

## The Pyrocene comes to Australia: A commentary

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### Abstract

This is an invited commentary, after last summer's fires, from Stephen Pyne, doyen of those studying fires in nature around the world, and author of *Burning Bush: A Fire History of Australia* (1991); *The Still-Burning Bush*, rev. (2020); and *Fire: A Brief History*, 2<sup>nd</sup> edition (2020), revised with an Australian preface.

### Australia and fire

That Australia is a fire continent is not news. Since it broke from Gondwana, Australia has increased its flammability; since the advent of humans, it has experienced an almost inextinguishable source of ignition; and since the arrival of Europeans, it has undergone a more or less continual disruption in fuels, sparks, and fire regimes that have challenged a transplanted way of living that originally emerged from a landscape not naturally disposed to burn. Australia has burned widely and routinely as far back as anyone cares to look. The first European explorers reported “fires by night and smokes by day.” The record of British colonization is a chronicle of conflagrations whose names have filled up the days of the week and more, spilling across the calendar as flames have the countryside.

Yet the most recent outbreaks feel different. The bad burns seem to be coming more often, raging more savagely, and wrecking more havoc. Black Saturday and a Red Summer of forever fires might serve as geodetic markers from which to triangulate the future. Underwriting both lies another order of combustion, one that is burning lithic landscapes of fossil fuels which are interacting with the ancient fires of living landscapes. The Black

Saturday fires of 2009 rampaged across a countryside shaped by coal and oil — a natural and social geography made possible by the Hazelwood Power Station and its brown coals. Of the 173 lives lost, 162 resulted from fires started from powerlines — an apt metaphor for the violence that can occur when living and lithic landscapes cross. The endless Red Summer fires of 2019/20 had a monstrous drought to ready fuels, dry lightning to kindle blazes, and a mosaic of quasi-natural fuels in protected lands and dispersed settlement vulnerable to ember storms. Climate change and land use change, both underwritten by fossil fuels, readied plentiful tinder. Against such forces — ignitions so abundant, fuels so profuse — human countermeasures were inevitably inadequate. Deluges would have to end what drought had made possible.<sup>1</sup>

What had been an incremental escalation in burning has made, as it were, a hydraulic jump. What have been fire fights became fire sieges. What have been outbreaks have lengthened into seasons. What have been fire crises localized in time and space are evolving into a globalized fire epoch. Call it the Pyrocene.

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<sup>1</sup> The 2020 Bushfire Royal Commission learnt that March 2, 2020, was the first day for months that there were no bush fires burning. [Ed.]

### *The Pyrocene*

When did humans begin to redraw the geography of fire on Earth? When did we go from cooking food to cooking landscapes and now to cooking the planet? Every observer will have his or her preferred marker.

My reading is that it took the sudden warming of the interglacial to create ideal conditions for a fire-wielding species to propagate its most potent technology. Humans and fire forged an alliance in which each would expand the range and power of the other. Together, they could interrupt the cycle of frost and thaw that had characterized the Pleistocene. They could nudge, and then shove even climate.

By burning, Aboriginal economies could prevent woods from reclaiming the wetter grasslands — the tropical savannas, the sourveldt, the tallgrass prairie, the pine steppes, the cerrado and llano. With fire as a catalyst, agricultural economies could actively clear and convert, or slash and burn through peat and moor as well as forests, adding methane from irrigation and livestock. When burning stopped in the grasslands, many filled with woods or thickened their presence. When people abandoned fields from disease, famine, or war, the forests returned.

All this occurred within broad ecological baffles and barriers. What burned was living landscape, and there were limits on how much and how frequently fire could return, or what else could interact with fire. The land could be exhausted, unable to recover quickly, its fires starved along with other inhabitants.

That changed when people, ever eager for more fire power, turned to lithic landscapes. Revealingly, the earliest steam engines were used to drain coal mines to make more fuel available. These combustibles have proved

essentially unbounded and so have their byproducts, which are no longer constrained by the primordial rhythms that governed fire over the past 400 million years. They can burn day and night, winter and summer, through wet and dry, year after year. There is no sink adequate to the source. Instead, the effluent overloads the atmosphere, the biosphere, the hydrosphere, the Earth. We are taking stuff from the geologic past, burning it with unanticipated consequences in the present, and releasing its residue into the geologic future.

Similarly, there seems no inherent limit on the power humanity derives from such combustion until, at some point, the planet becomes uninhabitable for people. Most observers have focused on the impact of emissions on climate change. But burning's byproducts also affect how people organize and live on landscapes. They affect transport, which also determines how natural resources and agriculture connect to markets, and how people choose to arrange their residences. And they actively seek to replace open fire, from candles to field fires, with fossil-fuel-powered surrogates, and, where substitution fails, to suppress any expression of flame.

In setting after setting, this pyric transition — the shift from burning living to burning lithic fuels — has remade where and how people live. Satellite images of the Earth at night show the divide clearly. Sub-Saharan Africa glistens with flames burning through living landscapes. Europe glows with electricity powered by fossil-fuel combustion, or with technologies for which such combustion is a catalyst. Save for a period of transition, only one kind of fire or the other exists at any site. Industrial combustion doesn't play well with others.

Working fires are mostly gone from modern cities and residences; are going from agricultural practice; and are disappearing from protected nature reserves. In industrialized countries the rural landscape is being recolonized by an urban out-migration and a service economy, which also eliminates the buffer zone of fields and paddocks around rural towns and the routine burning that dampened wild fires. In many settings the crisis is not a surplus of uncontrollable fires but a deficit of controlled ones. Like the demographic transition with human populations, the pyric transition leaves the population of fire below ecological replacement value.

Thanks to transport and climate change, local impacts have generalized — have, in fact, globalized. The contours of the fire equivalent of an ice age are taking shape with megafires, fire-informed biotas, melting ice packs and permafrost, spreading deserts, and mega-smoke palls taking the place of ice sheets, mountain glaciers, a frozen Arctic, thickening permafrost, pluvial lakes, and outwash plains. Fire creates the conditions for more fire, as ice did for ice. Climate is warming. Sea level is rising. Mass extinction is underway.

The Age of Humans, the Anthropocene — there are many terms to describe the plexus of fluxes. Pyrocene gives us a continuous narrative that dates back to that ancient alliance between humanity and fire and it grants a vivid analogue around which to cluster the bewildering swarm of changes. The upshot is too much bad fire, too little good, and too much combustion overall. It adds up to a fire age.

### *The Pyrocene in Australia*

Australian history intersects this most recent phase change in curious ways. Its contact with Europe tracks, with eerie fidelity, the acceleration in humanity's firepower that has made the Pyrocene not simply a check on a succession of glacial breakouts but a runaway phenomenon in its own right.

Three events converged. Geopolitically, Captain James Cook explored eastern Australia in 1770; Joseph Banks proposed a penal settlement in 1779; the First Fleet arrived in January, 1788. Technologically, James Watt invented the first successful steam engine between 1765 and 1776 and effectively announced the prime mover behind the industrial revolution. And, intellectually, Joseph Priestly announced the discovery of "dephlogistinated air" which Antoine Lavoisier confirmed and more memorably named oxygen in 1774 and 1777, respectively. As an autonomous phenomenon, fire lost its standing; as an integrative concept, fire shed its capacity as an organizing principle for explaining what was happening. It disappeared from scientific consciousness at the same time it began vanishing into machines. Out of sight, out of mind.

Enlightenment science birthed a new wave of pyrotechnologies. Its reductionism was ideal for deconstructing processes into their elemental parts and then building tools to express them separately. It was now possible to have heat without flame, light without heat, combustion without plumes of smoke. This new power fed long-standing suspicions among European elites regarding fire. They distrusted free-burning flame, hated fallowing (needed to furnish fuel for agricultural fires), and stigmatized the use of fire as inherently primitive; to be rational and modern demanded an alter-

native to open fire. These attitudes were applied not only to native peoples in colonies, but to peasants in Europe itself. But it also left fire practitioners without a science to guide them.

In brief, the steam engine added a novel pyrotechnology that had the power to unmoor the ancient alliance between humanity and fire; European imperialism provided a vector by which to propagate European settlers, institutions, and ideas around the world; and the redefinition of fire through Enlightenment science helped make the resulting changes — the entire narrative of landscape fire — increasingly invisible except as spasms of disaster. That a continent so fire-rich as Australia should feel the consequences early and often is not a surprise. That its human history should so eerily align with its natural history does.

Of course, anthropogenic fire did not begin with émigré Britons. Aboriginal fire practices had already altered Australia's biota over the course of tens of millennia — how much remains a matter of dispute. In Australia anthropogenic fire found an especially receptive environment. It affected landscapes at a large scale long before it influenced Europe, North and South America, and most of Eurasia. We might consider the experience a dress rehearsal for that greater reformation prompted by the arrival of industrial combustion, which, thanks to Britain, Australia felt early and offered an inviting environment.

What I find more interesting, however, is the way that legacy of anthropogenic burning persists. The Aboriginal firestick keeps reincarnating. After the shock of contact, the “firestick habit” was picked up by rural Australians. After World War II foresters adopted it as a principle of land manage-

ment, one they celebrated as having grown out of Australian experience and that contrasted both with British examples, which sought to ban fire, and with American ones, which sought to rally paramilitary muscle to suppress it. Australia's foresters were the only group of foresters to embrace deliberate burning; it's not hard to believe that the stubborn persistence of the firestick is a reason. Then ecologists countered with a firestick of their own, shifting the focus from hazard reduction to biological values. Now Indigenous peoples are rallying around a revival of traditional burning as a means of restoring heritage as well as country.

Each group has its own term, context, and purpose for the practice, and the whole discourse has come to pivot around something like identity politics. The Aboriginal firestick farming made famous by Rhys Jones (1969) evolved into the “burning off” of rural Australia, then into “firestick forestry,” “firestick ecology,” and “cultural burning.” Controversies over how and where to deliberately burn is a staple of Australian fire politics. At least three royal commissions (1939, 1961, 2010)<sup>2</sup> have granted it a central role. With cause: in a fire-prone place, the choice is not whether the land will burn but when and with what effects. The firestick is a device that can transmute bad fire into good, and in social settings it can be a symbol, lever, or club. Over and over, it becomes synecdoche for the whole, tangled issue of how Australians live on a fire continent.

There are practical concerns, too. Among many paradoxes, as we ratchet down our binge-burning of fossil fuels, we'll have ratchet up our routine burning of living

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<sup>2</sup> Stretton (1939), Rodger (1961), Teague B. et al. (2010).

landscapes. A fossil-fuel civilization has already baked into the future a new climate and patterns of economy and society. Even if fossil-fuels were abolished tomorrow, the lag times would leave us with hazards and risks for many decades. We will have a lot more fire — will, again paradoxically, need a lot more fire. What kinds of fires Australia will have is a legitimately political question. Science can advise how to do better what people choose to do and what the likely consequences are of various choices, but it cannot choose. That is a deeply cultural matter. For the sapient it is among the earliest choice the species made. Whether as mutual assistance pact or Faustian bargain, it put us on a path we have never left.

Among the dramatic changes in recent times is an exponential increase in fire science. Fire still has no disciplinary home; the only fire department on a university campus is the one that sends emergency vehicles when an alarm sounds. But landscape fire is no longer the exclusive bailiwick of forestry. Geographers, ecologists, climatologists, physicists, chemists, mechanical engineers, meteorologists, even social scientists and lawyers, even historians, novelists, and poets are publishing on fire as viewed through the prism of their home disciplines and genres. As it has in natural landscapes, fire has once again diffused through intellectual culture.

#### *The Pyrocene: Australia can choose*

Australia is feeling the harsh shockwave of an advancing Pyrocene. It feels it early because it has long been a fire continent, and because the pressures of the Pyrocene act like a performance enhancer. They make fire-prone places more fire-driven. They make fire-spared places more fire-susceptible.

Unlike many regions, however, Australia is better positioned to respond. It has fire institutions, long experienced in lighting and fighting bushfires. It has a robust suite of fire sciences — has made fundamental advances in fire behavior, fire ecology, and fire anthropology. It has an unbroken tradition of fire art that traces back to Aboriginal bark paintings. It has a fire literature of novels, poems, and histories. It has a politics that recognizes that bushfires are a persistent problem. Its fire history harks back to an Indigenous heritage of firesticks and to a Britain that, more than any other country, outfitted a mild Pyrocene with steam, then transported it around the globe, and bequeathed a full-blown Pyrocene. It has a population that, for all their laments about the strangeness of an urban, British-founded society on a sunburnt continent, and for all the ineluctable alienness of bushfire, is accustomed to fire on the land. Modern Australians still record a chronicle of smokes by day and fires by night.

First to experience, first to lead — Australia can turn what promises to be a problem Pyrocene into an opportunity; only the U.S. has a comparable technological and cultural capacity. Europe outside the Mediterranean, for example, has almost none of Australia's experience and fire culture to tap into. Other continents have fire and folklore but lack institutional heft. In a planet increasingly informed by fire in all its manifestations, a world that is segueing into the fire equivalent of an ice age, its experience counts. Australia is a firepower. How it uses that power matters to the rest of us.

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