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Combustion

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Combustion (photo: C. Sandilands)

The small, A-frame cabin that was my retreat this winter is primarily heated by a modest, cast iron woodstove. It is a finicky stove and requires a precise combination of fuel and airflow in order to light properly and keep an intense flame long enough to catch the larger logs. Begin with crumpled newspaper, small kindling, larger kindling—not too much—and arrange it all in a nice, neat tipi. (Yes, the damper is open.) Scratch the match against the box and set light to the corners of the paper. Close the door to a crack to force a concentrated vacuum-rush of air into the chamber. Blow as necessary. When the first large kindling is alight, add a few more pieces. Open the door, close the door, and open the door to see what is working best today to keep a steady, hot flame. At the precise moment, add a full log. Watch it catch. Then spend the evening negotiating: add a log, adjust air, arrange and rearrange embers, add a log, adjust air, arrange and rearrange embers. Until there are just embers.

[1] Thanks to Paul Huebener and Stephanie LeMenager for their comments on earlier drafts of this essay and to Vivian Demuth for her wildfire portraits.

Of course, it's a lot easier to switch on the baseboard heaters, which I do, often. But I love being sensually involved in combustion. I enjoy my agency in the life-sustaining process by which the chemical energy created by photosynthesis and stored in plants is converted, through oxidation, back into the light and thermal energy from whence it came. So I choose a piece of Douglas-fir from the woodpile outside, place it on the chopping block, aim the axe, and—*thwuck*—it splits down the middle, revealing the long, straight grain of the tree. I cut and cut the smaller and smaller pieces to create a deeply satisfying stack of kindling, my physical energy now stored with the wood's chemical energy as it makes its way toward the stove. I strike a wooden match to the paper in an act of sympathetic magic. I smell the oxidizing tree as I watch and listen to the specific fire-character of Douglas-fir play out: pitchy, crackling, hot. As Nigel Clark and Katherine Yusoff put it, "combustion . . . is a particular form of 'work' in which energy held in the atomic bonds of a fuel is released through . . . a reaction with oxygen or an oxygen-rich compound—resulting in the release of new chemical bonds" (204). I like to think that participating in the fire in this way is a slightly less alienated form of work than is flipping the switch and that, akin to making bread and guiding the energy of the yeast, the process can serve as a sensual reminder of our complete dependence on the vegetal and fungal world for, well, pretty much everything, including energy.

Pyric labour, Douglas-fir (photo: C. Sandilands)

I am not alone in thinking about combustion as a generative site for inquiry. Perhaps not surprisingly, prolific plant philosopher Michael Marder's new book is entitled *Pyropolitics: When the World is Ablaze*. He too finds it necessary to think about the moment at which vegetal energy is violently oxidized. His orientation, though, is not toward the dense particularities of fuel, technology, and work, but rather to the metaphorical, and sometimes literal, relationship between physical fire and political fire. As he writes, "from the books and

heretics incinerated on the pyres of the Inquisition to self-immolations at protest rallies, from the massive burning of oil on the global scale to inflammatory speech, from the imagery of revolutionary sparks ready to ignite the spirits of the oppressed to car bombings in the Middle East—fire proves to be the *sine qua non* of politics" (xiii). Indeed, in arguing that the world is burning, both literally and metaphorically, he wonders whether we are now at last coming to terms with our planetary finitude "made obvious in a piece of wood . . . about to be reduced to a pile of cinder and ashes" (xii).

More clearly materially, Clark and Yusoff advocate a *pyrocentric* practice of historical inquiry as a way of highlighting the changing conditions of human life in relation to the geological conditions of earthly existence. "The generalized study of combustion," they write,

> is a key to contextualizing human energetic practices within a broader "economy" of terrestrial and cosmic energy flows. . . . The fire that [burns in the woodstove] is much the same fire that rages through a forest, and has raged through foliage for hundreds of millions of years. Fire, in other words, is a force that binds intimate and mundane human activities to some of the most "monstrous" energetic movements of the Earth. (206)

Although they would agree with Marder that combustion certainly does political work, the revolutionary sparks they emphasize are those concrete intimate/monstrous energetic practices that drive people and animals into confined, capturable territories, or that fire weapons, or that scorch the earth as part of a desperate military retreat. Indeed, in this pyrocentric history, the *prevention* of fire becomes as important as fire itself: along with particular forms of vegetation and agricultural techniques, for example, European biocolonialism brought with it specific fire regimes that replaced longstanding practices of broadcast (intentional and controlled) fire *use* with widespread fire *suppression.* These colonial regimes have destroyed indigenous pyrotechnologies, degraded soils that were managed through the use of fire for generations, fundamentally altered ecologies dependent on periodic burning in favor of species that are not pyrophilic and, in the end, ironically created ideal conditions for massive wildfire: "especially in those regions where seasonal rhythms alternatively plump the landscape with [phyto]mass and then dry it out, prohibitions on broadcast burning have played out with a vengeful logic" (215).

In this pyrocentric history, the *prevention* of fire becomes as important as fire itself.

In the part of the world in which I lived this winter, in and around the Salish Sea, management-by-fire was (and remains) extremely important to Strait Salish peoples' agri/cultural practices. Before the arrival of white colonists, Lekwungen women cultivated and harvested camas (kwetlal, or *Camassia quamash* and *C. leichtlinii*), a prized, spring-flowering plant with bulbs that are rich in starch and nutrients. Kwetlal thrives in open, savannah-like meadows; in order to prevent the encroachment of shrubs and ferns (and eventually Douglas-firs, which are also valued by Salish peoples but in their proper places), the family/women owners of the meadows

would burn them at the end of the season. According to John Sutton Lutz, "ironically, it was the open camas prairies, maintained by the Lekwungen's regular burning, that attracted European settlement to their territory" (67); precisely because of their resemblance to the well-managed, Georgic leas of the English countryside, the kwetlal meadows beckoned to Governor James Douglas as ideal sites for British colonization and settlement (*Meeqan*, one of the best kwetlal meadows in the region, is now in the middle of Victoria, British Columbia). With the dispossession of Lekwungen territory came the extinguishment, at least temporarily, of both their land rights and their fires: management through burning gave way to wholesale fire suppression in order to safeguard introduced settler-colonial agricultural interests and species in the new colony. Although Songhees Land Manager Cheryl Bryce and others are working to conserve and revive complex camas-fire-human relations in the region (Penn), continued settler-colonial pyrophobia is a significant barrier to restoration.

Pyric labour, kwetlal (photo: C. Sandilands)

But burning was also productively harnessed to new regimes. As incendiary fire historian Stephen Pyne reminds us, it is not that we now live without fire: it is that combustion has been transformed, on a planetary level, from the surface burning of relatively recent phytomass to the burning of much more *ancient* biomass in tightly sealed and regulated compartments. Pyne calls this almost wholesale shift "the pyric transition" to industrial fire: the living, surface world could only supply so much fuel, and as industrial activities required more and more (and also higher and higher heat), people increasingly turned to charcoal, then to coal, and then to fossil fuels, at the same time developing ever more sophisticated ways of burning them. In Pyne's view, "all of the Anthropocene's potential environmental maladjustments—the onset of global warming, the explosion of human population, modern planetary pollution, the triggering of mass extinctions—align with a relatively simple index of industrial fire. . . . The Anthropocene is

the epoch of anthropogenic fire" (*Fire*, 158-9). It is an epoch in which the act of combustion is almost completely divorced from the deep time and place of its sources of fuel, in which the multiple forms of labour necessary to render biomass ready for particular ignition are largely erased, and in which the human and ecological costs of combustion are both inescapably globalized and deeply local, as with the elevated cancer rates among the Dene and Cree residents of Fort Chipewyan, downstream from the Alberta Tar Sands, and among residents of Appalachia experiencing the dust caused by mountaintop removal.

Fire hazards (photo: C. Sandilands)

For Marder, "since the start of World War I in 1914, the world in its entirety has been burning" (xiii). For Pyne, the problem is that it really *hasn't* been. It is not just that the internal combustion engine has replaced open fire, or that the hydro-generating plant that flooded indigenous land in Northern BC makes the baseboard heater much easier than the woodstove. Rather, industrial fire has generated an entirely different pyrotechnic landscape (which can include enrolling water in the service of fire). For example: "instead of fire liberating nutrients into soil, air, and stream, fossil-fuelled factories break down . . . biomass to produce nitrogen, phosphorous and other fertilizers, while trucks haul them away to distant sites and tractors [spread] them" (*Fire*, 161). Perhaps most importantly, the move to internal combustion—for agriculture, for human settlement, for transportation—has been accompanied by an intense need to *extinguish* open combustion. Where in the past, the best way of taming fire was to organize the landscape so that it would not burn—or to use set fire itself as a pre-emptive control for wildfire—the new landscapes of industrial fire are simultaneously much more flammable and much more fire-averse. Is it an irony that we are forced to "appeal to the machinery of internal combustion . . . to pump water or chemicals" (162) on those blazes that unavoidably erupt? Probably not.

Wildfire, Willmore Wilderness Park near Hinton, Alberta (photo: V. Demuth)

Of course these eruptions do occur, and in more and more devastating ways, precisely because we have had the hubris to imagine that we can control, rather than be a mindful part of, our technologies and relations of combustion. I wrote the first version of this essay months before May 1, 2016, the day that the massive Horse River wildfire (nicknamed "The Beast" by firefighters) broke out near Fort McMurray, Alberta: the fire was only officially declared "under control" over two months later, after over 590,000 hectares had burned and tens of thousands of people had been evacuated, with an estimated insurance cost alone of over $9 billion. The fire was, almost certainly, human-caused; it was also especially intense because of increasingly dry winters in the region, combined with record-setting May temperatures, low humidity, and high winds. In the weeks that the fire was daily, spectacular front-page news, few people could ignore the uncomfortable proximity of Tar Sands production, climate change, and wildfire, so much so that Prime Minister Trudeau felt compelled to publicly disavow the connection. Even as some commentators argued that it was "insensitive" to talk about climate change in the midst of the traumas of conflagration, evacuation, and destruction, others underlined what was, perhaps, the key source of our collective distress: this massive wildfire, in this particular place, was a singularly brutal reminder that the petrocapitalist pyric regime threatens both our current way of life and, ultimately, our survival (Holthaus, n.p.).

This massive wildfire, in this particular place, was a singularly brutal reminder.

Petrocapitalist fires (photo: DarrenRD via Wikimedia Commons)

To speak about a petrocapitalist pyric regime is to emphasize that the Horse River wildfire was not only about climate change, but also implicated in a larger array of combustive economic, spatial, and ecological relations of which climate change is only one element. As Stephen Pyne reminds us, "the burning bush and scorched town are joined . . . by a global economy, and behind both [climate change and economy], by a global commitment to fossil-fuel firepower" ("Welcome," n.p.). He points to the cars carrying fleeing evacuees as especially apt metonyms of internal-combusting society:

> Car-propelled flight, cars stranded for lack of gas, cars melted in garages, evacuation convoys halted due to 60-meter flames, relief convoys laden with gasoline. It isn't only what comes out of the tailpipe that matters but how those vehicles have organized human life in the boreal. The engagement (or not) with the surrounding bush. The kind of land use that cars encourage. The kind of industry that must develop to support those cars. The kind of city that such an industry needs to sustain it. (*Ibid*.)

In this context, Pyne's big worry is that wildfire and internally-combusted fire are no longer at odds—the one to be suppressed and the other to be encouraged at all costs—and instead increasingly engage in a collaborative relation that dramatically exceeds our ability to keep them apart: the Horse River wildfire was a striking example of one fire and another "together

mak[ing] more fire" (*Ibid.*), and of a sort that we had definitely never counted on. And so he greets us: welcome to the Pyrocene.

Old fire, new fire? (photo: C. Sandilands)

In this context, my little woodstove seems pretty small. Still, it was a decent place to start: I think it's important for us to be both politically and *corporeally* aware of our complex involvements in fire histories and futures. Lighting that finicky little stove was a form of sensuous participation in a set of relationships that is, in this petrocapitalist regime, much more likely to be spread out over thousands of miles and millions of years, and therefore much more likely to be invisible except in situations like the one that exploded in Fort McMurray (I do not mean to suggest that mine was unalienated labour, but perhaps it was slightly less based on the forgetting of labour altogether). If you will forgive the horrible bastardization of Marx: we make our own combustions, but not in the histories of our own choosing. Perhaps attentiveness to our specific pyric incorporations might not only help us think more clearly about our uses of fossil fuels (about which much has been written), but also allow us to begin to imagine what it might mean to change our relations to fire as part of a larger project of socio-energetic transformation (even as the nature of fire itself is also changing). And perhaps an active recognition that knowledges and practices of other fire regimes are alive and well in a variety of bodies and communities might also allow us to better connect this project with one of energetic and ecological decolonization.

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