and the larger destroys the smaller."

It is no less a place of exceptional human history. The Mediterranean was a hearth both for agriculture and for European civilization; and the world's five Mediterranean regions have been prime sites for extra-European colonization. They all feature important fire institutions. They remain today exemplary arenas for fire management within the continents of which they are a part. The Cape of Good Hope has made South Africa the premier focus for fire ecology and management in Subsahara Africa; California has exerted a similar role for the United States; Chile, for South America; its southwestern and southeastern sectors, for Australia; and of course the Mediterranean *sensu strictu* for Europe. The modern cycle of international fire symposia began with a 1977 conference on fire in Mediterranean-climate lands, succeeded by another in 1983, and others since. Perhaps only the vastly more expansive boreal has attracted more fire conferences.

But the Mediterranean's greatest contribution may lie within the realm of ideas; ideas of how fire functions in nature and how it works in society. In this regard the Mediterranean experience has served as both paradigm and paragon. The landscape history of the Mediterranean has long furnished the prevailing notions of Garden and Desert, of a natural Eden and a Fall into anthropogenic ruin, that have underwritten almost all narratives of Western environmentalism. This declensionist model has

also informed academic understanding of how fire affects the Mediterranean biota: the ideal, "natural" order is one of thick woods which, under the blows of axe, hoof, and torch, degrade into more diminutive shrubs and finally into patchy scrub, prickly phrygana, and inedible weeds. Instead of a malleable landscape capable of assuming many forms, but one so long used and fatigued that it has lost much of its elasticity, the prevailing model promotes a notion of singular directionality. It insists that the biota must move up or down when it might rather be seen as shifting horizontally. In this phrasing fire's presence drives the system down, while its suppression allows it to rise; there is no sense that it is a catalyst that, like iron in a forge, helps its human artificers fashion it into different forms. This declensionist conception, as paradigmatic as a Latin noun, has been one of the Mediterranean's dominant fire exports.

More usefully, the Mediterranean can profoundly challenge prevailing assumptions, embedded deeply in the genetic fiber of the industrial firepowers, that the core landscapes of analysis must stem from wilderness, that removing the human presence is the surest corrective to pyric imbalances, and that fire must, in its essence, be natural in order to serve ecological goals. The Mediterranean suggests otherwise. It says that the core landscape of any meaning is cultural and that the defining fires are anthropogenic. Such conceptions are foreign to North American and Australian fire philosophies, but they are not alien to northern Europe, and they merge seamlessly into the fire histories of South America, Africa, and Asia. More than anywhere else in Europe the Mediterranean illustrates the ancient European understanding of fire as primarily a cultural construction.

Vulcan and Vesta – the Roman god of the forge and the goddess of the hearth, fire as a tool and fire as a symbol, with both in the service of society; this is the European legacy for understanding fire. The hearth, the furnace, or their domesticated landscape analogue, the cultured field, is where fire should reside, not free-burning over untrammeled realms of geography. It is a vision of fire as instrumental and as a power that must be disciplined by social prescriptions. If fire could be replaced by better tools, it should be. A corollary is that fire thus becomes, as European thinkers have always insisted, an index of social order (Goudsbloom 1992).

It is not hard to see such notions at work today. The feral fires of recent decades in the Mediterranean are, in fact, a measure of social unrest; they are as fully an outcome of the global economy as of the global climate. They will be contained not by force of fire-suppression arms, except fleetingly, but by reconstituting a matrix of patchy land use. Like petrified wood in which silica replaces lignin molecule by molecule while preserving the gross structure, the emerging European landscape may find industrial surrogates. It may be, too, that controlled burning vanishes, or more properly gets sublimated into machines as part of a general reversion from a fossil-fuel economy. Even our globally-warmed climate, after all, now falls under the purview of humanity's combustion habits, such that there are plenty of European intellectuals who would be pleased to see a final abandonment of open burning in the drive for a carbon-neutral world.

Whether or not such views prevail, they are strongly valenced to the European Mediterranean. Whatever fire scene eventually evolves in the region, it is likely to

emphasize that control resides in the social creation of the landscape and that fire – anthropogenic fire – is something that expresses the character of its sustaining society. Fire, after all, is only what its context makes it. And as Theophrastus reminds us, it thrives most boldly in the empty places society leaves.

Acknowledgements This essay builds from my summary of Mediterranean fire history published in *Vestal Fire. An Environmental History, Told Through Fire, of Europe and Europe's Encounter with the World* (Seattle: University of Washington Press 1997): 81–146. Readers interested in background sources should consult the notes and bibliography that accompany that study.

http://www.springer.com/978-3-642-01753-7

Earth Observation of Wildland Fires in Mediterranean Ecosystems

Chuvieco, E. (Ed.)
2009, XI, 257 p., Hardcover
ISBN: 978-3-642-01753-7