

Fungi

An entangled exploration

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This special issue of *PAN: Philosophy, Activism, Nature* invited authors to explore a spectrum of perspectives and ways of thinking about kingdom Fungi. For many people, fungi are perplexing organisms. With their bizarre trophic modes, complex life histories and menacing mythologies, fungi arouse human responses from intrigue to repugnance. They have inspired the imaginations of scientists and aesthetes alike and are deeply enmeshed in the mythologies and traditions of many cultures. As the effects of anthropogenic change become ever more dauntingly apparent, the importance of fungi in underpinning the earth's terrestrial ecosystems – directly influencing our lives – gains significance. However, despite their ubiquity and ecological importance, fungi are largely unregarded, especially within English-speaking cultures where mycophobia is the overwhelming norm.

How do the perspectives of the arts and humanities broaden the ways in which we think about fungi? Conversely, how might fungi contribute to the evolution of our understandings of philosophy, literature and other disciplines? In exploring the theme of fungi with these questions in mind, the special issue combines analytical approaches with narrative forms commonly found in the humanities. As far as we are aware, this is the first special issue in an interdisciplinary, academic Australian journal to bring together these broad-ranging approaches to the fungal kingdom.³ This variety of lenses through which to imagine – or re-imagine – this kingdom will hopefully improve possibilities for reaching wider audiences and for inspiring new approaches to considering and conserving fungi. One of the aims of the issue is to provide a forum for understanding how *Homo sapiens* might be included within the entangled lives of fungi. Indeed, human intersections with fungi have broader implications for a challenge faced by the humanities and arts today: learning to think integratively and ethically about nature and culture, particularly in terms of other species.

This issue ranges in content from the cultural histories of fungus foragers to the microscopic mechanisms of spore ejection; from critical examinations of mushrooms in literature to imaginative reinterpretations of fungi in the visual arts. This variety of approaches to fungi is explored through descriptive essays, provocative theoretical papers, stories, poetry and visual representations. Each author offers an expression of

his or her own insights, an examination of fungal life – sometimes the subject of formal research, sometimes experience and anecdote. Some of our contributors provide accounts of their discipline-based research on a particular fungal group. Others embed fungi within human contexts, identifying human-fungus relationships; most request greater consideration of fungi within the spheres of human responsibility – for the sake of fungi, humanity and, indeed, the entire biosphere. While the disciplinary and theoretical approaches towards fungi differ, the intersections – the mycelial connective threads – link the writings in this issue together. We suggest that the unique confluence of ideas about fungi results from the interdisciplinarity of the *PAN* journal itself.

In total, the special issue has attracted equal representation of papers from Australia and elsewhere; with contributions from Canada, the USA, the UK, France and Switzerland. Contributors represent a diversity of disciplines including mycology, botany, ecology, natural history, microbiology, entomology, anthropology, sociology, psychology, philosophy, outdoor recreation, poetry, law, sculpture and the visual arts. All scholarly articles have gone through an external refereeing process. We note that of the 21 contributors, only two are employed as professional mycologists. While this might reflect the dearth of professional mycologists in Australia and elsewhere, it also positively suggests a strong interest in fungi across a spectrum of disciplines. We hope to elicit this multi-faceted interest in fungi in the special issue, opening the dialogue on fungi to a broad audience of writers, researchers and thinkers.

The issue kicks off with anthropologist Anna Tsing's article "Dancing the Mushroom Forest" in which she asks us to consider mushroom foraging as a form of interspecies dance. Tsing lyrically explores the intersections of fungi and people in the practice of matsutake harvesting by Asian Americans in the U.S. Pacific Northwest. The ethnographic narrative approach of the article prompts us to reconsider reductionist, categorical frameworks for "knowing" fungi. For Tsing, "performance-based appreciation of human-nonhuman ecologies might offer models for environmental awareness for our times".

Following Tsing's forest dance, Alison Pouliot's "Intimate Strangers of the Subterrain" transports us across the Pacific to the wet forests of Victoria, Australia where a tiny blue mushroom – the pixie's parasol (*Mycena interrupta*) – becomes a profound metaphor for ecological connectivity. Further south in Tasmania, we also learn of the first scientifically described Australian fungus, "a cleverly disguised dipteran amuse-bouche" known as *Aseroë rubra*. Pouliot demonstrates – through a blend of historical, scientific and popular materials – some of the dominant attitudes towards fungi. Indeed, disgust, disdain and neglect underpin a motivation to exterminate certain members of the kingdom. However, the subterrain mycelial networks of fungi – crucial to life on the planet – provide hope for advancing conservation and engendering human empathy for the "intimate strangers" around and within us.

Situated also within Australia, Anne Therese O'Brien's "Supporting Soil Fungi to Rebuild Soils in Agriculture" illuminates the fundamental place of soil fungi in sustainable agricultural systems. O'Brien advocates the development of "different tools, materials and technologies" for promoting soil health. A shift towards valuing soil fungi also involves a transformation in human perceptions of the environment – a "becoming receptive and imaginative, seeing soils not merely as surfaces but as complex three-

dimensional communities". A palette of "convivial assemblages" builds soil health and minimises human impacts through the conscientious application of keyline ploughs, compost teas and other technologies. Invoking the work of Bruno Latour and Ivan Illich in science and technology studies, O'Brien concludes that such assemblages herald a shift from a position of mastery over the soil to one of apprenticeship with its living constituents.

We then leave geographical coordinates behind for a moment to peer down through a literal and philosophical microscope with Tarsh Bates in "HumanThrush Entanglements". Here, the human becomes a multi-species ecology rather than an individuated subject, ego, consciousness or body. In this intriguing re-examination of the human, Bates focuses on the single-celled pathogenic fungus, *Candida albicans* – more commonly known as thrush. Springing from Donna Haraway's suggestion that "to be one is always to *become with many*", the article theorises, questions and reinterprets aspects of human identity in the context of our symbiotic relationships with fungi. Employing Haraway's visual metaphor of Cat's Cradle throughout, Bates affirms that "the entanglements between humans and *Candida* are complex, material, embodied and cultural".

From the ecologies of American forests, Australian fields and laboratory microscopes, we venture into the French forests with Bronwyn Lay to consider fungi in the context of ecological jurisprudence. Beginning with Giorgio Agamben's work on sovereignty, Lay takes us on a walk with her friend Val through a forested world enlivened by fungi. The ramifications of the realisation – that fungi are everywhere – are far-reaching and transformative. Lay's perspective is not diffident, but bold and forward-thinking. The article confronts – through an amalgam of parable and philosophical-legal discourses – some of the major questions surrounding human relationships to kingdom Fungi as we freeze "in the autumnal wind, wondering why we humans, as lawmakers and citizens, were not able to see or seek to fully protect fungi, on which we depend for life". Shifting between the desk and the French forest – between legal structures that disallow fungal sovereignty and those that seriously acknowledge our absolute interdependence – we are left to "imagine a jurisprudence that matters".

From the French forests and west across the Atlantic, we visit 19th century American poet Emily Dickinson's lawn in Amherst, Massachusetts where she regards the mushroom of the field mythologically as "the Elf of Plants". Drawing from ecopoetic and multispecies theory, John Ryan argues that "mycopoetry" is a form of ecological poetry that reflects human attitudes towards kingdom Fungi. Whereas critical studies of animals and plants have given rise to the new fields of Human-Animal Studies and Critical Plant Studies, no comparable frameworks have been developed for mycological research. He, therefore, engages in a critical reading of mushroom focussed poetry within the context of the "unique otherness of these organisms". Through the works of four different poets – Emily Dickinson, Sylvia Plath, Mary Oliver and Caroline Caddy – Ryan explores some of the ecological, cultural, historical and social lenses through which humans perceive fungi.

Over to Italy and the haunts of writer Italo Calvino, Ted Geier presents a mycological reading of the stories "Mushrooms in the City" and "Adam, One

Afternoon". For Geier, Calvino's works "teem with life and objects, plants and other creatures, forces and elements, and just about everything else in the universe", including the fungal. The article convincingly makes the case for Calvino as a multispecies writer whose works resist hierarchies between species as well as positions of human privilege over the nonhuman. Calvino's positive representation of fungi as "funky – earthy, unconventional, mouldy by definition, possibly unsettling but also hybrid" defines him as not only a seminal literary figure but a prescient ecological thinker.

Turning from literary representations to recreational pursuits, Raynald Harvey Lemelin and Gary Alan Fine's "Leisure on the Recreational Fringe" explores amateur mycology in social terms as a series of recreational interactions between fungi and people. Through Bruno Latour's Actor-Network Theory in conjunction with the concept of Naturework, the authors consider the commonalities between amateur mycology and entomology – the latter represented by dragonfly or "dragon" hunting. Recreational activities relate to broader social attitudes that preference particular species of fungi and insects over these Kingdoms as a whole and in relation to their ecologies. Lemelin and Fine conclude that recreational mycology and entomology are not merely "isolated domains of local action, but...resources by which societies can structure larger choices of the relationship between the human and the environment".

Citizen action and community engagement are key themes in Ray Kearney's "Citizen Science in Mycology" – the final inclusion in this issue's series of scholarly articles. As an activist, conservationist and retired immunologist, Kearney observes that citizen science has always been vital to professional mycology in Australia. In advancing his position for citizen science in fungal conservation, the article offers a case study of the Sydney Fungal Studies Group Inc. (SFSGI). The group's contingent of citizen scientists initiated the listing of a reserve on the basis of an endangered fungal community (Hygrocybeae), setting an important precedent in Australian fungal conservation. However, Kearney leaves us with a message of urgency: without further funding and support, mycological conservation, based in citizen science, is becoming a rapidly endangered tradition.

The essay section of this issue includes a compelling range of written and visual reflections. We begin with Nicholas P. Money's "Circus Fungorum", an entertaining and provoking account of the aesthetics of fungal spore discharge mechanisms. Through the use of high-speed cameras for capturing fungal feats of reproductive wonder, science and art appear to converge. Anna Maria Johnson and John Vilella's "In Praise of Lichens" takes us foraying through the old-growth forests of Oregon to ponder an ancient and innovative partnership – that of fungi and algae – known as lichens. Although originally classified as plants, lichens represent some of the earth's oldest terrestrial symbioses, as Johnson and Vilella explain in lyrical prose. British mycologist, Lynne Boddy in "Fungi: The Unsung Heroes of the Planet", recounts her distressing first interaction with fungi as a student when her Georgian terrace house was dismantled by an unwelcome other – the dry rot fungus, *Serpula lacrimans*. Distress evidently turned to fascination as Boddy went on to co-author a 600-page book on the role of fungi in wood decomposition³ and eventually became a professor of mycology at Cardiff University. From science to art to science and back again, Melbourne-based

visual artist, Joanne Mott escorts us through her sculptural and illustrative representations of fungi in her exhibition *Fungivorous*. And heading further south across Bass Strait, Sarah Lloyd takes us deep into the dripping Tasmanian forests to explore those “almost-fungal” and peculiarly mobile organisms: the slime moulds. Alison Pouliot’s photo essay “Fleeting Lives” rounds out the section with an evocative account – in words and images – of her embodied pursuit of fungi as a photographer. Lastly, the poetry section of this issue features work by an international cohort of poets with interests in all things fungal, including Amy Cutler, Caroline Hawkrigde, Susan Hawthorne, Rachel Nisbet, John Ryan and Elizabeth Schultz.

These perspectives prompt us to consider ways in which we might understand and interact with fungi more sustainably and ethically. The approaches of the authors in this issue also help us to recognise why fungi have been less well regarded than flora and fauna and, consequently, overlooked in biodiversity conservation. In sum, we need fungi and fungi need us: academics and theorists, along with poets, naturalists and fungal enthusiasts in the field. Through interdisciplinary attention to kingdom Fungi, important cultural context and meaning can be foregrounded. The synthesis of sciences and humanities – evident in this issue – employs various genres and styles to convey information about the multiple ways that human lives entangle with fungi. But perhaps most importantly, we need stories about fungi that will touch as broad an audience as possible. We hope this special issue on fungi inspires you to contemplate and value – or re-value – fungi and to discover new perspectives on these very ancient organisms that are active agents in our lives.

Our enormous thanks go to these contributors and the many anonymous peer reviewers who assessed the scholarly articles and especially to Professor Freya Matthews for having the insight and imagination to propose this special issue. We think it is now appropriate for you to kick back and enjoy a nice ripe Camembert or Roquefort, a cool beer, a mellow vino or other gift from the fungal world while you contemplate this issue of *PAN*.

Notes

1. Alison Pouliot is an ecologist and environmental photographer.
2. John Ryan is a Postdoctoral Research Fellow in Communications and Arts at Edith Cowan University in Western Australia. He is the author of *Green Sense: The Aesthetics of Plants, Place and Language* (TrueHeart Press, 2012), *Two with Nature* (with Ellen Hickman, Fremantle Press, 2012), *Unbraided Lines: Essays in Environmental Thinking and Writing* (Common Ground, 2013) and *Digital Arts: An Introduction to New Media* (with Cat Hope, Continuum, forthcoming 2014). His interests include environmental writing, ecocriticism, ecocultural studies and Australian botanical history.
3. See, for example, D. Arora and G. Shepard (2008), “Mushrooms and Economic Botany”, in Special Mushroom Issue, *Economic Botany*, 62(3), pp. 207-212; and T. May (2005), “Forgotten Flora Remembered”, *Australasian Plant Conservation*, 14(1), pp. 2-3. These two special issues on fungi are from the fields of ethnobotany and conservation biology, respectively.
4. A. Rayner and L. Boddy (1988), *Fungal Decomposition of Wood: Its Biology and Ecology*, John Wiley & Sons, Bath.