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Abstract:

In public discourse, there is a tendency for arts and science – or, more broadly, academic research – to be cast as irreconcilable at best and oppositional at worst. However, the explication of trauma, resilience and wellbeing in creative writing is as much a matter of science communication as literary practice. It involves writing down the bones of the phenomena that researchers chart and treat, exploiting the narrative and poetic properties of such endeavours, and making explicit both cognition *and* affect, empirical evidence *and* felt experience. It is evident in fictional worldmaking, creative nonfiction, poetry, and in hybrid works such as narratives that combine memoir and scholarship. Such diverse approaches to literary expression do not necessarily aim to extend theory or present experimental data, but to provide opportunities for alternative ways to view and review such material content, and explicitly incorporate imaginative and evocative engagements. At their best, such writings enact a form of affective, micro-macro testimony that has the potential to demystify scholarly findings, personalise and humanise related issues, confront denial and minimisation, and build bridges between what C.P. Snow named the "two cultures". This paper begins by considering Snow's advice to rethink how science and literature operate, and moves on to discuss hybrid and multiple lines of knowledge and practice – in fiction, memoir and personal writing, and healing workshops – that can build bridges across knowledge domains and social cultures, and afford recovery from personal, community and environmental trauma.

Biographical notes:

Jen Webb is Distinguished Professor of Creative Practice, and Dean of Graduate Research, at the University of Canberra. Recent book publications include *Researching Creative Writing* (Frontinus, 2015), *Art and Human Rights: Contemporary Asian Contexts* (Manchester UP, 2016), and the poetry collections *Moving Targets* (Recent Work Press, 2018) and *Flight* Mode (with Shé Hawke, Recent Work Press, October 2020). She is co-editor of the literary journal *Meniscus* and the scholarly journal *Axon: Creative Explorations.*

Meera Atkinson is a literary writer, interdisciplinary researcher, and educator. Writing across forms/genres, her work has appeared in over 40 publications, including *Salon.com, Best Australian Poems 2010, Best Australian Stories 2007, Meanjin, Southerly,* and *Griffith Review*. Her books include the creative nonfiction title *Traumata* (2018) and *The Poetics of Transgenerational Trauma* (2017), an academic monograph.

Jordan Williams is a researcher in the Centre for Creative and Cultural Research at the University of Canberra with a focus on creative practice and wellbeing. Her own creative practice centres on the materiality of writing and employs textual poetry, image, media and textiles, exploring themes of compassion and alienation. As an applied arts and wellbeing practitioner/researcher she is academic lead on the Defence Department-funded Arts for Recovery Resilience Teamwork and Skills (ARRTS) program and on other funded creative projects. In addition to journal articles and book chapters and exhibited artworks, her poetry is included in the recent international anthology *No News* published by Recent Work Press.

Keywords: eco-fiction, resilience, memoir, trauma, creative writing

Introduction

A bridge is a structure built to provide passage, to enable means of transition, to connect two spaces. When we talk about "literary bridges", there is an analogical reference to these physical structures. A literary bridge aims to provide passage across the gap between cultures; across geographical or temporal distance; between ideologies; or between disciplines. It also offers opportunities to connect across metaphorical, ideological or disciplinary spaces; a chance to change ways of thinking, seeing and doing.

In this essay we focus on the literary bridges that connect creative writing to the sciences, with particular reference to trauma. The need for a bridge between the arts and humanities disciplines and the human and natural sciences has been discussed in the scholarly literature at least since the mid-twentieth century, with perhaps the best known being C.P. Snow's characterisation of art and science as "two cultures". This, first presented in the Rede Lectures of 1959 and then published in book form in that same year, takes a bleak perspective. "I believe the intellectual life of the whole of western society is increasingly being split into two polar groups", he stated: "Literary intellectuals at one pole—at the other scientists … Between the two a gulf of mutual incomprehension" (Snow, 1959, p. 11). The problems Snow identifies are, first, that being untrammeled by the scientific method, literary artists are not called to account for poor thinking as readily as are scientists; next, that the "imaginative understanding" of scientists is impoverished by their lack of access to artistic expression (Snow, 1959, pp. 7–8), and, most worrying of all, that the gulf between the two cultures vitiates the development of truly creative solutions to contemporary problems.

The situation did not improve post-*The Two Cultures*, education continued to be siloed into disciplines that rarely connect and writers remained largely uninformed about the specificities of science and scientists largely uninterested in the arts. But even mid-twentieth century, a third culture emerged out of the art/science binary, that of scientists who no longer needed the translation skills of professional writers to talk to the public, but who produced their own writing and public speaking. Names that come immediately to mind include marine biologist Rachel Carson, primatologist Jane Goodall, and astrophysicist Carl Sagan, each of whom produced books that quickly captured the public imagination, and in some cases were translated into film or television works. They were followed by a number of other significant scientists who demonstrated the capacity to communicate beyond the sciences, and beyond the academy: astrophysicist Neil deGrasse Tyson, for example, epidemiologist (and novelist) Sunetra Gupta, or neuroscientist Christian Keysers. As John Brockman observes, such science communicators "are taking the place of the traditional intellectual in rendering visible the deeper meanings of our lives" (Brockman, 1995, p. 17). And, as more creative writers began to explore hybrid modes of literary production, and as the task of researching scientific findings became more accessible following the advent of the Internet, literary works produced by non-scientists began to incorporate more scientific material as part of their narrative structure; or explicitly engaged with the scientific realm, its discourses and concerns.

In this article we consider the ways in which scientists and creative writers have worked across cultural borders to build knowledge and understanding, and to raise awareness beyond their own communities. The impact is evident in the public audiences they are gaining for books and articles that avoid the didactic impulse, and instead capture the attention and the

empathy of readers. We explore such bridge building (between science and arts; between specialist communication and that for a more general audience) from two main perspectives. The first is associated with environmental writing produced by scientists and novelists – works that make the phenomenological impact of the material world more explicitly felt, and also urge personal action in the face of increasing environmental degradation. The second, which focuses on trauma, similarly combines the work of raised awareness of a situation, and aims to engender collective and individual action through the use of narrative arts. Whether the trauma is personal or collective, whether it is socialised, structural or environmental, a body of research within both the scientific and the literary cultures points to the affordances of creative writing for understanding, management of trauma's effects, and possible recovery. We discuss this in two discrete sections: the first examines work produced by individuals who are recognised as writers; the second explicates the deployment of writing workshops and narrative environments for those not trained in writing, and not identifying as writers, to begin their own healing processes. We start, though, by examining what has been happening in the two cultures, and reflecting on such practices in the light of Snow's concerns for the "gulf of mutual incomprehension".

Literary bridges and the material world: eco-science, eco-writing, eco-practice

Well into the twenty-first century, changing imperatives and new technologies associated with massive social and environmental transformations have exposed areas where Snow's binary logic is both limited and flawed. One issue is Snow's argument that literary artists should occupy the role of public intellectuals, communicating social values and scientific information. While the question of the role of literary writing continues to be debated, Snow's focus on a particular and limited notion of public good or social responsibility can now be perceived as tendentious, and as a failure to understand both why individuals choose to write and what literature might – or should – achieve (Ortolano, 2016, p. 124).

A second issue is that what Snow perceived as a necessity – for literary writers to produce science writing – is manifestly myopic. Walter E. Massey, a physicist who ended his career as Chancellor of the School of the Art Institute of Chicago, and who therefore – like Snow himself – has eyes into each culture, notes that the gap between the two cultures is rapidly closing, due to "quite a lively and healthy interest in science by humanists, and vice versa" (2018, p. 68). Massey attributes this to greater interdisciplinarity within the science disciplines; greater familiarity with scientific "language" within the arts and humanities; and, thanks to popular science writing and television, expanded access to scientific thought within the general public (2018, p. 69). Consequently, he writes, collaborations between artists and scientists have moved beyond the convention of artists merely providing accessible accounts of scientific findings, to "more interesting art-science collaborations [that] aim to discover new insights that will not have been revealed by the artist or the scientist working alone" (Massey, 2018, p. 70).

Following this line of thought, our notion of literary bridges is not of simple linear structures connecting two disciplines, but of multiple and diverse bridges between the multiple and diverse cultures that co-create the worlds we inhabit, shaping and representing the "deeper meanings of our lives". This points to a creative writing practice that both draws on and collaborates with science thinking – complementing, communicating, and sometimes

complicating scientific perspectives. Such a practice traverses the bridge between Snow's two cultures of art and science, becoming not merely as translator of science or literary insights and knowledges to the other cultures and the wider community. It also enacts new ways of being and of communicating, initiating a writing practice that explores constructs and concerns that are of pressing social and environmental importance – and indeed, often, of global importance. Such writing can provide cognitive and affective bridges into understandings and critical reflection, revitalising the writer's or reader's connection to their own past, cultural history and the world at large, and reaffirming the necessity to connect to others in the interests of preserving both nature and culture into the future.

Thoughtful, ethical, and accessible literary writing is not the sole preserve of those trained and named as creative writers. Astrophysicist Priyamvada Natarajan's lyrical *Mapping the Heavens* (2016), a research volume that discusses the entwining of myth and imagination with scientific exploration, is presented in the mode of creative nonfiction. *The Emperor of All Maladies: A Biography of Cancer* (2010), by oncologist Siddhartha Mukherjee, won a number of literary awards, including the 2011 Pulitzer Prize. Michael Taussig's *I Swear I Saw This* (2011), described by The University of Chicago Press as a record by a "visionary anthropologist" reflecting on the fieldwork notebooks produced over the course of two decades of study in Colombia, is written in dazzling prose, and is frequently used in creative writing classes.

Individuals who identify as creative writers similarly enact, or perform, scientific knowledge. Annie Dillard's *Pilgrim at Tinker's Creek* (1974) – another Pulitzer Prize winner – is an author's observation and exploration of the natural world in one location, and her contemplations on life, science, and art. Other authors, particularly those working in literary and speculative fiction, offer warnings about the outcomes of a refusal to weave science into everyday understanding and cultural transformation. Such stories exemplify modes of trauma testimony that ensue from unrestrained and unsustainable economic growth.

Margaret Atwood's *MaddAddam* trilogy (2003 to 2013), for example, begins in a moment of history when all of human society is violently divided, and has moved far beyond the basic tenets of ethical government, industry or family structures. It is a world characterised by technoscience, a context in which technological innovation is the primary value, where transnational corporations trump national laws or interests, and where cultural practices and human relationships are discounted and devalued (see Bruno Latour, 1987; Jean-François Lyotard, 1979; Gilbert Hottois, 1984). The first volume of *MaddAddam* opens in what appears to be a post-human world, the result of a virus deliberately designed and released by Crake, a geneticist who sees mass death as the only remedy for this broken world. His childhood friend, Jimmy/Snowman, seems to be the only person left alive to care for the "new humans" designed by Crake, and to offer testimony to the combination of biopolitics, hyper-capitalism and anomic science that led to the world-ending pandemic. This devastating scenario is mitigated a little in the two later volumes, where other survivors appear and begin to create a new society. This society depends on cooperation, grounded on written and spoken testimony of their pasts; and this provides survivors and the next generations the capacity to learn to live as part of nature, and thus to heal, in the small and limited ways possible, in this impossibly changed environment.

Alexis Wright's *The Swan Book* (2013) opens into a dystopic future, in a depressed and degraded Aboriginal community on the northern edge of Australia that has become a prison *cum* quarantine station. Like Atwood's, Wright's storyworld has been infected by a virus – in this case, the virus is nostalgia – and ruined by the hyper-capitalism and technoscience that caused the "climate wars", and resulted in a steady flow of refugees from the northern hemisphere. Wright's dystopia is predicated less on technoscience and more on the impact of climate change as it bumps up against a history of racism, sexual violence, and political oppression. The story is focalised through Oblivia, a young woman who, though mute, bears testimony to her experience of rape and rejection, and to the experiences shared by her own Aboriginal community and the natural world: a shared history of abuse and of the refusal by those in power to hear alternative stories. The swans that provide the motive energy to the plot double as presenters of testimony. This is seen in the white swan that led European refugees to the uncertain safety of the Gulf, and in the black swans that bear witness to environmental trauma and the continuing trauma of the violence enabled by the lie of *terra nullius* by dying in great numbers. In a more optimistic vein, Oblivia's swans allow her to remain more or less functional despite her past and her present, and to begin crafting a future attuned to the natural world, where people can hear the stories that belong to the land, and keep telling the stories that mean the land can stay alive.

Richard Powers's Pulitzer Prize-winning novel *The Overstory* (2018) conceptualises the lives, relationships and agency of trees in a literary enactment of the vital interconnectedness of all lifeforms. Like C.P. Snow, and like Walter Massey, Powers is citizen of both art and science, and across his career (twelve novels, to date), his writing crafts bridges between the domain of art and cultural practice and that of science and technology. Like Atwood's and Wright's novels, *The Overstory* addresses the relationship between the human and natural worlds, and considers the effects of science, technology, and hyper-capitalism not only on humans, but on the planet as a whole. It encapsulates several of the tendencies we address in this essay: bridges between multiple cultures; the capacity of literary fiction to galvanise understandings of scientific knowledge; its equal capacity to interrogate the impact of late-stage capitalism, and the desolation that affects both humans and the planet when the destructive traumas imposed on them are not acknowledged, and not remedied. The narrative shifts between specific communities of trees and the people who know them, and the work of testimony is provided as much by the trees themselves as by human agency. For example, toward the end of the novel, while the artist Nick is working in a forest:

> … he hears voices. One voice, really. It repeats what it has been saying to him for decades now, even since the speaker died. … Words that he has never fully grasped. Wounds that won't heal. (2018, p. 492)

The one consolation is in the art Nick produces from the fallen limbs of a massacred forest: a single word, a poetic gesture whose "letters spell out a gigantic word legible from space: STILL" (2018, p. 501). Of course the forest will regenerate, if left to its own resources, but:

> Two centuries more, and these five living letters, too, will face back into the swirling patterns, the changing rain and air and light. And yet – but *still* – they'll spell out, for a while, the word life has been saying, since the beginning. (2018, p. 502)

The trauma Nick and all his colleagues have endured, the trauma the forests have endured, is not healed by this small act of an artistic intervention, a poetic moment; but it does acknowledge life, and offers a small consolation – that life will go on, regardless, though changed by history.

All three novels point to the possibility of being able to build bridges toward a more sustainable, less traumatised future; to connect the human and more than human worlds; and to provide passage over or under the "incessant, disorderly buzzing of discourse" (Foucault, 1972, p. 229) that masks trauma, flattens affect, and militates against creative innovations. And such fictions involve writing practices that refocus the lens of perception and explore alternative narratives to that of economic development and political power games.

What these works offer is a story of testimony that is not bound by rules of "truth". There is, we argue, a truth in writing no matter its mode. It is easy to dismiss creative expression as "not real", as made up. But creative writing is not alone in this status; scientific testimony can be judged by its audience as true or not, whether or not that audience is equipped to make such judgments, whether or not that audience retains internal consistency or coherence in their consideration. [1] Any mode of writing, whether fiction, reportage or scientific testimony, must consider audience, narrative structure, argument, and the other building blocks of communication.

Literary bridges: between trauma studies and testimony

More than *a* bridge, creative writing can be conceived as a series of bridges and pathways, across and between personal experience and social history, positivist and constructivist epistemologies, art therapy and neuroscience, and the many other elements that comprise this spiderweb of human activity. Trauma has long been a grand theme of literature, and for over a century it has been a focus of scientific study. We write this paper as members of a nation and a global community dealing with trauma, and turning to science for answers to the crises heralded by fire, floods, and the pandemic, and to creative work for consolation and the capacity to endure.

As a specific mode of communication, testimony emerged in the academy in the second half of the twentieth century. It is a central tenet in the Holocaust studies that arose in the wake of the devastation of World War II. However, it is accompanied by what founding literary trauma theorist Cathy Caruth (1995, pp. 153–155) identifies as a paradoxical problem: a traumatic experience is, quite literally, incomprehensible, and therefore cannot be conventionally encoded in memory, and therefore cannot be related as a narrative. So, though testimony is crucial to healing, traumatic memory cannot fully account for, or witness to, the traumatic experience and its expression; because how can the unspeakable be rendered in language? Or, as Judith Butler writes, "trauma takes its toll on narrativity" (2004, p. 154). In the absence of access to expressive language, traumatic suffering tends to manifest in "traumatic repetition" (Caruth, in Brochard & Tam, 2019, p. 55) rather than in healing articulation; and the sufferer cannot easily escape that state of traumatic repetition, or move from traumatised self to a self who can "persist in their own being" (Butler, 2004, p. 31), and find the words and the forms to break the trauma cycle.

More recently it is becoming apparent that creative writing offers unique affordances for traumatic testimony and for breaking the cycle of traumatic repetition (Atkinson, 2017; Schwab, 2010), and such modes of expression remain highly relevant in an increasingly technologised and globalised twenty-first-century environment. As Kilby and Rowland (2014) argue in their introduction to *The Future of Testimony*, "As a meeting point between violence and culture, the future of testimony is guaranteed". But, they continue, "Less predictable is how we will understand its ongoing importance". One problem of understanding is that testimony as memoir is often aligned with confessional writing and with what Brendan O'Neill characterises as "misery lit" (2007), a form that is often disparaged as "maudlin" or "mawkish self-pitying" (Brien, 2017), or as failing to deliver the necessary break from the traumatic cycle, being "autobiographical accounts concerned with representing and memorializing traumatic memory and experience" (Tranter, 2015, p. 115). Though these critiques may have validity in relation to certain works, our focus is on memoir testimony that exceeds the boundaries of both confessional writing and "misery lit". Such texts are not simply a narrative of former suffering, but more precisely an attempt to write out of a disastrous moment of personal and/or cultural history, and to find both meaning and solutions through this process of testimony.

While much of the writing usually termed testimony tends toward nonfiction, decades of research and critique across the humanities demonstrates that every such account is at least somewhat unreliable in terms of provable fact or assured accurate recall. Eyewitness is corrupted by the processes of memory, for instance; memoir is framed by the writer's choice of how to construct the self and the work. Life itself is too big, too messy and too amorphous to be simply and faithfully told, and understood as is. It must be curated if it is to be rendered intelligible, as Joan Didion makes explicit in the opening page of her essay collection *The White Album* (2017):

> We live entirely, especially if we are writers, by the imposition of a narrative line upon disparate images, by the "ideas" with which we have learned to freeze the shifting phantasmagoria which is our actual experience.
> Or at least we do for a while.

Didion's "narrative line" and its apparent stability cannot carry us through every moment; but there is nonetheless a perceived truth in writing, arguably because it is presented in language which, writes developmental psychologist Paul Harris and his co-authors, is what human beings deploy "to make credible assertions" (Harris, Koenig et al., 2018, p. 253) – as such, it constructs a bridge between scientific explanations, and accessible explication. For creative writers, the instruments applied to the task of producing "credible assertions" that engage readers, critique social formations, and seek to counter the traumas of the past are primarily the materials of the art form: words and sentences, narrative structures, literary genres (Webb, 2020, p. 8). The genres include the whole panoply of text: poetry, science writing, dystopic fiction, and forms of creative nonfiction, including both memoir and hybrid memoir.

The latter has emerged from the umbrella genre of creative nonfiction (see MacAdams, 2017) and, more explicitly than standard memoir, it blends creative strategies and academic research to explore connections between micro and macro experiences, and between individual, cultural, and structural realities. Micro-witnessing, a central element of hybrid memoir, incorporates personal and subjective experiences; macro-witnessing reflects the

social, political, and public realm. The blending of these two in hybrid memoir is a vivid expression of the impossibility of separating the personal from the social, or from the political (the personal, after all, is always also political, as Carol Hanisch averred in 1970). Two examples of hybrid memoir, both of which centre on conversion disorder, are *The Shaking Woman or A History of My Nerves* by Siri Hustvedt (2010) and *Hysteria: A Memoir of Illness, Strength and Women's Stories Throughout History* by Katerina Bryant (2020). Formally known as hysteria, the condition of conversion disorder (in which a patient experiences neurological symptoms that cannot be explained by medical investigation), was closely studied and hotly debated by the founding fathers of psychoanalysis. Freud's mentor, Jean Martin Charcot, considered it a hereditary disposition triggered by real events, which is particularly interesting given fledgling findings that suggest trauma might be transmitted, epigenetically, across generations (Yehuda 2016).

Freud's initial explanation was that such symptoms had social roots, particularly in childhood trauma, and the child's experience of sexual assault (see Breuer & Freud, 1937). When this theory met with resounding rejection, he recast his theory of hysteria, proposing the less confronting, more socially acceptable, and now controversially victim-blaming seduction theory (Freud, 1962), which proposed that hysterical subjects harboured repressed sexual phantasies, and these phantasies generated their symptoms. Further analysis of this history is outside the remit of this article, but it does bear acknowledgement en route to stating that hysteria remains crucially linked to trauma; if not in the sense of aetiology, then in the sometimes traumatising experience of conversion symptoms, and the historically problematic and often traumatising treatments issued in response.

In *The Shaking Woman*, billed as a neurological memoir, Hustvedt describes the saga of a mystery affliction that brought about violent seizures. Her transdisciplinary encounters generate questions about the differentiation between brain and mind, the nature of memory, and the constitution of the self that are both scientific and philosophical in nature. Charting the way the symptomology of traumatic grief has been treated within various disciplines throughout history, Hustvedt discusses scientific accounts as embedded in personal exploration. It is difficult to separate her individual experience from her scientific and historic sojourns: on the page they read as *entwined*, the self as scientific experiment. "One has cancer", she writes, early on in the book:

> Neurological and psychiatric illnesses are different, however, because they often attack the very source of what one imagines is one's self … The shaking woman felt like me and not like me at the same time. From the chin up, I was my familiar self. From the neck down, I was a shuddering stranger. (2010, p. 7)

The remainder of the book is the account of her search for that "shuddering stranger" in medical, philosophical and historical texts as well as in her personal experience. The language in which she recounts this search is plain and direct, not conventionally "literary", yet her skill as a literary essayist is evident in her control of highly complex and multifaceted material, and the construction of sentences that are economical, and yet charged with muted affect.

Katerina Bryant, an Australian writer, takes a markedly different approach in her exploration of hysteria. Each of her five chapters is named after a hysterical woman in history as they are

subjected to and/or helped by the medical and institutional bodies of their day. The final chapter, "Katerina", consolidates the memoir that frames her explorations of other women's lives and illness. Like Hustvedt, Bryant's narrative involves a dual arc of discovery and peace-making, but her diaristic memoir/potted biography is at once less engaged with the philosophical conundrums underpinning scientific knowledge and epistemology and more concerned with the gendered nature of mental illness and its treatment.

There is a diaristic quality to Bryant's prose, an invitation into both the inner sanctum of her suffering and her obsession with historical hysterics. The narrative voice is present tense except when dealing with the past of the women, but even then they are not settled in history. They reach across time, their lived experiences, and Bryant's handling of this, suggesting a resonant questioning of the past as something static. Theorising the way in which figures and events in public life can linger on "neither living nor dead, present nor absent", these women from history "spectralise", to use Derrida's term (1994, p. 51), manifesting Derrida's concept of hauntology, which he describes as a "politico-logic of trauma" (1994, p. 97).

Traumata (Atkinson 2018), written by one of the authors of this paper, explores personal trauma in the context of structural, socialised trauma. A hybrid memoir, it weaves together personal narrative, scientific research, public commentary, popular culture, and philosophy, in an attempt to reverse the usual depiction of trauma as originating in individual history that then has a negative impact on society. In *Traumata* Atkinson argues that the origins of trauma are largely social, though it is carried by and circulates within individual bodies.

The book begins in reflection on memory, and then opens out into an exploration of memory research, while in the background an epidemic of gendered violence lurks. It proceeds by recounting the past in the present that is traumatic experience, often in poetic prose that crafts lyrical sweeps across the author's lifetime. And then, when the narrative reaches the limit of what it can achieve in personal account, the text turns to science, to concrete findings and the world beyond subjective experience. The combination of evidence and expansion, cross-disciplinary nuance and dialogue, interwoven interdisciplinary research – trauma studies, neuroscience, psychology, psychiatry, and public health research – is a practice of pulling rabbits from rabbit holes, teasing out what is most useful and folding it into text. And then, when the science is exhausted and, having served its function, it fades away, the narrative turns inward once again, digging deep into the reservoir of fractured memory.

Writing multiple layers, in varying registers and in repeating rhythms, requires dexterity, and the success of this mode depends on there being a strong and multifaceted narrative voice that draws readers into the often challenging narrative interweavings and codeshifting. Reviews of these books made clear that this strategy of interwoven narratives and registers had much to do with their impact. A *New York Times* review concludes that "Hustvedt makes a stout case that brain disorders must be viewed not just as scientific phenomena but as human narratives, and she advances some useful correctives about the limits of neurobiological research" (Morrice, 2010, para 6). Rachel Robertson, reviewing for *Australian Book Review*, ponders whether Bryant's bridging hybridity might bring about a broader empathy and understanding for marginalised bodily experience. She writes, "If those living in the 'kingdom of the well' (as Susan Sontag puts it) now start to recognise the contingent, temporary, and often accidental nature of well-being, could that trigger a deeper understanding of those who always live with chronic illness or disability?" (Robertson,

2020). And, in *Sydney Review of Books* (2019), Jocelyn Hungerford writes that "*Traumata* steers a fragmentary, nonlinear course through memories, textual analysis, and Atkinson's lucid and meticulous explanation of trauma's systemic, cyclical patterns. This is a great service to readers, as the book also works as a scrupulously careful guide and introduction to many helpful resources, from the academic to the popular". In short, this is a mode of writing that demands expertise of the writer along with the willingness to share painful personal experience.

Literary bridges and healing: creative writing against traumatic wounds

This raises a new question: it is clear (*pace* CP Snow's concern that scientists can barely communicate with those in different scientific disciplines, let alone with non-scientists) that scientists are very much able to produce effective public communication; and that writers are capable of producing fiction or nonfiction that draws on and elaborates scientific knowledge. But in what ways can the affordances of creative writing become available to those who are not trained in the form, who lack experience in the processes of expressive writing, and who are not sufficiently trained in the sciences to use them as a bridge into communication, creative thinking and recovery? In this final section we move away from Snow's focus (on elites – scientists, literary writers) to consider how people outside those categories might access the affordances of writing. We particularly consider those who are living with or at risk of illness, and/or are suffering the effects of traumatic experiences or histories. We draw, in this section, on research and practice associated with creative writing workshops for individuals and communities who have suffered external traumatic experiences. These people, as workshop writers, are bearers of testimony; though they are neither the literary specialists nor the research scientists conceived of by Snow, they have confronted disaster, are living with its fallout, and testing out the possibilities of writing for recovery.

There has been over a century's history now of the use of creative activities in therapeutic settings, to "treat" traumatic shock. Following World War II, such treatments became formalised as art therapy, and this is now a well-established clinical intervention. Not all who experience trauma or other stressors choose to engage in a partially medicalised practice, or to review their traumatising experiences in a remedial context. But many people and groups have been eager (or at least willing) to engage in non-therapeutic creative workshops – spaces where they are provided some training, and can undertake some practice, in creative and expressive modes.

So we start this context with a story. At an International Health Sciences conference in 2018, the chief scientist of a large research organisation – let's call them Dr X – had attended a performance by participants in the sort of creative program mentioned above. Dr X told the plenary session at that conference: "This program saves lives. You have to see it". Certainly there is quantitative data from evaluations of that program that show statistically significant improvements in a range of pychosocial measures: this is science, backing up the approach. But Dr X's "saves lives" claim does not fit within the scientific measures used to evaluate the program. After all, how do we *know* it saves lives? And what is it about engaging in creative arts that produces this phenomenon of "saved lives"?

Fundamentally, the evidence is testimony offered by participants in these programs. Dr X was convinced by testimony presented in the form of creative writing, and visual art and performance, by people with various psychosocial and physical diagnoses, that there is an outcome of "saved lives" and that this program achieves that outcome. But there is an epistemological difficulty in accepting as truth or fact testimony that is based only on the speaker's assertion. Dr X clearly accepted the creative testimony of program participants and believed that the program had saved (their) lives. His belief is likely based on the claims of participants to know their own experiences in ways that constitute personal truth; claims expressed in creative mode, whether fictional or nonfictional, and operating as a testimony.

The work of social psychologist James Pennebaker seems to support Dr X's confidence that creative testimony about personal trauma would lead to improved health. Pennebaker conducted various experiments into the health benefits of writing from the 1980s (see Pennebaker & Seagal, 1999), and the results indicated that writing about memories resulted in participants requiring fewer medical appointments, and reporting increased wellbeing. Other modes of expression – dance, visual art – certainly resulted in some improvements in wellbeing, but "The mere expression of a trauma is not sufficient to bring about long-term physiological changes", write Pennebaker and Seagal. "Health gains appear to require translating experiences into language" (1999, p. 1248).

Nearly a decade later, Pennebaker summarises the body of research into expressive writing and wellbeing, recalling that in the 1990s his assumption was that "secrets are toxic", and that expressive writing, by bringing the secret into the light of the world, was necessarily good for the writer's health. While those early researches showed that there is a strong cognitive aspect to expression and wellbeing, he notes that there is still no hard evidence for the negative effects of inhibition (usefully and humorously he states (2018, p. 227): "Note to aspiring scientists: Theories are grand but never take them too seriously. Their importance is in guiding research. If your data do not support your theory, trust the data more than your theory").

Pennebaker's studies involve subjects who write their own memories and their own experiences. One of us (Jordan Williams) has tested Dr X's assumptions and Pennebaker's research findings over several years while conducting creative writing workshops with serving military personnel, veterans, members of drought-affected communities, and communities decimated by bushfire (see Bullock et al., 2019). She draws on creative writing pedagogical modes rather than art therapy modes, because this approach can bring an immediate acceptance of the potential primacy of personal experience to traumatised participants. Where workshop facilitators are writers and not therapists, the question of a participant's diagnosis is effectively irrelevant; a participant need not and may not disclose their health condition (or, indeed, even be aware of it), because the "contract" of the workshop is to work creatively to produce an expressive outcome. This allows facilitator and participants to co-construct new bridges, finding paths into recovery, the rebuilding of social networks and related capital, and a greater confidence in the future. In addition, such workshops function for the participant as a two-way bridge between pre-existing diagnoses (if any), ongoing medical/psychosocial protocols (if any), the participants' knowledge about their own situation, and the revelations that arise in the process of expressing their stories. In this way, writers who teach or facilitate workshops drawing on the science of trauma studies

construct another, more implicit, kind of bridge between the arts and science, one the participants may not (and need not) realise has a scientific element.

The programs Williams has conducted over the past decade have delivered high levels of success, evidenced by the testimony of those who participated, as well as statistical evidence presented by mental health specialists – that is, literary artists and scientists combining to test the affordances of creative writing for people in great need of tools to confront their traumatic wounding. Where her work diverges from Pennebaker's is that there is no direction to participants to write about their secrets, their traumas or their pain. All they are asked to do is write; and while some choose to recount their personal histories, others – who seem to achieve equally positive outcomes – produce stories for their children, poems, prose fiction and playscripts about anything at all. Language, for them, written in the form of personal creative expression, seems sufficient to begin the work of building bridges from trauma into new health.

Conclusion

We have discussed four discrete modes of writing: popular or, at least, accessible science; literary fiction that draws on scientific findings to make political commentary; hybrid memoirs written by recognised authors; and the writing of non-specialists as a mode of recovery from trauma. To varying extents they satisfy the criteria for what Snow characterised as public intellectual writings. Each mode taps into the processes of construction and dissemination of material that is part of the knowledge domain. This includes the testing of ideas; the elicitation of evidence or understanding; a degree of analysis and/or reflection; and a mode of bridging that attends to ways of interrogating axioms, and redefining how we humans might make meanings.

The modes of writing we discuss span fiction and nonfiction creative works that themselves bridge science and art, knowledge domains and emotional encounters. What we have not addressed is the truth value of these different modes and, most particularly, of those writings categorised as "testimony". Social conventions hold that testimony is "true" or "based on fact" and hence trustworthy, while fiction or uncertain memoir is "made up", or "just a story". While on the face of it this may seem a valid criticism, David Hume rejects such an approach to truth value. For Hume: "the reason why we place any credit in witnesses and historians is not derived from any connection which we perceive *a priori* between testimony and reality, but because we are accustomed to find a conformity between them" (Hume, 1985 [1748], p. 29). His point is, then, that testimony is only persuasive because of inductive inference, not because of its evidentiary content; and that truth value must be predicated on empirical evidence, not on memory or on interpretation of historical documents.

C.A.J. Coady offers a compelling counter-argument to Hume, noting the value of accustomed conformity:

> After all when we inquire into the basis of some claim by asking: "Why do you believe that?" or "How do you know that?" the answer "Jones told me" can be just as appropriate as "I saw it" or "I remember it", "It follows from this" or "It usually happens like that". (Coady, 1992, p. 6)

Therefore, he continues, "testimony is very important in the formation of much that we normally regard as reasonable belief" (1992, pp. 7–8). Axel Gelfert too writes in support of "reasonable belief", observing that testimony is:

> … the chief source of knowledge by which we learn about the empirical world outside of our narrow realm of immediate experience, about the society we live in, and our place within both. Functionally, it is the main means by which people exchange information, it is crucial to the division of epistemic labor, and it is instrumental in securing the continuity of cultural tradition. (2019, pp. 65–66)

What we draw from this is that while we may accept Hume's criticism that neither fiction nor nonfiction expressly convey empirical evidence, nonetheless we can aver that memoir or fiction can function as testimony, as knowledge formation, and as a way of dealing with and communicating trauma. In this way such writing can activate understanding of some of the causes of social, personal and environmental trauma, thereby building bridges that may provide paths to increased agency and resilience, that lead to a better present.

At its best, "bridge" literature acknowledges limits as well as affordances. These works can recognise conflicts between arts and sciences, as well as their capacity to come together. They can acknowledge failure while still aiming to achieve ideals; and they can enact a form of affective witnessing that has the potential to demystify conventional knowledges, and thus personalise and humanise big-picture problems. Whether fiction or nonfiction, memoir or personal expression, creative writing in these modes has the capacity to confront the present, interrogate instances of denial and minimisation, and build bridges between the human and nonhuman worlds, between the comfortable and those in crisis, between culture and nature. And, importantly, the bridge it builds can offer to those suffering from traumatic wounds a path out of the prison of the past and into a more endurable, enriched life.

Notes

[1] Consider, for example, the common phenomenon of a citizen who will accept what a meteorologist tells them about today's weather prediction, but reject the scientific consensus about global warming.

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