MESSAGE IN A BOTTLE: CULTURE, BUSHFIRE AND COMMUNITY UNDERSTANDING

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Abstract
The communication to the wider community of scientific information about bushfires must be cognisant of a range of pre-existing social and cultural influences that may affect popular understandings. A variety of “cultures” have the potential to influence people’s understandings of bushfires and bushfire behaviour. These include the mass media, film, television, literature, art, popular culture and the internet. To illustrate the point, this paper examines the impact of Australian children’s literature in perpetuating the notion that discarded bottles and broken glass are a common cause of bushfire ignitions. An analysis of books for children and adolescents since the 19th century reveals acceptance and reiteration of this causation despite its dismissal in scientific and generalist adult texts. The credibility of the notion is reflected in its acceptance and repetition in the adult world, to the point of being quoted in parliamentary debates. The limited academic discourse on the impact of culturally derived understandings of disaster (including bushfires) and community perceptions is discussed.

Keywords
Disasters; wildfires; children’s literature; popular culture; myths.

Introduction
Unfortunately, this paper begins with some rather “dodgy” science. But that in a sense is its premise: translating science into practice in the context of bushfire is fraught, not so much with difficulty as with vast differences in and potential barriers to understanding. Facilitating increased community consciousness of bushfires — one of the key themes of this conference — is less of a problem in an era when bushfires are increasingly thrusting into the outer suburbs of Australia’s major cities. However, igniting greater community understanding of what it is they are seeing, why this is happening and how Australians should respond to the phenomena is another matter altogether.

Putting bushfire science into the public domain in the hope that it will be understood means competing against a range of established beliefs and some popular misconceptions. Such myths, once established and perpetuated, are difficult to overcome. Exploding houses and fireballs rolling across the landscape remain popular understandings despite the best efforts of fire scientists and community fire educators to dispel them. There are other hurdles, such as the “competing cultures”, as they are sometimes called, of science and journalism. There are few better contemporary illustrations of this than the media’s handling of the debate over climate change. The news media — and television in particular — are enormously influential in shaping community understandings. In the past, the emergency services have contributed to the mythology in their own communications about bushfire, in the process encouraging a culture of public dependence.

Yet there are many other “cultures” that have also influenced and that continue to influence the way in which physical science is interpreted by a broader audience. This paper uses the example of the notion that bushfires are commonly ignited by discarded bottles and broken glass to demonstrate how quite basic science, misinterpreted and reiterated, takes on meanings of its own.

Discussion
While bushfires are integral to the Australian landscape and the life and culture of its inhabitants, most will never experience a bushfire first-hand. The same applies to other natural and man-made calamities. This does not diminish the fact that some bushfire events take on broad, even national significance. Stephen Pyne, the influential fire historian, has described the 1983 Ash Wednesday fires as a “cultural epiphany”, as significant an event as the fateful Burke and Wills expedition more than a century earlier. (Pyne 1997)

Certainly, the communal artefacts of fire are not necessarily just those of scientific analysis. They are more likely to be creations of popular culture. Large fire events generate enormous media attention. They also lend themselves to pictorial and literary commemoration. They become events that are in various ways recorded, remembered and imagined: in news reports, film, fiction, poetry, art, photographs, reminiscences, even T-shirts.
But back to the dodgy science. Before the distractions of television, computer games and the internet, almost every school-age child knew the power of the humble magnifying glass. Beyond its practical and legitimate uses, the enterprising also knew that it was possible to use refracted light through this simple instrument to start a fire. All you needed was a glass, some grass or gum leaves and perhaps a bit of paper. It was a simple, practical lesson in physics, though one not always sanctioned by teachers or parents — especially in rural areas where such a combination could have far-reaching consequences unforeseen by a junior fire scientist.

The physics helped fuel one enduring belief about the cause of bushfires. The idea that bottles and broken glass (and even the concave ends of aerosol cans) lying in the bush are often responsible for igniting fires has proved a persistent one. This is despite scientific experiments that found to the contrary, a complete lack of statistical data and even simple common sense. There are roughly 850,000 kilometres of roads in Australia (ABS 2004). According to the best available estimates, glass bottles make up around 6 per cent by volume of all litter discarded nationally. A recent national litter count conducted on behalf of the Keep Australia Beautiful organisation found that two-thirds of glass bottle litter is discarded on the roadside. On the basis of counts conducted at 151 sites around Australia, the study extrapolated that no less than 320,678 cubic metres of glass lay discarded beside the nation’s highways at the time of the count. (KAB 2006)

The first observation that needs to be made is that if glass and bottles on the roadside really were a significant cause of bushfire, then during most summers much of south-eastern Australia and beyond would surely be on fire most of the time. Cheney and Sullivan (1997) suggest that it is theoretically possible that glass bottles or fragments are responsible for the ignition of bushfires. Laboratory tests have shown that a glass bottle containing water can form a lens sufficient to generate combustion by focusing the sun’s rays on a fuel bed. However, they note that under field conditions it is “highly unlikely that a bottle or glass fragment will form a lens of the correct focal length and orientation to concentrate sunlight sufficiently to start a fire”. They go on to point out that “considering the vast amount of glass and can litter along our roadsides, the chances of ignition by these agents must be very small indeed”.

Weber (2000) also acknowledges the theoretical possibility and various attempts to replicate such ignitions. “Glass fragments and discarded cigarettes can cause fires, but this a very unlikely source of accidental ignition,” Weber notes, pointing to experiments attempting to evaluate the real possibility of ignition from these sources. Importantly, he also points to mathematical modelling estimating the concentration of heat and its effect on vegetation “showing these to be unlikely ignition sources unless used deliberately”. At most, he estimates glass and discarded cigarettes are responsible for just a few per cent of fires. A key 1980s study of the cause and effect of bushfires in Australia does not even mention bottles or broken glass. Nor does a later study of the causes of fire on public lands in Victoria over a 20-year period. (Barber 1986, Davies 1997) In Victoria, an examination of all wildfire, scrub and grassfire reports lodged with the Fire Incident Reporting System (FIRS) between 1 January 2000 and 28 February 2006 found six records of glass or bottles identified as the possible accidental cause of bush or grassfire. In addition, there were two reports of fires started by children using magnifying glasses. On average FIRS records 4000 to 5000 wildfire calls annually, further suggesting glass and bottles are a statistically insignificant fire cause. (Harvey 2006)

Foster (1976) is the perhaps the most trenchant critic of the bottle and glass theory, bluntly describing it as “fallacy”. After the 1927 Royal Commission of Inquiry on Bushfires in New South Wales listed “glass lying in fields” as one of 10 causes of bushfires, Foster says it became an excuse “used by many graziers to conceal their own culpability for burning off escapes for many years afterwards”. He also notes glass appeared as cause in South Australian fire statistics until the 1970s, before concluding that “as a cause of bushfires this phenomenon is discounted by those who have deliberately attempted it”. Interestingly, the royal commission’s suggestion was being dismissed contemporaneously by the popular author Donald Macdonald in a bushcraft book for boys: “You may by chance get a piece of broken glass lying in such a position that it concentrates the rays of the sun like a burning glass, but the chance is one in a hundred thousand”. (Macdonald 1930)

Perhaps ironically, given the experimentation of our junior scientists referred to earlier, one of the key repositories of the “truth” that discarded bottles and glass are a bushfire ignition source has been children’s literature. Bushfire has had a strong and consistent presence in Australian children’s literature since the late 19th century. To begin with, it was just one of a litany of horrors that this alien landscape threw up to challenge colonial new chums. These included floods, Aboriginals, escaped convicts, snakebite and bushrangers. (Lees and McIntyre 1993) Most often fire was portrayed as a destructive enemy, an intruder into the landscape to be beaten back and defeated. Only more recently
have other elements — such as regeneration and renewal — found expression in the bushfire story for children. (Robinson and Leach 2002)

Until the 1980s the bush itself was often depicted as a hostile environment. Foster et al (1995) argue that it became almost axiomatic that time in the bush equalled time in danger. This was certainly the 19th century vision of the Australian bush in children’s literature. With the growth of fiction for young Australians as a genre in its own right in the mid-20th century, the bush became a place in which the immature were tested and, in some circumstances, made the emotional transition from childhood into young adulthood. Bushfire became a set part of this landscape of danger in many early adventure stories. In Harry Treverton: His Tramps and Travels Told by Himself (1889) by William Henry Timperley the protagonist encounters a bushfire and a ruffian who wants to rob him in the course of one journey (Saxby 1998). In the popular ‘Billabong’ series by Mary Grant Bruce, bushfire is one of the consistent threats to station life. In A Little Bush Maid (1910), young Norah demonstrates her pluck when she rescues a flock of sheep in the face of a bushfire.

The highpoint of bushfire as a pivotal theme in juvenile literature was probably the late 1960s and early 1970s. Nimon and Foster (1997) suggest that around this time Australia’s unique natural environment and the specific challenges it presented came, in large part, to define the “Australian-ness” of stories for children and adolescents. Landscape came to signify nation. Yet post-war Australia was, of course, simultaneously a period of rapid urban expansion. The landscape of bush and bushfires was for many adolescents increasingly remote: “Rural Australia in its most terrifying to signify nation. Yet post-war Australia was, of course, simultaneously a period of rapid urban expansion. The landscape of bush and bushfires was for many adolescents increasingly remote: “Rural Australia in its most terrifying manifestations furnished the settings for the majority of the early adolescent novels written in this country. Merely to live here appeared a potentially dangerous enterprise, especially for those approaching puberty.”

Rather than merely being part of the backdrop of danger in the bush, bushfire itself became central to the story. Indeed, bushfire stories seemed to break out all over the place. This was coincidentally a period of significant bushfire activity across Australia. Several major bushfires affected rural and outer suburban areas in the south-eastern states and also Western Australia. In Victoria, the Dandenong Ranges (1962, 1968), the Yarra Valley (1962), Longwood (1965), Lara (1969) and central Victoria (1969) experienced large bushfire outbreaks which claimed a total of 37 lives and more than 600 homes, together with extensive stock and property losses. Tasmania endured the devastation of the 1967 fires, which killed 61 people and destroyed 1700 homes. In New South Wales, fires claimed several lives around Goulburn in 1965 and there were other major outbreaks on the South Coast in 1968. In Western Australia, fires destroyed the town of Dwellingup and other communities in the south-west in 1961. (Esplin et al 2003; Luke and McArthur 1978)

These real fires undoubtedly helped spark several fictional outbreaks. One of the best known is Ivan Southall’s Ash Road (1965), winner of the Children’s Book Council Book of the Year in 1966. Other titles to emerge at this time include February Dragon (1965) by Colin Thiele, Bushfire (1967) by Alan Aldous, Wildfire (1972) by Mavis Thorpe Clark, The Bush Bandits (1966) by Betty Roland, The Ring of the Axe (1968) by James Preston and Family at The Lookout (1972) by Noreen Shelley. The fires also prompted two quite different but potent picture books — Ash Tuesday (1968) written by Joan Woodberry and illustrated by Max Angus and The Death of a Wombat (1972) written by Ivan Smith and illustrated by Clifton Pugh.

Without over-estimating the importance of these works, it is arguable that they influenced the perceptions of a generation or two of Australians when it came to bushfires. Earlier generations had been exposed to a suite of other books, many of them written in Britain for British children about events in Australia that their authors had never themselves witnessed. Other Australian authors for children, such as Mary Grant Bruce, had written about fire, but never before had the topic been covered in such detail. Later authors similarly picked up and used bushfire as a theme, again often in response to particular fire events.

The 1983 Ash Wednesday fires in South Australia and Victoria inspired a fresh round of juvenile bushfire literature. These fires killed 75 people, burned some 418,000 hectares and destroyed 2400 homes along with significant stock and other property losses (EMA 2006). Among the Ash Wednesday books is one of the least forgiving juvenile novels about bushfire: Firestorm! (1985) by Roger Vaughan Carr. The author and his family lived at Airey’s Inlet on Victoria’s south-west coast and lost their own home in the fires. So too did Marguerite Hann Syme, author a novel Burnt Out (2001) and a picture book Bushfire (2000). Another works was Fire on the Ridge (1989) by John Wells, while Colin Thiele was prompted by Ash Wednesday to return to bushfire in Jodie’s Journey (1988).
The influence of fires in and around Sydney during the 1990s and 2000s and more recently in the Australian Alps has been comparatively slight, although bushfire has again found favour as a theme in a range juvenile literature. (Croasdale 1998, Pausacker 1998, Harris 1999, Kelleher 2000, D’Ath 2005).

There is, in sum, a substantial body of children’s literature dealing directly with bushfire. Over the past century, some 30 juvenile novels have been published which involve bushfire as a major theme, plus another 10 illustrated story books. In addition, there is a range of other educational material published for children over and above any official fire service or government publications. This body of work represents a significant influence on generations of young Australian minds, which for the past half century have also had the influences of film, television and more recently the internet providing even more understandings and interpretations.

What children have been reading about bushfire includes, among some quite accurate and often gripping depictions, is also some pretty dodgy science. For it is in this realm that the discarded bottle not merely survives, but prospers as a source of bushfire ignition. In one of the most poignant and most popular of illustrated Australian stories, The Death of a Wombat (Smith and Pugh 1972), the glass that starts the fire that kills the hapless Vombatus ursinus is not even clear, but oddly a discarded, unbroken, brown bottle.

In The Bush Bandits (Roland 1966) the guilty bottle appears along with another unlikely ignition source (“two dead branches rubbing together could generate a spark, or a broken bottle heated by the sun”). Thankfully, in Ash Road, “no one dropped broken glass or bottles that might by chance concentrate the sun’s rays onto a flammable substance”. In February Dragon, the “empty bottle” appears in a list of possible bushfire causes. Mr Pine tells his children that almost all fires are started by humans and “almost always through carelessness”:

“Campfires, broken exhaust pipes, bad spark arresters on tractors and railway trains, magnifying glasses and empty bottles, hot ashes, incinerators, welding gear, lamps, electrical faults. But most of all from silly people with cigarettes and matches.”

Wildfire (1973) by Mavis Thorpe Clark also provides a list of causes: campers not putting out campfires, motorists tossing cigarette butts from the window, graziers burning off or using vermin baits carelessly. She echoes the curious observation of the 1939 Stretton royal commission in Victoria that “sometimes lightning started a fire but not often; and then the blaze was generally followed by rain that extinguished it”. The physical science and past experience indicates otherwise, with around 25 per cent of bushfires in Victoria started by lightning. The 2003-03 Alpine fires were all started by lightning, burning for several weeks before rain extinguished them. (Davies 1997, Esplin et al 2003)

In Eleanor, Elizabeth (1984) by Libby Gleeson, the bottle is back in the frame — indeed, it is the sole cause of bushfires mentioned in the text. Eleanor’s mother carefully packs drinks for a picnic on a high fire danger day. “I’ve emptied the drinks into plastic bottles,” she tells her daughter. “Glass is too much of a fire hazard in this weather”. The first suspicions about fires breaking out on the property in Black Earth (Forrestal 2004) point to arson. To begin with one of the children playing with matches is suspected, and then a mysterious man is seen camping in the bush. In the end the cause turns out to be the hot exhaust of a new quad bike being used on the vineyard. Refracting glass is also mentioned here, but this time it is the more plausible proposition that a child may have been starting fires by playing with a magnifying glass.

Aside from fiction, broken glass and bottles have also occasionally found their way into educational texts. Bushfires (1979), one of the ‘Australian Fact Finders’ series for young readers written by Michael Dugan, gives the broken bottle as a source of ignition further credibility: “Broken glass or bottles left lying in the bush can also lead to bushfires. A piece of broken glass can act as a magnifying glass. It concentrates the sun’s rays on dry grass or twigs and sets them alight.” He repeats and expands upon the theme in Bushfires (1996), one of the ‘Australian Disasters’ series of educational books for young people, again stating that “glass can act as a magnifier”.

While the mainstream scientific and non-scientific literature of bushfire has largely discarded it, the continuing reiteration of the glass bottle theorem in children’s literature has ironically ensured its survival in the adult world. It is especially prevalent in discussions about roadside litter. During debate on the ACT Bushfire (Amendment) Bill 1998, the Minister for Urban Services, Mr Smyth, told the Legislative Assembly that fire “can commence from light focused through a broken Coke bottle” (ACT Legislative Assembly Hansard, Week 10, 26 November 1998). One rural MP confidently told the NSW Parliament during a debate on changes to the littering laws in 2000 that “in summer time...
bushfires are started by the sun burning through glass bottles thrown from car windows”. (NSW Legislative Council Hansard, 4 May 2000)

In Western Australia, the Shire of Roebourne’s code of ethics for travellers warns visitors to the Pilbara to “be alert to prevent causing bushfires”, the listed causes of which are “electrical faults, cigarette butts, broken glass and even vehicle exhausts”. (Roebourne 2001). In a 2003 discussion paper on litter abatement, the Keep Australia Beautiful Council (WA) points to “broken glass igniting dry vegetation” as a threat to the state’s biodiversity (KABC 2003). The travel website walkabout.com, published by Fairfax Digital, earnestly warns visitors to Australia to “respect fire bans (broadcast on the radio) and be careful with cigarette butts and broken glass which can ignite bushfires in hot, dry weather”. (Fairfax 2006)

Why has the myth of the broken glass or the abandoned bottle been so persistent? There is probably some merit in Foster’s (1976) observation about rural landowners looking for a convenient scapegoat. But there may also be another reason, at least in relation to the persistence of the bottle in children’s literature. An accidental cause is a convenient way of shrouding, from children at least, the less palatable fact that many of the worst Australian bushfires in recent years have been the work of arsonists, sometimes acting with dark and malicious intent.

Conclusions
There has been remarkably little study of the impact of broader cultural influences on community understandings of fire and other disasters. In the United States, Quarantelli (1980) led the way with an examination of disaster movies and the impact these had upon community understandings. More work has been done on the impact of the news media on public perceptions and some is now being specifically undertaken in conjunction with the Bushfire CRC in relation to the media and bushfires in Australia. (Cohen, et al 2006)

For those trying to bring meaning through science to a broader public in the hope that their responses to bushfire will be grounded in better understandings of such events, there are some considerations in this context. Australians have had a century to “unlearn” about the bush. In 1906, 52 per cent of Australians lived in towns and cities. A century later, that figure is around 90 per cent. Their understandings of what goes on in this alien, fire-rich landscape into which cities are sending tentacles and into which more and more Australians are making “sea change” or “tree change” escapes is equally affected by a range of extraneous cultural influences.

These include such seemingly innocuous sources as film, fiction and children’s books. Wachtendorf (1999) argues that all cultural texts, no matter what their form, are relevant to our knowledge of disasters and offer researchers “clues” as to how different groups experience crises. As Liverman and Sherman (1985) have pointed out, “disaster novels often convey a sense of scientific accuracy”. At the same time, films and novels give succour to many myths. In the Superman movie, the earth opens up in gaping holes when the earthquake hits. The post-disaster social behaviours such as looting, panic, outbreaks of crime and disorder remain common themes in disaster fiction despite having long been debunked by researchers. (Quarantelli and Dynes 1972)

Pyne has recently pointed to a disconnection between America’s vernacular fire reality and its high culture. He argues that wildfire in America cries out for philosophy, history, ethics’ literature, economics and political theory. Instead, the language of fire has become the jargon of the technical manager and sensational journalism: “a subject that goes to the heart of our identity as a species ends up as government reports, bowlderised war stories, or a genre of juvenile sports literature”. Fire, in order to be fully understood by the wider community, needs to engage the interest of the intelligentsia, he argues. Despite the influential role of authors such as Normal Maclean and, indeed, Pyne himself, what fire needs, he concludes, is a poet. (Pyne 2004)

The message is clear enough for those seeking to translate science into practice. In Australia, popular culture — even the seemingly innocent children’s book — is a rich source of information that those concerned with perception and response to bushfire cannot afford to ignore. Evidently, that information varies in quality. Yet it is reasonable to assume that people will retain and interpret at least some of this information as an accurate reflection of reality, depending on its source and just how convincingly it is delivered. That is the message in the bottle.
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