

Mining and Indigenous Lifeworlds in Australia and Papua New Guinea

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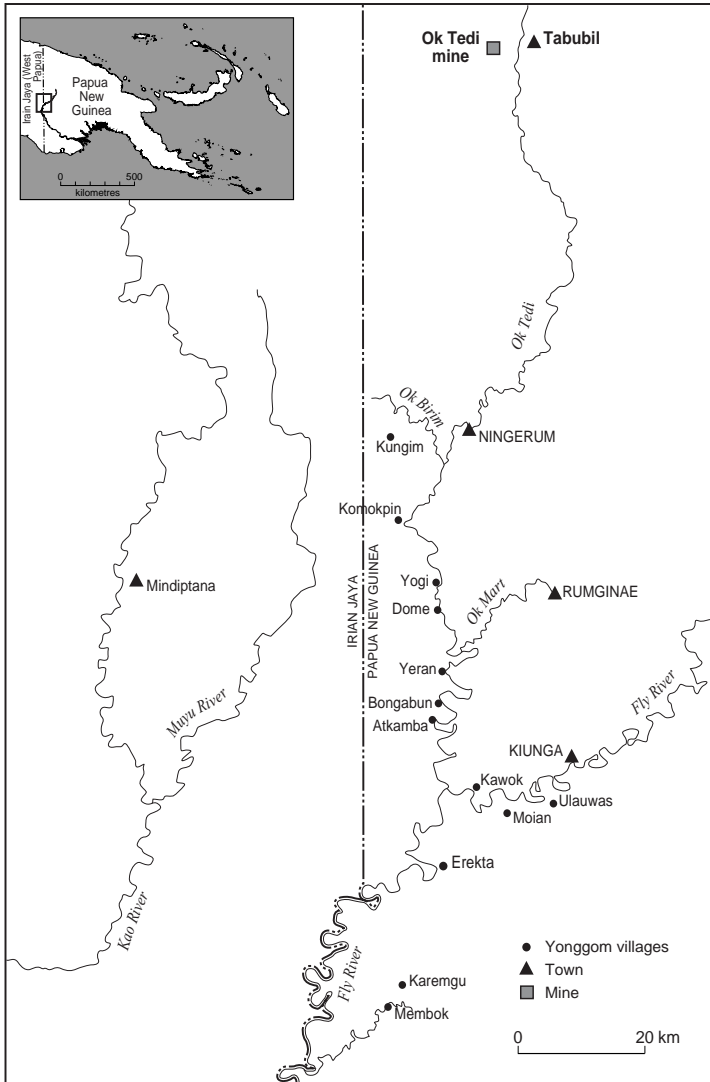
CHANGING VIEWS OF PLACE AND TIME ALONG THE OK TEDI

Stuart Kirsch

The dialectical oppositions between place and space, between long- and short-term time horizons, exist within a deeper framework of shifts in time-space dimensionality that are the product of underlying capitalist imperatives to accelerate turnover times and to annihilate space by time. The study of how we cope with time-space compression illustrates how shifts in the experience of space and time generate new struggles in such fields as aesthetics and cultural representation, how very basic processes of social reproduction, as well as of production, are deeply implicated in shifting space and time horizons. The production of spatio-temporalities is both a constitutive and fundamental moment to the social process in general as well as fundamental to the establishment of values. And that principle holds cross-culturally as well as in radically different modes of production and significantly different social formations. [Harvey 1996:247]

This is an ethnography of loss and of innovation. My subject is the response of the Yonggom of Papua New Guinea to the impact of the Ok Tedi copper and gold mine on their environment. (For locations see Map 9.) In production since the mid-1980s, the mine releases 30 million tons of tailings and 40 million tons of waste material into the local river system annually (Ridd 1997). Pollution from the mine has resulted in deforestation, the destruction of garden land and sago swamps, the disappearance of birds and other wildlife, and unknown chemical hazards. In this chapter, I examine the consequences of these changes for the Yonggom and their relationship to the surrounding landscape.

This discussion is intended to contribute to debates about the impact of large-scale resource development projects on indigenous communities, which can destabilise the conditions through which



Map 9: The Ok Tedi mine and Yonggom villages in Papua New Guinea

these societies reproduce themselves.¹ Euro-American assessments of environmental impact, which emphasise economic costs and benefits, biological continuity and aesthetic impairment, are insufficient

for analysis of Yonggom responses to pollution caused by the Ok Tedi mine.² It is necessary to account for their experience and understanding of local landscapes as well as the kinds of social processes they build from them (see Strathern 1988; 1997:7). In my inquiry into these practices, I take as my starting point the idea of 'place' as articulated by Steven Feld and Keith Basso (1996) in their edited collection *Senses of Place*. Whereas the contributors to that volume emphasise the ethnographic task of 'set[ting] forth as accurately as possible what being-in-place means' (Casey 1996:15), my focus is on how such basic understandings may change.³ I describe how the deterioration of local landscapes has led to an ontological shift in Yonggom perspectives on place and time, and trace the conceptual and epistemological dimensions of these changes.

My argument thus attempts to bring together political economy and phenomenology. In *Justice, Nature and the Geography of Difference*, David Harvey (1996:315) argues that there is a dialectical relationship between capitalist or modernist space-time and the phenomenological experience of place. Nonetheless, he maintains that the interconnections between places established through the global economy requires that 'we should start to think of these arguments not as mutually exclusive but oppositions which contain the other' (ibid.:315). Alternative ways of conceptualising environmental relationships can enrich contemporary debates about the costs of economic development. This analysis of Yonggom ideas about place and loss is therefore intended to amplify the power of indigenous ideas as counter-narratives to the prevailing discourses of capital.

I also take up the problem raised in the debate between Alfred Gell (1992a) and James Weiner (1995b) regarding the differences between art and technology. Weiner argues that Melanesians see art and magic as means of revealing those aspects of the world that make creation and production possible. He reiterates Heidegger's call for a non-productionist metaphysics as an alternative to the metaphors of production ingrained in capitalism. This argument is central to my discussion and analysis of how the Yonggom perceive their landscape as possessing hidden possibilities that can be revealed through enchanted means. Their relationship to the unseen dimensions of their world has been compromised by the mine, leading them to conceptualise new modes of 'being-in-place.'

I begin by describing how Yonggom actions within the landscape are incorporated into narratives that link biography and history to

place. Pollution from the mine has transformed local places along the river, disrupting the spatial form of these narratives. In response, the Yonggom have begun to emphasise chronological frames of reference. These changes affect their relations with the other beings with whom they share the landscape, which has implications for their religious beliefs and practices. Environmental degradation challenges their perceptions of environmental security and risk as well. By forging alliances with conservationists and other international activists, however, the Yonggom and their neighbours have been successful in challenging the mine through protest and legal action. These events influence Yonggom debates about the future and the nature of change in the new millennium. In conclusion, I discuss the relationship between the enchanted technology of the Yonggom and capitalist understandings of productivity, and argue that political-economic analyses should take account of alternative modes of 'being-in-place.'

Place

When I began research among the Yonggom in 1986, local histories were mapped onto the landscape, with places metonymically representing experiences in a person's life. In the course of a lifetime, the Yonggom acquire detailed knowledge of their land. They learn the location of useful trees and plants. They know the fruit stands where birds come to feed and how to find pig and cassowary tracks. They know where to catch fish, crayfish and turtles. The Yonggom also transform the landscape through its use. They maintain a network of trails, camping places and catchments for drinking water. They control sago stands through selective harvesting and replanting. They clear and burn the forest for swidden gardens. They plant fruit trees in these clearings as well, which reach maturity long after their gardens have been abandoned. They fell trees to make canoes and to build houses. Gradually the landscape is transformed so that it reflects the biography of its owner.

Lineage names signify physical places as well as social groups. When a lineage divides in two, the new groups are identified by residence, so that Miripki lineage, for example, may become Miripki-kubunun, Miripki-on-the-waterfall, and Miripki-yumkap, Miripki-by-the-bananas. Places may also figure in the formation of *won* reciprocal nicknames that formalise dyadic relationships (Kirsch 1991; cf. Schieffelin 1976:56-57). Land and identity are coincident.

The Yonggom also read the traces of others on the landscape. When walking through the forest, people identify the hunting party that camped at the junction of two paths or the man who planted a tree that matured after his death. They refer to the owners of a sago stand, the hunter who shot a flying fox in the arms of a breadfruit tree, or the location of a male initiation ceremony (*yawat*). Places are linked with human activity; as Edward Casey (1996:27) suggests: places 'not only are, they happen.'

These inscribed histories extend beyond the lifetime of the individuals whose activities produce them. What Weiner (1991) has written about the Foi holds true for the Yonggom as well: 'the life of the deceased is depicted as a series of places that belonged to him, or that he inhabited.' After a death, people mourning the loss of a relative or a close friend may refuse to leave the village for long periods of time to avoid confronting the memories of the deceased that continue to echo through the forest.

Throughout southern Papua, biography is conceived of as itinerary, as Feld (1996:113) has observed for the Kaluli. The conjunction of place and event provides the primary mode of remembering and representing past experience. Yonggom narratives about the past are organised in spatial terms: where one was born, lived as a child, went hunting or made sago, and so on. Individual lives are seen as a series of movements across the landscape. Memories of the past are linked together like campsites along a trail, organised by physical proximity rather than chronological sequence. Bumok Dumarop told me her life story this way, describing how she moved from the Muyu River to a place called Dunumbit, then to a settlement at Mokbiran and from there to the area along the border, where she spent several months helping an uncle prepare sago for a feast. Later she moved across the border, settling in a village beside the Ok Tedi River in Papua New Guinea.

While time flows through Dumarop's narrative, she tells a story of movement between places. These are not arbitrary landmarks, but the locations of meaningful activity. Yonggom narratives make the nexus of person, place and event come alive in public consciousness and memory.

By virtue of being related as journeys, these Papuan spatial ontologies always incorporate the passage of time, as Andrew Lattas (1996) emphasises in another context. Alfred Gell (1992b) compares two modes of representing time, the first of which organises events into a

linear sequence of past, present and future. Alternatively, events may be categorised in relation to each other; that is, whether one occurs prior to, simultaneous with, or subsequent to the other. Whereas chronological time emphasises linear relationships, Yonggom narratives about place stress relative position rather than absolute order. Place and time are incorporated into both modes of representing experience, but with differential emphasis.

Howard Morphy (1995:188) makes this point in his analysis of Yolngu ideas about place and time:

Place has precedence over time in Yolngu ontogeny. Time was created through the transformation of ancestral beings into place, the place being for ever mnemonic of the event. They 'sat down' and, however briefly they stayed, they became part of the place for ever. In Yolngu terms, they *turned into* the place. Whatever events happened at the place, whatever sequences they occurred in, whatever intervals existed between them, all becomes subordinate to their representation in space ... What remains is the distance between places rather than the temporal distance between events.⁴

For the Yonggom, temporality is also subordinated to the landscape, which is the form taken by history. Travel through the rainforest reveals places that were sites of meaningful events in the past. The future is also conceptualised in terms of the revelation of possibilities otherwise concealed within the landscape, as I describe below. The resulting notion of place has an unseen dimension that is central to Yonggom ideas about productivity and the manifestation of opportunity.

Loss

Today, when walking near the Ok Tedi River with a friend, it is difficult to locate the places where we once shared a meal or went swimming. Where towering trees once stood there are only ghostly tree trunks and the creeks have all been buried by sand. This transformation of the landscape not only produces spatial disorientation, it also displaces memories of the past. A young woman who remembered making sago with my wife expressed dismay that the sago swamp where they once worked together was now dried up and filled with sand. Memories previously anchored by the landscape have lost their mooring.

During a recent visit to the Ok Tedi, I walked with Buka Nandun to where his mother used to make her gardens. Until recently this was an island in the Ok Tedi River known as Dutbit, the site of fertile land that bore fruit without fallow. Tailings from the mine have covered the island, which has been joined to the mainland. No one gardens here any longer. The few mature trees that remain lean precipitously. Leading me to an area through which he has walked many times before, Buka lost his way in a thicket. Craning his head right and left, he searched in vain for a landmark that might show him the way out. Pollution has erased all traces of the past.

What is the meaning of these empty places? What kind of places are these? Casey (1996) describes memory as fixed to place and places as the repositories of memory. With the destruction of local landscapes, memories are severed from the site of their creation: Dutbit Island is not just an empty place, but a scene of loss.

In life history interviews, women in the villages described how their lives have changed since production began at the mine. They expressed feelings of *mimyo*, of sorrow and loss, at the way that the landscape along the river has been disfigured.⁵ Duri Kemyat from Yogi village, a woman in her mid-fifties, described this transformation in the stylised form of a lament, the speech genre associated with bereavement:

Before the river was not like this;

it makes me feel like crying.

These days, this place is ruined,

so I feel like crying.

Where I used to make gardens,

the mud banks have built up.

Where I used to catch prawns and fish,

there is an empty pool ...

So I feel like crying.

Before it wasn't like this.

We had no difficulty finding garden food and wild game.

We had everything we needed.

Now we are suffering and I wonder why.

The narrative coupling of place and event is frequently associated with the expression of loss in Papuan societies. This may take the form of the loss of a human life or the disappearance of the traces of that person's life in the form of abandoned gardens or house sites that

have been reclaimed by the forest in the absence of the human intervention required to keep these places open and productive. These losses are revealed through movement across the landscape, whether a physical journey, the biographical accounting of one's movement between places, or a metaphorical journey, as in the Kaluli *gisalo* (Schieffelin 1976, Feld 1982, Weiner 1991, Munn 1996). The actions of the other beings with whom the Yonggom share the landscape may also call attention to loss. For example, the song of the bird *on kuni* (hooded butcherbird) evokes memories of deceased relatives. Flowering sago palms are associated with feelings of sorrow and loss as well. These trees only flower once after twelve to fifteen years of growth. They must be harvested before flowering as the efflorescence consumes the bulk of the tree's edible starch. A flowering sago palm, because its starch has gone to waste, evokes memories of relatives too old or too frail for the labour required to process sago, or who have already died.

In these cosmologies of emplacement, aspects of the landscape are revealed by human and non-human movements and events, such as a journey between places or bird song, evoking a sense of loss that is generically associated with place. The resulting association between memory and place constitutes their experience of loss and has shaped the Yonggom response to the mine's destructive impact on their landscape. Kemyat's moving elegy to place and loss – 'Where I used to make gardens/the mud banks have built up/Where I used to catch prawns and fish/there is an empty pool ... /So I feel like crying' – reflects their understanding of the landscape as the embodiment of history and therefore the medium through which the experience of loss is made explicit.

If the 'power of place is that it counters the process of entropy' (Casey 1996:25), then the challenge to the Yonggom is how to retain their memories in the wake of destruction. Peter Munz (cited in Hughes 1995:3-4) compares the separation of the structures of time from human experience to filleting a fish, which leaves behind 'something like a mollusc – a wobbly, still undifferentiated mass ... deprived of its time skeleton'. Yonggom narratives have their own sense of time, which is mapped onto concrete places and represented as movement across the landscape. These narratives are the 'time structures' that give form to their experience of time and place. In response to the destruction wrought by the mine, Yonggom narratives have been reworked to incorporate alternative modes of temporality.

Time

Yonggom narratives of past experience are increasingly structured in chronological terms. Some of these chronologies were whispered furtively to me, much the way that people once divulged the *waruk* magic names of objects. *Waruk* represent the true names of things: of animals, of lightning, of the ground itself. Knowledge of *waruk* gives its owner influence over the things to which they refer. People only revealed *waruk* names to me in confidence; when alone they sometimes introduced important myths by reciting a string of *waruk* names that authenticated their story, much like totemic names are recited in the Sepik (Harrison 1990).⁶ These chronologies delineate the gradual incorporation of the Yonggom into broader social, political and economic systems. They are structured by key historical events, such as the arrival of the first missionaries, the founding of the town of Kiunga, the establishment of the village and the beginning of production at the mine. These important dates are treated analogously to *waruk* names that bring about change by virtue of being spoken aloud; the implication is that knowledge of key historical dates confers power over the processes of change. Kewo Yang, a retired policeman, insisted that I record the chronology of the mine, from the early days of prospecting in the 1970s to the problems after production began in 1984.

People have begun to recount their life histories in chronological form as well. Some of these stories begin by referring to the places where the events occurred, but shift to a temporal framework after 1984, the year that a cyanide tap at the mine was left open overnight, killing thousands of fish, crocodiles and turtles along the Ok Tedi. Andok Yang, a woman from Dome village, described how circumstances changed after the cyanide spill: 'People wondered what would happen next. This was the beginning of the sand banks that later covered our gardens along the river. By 1986, the plants and trees along the river began to die. Their leaves turned yellow and fell off. Gradually the effects of the mine spread into the swamps where our sago palms grow and into the surrounding forest. The creeks filled with mud, killing the sago trees. The sand banks along the river grew higher ...'

The shift from a predominantly spatial representation of past experience to temporally organised narratives is one of the conceptual consequences of environmental degradation caused by the mine.

It implies a fundamental change in how the Yonggom view their relationship to the world around them. With reference to past events becoming increasingly structured by abstract chronologies, their remembrance of things past is no longer linked to their surroundings. New biographies are being imagined that have the potential to separate experience from place.

In the anthropological literature on the politics of time, calendars and clocks are usually described as instruments of domination through which political elites establish control over the broader body politic (Bourdieu 1977, Rutz 1992). Henry Rutz endorses this view: 'A *politics* of time is concerned with the *appropriation* of the time of others, the *institutionalization* of a dominant time, and the *legitimization* of power by means of the control of time' (ibid.:7). Katherine Verdery (1992:37) emphasises the political context of encounters between the 'bearers of nonwestern or non-capitalist temporalities ... and the new organizations of time brought to them by capitalist commodity production.' She defines the politics of time as a political struggle between 'social actors who seek to create or impose new temporal disciplines ... and the persons subjected to these transformative projects' (ibid.:37). Most importantly, she observes that 'struggles over time *are* what construct it culturally, producing and altering its meanings as groups contend over them' (ibid.:38). Social consciousness of time is the product of power relations.

The Yonggom have turned to new forms of chronological and calendrical reckoning in response to environmental degradation and its threat to local models of place and time. Although facilitated by education and literacy (Kulick 1992, Smith 1994), these changes suggest other means by which capitalist modes of production can influence local ideas, both by disrupting local constructions of place and by providing alternative ways of conceptualising experience. Temporal innovation, including a linear model of events, provides the Yonggom with new ways to make reference to the past.

These new forms of temporality have two significant implications for how the Yonggom conceptualise their relationship to the landscape they inhabit. Whereas their experiences once overlapped completely with the lives of the animals and other beings with whom they interact, the decoupling of time from place emphasises ontological differences between humans and the other inhabitants of their shared landscape. While the Yonggom otherwise view the future

as an aspect of place that can be revealed through enchanted means, these new models of time separate the present from the future.

The nature of communication

Central to Yonggom notions of place is the presence of animals and other beings that are conceived of as having powers of agency comparable to that of people, much as Don Gardner (1987:170) has described for the Mianmin:

The central feature of these animistic beliefs is that the natural and social worlds, the worlds of things and persons, are subsumed under a single and familiar scheme of explanation.

The crucial aspect of such schemes is the all-persuasiveness of agency as a principle of the functioning of the world and explanation of events of all kinds (ibid.:162).

According to this perspective, agency is not restricted to humans, but extends to the other beings with whom the Yonggom share the landscape, a quality that Tim Ingold (1996:129) describes as ‘interagentivity.’

Yonggom knowledge about the world around them is structured by communication with the other inhabitants of their landscape. They are adept at recognising many bird species by their calls, such as the ear-piercing cry of *on kawa*, the sulphur-crested cockatoo, or the nasal honking of *ono*, the greater bird of paradise. Birds indicate the time of day by their calls and movements, the seasons by their appetite for ripening fruits and the weather by migrations during periods of drought. Birds mark sacred time as well; during male cult ceremonies, everything grows quiet as the birds are said to cease singing altogether. Birds identify themselves or speak in Yonggom language, like the large-tailed nightjar known as *on dokdok*, which calls out *‘dokdok dokdok, dokdok,* or the bird the Yonggom call *on kam*, which says *‘kwi, kwi, kwi,* meaning ‘like that, like that, do it like that.’ Birds also signal impending misfortune by appearing at the wrong place and time: an owl calling in the village at night means that a sorcerer is on the prowl.

Other animals communicate with the Yonggom as well: cicadas crying out before dusk tell people still in the bush to hurry home. Natural phenomena also convey messages: the golden light of the sunset known as *dep aron*, named for the colour of the marsupial

bandep, warns of death. The appearance of animals in dreams provides insight into the future. A dream about a crowned guria pigeon indicates that a *kumka* assault sorcerer will come to the village. A kingfisher's appearance in a dream is a harbinger of illness. Pigs and cassowaries have inverse relationships with men and women in the dream world: a pig's appearance in a dream means that a man will visit the village, whereas to dream of a woman signals an opportunity to hunt for cassowaries. The referents of these signs are not limited to natural events, such as the danger posed by rising rivers or a propitious time to plant. They also provide critical social information, including warnings, predictions and the indication of opportunities upon which people can act (Wagner 1972:55-84). As Gardner (1987) suggests, the laws governing the physical world are seen to guide human affairs as well.

Communication between the Yonggom and the other inhabitants of the landscape moves in both directions. The Yonggom use magic spells to convey their intentions and desires to the birds, fish and other animals with whom they share their landscape. The following invocation is used when hunting guria pigeons:

<i>on kurim</i>	guria pigeon
<i>kup ku kirot mene</i>	you come here quickly
<i>menip kop, weetmore wana</i>	come forward so that I can see you
<i>ne ku munggi bopman</i>	I am starving to death
<i>kowe, kwi</i>	so, do it like that

A similar spell is used to catch fish:

<i>on yip, ku ne doberan ki</i>	you fish, I am waiting
<i>kirot, yaro minime!</i>	quickly, you must come!
<i>menip kop</i>	all of you come
<i>monbe, monbore</i>	shoot, I am shooting
<i>de ambioom wana</i>	and then I am going home

These hunting spells urge animals in the rainforest and the river to come forward so that they 'may be seen.' This is sometimes expressed through the use of the adjective, *ayimamip*, which combines the verb stem *aye*, meaning to hit, strike or shoot, and the suffix *-mamip*, which like the English -able and -ible implies capacity, fitness or worthiness. Thus *ayimamip* means 'possible to shoot' or 'within range.' The contrasting term is *akmimamokban*, which means 'hidden'

or ‘unseen,’ and is composed of the verb stem *akme*, to see, the negative marker *ban* and the infix *-mamok*. *Mamok* is the negative form of *mamip*, implying the lack of capacity. For example *animamokban*, meaning ‘inedible,’ is a parallel construction using the verb stem *ane*, to eat.

These spells thus preside over the transition of things that are hidden or unseen, known as *akmimamokban*, to that which is visible or *akmimamip*.⁷ In this latter state, that which was concealed is now manifest, creating an opportunity upon which one can act, much like a message from the natural world. This magical strategy operates as a discovery procedure, a technique of elicitation, a form of revelation.⁸ The intended event, in this case a successful hunt, involves a process of manifestation in which the seen and unseen aspects of the world are brought together. Production in the Yonggom view entails the revelation of the future through the conjunction of these two aspects of reality.

These spells also exemplify Weiner’s call for a non-productionist metaphysics. ‘What if the world of production and making, of consumption and controlling was only elicited,’ Weiner asks rhetorically, ‘what if it were the reflexive by-product of something else, like magic and art?’ (1995b:33). Yonggom hunting magic illustrates the assertion that Melanesians view magic and art as foundational acts. Productivity is contingent upon magical techniques of elicitation that ‘bring-forth’ that which is otherwise hidden or concealed.⁹ These magic spells reveal the hidden potential of place.

Yonggom hunting spells do their work, however, by the magic of communication: they compel, they cajole and they persuade.¹⁰ They give instructions, such as *mene*, ‘you come,’ which may be emphasised by the use of the imperative *minime!* or ‘you must come!’ They persuade by means of exaggerated claims, such as *ne munggi bopman*, which literally means, ‘I am starving to death.’ They use temporal adverbs like *kirot*, or ‘quickly,’ to establish a sense of urgency. This may be underscored by use of the contrasting verb, *dobere*, to stand and wait. *Dobere* implies impatience as well, as in the formulaic utterance: *ku ne doberan ki, kirot, yaro minime!* which means: ‘I am standing here waiting, so you must hurry up and come!’ The spells also refer to the completion of the intended act by a shift in tense from the present to the transitive (for example, ‘shoot, I am shooting’) and by reference to events that come afterwards, *de ambioom wana*, which means, ‘and then I am going home.’

These spells are the vehicle through which the hunter attempts to impose his will on the other beings with whom he shares the landscape. They depend on the assumption that people and animals form a single speech community. Relying as they do on persuasion, the spells acknowledge the agency of these other beings as well.¹¹

Through their messages and their appearance in dreams, the other beings with whom the Yonggom share the landscape invoke a notion of time in which the future is made manifest in the present. Much like events in the past are revealed through movement across the landscape, the future is an unseen aspect of the present that may be revealed through enchanted means. Yonggom notions of time are structured by the same opposition between the seen and the unseen that organises their sense of place. The Yonggom do not have a linear or evolutionary sense of time, but a view in which the future appears in the present much like the hidden is made manifest in a clearing through magic. The future is a hidden aspect of reality that can fill up the present (the now) with signs of itself, much like magic fills up the present (the here) with things. The future is therefore present but not visible until it is made manifest through the enchanted agency of the Yonggom or the other beings with whom they share the landscape.

Yonggom religious beliefs are animated by the presence of the beings with whom they share the landscape: what are the consequences for their religious imagination when there are no longer any fish in the river, no birds overhead and no game nearby, as is the case along the Ok Tedi River today? Whereas Yonggom hunting magic works by revealing what is concealed by the rainforest and the river, pollution from the mine has destroyed the hidden potential of the landscape. Magic has lost its audience. The forests have grown quiet and the dialogue the Yonggom once had with the animals around them has all but ceased.

Yonggom ritual and myth are populated by birds, fish and other animals. Yet symbols are only powerful repositories of meaning when the referents are familiar. Without exposure to these animals in their natural habitats, Yonggom rituals may lose their capacity to communicate insights about the human condition or to solve the dilemmas that people face. Under such circumstances, myth may degenerate to the level of amusing folk tales, known as *stori tasol* in the Pidgin. Even if the message of the myth remains clear, its characters no longer share the landscape with the Yonggom. Similarly,

some people now see ritual as something that tricks rather than enlightens them.¹² Although hunting magic may still be effective away from the river, where the land is not affected by the mine, its local collapse foreshadows a time in which magic will no longer have any efficacy. These narrative conventions are only powerful and compelling because they have effects in the material world, and when that world alters profoundly, the power of speech itself may become attenuated.

From security to risk

Yonggom subsistence once depended upon their knowledge of a wide variety of plant and animal species. They traded with their neighbours, but were largely self-sufficient in terms of food production. As they became more active participants in the world economic system, they began to exchange their labour, as well as a share of their garden, forest and riparian products for commodities produced elsewhere. Until recently, however, their environment provided them with both subsistence and security.

This aspect of the Yonggom relationship to the physical environment has changed in two fundamental ways. First, they are haunted by a vision of 'environmental collapse' comparable to the biological concept of trophic cascade (Kirsch 1997a). In addition to the immediate problems caused by the mine – the dead trees, the river dried up and full of mud, and the loss of fish, birds and other animals – the Yonggom perceive a variety of other changes in the world around them. They say that the sun has become hotter and burns their skin, that the rainy season lasts longer, that the stars and the moon are no longer as bright in the night sky, that rain harms the plants in their gardens and that the wind has become abrasive. They question the capacity of the world to sustain them. They use the term *moraron*, corrupted or corroded, like a piece of wood that has decayed or food that has become rotten, to describe the forests and rivers affected by the mine (Kirsch 1997a:149).

Yonggom fears about 'environmental collapse' reflect the new forms of risk created by the mine. In *Risk Society*, Ulrich Beck (1987: 154) analyses the social costs of environmental risks, arguing that modern forms of industrialisation have brought about a radical change in our relation to the world, in that our senses no longer provide us with an adequate understanding of our surroundings and

the dangers posed to us by pollution.¹³ Yonggom fears of 'environmental collapse' are directly related to their inability to assess the risks associated with pollution from the mine.¹⁴ They lack a clear understanding of the way that pollutants may be transported in the air, through the water, or beneath the ground, and where the resulting lines of safety may be drawn.

We can say, as does Stephens (1995) for the Sami, that pollution brings about a 'doubling' of the world (see also Beck 1987:154).¹⁵ Even if Yonggom sago palms show no outward signs of damage, they may not bear the normal quantities of starch. Even though their gardens initially appear prosperous, they may not yield the expected harvest. Surface appearances may mask the underlying reality of the mine's destructive impact. The 'doubling' of the world is of particular significance to the Yonggom given the association between productivity and the unseen world. Magic spells and *waruk* names, along with bird calls and other natural events, give the Yonggom access to this invisible realm. Pollution from the mine has also transformed this aspect of place, compromising the creative potential of the landscape. Conditions along the river prevent Yonggom magic from accessing the powers of the unseen world.

The other major change in Yonggom relationships to the world around them is that survival no longer depends on local resources. Today people are more likely to bring home food from a trade store than to parade game from the forest through the village. The largest source of income for the Yonggom is cash compensation for the mine's impact on their river and forest. These payments are scheduled to continue throughout the remaining decade of production at the mine. Instead of living off the land, the Yonggom must rely on compensation payments from the mine. In other words, there has been a shift from a subsistence economy dependent upon the use of natural resources to an economy based on resource rents, or payments made according to the value of their natural resources to others (Filer 1997b). Unlike ordinary resource rents, however, the Yonggom do not receive compensation in return for the consumption and use of their resources by others parties, but for the destruction of the productive capacity of their land as the indirect result of activity carried out elsewhere. Their environment is no longer a site of productivity, but a scene of loss. It no longer provides them with security, but confronts them with new, indecipherable risks.

New geographies of the imagination

In response to the challenges posed by the environmental impact of the Ok Tedi mine, the Yonggom have sought to perpetuate and expand their spatial understanding of the world. The location of the mine in the mountains to the north means that the character of the place in which the Yonggom live is largely determined by action taken at a distance. Rather than accept the terms brokered by the mine and the state, which permits the release of vast quantities of mine tailings and other waste material into their river system, the Yonggom embarked on a series of global journeys in which they successfully challenged the mine in a precedent-setting legal battle as well as in the court of public opinion (Kirsch 1996, 1997b). The result of their lawsuit was a negotiated settlement in June 1996 worth approximately US\$500 million in compensation and commitments to future tailings containment.

By forging connections between these widely dispersed locations of capital and power, the Yonggom have been able to identify and respond to the space-time compression produced by the mine. Their campaign was successful because they were able to solicit support from an international network of environmental and legal activists, who helped them to regain control over their land. Andrew Strathern (1984) once used his informant's expression 'a line of power' as the title for a book examining the exchange cycles linking big-men across Melpa communities; new global 'lines of power' connect the Yonggom to their Melbourne lawyers and to political advocates around the world. Their new global imaginary extends from Port Moresby to Australia; in the Americas from Northwest Territory in Canada to New York, Washington, DC, and Rio de Janeiro; and in Europe from London to Amsterdam and Bonn, all stops along their campaign trail.

The Yonggom struggle against the mine is an example of so-called 'Lilliput strategies' of tying down and impeding transnational flows and globally dispersed work chains by linking 'local struggles with global support' and connecting 'local problems to global solutions' (Wilson and Dissanayake 1996:3). The international context of their activism follows the need to trace 'the complex and sometimes ironic political processes through which cultural forms are imposed, invented, reworked, and transformed,' as Akhil Gupta and James Ferguson (1997:4) have recently argued. Central to these processes

is the effort to 'recover the concreteness of space [or place] that capitalism makes disappear' (Wilson and Dissanayake 1996:3; cf. Harvey 1996).

Yonggom magic-of-place and its ability to elicit new opportunities from the landscape might be compared to the mapping of global connections that manifests – as a form of productive activity itself – previously unknown links between places.¹⁶ Their geographic imagination and their ability to map out alternative space-time and power relations enabled the Yonggom to conceptualise and realise an alternative future through the mechanism of protest and the formation of the global alliance that ultimately overcame Australia's largest corporation.

Future thoughts

Pollution from the Ok Tedi mine is not the only force that fuels Yonggom alienation from their environment. Urban migration, wage labour, Christianity and emerging national consciousness all contribute to the shift as well. These processes have parallels throughout Papua New Guinea, including areas unaffected by large-scale resource extraction projects.¹⁷ Nonetheless, the mine's impact on the Yonggom has clearly pushed them further and faster in this direction.

These changes are reflected in Yonggom debates about the future. In 1996, I had several conversations in which people expressed their concern over the fate of the *aman dana*, the children of the future. Older people lament the fact that the youth of today have grown up without learning how to hunt and fish, to make string bags from tree bark, or to build houses without nails and sawn timber. The Yonggom have grown accustomed to eating rice and tinned fish and many young people resent the hard labour involved in gardening and making sago.

Their expectations for the future appear in two competing forms. Some of the members of an evangelical Christian church emphasise the importance of the coming millennium, which they expect to usher in a new era characterised by material prosperity. This future is defined in terms of accessibility to Western technology, which is sometimes referred to as the magic that enables Europeans to obtain whatever they wish simply by thinking of it. The Yonggom, in contrast, must work hard for their food by planting gardens, processing

sago and by hunting and gathering. As Weiner (1995b:33) suggests, Melanesians may see 'our technology as a concealed or repressed form of *their* art [and magic].' Gell (1992b:58) refers to this as the 'effortless technology' that is a shadow of Euro-American production.

These European powers are also described as the magic of Digore, a mythological figure with the power over life and death who, like Jesus Christ, left after promising that he would eventually return. Digore is given credit for innovations such as houses with iron roofs and showers, stores full of food and other manifestations of Western wealth and technology. As one informant explained: 'When Digore returns ... in the year 2000, there will be a new time and all of us will live together [as equals], European and Papua New Guinean.'

The millennial view holds that there is an opposition between the Papua New Guinea universe of villages, bush material houses and traditional technologies, and 'modern' life characterised by towns and technological achievements controlled by Euro-Americans. This perspective also takes the new emphasis on chronology to its logical conclusion, attributing agency to a particular moment in time, the year 2000. It is also a globalising discourse, synchronising the fate of the Yonggom to that of all Christians. It marks a conceptual shift as well: previously the Yonggom located the potential for transformation within the landscape, elicited by their magic or communicated by the other beings which inhabit the area or appear in their dreams. In contrast, this group attributes the power to bring about change to an abstract moment of time, which is by definition independent of place.

Other people in the villages have competing views on this subject even though they have comparable aspirations. A village catechist for the Catholic Church disputed millennial expectations popular among members of the rival evangelical church: 'The changes [they predict] are already taking place. The road to [the town of] Kiunga is coming closer and soon they will build a bridge over the Ok Tedi River and complete the road to the village. People have already begun to build permanent houses. Soon you won't see sago roofs at all, only tin roofs. Not long afterward, [electric] power will be coming in as well. These are the real changes and they are already taking place.' The catechist sees the technological markers of modernity – roads, permanent houses and electricity – as slowly diffusing across the landscape, moving steadily closer to the village. In keeping with Yonggom notions of creating possibilities by revealing

the hidden potential of the landscape, the catechist suggests that their own political and legal efforts have brought these developments to the village.¹⁸

The two perspectives rely on opposing assumptions about the nature of change. The millennial scenario posits a succession of epochs that replace one another, a position familiar to anthropologists from an earlier generation of cargo cults (Lawrence 1964, McDowell 1988). In contrast to most cargo cults, however, the millennial transformation is not seen to be the result of human endeavours in ritual and exchange, but of chronological time with its synchronising frame and the universality that such a temporal grid implies. The resulting model of change is more conducive to conceptualising simultaneity with other people and places, a dimension of cargo cults that analysts have not always emphasised. The alternative perspective, represented here by the Catholic catechist, is that change is gradual, progressive and under way, but the direct result of human action and creativity.

The two views also incorporate very different perspectives on how the future manifests itself. The first scenario involves an 'effortless' episodic transformation in which the millennial future will manifest itself in the present at a pre-ordained moment of time, while the second scenario is dependent upon the productionist rhetoric of development and progress. Prior Yonggom understandings of the future as potentially manifest in the present correspond to the millennial view, but agency is displaced to magical forms of chronology, whereas the linear model of the future implies a productionist view that, while still grounded by place, involves forms of agency that are restricted to humans.

Conclusions

Before the mine, Yonggom ontologies emphasised place over time and the Yonggom saw their lives as unfolding in a landscape that they shared with other beings that possessed powers of agency comparable to their own. Historical relationships formulated in terms of the movement of people across the landscape have been interrupted by the destruction of the places that embody these memories. Yonggom concerns about these changes articulate with narratives in which the experience of loss is revealed through the landscape, shaping their response to environmental degradation. With the

destruction of the landscape and the damage to resources along the Ok Tedi River, these relationships have been called into question and new risks have been created by the mine, raising the spectre of 'environmental collapse.' The Yonggom have turned to new forms of chronology to re-order their memories in a form that transcends place, leaving them estranged from the other beings with whom they previously shared the landscape. Magical forms of productivity have been jeopardised and the Yonggom face the challenge of a 'doubled' world that threatens the creative potential of place. The destruction of the landscape along the Ok Tedi River threatens to undermine their sense of place, history and enchanted forms of productivity, but also illustrates their capacity for overcoming these challenges.

This work raises an important question about the appropriateness of phenomenological realism for ethnographic description, which might be seen to exoticise the lifeworlds of the people under study. Yet Casey (1996) argues the connections between memory and place are a universal dimension of human experience, an assertion supported by the other contributors to Feld and Basso's (1996) *Senses of Place*.¹⁹ While the experience of 'being-in-place' is valued by Euro-Americans, the Yonggom organise their most fundamental understandings of the world in these terms. Their ideas about enchanted forms of production emerge from their interactions with the living landscape, as does the importance they attribute to place over time.

Harvey (1996:315) argues that place-based phenomenological realism and alternative relations formed through capitalist space-time share a relationship of mutual encompassment. This is reminiscent of Weiner's argument that art and technology constitute a figure-ground reversal in which art reveals the relations obscured by technology (and vice versa):

there is always a counter-invented world that emerges along with the intended objects of our conscious efforts but which remains concealed or unknown. This world is created as an unintended by-product of the focussedness of people's perceptions, and makes itself felt as a resistance to those efforts. It is not brought out directly, but only indirectly – hence our conventional terminology of production, construction, and ordering do not accurately characterise its origins. And because it is a reflexive effort, as it were, of intentionality ... it requires specific techniques, which are themselves non-productionist, non-relational, non-

constructivist, non-representational, to make them visible. [Weiner 1995b:42]

I suggest that this figure-ground relationship applies more broadly to phenomenological understandings of place and the technological and productionist view of the world established through capitalism. Not only does an awareness of 'being-in-place' oppose experiences produced through capitalism, it can also reveal its hidden assumptions, making it possible to conceptualise alternative modes of being in the world. Thus while Marx argued that capitalism works to replace space by time, it is not a matter of the establishment of irrevocable difference but the privileging of one perspective that partially obscures the other. The lesson is that differences between Euro-American discourses about environmental impact and how the Yonggom perceive the changes to their landscape need not remain a 'permanent feature of fragmented postmodern sensibilities' (Harvey 1996:285).²⁰ Working out these relationships is as important politically in terms of debates about the environment as it is theoretically (ibid.:285).²¹ Perhaps the most significant element of the Yonggom case is the extent to which they have carried out the necessary interpretive work themselves in forging connections between their understandings of place and alternative modes of space-time relations imposed by capitalism.

In this ethnography of loss, I have emphasised the continuity of a tradition that puts place first in the imagination of the world. Feld and Basso (1996:9) have argued that 'place is the most fundamental form of embodied experience – the site of a powerful fusion of self, space and time.' Given the immense challenges posed by the transformations of their physical landscape, Yonggom use of chronological narratives, their creation of a global space for protest and their debates about the future might best be characterised as efforts to elicit new possibilities in their understanding of the dimensions of place. Like their hunting spells that work by revealing the unseen animals of the forest, these endeavours are intended to render visible their future along the Ok Tedi.

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Notes

1. In the Yonggom case, the consequences of environmental degradation outweigh the quiet but steady pressures of commodification that are the primary force of transformation elsewhere in Papua New Guinea (Foster 1995).
2. The economic costs of environmental impact include the consumption of resources with value as commodities and lost opportunity costs, although these assessments are limited by two factors: contemporary capitalism favours short-term calculation of economic costs and benefits, the problem that discourse about sustainability seeks to redress, and the assumption that economic valuation is universally applicable, which may 'bottom-line' values not appropriately reducible to economic variables or amenable to cost-benefit analysis (Rappaport 1993). The second mode of discourse is biological, measured in terms of impact on species biodiversity, population size and damage to particular habitats or ecological niches. The third mode of discourse is aesthetic, focusing on damage to the environment as something that may be experienced as pleasurable. Industrialised societies explicitly balance land used for production with landscapes set aside for consumption as 'nature' (Frykman and Löfgren 1987; Hirsch 1995:11).
3. Analysis of the conceptual consequences of environmental change may also facilitate comparisons of how ontologies of place and time change. In his book *A Place for Strangers: Towards a History of Australian Aboriginal Being*, Tony Swain (1993) adopts the extreme diffusionist position in claiming that the concept of time had no role in traditional Aboriginal beliefs, but was introduced through contact with other societies. In response to Swain, I would argue that place and time are not radically opposed, but mutually presupposing and that the processes that I have observed among the Yonggom should be understood as transformations of their ideas of place and time rather than the displacement of the one by the other. As Diane Austin-Broos (1996:6) wrote about the Aboriginal context, 'cosmology did not simply evolve as a different aspect to ontology emerged. Rather, large-scale change was accompanied by

extensive loss as well as transformation.’ She also argued that the ‘transition was more messy, more violent and more optimistic’ than Swain indicates, ‘in the sense of involving Aboriginal agency.’

4. Howard Morphy (1993:234–6) contrasts Aboriginal and European processes of locating and creating value in land: ‘In the case of Europeans, history and landscape progress from outside to inside, history articulates with the landscape and releases its potential. Landscape is given a value by its place in history and by its economic potential.’ In the Aboriginal case, however, landscape and myth (the Dreaming) are used to suppress or ‘mask’ the experience of history (ibid.:236, although see Rumsey 1994).

5. *Mimyoop* is the Yunggom term meaning sorrow and loss. It is also the name of the heart, which is described as the source of this feeling. Mimyoop is often referred to in terms of exchange; its archetypal form is in response to circumstances in which a relationship has been interrupted by separation or death. Sorrow is conceptualised in terms of a loss and the resolution of these feelings is contingent upon obtaining a replacement or compensation for what is missing.

6. Their influence is subject to the forces of entropy, however, so that the knowledge of these names must remain restricted if *waruk* names are to remain efficacious (see Evans–Pritchard 1929; Gewertz and Errington 1991).

7. Alfred Gell (1995:238) emphasises the auditory rather than visual dimensions of invisibility for the Umeda: ‘an audible but invisible object was entirely ‘present’ in a way difficult for us to grasp, in that for us such an object is ‘hidden,’ however perceptible. The concept of ‘hiding’ in Umeda culture was, in fact, quite different from our own ... [implying] not invisibility, but the concealment of auditory clues, as in the silent approach of an assassin.’

8. Maurice Bloch (1995:66–67) describes the central value of ‘clarity’ to the Zafimaniry of Madagascar, which extends beyond visual domains. The name of their most powerful medicine, for example, means ‘that which renders clear.’

9. Ingold (1996:145) argues that: ‘Hunter-gatherers, in their practices, do not seek to transform the world; they seek revelation.’ He (ibid.:144) challenges the dichotomy between ‘peoples’ practical-technical interaction with environmental resources in the context of subsistence activities, and their mytho-religious or cosmological construction of the environment in the context of ritual and ceremony,’ arguing that their myths are not a ‘metaphorical representation of the world, but a form of poetic involvement.’

10. Ingold (1996:131) makes a comparable claim that: 'Hunting itself comes to be regarded not as a technical manipulation of the natural world, but as a kind of interpersonal dialogue, integral to the total process of social life wherein both human and animal persons are constituted with their particular identities and purposes.'
11. Peter Gow (1995:49) suggests that for the Piro of the Western Amazon: 'the game animals of the forest and river [in contrast to garden crops] exist outside of human agency. Humans do not create them nor do they work to multiply them ... The game is produced as food by locating and catching it.'
12. In 1998, the Yonggom sponsored the largest *yawat* male initiation in many years, with the participation of more than fifty initiates (B. Nandun, pers. com. 1998). The ritual was promoted by the leaders of the protest movement against the Ok Tedi Mine, who were members of a single initiation cohort (*kaget won*) many years ago (Kirsch 1997b:126).
13. Beck (1992:19) argues that the defining feature of late modernity is the shift from a 'logic of wealth distribution in a society of scarcity to the logic of risk distribution.' By this he means that the central problematic of contemporary capitalism is not inequality resulting from the distribution of limited commodities, but how to manage the risks and hazards that result from the processes of production.
14. In contrast, Rolf Gerritsen and Martha MacIntyre (1991:36) argue that the "social, political and economic impacts of mining are principally about the distribution and redistribution of benefits,' largely discounting the problems of environmental impact associated with mining projects in Papua New Guinea. For an extended critique of their 'capital logic' model of mining and its discontents, see Kirsch (1997b:119-121).
15. Stephens (1995) describes how the fallout from the nuclear disaster at Chernobyl affected Sami reindeer herds, forcing them to depend on scientists and technology to assess the invisible dangers posed to them by radioactivity.
16. For example, several years ago I was contacted by a University student from a Yonggom village near the Ok Tedi River, who sought my assistance in mapping land boundaries for her lineage. She proposed using a GPS (Global Positioning System) unit, which establishes the absolute location on the Earth's surface through the triangulation of satellite signals. Like the sequencing of events by means of abstract, chronological time, this map would fix Yonggom places within a larger universal grid. It is difficult to imagine a better example of Yonggom attempts to place

themselves in the world system than this woman's plan to map Yonggom land using global positioning technology.

17. For an analysis of the concerns of rural Papua New Guineans in the absence of development, see Smith (1994).

18. Hirsch (1996) describes how the Fuyuge similarly envision change occurring as a result of their efforts to attract things from the periphery of their world.

19. For an extended discussion of the philosophical history of place, see Casey (1997).

20. Harvey (1996:287) argues that: 'It is precisely because of the transcending possibilities of such a global framing that we can register other forms of differences. Something may be lost in such a gesture – integrating into a hegemonic map of the world in order to demonstrate a particular cartography of domination and of power relations is no different than having to learn and use the oppressor's language in order to resist oppression. But something is also gained – the bringing to life of hitherto uncommunicated and hitherto incommunicable differences.'

21. This account is intended to challenge 'outright the absolutist perceptions and pretensions – the totalizing vision ... of the ahistorical treatment of space and time incorporated in conventional analysis ...' by examining how such relations are established (Harvey 1996:290). It calls for acknowledgment of the 'diversity in the social construction of space-time while insisting that different social processes may relate and that, therefore, the space-time orderings and the cartographies of resistance they produce are in some way or other also interrelated' (ibid.:290).