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Terra nugax and the discovery paradigm: how Ok Tedi was shaped by the way it was found and how the rise of political process in the North Fly took the company by surprise

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The Ok Tedi litigation crisis is a topic that defies compression: at least five books (Jackson 1982, 1993; Browne et al. 1983; Pintz 1984; Hyndman 1994) and one PhD (Anere 1993) described the project as it was even before the crisis emerged. Before I give my version of these events, the avenues of discussion can be narrowed down considerably if common ground can be established. There has been a real crisis generated by the Ok Tedi mine, which was acutely felt as an environmental disaster by people in the Ok Tedi impact area—predominantly, but not only, by the people of the Alice River. It was experienced by the mine operator as a threat so serious as to jeopardise the worth of continuing the project, and as corporate pain so acute to BHP, the principal shareholder and target of the court cases, that it would go to considerable lengths not to repeat them.

Establishing this common ground is necessary for two reasons. First, I frequently meet people who, disagreeing with the basic facts of the case, believe the crisis was in some way the product of mischievous forces bent on interfering with the legitimate company–government relations. Second, if the crisis was an illusion, my chapter is rendered largely worthless; if nothing happened, seeking out historical turning points and overlooked opportunities of averting crisis is not a meaningful exercise to have undertaken. If so, then the analysis for predictive

purposes of mining operations where no crises have yet arisen, but where organisational pathologies similar to those seen at Ok Tedi can be identified, is also a waste of time (for example, Burton 1994b, 1997a). I discount the conspiracy theories, however, and believe it valid to conduct a historical analysis of how the Ok Tedi crisis came about.

The discovery paradigm

Discussions of scientific thinking are often framed in terms of a discipline's 'paradigm', the fundamental thinking that underpins all endeavours within it (Kuhn 1970). The term has also come to be widely used outside science; one chief executive (Davis L. 1995:3) has already used it regarding corporate approaches to mining in Papua New Guinea. Here I want to look at what kind of paradigm was dominant from 1969–81 as the Ok Tedi project began to take shape.

For Forbes Wilson, who founded New Guinea's biggest mine, Freeport, in the 1960s, the process of discovery was expressed in terms of the 'conquest' of apparently insurmountable physical obstacles in 'the mountainous interior of the world's most trackless wilderness' (Wilson 1981:10). This, I suggest, is so clear a mission statement of a view of the miner's fundamental enterprise as it was in the 1960s and 1970s, that I shall take it as the exemplar of a 'discovery' paradigm that reigned unchallenged in those decades.

The discovery paradigm has a number of key cultural elements. Vivid accounts of the first sighting of a famous ore body are essential, passing into the folklore of mining by frequent retelling, while the discoverers become 'culture heroes' who wander across usually hostile landscapes until they reach their goal. The imagery of the discovery paradigm is lost on people who call these discovery landscapes home. Commercially, such a conceptual framework also holds back those companies whose managements adhere to it, undermining their ability to handle social and political issues in the environment surrounding their operations. A tired stalwart of the discovery paradigm is the use of the word 'remote', even today making almost daily appearances in mining-related literature on Papua New Guinea:

> Ok Tedi...is situated in a remote, mountainous region of dense forest (OTML 1985:1).

> In 1963, contact was first established with the people of the Star Mountains by a government (Australian administration) patrol team, near the remote western edge of PNG (Anere 1993:90).

> ...the Ok Tedi project, on a mountain's edge in the remote western highlands [sic] of PNG (*Sydney Morning Herald* 12 June 1996).

Remote should mean inaccessible. This was briefly true of Ok Tedi, but then most mines are found in rural locations and are initially hard to get to. Charter flights nowadays connect the airport at Tabubil with international services; it is hardly remote today. The existence of physical connections to cities is, of course, not why words like 'conquest', 'remote' and 'trackless wilderness' are used. They are used to express discovery paradigm concepts, not factual statements about geography. The harm lies in misrepresenting the existing human uses of land within exploration licences as 'lack of use' by setting them in contrast with Western industrialisation. For Ok Tedi, the contrast between the traditional and the modern is most explicit—and quite intended—in the photo-essay, *Ok Tedi 24:00* (Browne et al. 1983). It is only a short step for writers to marvel at the human ingenuity (of miners) that sees mineral wealth created, as it were, out of nothing and then to draw a moral conclusion about the appropriateness, or inevitability, of a certain type of technology-given progress in the mining area (also Browne 1982; Archer 1985).

Terra nugax: land that is politically invisible

I will now introduce the concept of *terra nugax*, as a corollary of the idea of exploration in areas of a 'remoteness' believed true of Ok Tedi. The adjective *nugax* means 'worthless, trifling, of no consequence'. I intend the first meaning of *terra nugax* to be that of land that, not being used for anything else or having 'trifling other uses', is a promising candidate for industrial use through mineral extraction. At the time of the 'discovery' of Ok Tedi, a critical passage in the *Mining (Ok Tedi) Agreement* of 1976 read:

> ...regard...shall be had to the *limited present use* of the area, to *the need for its development*, to *the State's desire* for the Project to proceed and be economically viable, and to the effect *the Project must necessarily have on the Environment* (Papua New Guinea 1976a, Clause 29.13, my emphasis).

This would frame the company's future environmental obligations and the government's attitude to its enforcement of social and physical environmental compliance standards.

The surprising persistence of Crown Land into early postcolonial times in Papua New Guinea is also relevant. In the Papuan 1908

Mining Ordinance, Crown Land 'shall include and shall always be deemed to have included all native lands' (Territory of Papua 1912:155);[1] this might be thought obsolete, but the terse minutes of state–company briefings during the period of construction at Ok Tedi reveal that the leases, the Kiunga–Tabubil road corridor and the Ok Tedi were all considered Crown Land in exactly this sense:

> [g]ovt. stated on Crown Land only Improvements are paid not economic trees (Papua New Guinea 1983a: Item 114).

> And when run-off from construction activities was entering the Ok Tedi, a public waterway and a riverine version of Crown Land, people normally drank and washed from tributaries, therefore OTML *not* liable for compensation (Papua New Guinea 1983b: Item 133, emphasis in original).

Nevertheless Crown Land did not carry the implication of *terra nullius*, or 'land of no-one', because in Papua New Guinea there was always, whether in 1908 or in 1983, a recognition of native occupation and provision for compensation. Instead, it appeared to be the government's way of disallowing the extension of traditional rights by natives to what might be termed 'emergent rights': that is, to new rights purportedly not conceived of in custom, like ownership of minerals, zoning for commercial use, or as might be exercised over spontaneous growths in the form of naturally seeded trees about to be cleared for a government road. What I want to identify here as the most important emergent 'use' kept by government was political control of any future uses that might yet come to light or, in the words of the earlier discussion, be 'discovered'.

This, then, is the second and key meaning I wish to impart to *terra nugax*; that it is land that, though it is 'of someone', lies untouched by the political process of metropolitan society—it is invisible to the politically empowered citizenry of that society. Let me clarify this. I do not invent the use of *nugax* to characterise the low valuation given until recently to gardens, forests, game animals and the like on any of monetary, ecological or what we now term 'world heritage' grounds (although this may have been so). I mean that the political connections of land treated as *terra nugax* are believed 'trifling, of no consequence, nugatory' and that decisions can happily be made about it with few repercussions.

Ok Tedi as a 'discovered' landscape

In the 1960s and 1970s, the people of the North Fly as a whole, and those of the Star Mountains in particular, are best described as seen but not heard. As portrayed in early Ok Tedi literature, this was because they had only been 'discovered' themselves in 1963:

> [c]ontact was not established with the inhabitants of the Ok Tedi Project area until January 1963 (Bechtel–MKI 1981:7).
>
> Fitzer...led the first patrol into the then unexplored Ok Tedi area of the Star Mountains in 1963 (Browne et al. 1983:67).
>
> The people in the Project Area had no contact with Europeans until January 1963 (OTML 1985:1).
>
> In 1963, contact was first established with the people of the Star Mountains by a government...patrol team (Anere 1993:90).

These statements are incorrect. In 1922 Leo Austen, the Assistant Resident Magistrate in Daru, established a government camp on the Alice River near Dome village at Wukpit. Austen contacted all accessible Yonggom and Awin villages—his names for them were the 'western Tedi' and 'eastern Tedi' peoples[2]—then walked to the head of the Ok Tedi itself, probably going straight past the future site of Tabubil, and turning back at about 5,000 ft (Austen 1923, 1925). It is not easy to know where this was, but the altitude places him well past the junctions of the Kam and Mabiong Creeks with the Ok Tedi, and definitely beyond the mining area. That Austen made what is conventionally known as 'first contact' in the Upper Ok Tedi is unmistakable; Hyndman (1994:71) says 'the Wopkaimin...were certainly encountered by Austen on his second patrol late in 1922 and his map places him in Iralim parish'. Iralim is the principal land estate of the Ok Tedi mine area landowners.

Further, the North Fly was not bypassed between the time of Austen's contact patrol and 1963. A stream of prospectors, war refugees and patrol officers had traversed the area north of Kiunga until, in the 1950s, patrol parties repeatedly crossed Wopkaimin lands. Hyndman (1994:73–5) notes nine patrols to the area, between 1952 and 1961.

The 'first contact in 1963' label comes from a long patrol led by Des Fitzer in that year, with the achievement accentuated by repetition of

Fitzer's description that the terrain his men crossed was a 'geographic hell' (Jackson 1982:43; Browne et al. 1983:4). It is correct to portray this as a major effort by the administration to visit all Star Mountains groups, and to acknowledge that Fitzer 'contacted several small groups of Min for the first time' (Jackson 1982:43) between Mt Fubilan and the Indonesian border (Hyndman 1994:75), but it is not correct to depict the Wopkaimin as isolated in a timeless, Stone Age, lost world until 1963, as in:

> For thousands of years the people of the Star Mountains...lived in isolation....life in the Star Mountains stood still...a day to day battle to survive in an astonishingly harsh environment (Browne et al. 1983: dust jacket notes).

This infers the imposition of beliefs in a hand-to-mouth existence and a native world ring-fenced against change (due to some inherent conservatism of the inhabitants), both widespread suppositions in the mining literature. The descriptions are also at odds with contemporary observations of the area. Patrol officers prior to Fitzer reported huge gardens and an abundance of food, while Hyndman (in the original Ok Tedi environmental study) noted that the traditional Wopkaimin diet had the highest proportion of meat seen in any PNG population (Hyndman 1982:21). A generation earlier, the prospectors Kienzle and Campbell (1938:470) wrote of the 'healthy, bracing mountain climate' inhabited by Faiwol speakers and the absence of the skin complaints seen at lower altitudes. While Fitzer and his companions obviously required some fortitude to complete their patrol, the 'hell' in these parts was mainly experienced by the patrol, rather than by the inhabitants.

Ethnographers depict the Ok Tedi area in terms of the 'sacred landscape' traversed by the culture heroine Afek in mythology (Brumbaugh 1990)—far from being isolated, the Wopkaimin were linked by myth, ritual and oral history to other Min people in one of the largest and most coherent culture areas in Melanesia (Craig and Hyndman 1990). We may also note that the 'life in isolation' pitch stands in direct contradiction with the various Ok Tedi agreements, which recognise the secondary claims over Mt Fubilan of people as far away as Telefomin in West Sepik (Brumbaugh 1990:56) and include these in the 'preferred area' for employment (Papua New Guinea 1976).

The view of life in the Star Mountains as frozen in time, and hellishly isolated is not a matter of arbitrary academic disagreement or a mistake easily correctable with better scholarship. It was a choice

supplied and necessitated by the discovery paradigm, lending a moral purpose to the appropriation of Mt Fubilan for national ends by linking the exploitation of the minerals to a rescue of the inhabitants from their Stone Age plight. Many writers (Wolf 1982; Thomas 1991) have dealt with similar matters in other contexts.

The dramatised backwardness of Fitzer's 'several small groups of Min' was often projected onto other people when the footprint of project was reoriented to include areas downstream of the Star Mountains after 1984, as in this example by a government consultant:

> Field research carried out by OTML and the University of PNG's Medical Faculty has shown that the standard of people's health in the North Fly has risen from one of the most neglected to the best in PNG (Timperley 1994:13).

By substituting the vast North Fly—a huge region extending from Moian to Murray Valley—for the tiny Star Mountains, the writer has dismissed the appalling health conditions outside the 40km catchment of the Tabubil Health Centre which have not changed since the project began (Taukuro and Nurse 1978–79, Taukuro et al. 1980; Burton 1993b:24–9).[3]

Two phases of political development in North Fly

In fact the isolation of the North Fly was not due to physical barriers, but to a lack of political connectedness. When the Daru postmaster was elected to Western District Open in 1964, among the Suki, the only inland group for whom we have a contemporary report, 'no one seemed interested in the results' (van Nieuwenhuijsen and van Nieuwenhuijsen 1965:387). This was unchanged when Krenem Wonhenai, from the Awin village of Yenkenai, and the first leader in the traditional mould to emerge into formal politics, won North Fly Open in 1972. The reason is that politics and competitive leadership are not traditionally important features of local culture. According to Stuart Kirsch (this volume:126), for the Yonggom, 'political authority is generally restricted by kin group and context, leaving a political vacuum above the level of lineage'.

This is applicable in equal measure to Awin and Ningerum leaders, and presumably to Faiwol leaders as well. This political vacuum goes a long way towards explaining the inability of men like Wonhenai to make substantive inputs during the mine negotiations. The 'greasy-pole' work that Westerners recognise as politics is supplied in ample measure by traditional cultures in other parts of Papua New Guinea,

where the dynamics of interclan and intertribal relations are the lifeblood of customary politics.

Unable to speak English, Wonhenai made 'virtually no speeches' during his term (Jackson 1983:65). When I sought him out at his village in 1994, I learnt that his goals had been to *pait strong long kisim main* (to fight hard to get the mine), but I was unable to find out much beyond this.

Kala Swokin, an Awin from a village some distance inland, was elected to Western Regional and Warren Dutton,[4] an active participant in local business, regained the North Fly in 1977. By 1979 political development in Western Regional entered a more activist phase; by 1980 development plans were ready and the mine awaited approvals (Jackson 1983:59ff.). It is a possible consequence of Dutton's 1977–87 terms that his presence in the national parliament deflected political aspirants like Isidore Kaseng, a southern Yonggom, and subsequently Norbert Makmop, a Faiwol, into provincial politics, where power could be exercised, but ultimately to no purpose and where little leverage over Ok Tedi affairs was obtained.

By the time of the 1982 elections, large numbers of mine workers from other parts of Papua New Guinea flooded onto the electoral roll at Tabubil and Kiunga giving the advantage to urban candidates like Bob Bubec, a Simbu who served nationally 1987–97. Bubec was the 'invisible man' as far as any North Fly rural issues were concerned, neither siding with the landowners in their litigation with BHP nor volunteering as an intermediary in the company's efforts to broker a settlement.[5] In summary, although Swokin had three terms as Regional Member, only one indigenous leader has represented North Fly Open in the national parliament and he did so during the first, passive and disconnected phase of political development. In the second, activist phase, Dutton was vocal and well placed in cabinet at the time of the Ok Tedi mine development agreement and during the gold cap production phase beginning in 1984, but we can say that rural North Fly has had a diminished political representation at the national level since full copper production—with its correspondingly high tonnage of mine waste disposal—got underway in 1988. The first serious complaints about garden damage along the Alice River by Yonggom villagers began in this year.

The onset of the environmental crisis

The environmental crisis at Ok Tedi is about sediment build-up in the river system caused by waste dumping at the mine site. This did not

occur overnight, and observations can be traced over a ten-year period. The chronology is as follows.

The observation of river pollution

The first mention of 'Ok Tedi River—Pollution' as an agenda item in the state briefings occurred on 27 January 1983, before the start of production:

> Kiunga Council has complained Ok Tedi river dirty and people unable to drink wash or swim in the river any more. Villagers also alleged two children died recently after swimming in the river. OTML C.R. and Env. Patrol disproved this allegation (children died of Malaria/ Pneumonia) however river was found to be full of sediment.
>
> Govt. stated it had an allocation of K20,000 to begin drilling bores in these areas--cost of bore approx. K500 each...OTML [will] seek guidance from Management as to its liability in assisting the Govt. in this bore drilling project seeing we are largely responsible for the condition of the Ok Tedi river and in view of the fact that the quality of the water will *not* improve for some time (Papua New Guinea 1983a: Item 121, emphasis in the original).

The 'Alice bores' project receives repeated mention in the state briefings during 1983. On 10 February 1983,

> Re bore drilling program OTML agreed that although contributing to pollution in the Ok Tedi River people normally drank and washed from tributaries, therefore OTML *not* liable for compensation or to give assistance to bore drilling program.
>
> Govt. agreed people normally drank from tributaries however also argued :-
>
> tributaries appear polluted
> Ok Tedi very polluted
> Fish populations affected in Ok Tedi
> Crocodile population affected in Ok Tedi
> Government stated OTML therefore may be liable to some form of compensation (Papua New Guinea 1983b: Item 133, emphasis in the original).

As I have already discussed, this would seem to be the expression of a view of differential liability for damage on Crown Land, in this case a waterway, as opposed to privately-owned land or tributaries. The funds for drilling the bores was now not forthcoming. On 20 April 1983, the government patrol to start the bores was again deferred, while OTML

was 'yet to determine our liability' (Papua New Guinea 1983c: Item 164). On 17 November 1983 the

> [g]overnment had proposed to mount patrol to drill drinking water wells/bores up the Alice. Idea fell through due to lack of funds (Papua New Guinea 1983d: Item 337).

On 1 December 1983, the contractor 'apparently disappeared' and the 'project [was] to be re-started 1984—funds allocated last year spent on drought relief work' (Papua New Guinea 1983e: Item 352). The minutes throughout 1984 do not mention the fate of this program, but the argumentative attitude of 1983 over the company's liability for compensation for discharge into the Ok Tedi—presumably at this stage the outfalls were receiving only waste rock—were about to look rather ridiculous.

The first stage of production commenced in 1984, with processing of the gold cap at the Folomian plant site. This lasted until 1988, when the gold process plant was decommissioned and the current process started in which a slurry—an ore concentrate from which copper, gold and silver is extracted offshore by the purchaser—is piped from Folomian to the river port of Kiunga for barging to the estuary. From 1984 to 1988, then, the mine was set to produce relatively little waste, and little sedimentation was predicted. At the same time, a tailings impoundment was still part of the mine plan, even though the first dam site was dropped. Landslides had halted work on 16 December 1983 and then irreparably destroyed the footings on 7 January 1984. Even so, little impact was forecast in the short term; in a pamphlet prepared in February 1984 to explain the stop-gap Interim Tailings Scheme, the company said:

> the Ok Tedi already has much sand (sediment) in it—approximately 5 million tonnes P.A. flow down the river. It is estimated we will add 1.5 million tonnes per year to that figure and that it will not have any long-term damaging effect on the environment (bush/animals/fish etc.). The only noticeable thing will be the water will probably look a little more dirty (Bos 1984a:3; OTML 1984:3).

In June 1984 a well documented spill (Townsend 1988:116) occurred at the plant site and tailings containing unneutralised cyanide were released into the river system. Compensation was not paid, nor in lieu thereof, an immediate and comprehensive effort made to assist government supply drinking water to the Alice villages (a new Alice well project commenced around 1988). Another pamphlet asked the villagers to 'let experienced, qualified people investigate' and the

assurance that 'We are confident *no* more mistakes will be made and *no* more untreated tailings will flow into the river' (Bos 1984b).

The construction deadline for a tailings dam on a new site was scheduled for 1985. This was postponed and the dam project was later shelved, with the result that more and more waste was discharged into the river as copper production began in 1988. Beginning with 1.68 million tonnes in 1984, the discharge rate went up an average of 1.5 times a year for six consecutive years before plateauing (OTML 1988: Table 3.1). In the revised 1991–95 plan, 25.5 million tonnes of ore residue plus an average of 40.17 million tonnes of waste rock was expected to be put into the river system annually (Markham 1991: Table 3.3), that is to say 65.67 million tonnes per year or more than 40 times what had been suggested in 1984.

OTML scientists did predictive modelling of what would happen to this sediment once it entered the river and an aggradation of the riverbed—an infilling due to sedimentation—of about 2 metres was predicted for the Alice in 1988.[6] However, the focus was on navigation problems for ore barges in the Fly River so that effects on the Ok Tedi, not on the barging route, were not pursued so vigorously. A key oversight was not to develop a model of what happens when bed aggradation reaches a point where the volume of water can no longer be accommodated by the profile of the channel that remains when the river runs in flood after heavy rains in the mountains. Of course, this is exactly what villagers in the area were about to report: that the river channel was filled in, that heavy rains caused flooding much more often than previously, and that the flooding was dumping large volumes of grey mine waste on their gardens.

Colour photographs taken from a helicopter in June and October 1987 (OTML 1987: Plates 6, 7, 9) of critical areas of the river, at the Ok Mart junctions and at a place near Ningerum station called Alice Farm, show that the river was essentially its pre-mine brown colour and that if flood dumping of mine wastes had occurred, it had not caused visible damage. But in December 1988, two OTML Community Relations officers, Atimeng Buhupe and Martin Tabi, went to stay in the Yonggom village of Dome to assist government workers in constructing a water tank. Buhupe, the company's Graduate Employee, reported,

> Generally, they have stopped fishing in the Alice River. However, there may be one or two still fishing there...
>
> The people are planning to present a petition to the Fly River

Provincial Government in either February or March of 1989. There are several things mentioned in the proposed petition.

a) Pollution of the Alice River by OTML's mining activities.

There is a lot of silt and sediment deposition covering the fertile land along the river banks. It is also claimed that a lot of plants and animals in and around the rivers have died. The proposed petition also claimed that before the mining, the Alice River was so clear that the river bed was visible but now it has become invisible and the possibility of outboard motors smashing into rocks and logs and missing fish when spearing it is very high.

b) Border Development Funds

It was claimed that the Border Development Funds were not distributed. They claimed that there has not been any development in the Ok Tedi–Moian Census Division for 25 years now, since 1965.

c) Royalty Payments

The Yonggoms want to be included in the Royalty Payments. They say they are affected just as much as the Awins and Faiwols.[7]

d) Problems of Border Crossers and Refugees

The refugees, as the Dome people claim, have been there since 1982 and have helped in speeding up the exploitation of resources. The Yonggom people would like to be compensated for this (Buhupe 1988).

This is quoted at length because it appears to be the first written report of how villagers felt shortly after the start of copper production to reach the attention of company management. It is a clear exposition of the issues affecting all the Alice villages and replicates what Stuart Kirsch and I would later report from our longer surveys of the villages on the west and east banks of the Alice respectively in 1991–92. Kirsch, on PhD fieldwork at Dome village at this time, reproduces a petition dated 1 December 1988 and containing the same list of points (Kirsch 1993:Appendix 4, this volume Appendix 2); Buhupe's report obviously relates to the same document. In April 1989, Kirsch reported that:

> sediment is being deposited along the riverbanks, forming five and ten metres-wide stretches of knee-deep mud. After a heavy rain in the mountains, the Ok Tedi overflows its banks, depositing waste sediment along what was the most fertile area for gardens, the shoreline (Kirsch 1989b:56).

In 1989, company management were moving to set up the Lower Ok Tedi–Fly River Development Trust to assist villagers with some basic needs, notably water supplies, classrooms, and some business assistance. The Trust is an important subject, but since it was explicitly not

intended to be a package of direct compensation—and in any case delivered about 80 per cent of its benefits outside the villages impacted by sedimentation—it will not be discussed further here.

In September 1991, when I visited the east bank of the Alice, severe over-bank flooding had just occurred. The village of Bige in particular had lost several hectares of garden land and a 26 hectare islet at Alice Farm, part of Ningerum Government Station, was covered with sandy deposits and lost all its crops. Forest dieback was restricted to the southern side of Bige village.

But now a rapid deterioration occurred. Forest dieback was observable up many Alice side creeks in 1992, and was set at an area of 8 sq km in mid-1994 (Rau 1994). As measured from infra-red aerial photography, the progression of dieback is shown in Table 3.1. In November 1996 the affected area reached well south of the confluence of the Alice and the Fly, the D'Albertis Junction, and some distance into the 'border bulge'.

Table 3.1 Estimated area of forest dieback in sq. km at various dates

	Dead Area			Stressed Area			
Year	A	B	C	A	B	C	Totals
1992	5.5	-	-	11.7	0.3	-	5.5 (12.0) sq km
1995	16.8	0.3	0.2	24.8	7.6	3.0	17.3 (35.4) sq km
1996(Nov)	29.1	8.5	0.4	20.6	32.1	15.2	38.0 (67.0) sq km

Note: A. Alice R. north of Konkonda
B. Alice R. Kokonda-D'Albertis Junction
C. Fly R. south of D'Albertis Junction
Source: OTML 1996, Figs. 4.6–4.8.

Scientific judgment in relation to riverine impact

There were two factors adding scientific complexity to the situation. Failure to properly grasp their implications cost the company and government the head-start needed for a proactive response to the impacts.

The first factor was the collapse of Vancouver Ridge in August 1989, a geologically unstable feature adjacent to the mine site, shedding approximately 120 million tonnes of material into the river system. The company's response was to put resources into geotechnical consultancy work aimed at assessing the risks of further movements and considering whether Vancouver was a natural event or one hastened by

blasting and heavy equipment movements at Mt Fubilan. It dwelt at length on Vancouver in briefings, emphasising the recurrence and size of natural landslides in the Ok Tedi catchment and rhetorically asking whether overbank flooding should be tolerated as part of the natural hazards of the region, over which the company did not have control. This was woolly thinking on two counts. OTML's own data showed that delivery of the Vancouver material would be completed during 1992, whereas the mine output of waste would continue unabated at about 65 million tonnes a year (Markham 1991: Table 3.2). And, as shown, Buhupe and Kirsch had separately given written accounts of garden damage many months before the Vancouver collapse, but the use of the natural event line of argument continued to be used by management in public well after 1992.[8]

The second factor was the influence of El Niño on the hydrology of the river system. El Niño was not well known in the 1980s so that, for example, *Climate of Papua New Guinea* (McAlpine et al. 1983) makes no mention of it, nordo the hydrological studies on which much Ok Tedi planning was based (for example, SMEC 1981, 1982), or the major review study required for the Sixth Supplemental Agreement (OTML 1986, 1988). To my knowledge, El Niño makes its first appearance in the 1992 annual environmental report:

> [a]n El Niño event, which commenced in September 1991, continued during early 1992.
>
> ...high rainfall was recorded at all upper stations during July 1992. However, rainfall for August and September was well below average (this trend continued through October and November). A renewal of the El Niño is not considered likely because of the normal Pacific sea surface temperatures observed at present (OTML 1993:16).

Unfortunately, this was not to be; the entire period 1991–93 was dry overall, with the Middle Fly lagoons like Bosset drying out completely in 1993, as they had previously in 1966, 1972, 1982 and 1986 (Burton 1995b: Appendix C). What was actually happening in 1991–93 was that consistently low flows of water were having a dampening effect on sediment transport from the mine to the points lower down the river system, masking the impact from mine wastes. This led to an overly optimistic judgment about the recovery of the system when some regrowth was seen in the forest dieback areas:

> [l]ate in 1993...OTML's Environment Department began receiving reports of new growth on trees considered dead and regrowth of

> vegetation on the ground...It is too early to draw any definite conclusions but the research suggests at least that the affected land and vegetation has the capacity to recover substantially from the deposition of sediments. Further monitoring and research...may well confirm OTML's assessment that the effects of the deposition of sediments in the Ok Tedi and Fly River will be only temporary (Wood 1994).

But when the El Niño induced dry spell lifted in 1995–96, record river flows were on hand to flush sediment temporarily stored higher in the system to the dieback areas. The result was the cessation of the mild amount of regrowth that had occurred, a rapid extension of the area affected, and a worsening of the severity of impact in areas already sustaining dieback, as shown in Table 3.1.[9] I do not suggest that OTML scientists ought to have been able to predict the weather better than they did; the point is that at critical stages of project planning, the dynamics of El Niño were not known, resulting in what can now be seen as decisions bearing unseen risk. For example, moving the ore by barging from Kiunga is a central part of the overall mine design; barging from a lower site like Aiambak, or some other mix of ore processing and transportation, might have been chosen with a present-day knowledge of the phenomenon.

What I particularly want to draw attention to here is that lack of a broad base in understanding the regional environmental system supplied the same kinds of defect to the scientific judgements of 1994 as they did in 1984–85 ('let experienced, qualified people investigate'), which now seem so ludicrous. Lack of knowledge is not a scientific transgression; misrepresenting the strength of one's knowledge is. I will return to this below.

Complaints by villagers about environmental impact

The other side of the equation in the outbreak of the litigation crisis was the response by those feeling the impact of river pollution. The first line of complaint about the environment came not from government regulators, but directly from villagers. Often this took the form of letters of complaint copied to as many parties as the writers could think of—the District Office, the government Liaison Officer, the OTML General Manager and so on—making little distinction of responsibility. Many are hard to understand partly because of the English they are written in, but mainly because of the jumbling of day-to-day matters with clan mythology, and a soup of cultural beliefs about *bisnis* and development. The messages contain a mix of complaints about the distribution of

mine benefits, the lack of government services and environmental impacts, but they are typically embedded in a wrapping of these other things.

For example, on 16 January 1984 the councillor of Mongulwalawam, a village in the Ningerum Census Division with land on the west bank of the Alice, wrote to the OTML Community Affairs Manager and the government Liaison Officer saying that his and another village must be paid K1 billion per fortnight or work on the mine would have to cease:

> They will get every fortnight for 1,000,000,000. Our T[u]mbuna went up to Mt Fublam [Fubilan] and then he be come his home of Gold and copper. If you people understand theirs problem they will said OK dig the copper. Bu[t] you people don't want to pay—then they will say no work and no digging copper...[10]

The District Officer at Tabubil wrote back politely explaining that the mine's land studies had not picked up landowner connections to his village, but that he could meet with the Star Mountains representatives to discuss any ties he might have with them. Other Ningerums wrote in July 1990,

> [s]ince back to Australian time...the National Government is one eye[11] to my people and myself. We Upper Ningerum people were left behind.
>
> ...we demand School, Roads, Business, aidpost, more money from the National Government and Provincial Government to up grade my remoted area...
>
> Unless the above mentioned demands are approved by National Government and Provincial Government.[12]

And again in July 1992,

> [f]ew centuries ago, there lived two brothers ... [legend follows]
>
> That's the right history which we are claiming for. Here are two most concerned demand which you must consider most, you Company Management people and Government Officials.
>
> 10% Gold profit must be shared to three villages.
>
> Full compensation must be paid to three villages for Southern Waste Dam [Dump] area.[13]

This form of presentation is typical of many submissions. Difficulty with English is a problem, but the use of unfamiliar idioms and the

exposition of clan mythologies, the meaning of which was lost on the recipients, blunted whatever message was intended. But more critically, none of the writers succeeded in instigating a political process through which to express whatever it was that they considered to be at issue. The last letter in particular hardly appears to be a political tract as is conventionally understood, yet it was sent to OTML by a member of the provincial assembly.

Further down the river system, community relations officers from the company were visiting villages during the critical period of impact from 1988. However, the cultural wrapping of the villagers' messages again made their complaints hard to unravel:

> [t]he fish in the giant[14] Fly River...has lost weight. The taste of the fish has become tasteless and the flesh has become tough as animal meat.
>
> The villagers said that this is because of the mining operations, the pollution been[15] disposed into the Fly River has killed food for the fish and also are affected by the pollution. That is why there is loss of weight in fish species, fish becoming tasteless and its flesh being tough. There used to be plenty of fish both in the giant river and surrounding lakes and swamps...Some fish has gone away to live, said the village people (Dangona 1990:1).

Half of the above is a statement about the taste of the fish, a cultural message about how fish ought to be. But the other half is about the physical environment. In the light of the heavy focus of the OTML Environment Department of the prediction of loss of biomass in mine waste-affected parts of the river system, it is worth dwelling on this. I see three propositions:

- a loss of prey species for fish targetted by villagers
- the biomass and/or species distribution of the fish is affected by the mine wastes carried in the river
- offered a choice of habitat and depending on the species (some species are sensitive to sediment load, others are bottom feeders and are quite tolerant), fish will choose the one where food is most plentiful and spawning places most suitable.

But people also said things not so easily parsed for empirical observations:

> The water that people drink is almost tasteless, said the village people. The old men said that before, during their young age, the water tasted good and these days it is almost tasteless. It's something like swallowing a rubber (Dangona 1990:10).

> Sago is one of the big concerns in the villages. The sago production has decreased since the mining operations said the village people. Two to five sago trees are chopped down which doesn't contain any nutrients. The ladies reported we are doing really hard work in search of sago. This is because of the pollution from the mine. So they would like OTML to set up a food store in each village or the main centres (Dangona 1990:10).

Tempering this with the knowledge that the best habitats for sago in the Middle Fly are the feeder creeks of lagoons and the swamp margins some kilometres away from the channel of the Fly, it may still be that sago is, in the appropriate situation, sensitive to disturbances. But as blanket statements, the above would seem to be cultural utterances about the nature of well-being among people for whom the Fly River is, both ecologically and culturally speaking, the source of their existence. I visited the same villages of the Middle Fly four years after these comments were made and the tone and content of villagers' remarks exactly replicated these earlier ways of saying things (Burton 1995b: Appendixes G, H, and I).

What about the people in the villages along the Alice in 1988–90? As shown above, in December 1988 the log of complaints at Dome covered four points: river pollution, the failure of government to bring promised development, a desire to gain a share of the royalties from the mine and the impact of refugees on Yonggom lands. The only thing I find surprising about this is that the petition to government, to my knowledge, did not come to light through some external political action such as a demonstration against the company, media reports or from its being raised as a political issue in Port Moresby. (This may be contrasted with the intense media coverage of highly politicised events at Mt Kare in 1988). As noted above, the Dome people said they intended to petition the provincial government in either February or March 1989 and Kirsch (pers. comm.) believes they did this. The intention to hold off for some months may have had the timing of the government's decision in mind; but if so, nothing happened. It is not a document worded with great eloquence, or likely to sting government into instant action, concluding as it does,

> During The Time We Give The Government have To be Thought About It And Give Us The Answer And The Amount We've Asked. This Will Continue If First Petition Is Not Meet.

Nonetheless, it is the first document to directly link environmental damage to a claim for general compensation, in this case K13.5 million.

The end of 1988 coincided with the submission by the company of the Sixth Supplemental Agreement environmental studies for review by the national government. The government's response, due in April 1989, would say whether the company would be permitted to continue dumping wastes directly into the river system. At any rate, the state–company briefings show that the government deferred its decision on tailings disposal until July 1989 (Papua New Guinea 1989a: Item 2316) and briefings to the various provincial bodies and interest groups subsequent to the decision were delayed first until September (Papua New Guinea 1989b: Item 2441), then until November 1989 (Papua New Guinea 1989c: Item 2504). The effect was that a whole year went by with no outwardly detectable political action on the part of the Alice villagers.

This is not to say there was no action. Community relations officers attended a meeting of the Ningerum Council in March 1989, which covers some Yonggom and all east bank villages along the Alice.

> As usual the councillors complained that the operation of OTML was having a very serious environmental impact on the Alice–Fly River Systems. The pollution according to the councillors was very serious along the Alice...Therefore the councillors claimed that the government should establish an independent body to do a separate environmental study from that of OTML which may be bias[ed]...They also claimed a compensation package be arranged...Mr Tameng and I told them that the decision as to whether or not a tailings dam should be built was something for the national government to decide...
>
> The councillors threatened to block the Kiunga–Tabubil road, Kiunga airport and Kiunga wharf if the government and Ok Tedi Mining Ltd do not come up with an acceptable remedy for the pollution of the Alice–Fly River systems (Buhupe 1989).

This was the limit of the political expression of local dissatisfaction for the time being.[16] Another year elapsed before the demonstration took place that seems to have set the ball rolling in the direction of litigation and the outcomes that we now have. On 12 December 1990,

> [a]t about 10 o'clock this morning around 600 to 800 people mostly led by youths and women staged a rather noisy but peaceful and orderly demonstration march to present their petition or sets of demands to OTML and the Government...
>
> The demonstration leaders Alex Maun, Rex Dagi and Joe Tata with the help of Peace and Good Order Committee under the watchful eyes of police kept the crowd under control. Surprisingly, there were no

> prominent [sitting] politicians among the crowd except Mr Philip Dipai who hardly said anything during the demonstration...
>
> The presentation lasted for less than half an hour and the crowd marched off towards the Government Offices to present their copy of the petition (Genora 1990).

This petition appears to be the one discussed by Gordon (this volume, see Appendix 3); he says that this was the point at which the future plaintiffs began to look outside their area for the means to pursue their grievances. Efforts to do this gathered momentum with the Wau Ecology Institute's case against the company (Sakulas and Tjamei 1991), the Starnberg report (Kreye and Castell 1991) and the Australian Conservation Foundation's visit to Ok Tedi (Rosenbaum and Krockenberger 1993). Here I am only concerned with matters up to the outbreak of political activity.

Direct political action using road blocks and demonstrations

I must briefly consider the forms of direct action that took place in North Fly at many points in the life of the mine project prior to these events. Road blocks became so common in 1983 that special procedures were thought necessary during the government's acquisition of the Kiunga–Tabubil road corridor to deal with them:

> [t]he road block syndrome has now become the accepted means of communicating with the Government and the Company. Established channels of communication are being ignored. Every time there is a road block we all come running and decisions are made—this trend must be stopped now and the people's faith in acceptable avenues of communication restored (Bos 1982).

The state briefings for the period show that Warren Dutton, the national member, and Kayamen Bokdap, a provincial member, were constantly on duty to talk through the disputes in question. A decade later, not much had changed. Overbank flood damage in the Ok Tedi River was—at last—the subject of a judgment by the Mining Warden on 22 June 1992. OTML was ordered to pay K38,850 in compensation to village claimants above Ningerum for the loss of gardens, economic trees, and graves. The assessment procedures were deeply flawed:

- Government officers failed to cross the river to look at west bank gardens because they were unable to find a canoe

- a flat rate of K270 paid per garden instead of individual accounting of crops and economic trees
- an almost random selection of garden owners for payment at various villages
- the extraordinary statement by the Warden that he had 'flown up the Ok Tedi by the chopper' [sic] and confirmed the claims as true (Kalei 1992).

On 1 August 1992 angry villagers at Wurimkanatgo village, also known as Kilometre 96, wrote to the District officer at Tabubil:

> [w]e are the owners of gardens we want to claim our demand for our gardens along Ok Tedi River. But yet you Company and Government haven't agree with us and payed us. I think you have no head to think about this...I think you people think that we are your kanakas and your rubbish people—that's why you [always] play a trick on us. So Tabubil District Government you see this. On Tuesday 4th/8/92 we will strack down the highway at 96km to Ningerum Tamaro village...If you see this and [pay] that's OK, if not then we strack down for 14 day until we receive or demand. [If not after this] then will close for 2 month...
>
> We mark for K100,000.00 for Wurimkanatgo village...what your answer will be? Our answer no truck move from Kiunga to Tabubil...
>
> 'Please we advice that' no police, no sicurity are allow to come stop us. We can't do any serious thing. But we only going to block the main road.[17]

On 8 August 1992 the villagers made good their threat and blocked the highway. The issue was resolved with the agreement to reassess the area, and K110,000 was paid to the claimants in 1993. In 1994 a much broader series of compensation claims were paid along the Alice to about 2,300 people and to the value of K1.38m. This generated an identical response, with a major demonstration outside North Fly House on 24 October 1994 protesting irregularities in the assessments and demanding the release of money believed by the crowd to have been held back by provincial authorities.

Of course, the North Fly is not the only place in Papua New Guinea where direct action is commonly resorted to, but its use generally betrays the failure of political structures that might otherwise redirect grievances to the appropriate channels. In North Fly though, petitioning, road blocks and demonstrations—a nuisance level of action—more or less exhausted the forms of political engagement used

by villagers prior to the Ok Tedi litigation. And whereas in other parts of the country, a local politician would almost certainly feature prominently, this has actually been quite rare in North Fly (with perhaps the Star Mountains as an exception). In the December 1990 demonstration, one was present but hardly said anything. I suggest this is unimaginable in most other parts of Papua New Guinea—however ineffective an orator he might be or however embarrassed, perhaps, at being shown up by younger, more educated men, a leader with politics coursing in his veins must seize the opportunity given by such events to take the stand. But traditional culture does not supply this kind of personage here; as I have already discussed, leaders from the Alice villages are not the 'big-men' of many other parts of Melanesia. It is no discredit that it occurs to few of them to do the pork-barrelling that makes politicians such recognisable figures the world over, but it makes them ineffective at dealmaking and on the hustings. (Success still eludes the litigants in North Fly Open: see postscript.)

The appearance of politics and the extinguishment of *terra nugax*

My thesis in this paper is as follows. A mine was opened up in a part of a certain country that seemed to be the perfect place, apart from its physical ruggedness, for collaboration between a government and a mining company to achieve economic goals on the one hand, and a return to shareholders on the other. The government would consult with its people and government technical experts would make informed decisions on their behalf. This was in accord with contemporary thinking on governance in relation to mining policy. While the provincial assembly was consulted during mine planning, there were no pointers to the possibility that local interest groups would emerge to enter the 'mining policy process'—a term favoured by Colin Filer—let alone challenge the validity of the national government's right to exercise a monopoly on decision-making over the project. A raft of supporting beliefs and assumptions upheld this point of view. They included:

- 'discovery' concepts that gave a blanket depiction of the whole of the project area as being isolated, backward and not having much use
- relict legal beliefs about the existence of Crown rights over land in the project area

- companion beliefs that the political connections of land in the project area were trifling, of no consequence, nugatory—what I call *terra nugax* beliefs
- a mistaken extension of the above assumptions to the downstream area along the Alice River when the tailings dam was abandoned and
- mistaken interpretations of direct action by villagers as opposed to the apparent compliance and passivity of elected representatives, failing to allow for the emergence of local political processes of a nature and sophistication not expected.

It is my argument that because these were false assumptions, the project set off in a fundamentally wrong direction. However, just because a ship is steering towards rocks does not mean it will come to grief: a course correction can be made later on. There were many opportunities to do this, notably at the time of the Sixth Supplemental Agreement environmental studies, 1986–89, and the 1990 Forum negotiations (for improved benefits for the Star Mountains landowners: see Filer, this volume). The history of the Sixth Supplemental Agreement must be dealt with elsewhere, but the gist of the company's approach was that as the environmental impact on the river system was reversible, the political masters of the project should not be overly worried about allowing riverine disposal of tailings. But on the basis of the evidence presented here, it seems clear that mine wastes were having a progressively severe impact on the river. Nevertheless, one official preferred to claim the 'lack of any clear evidence of permanent environmental damage' as late as 1995 (Uiari 1995:6). Given the extent of dieback already known to have occurred, this was to speak in denial of reality, especially given the non-reversable scouring of garden land, notably at Kwiapae and Bige villages.

But all of these assumptions were disposed of in one way or another during the mineral policy process of the late 1980s and early 1990s. The first to go were the principles underpinning relict Crown Land beliefs—at no project negotiated since Ok Tedi have landowners worn the argument that the state should not pay for economic trees in 'unimproved' bush. In consequence, although a breakdown allowing exact figures has not been calculated, the Porgera Joint Venture may have paid out K20 million for clearance of bush (not gardens and improvements) within its mining leases (Banks 1997b). OTML did not pay compensation inside leases at all.

While compensation inside leases is technically unconnected with the response to environmental damage outside leases, the methodology of compensation assessment atrophied at Ok Tedi because it was used on so few occasions. When it was used, landowners protested that the assessments were slipshod, and showed their anger with road blocks and demonstrations. Worse, company management allowed itself to fudge or become embroiled in arguments over liability in ignorance of the rapid shifts in accepted practice at Papua New Guinea's other mines (Burton 1997b). This is what accounts for what Filer (this volume:66) calls the 'missing compensation'.

The key point is that, no matter how slow it was in becoming effective, a political process did eventually appear to force other stakeholders—the mine lease landowners given a new-found voice in the 1990 Forum discussions by Premier Makmop, the national government, and the company—to give way and at last allow the downstream landowners a bargaining position. The Alice villages became connected to metropolitan forces that helped them succeed in this, namely to NGOs and above all to the leverage that the notoriety about the court case had on shareholders. These connections and this political process are the things that extinguished *terra nugax* along the Alice River.

What lessons can be learned from this? I suggest all parties can take away some sobering thoughts.

First, it is not true that better legislation can guarantee better outcomes. Observers frequently point out that Ok Tedi was exempted from the *Environmental Planning Act 1978* and slate home this defect in the project design as a root of the crisis. Unfortunately, this runs counter to the evidence, as the Department of Environment and Conservation has proven unable to discharge all of its responsibilities as environmental regulator of projects not exempted from the Act, neither developing a research and review capability nor acting to commission other national institutions such as the universities to do so on its behalf. Of the major resource projects in Papua New Guinea, it is the Environment Department at Ok Tedi that stands out as having mounted the most adequately funded environmental monitoring program, using the most highly-qualified staff and with the best-equipped facilities. In other words, the least regulated project has the most comprehensive monitoring program. When regulators are toothless, citizens are recommended to try and procure their preferred outcomes by their own efforts. But as mine operators are stakeholders too, such a course carries extraordinarily high risks and is not the optimum path. In this

circumstance, the principles of Best Practice should automatically apply, so that companies

- actively seek the highest standards of community consultation
- create the means of constructively debating issues with the community, and
- act in a timely manner to redress grievances identified by this process.

Second, it is no guarantee that spending big on environmental science will protect a mining company against the political processes I have described. Although some engineering measures have been put in place as a result of the settlement, the Ok Tedi crisis was not amenable to scientific solution. While the ceiling of A$150,000 set for the original environmental studies (Jackson 1982:85, 109) soon expanded to about A$1.3 million, none of this money saw its way into research or analysis of the social and political risks of the project. Scrutiny of the recommendations of the 1982 *Ok Tedi Environmental Study* (Maunsell and Partners 1982) shows a concern for the preservation of rare flora and fauna but little else. Since the project started, the lack of research into issues (not administrative or mitigation costs) of the social and physical environment may actually have worsened: approximately K50 million has been spent on monitoring of the physical environment as opposed to approximately K0.5 million on social monitoring. Even allowing for the laboratory costs of physical environmental work, this ratio of over 100:1 itself amounts to a dimming of vision and therefore an unnecessary exposure to risk. Would-be mine operators should think long and hard about this, as should the relevant Securities Commissions when accepting the representations made in share prospectuses, as well as the readers of such prospectuses.

Third, at several critical points, results stemming from the environmental science program were stated in a manner intended to allay community fear about environmental changes, but which instead appeared to dull the intellect of the organisation as a whole. Thus saying in 1984 that the 'only noticeable thing will be the water will probably look a little more dirty' now looks idiotic. Similarly silly things have been said more recently; for example in 1994 the categorical assurance was given that sedimentation in the Middle Fly was unmeasurable, while in 1996 it was revealed that 2 metres of riverbed aggradation had occurred (OTML 1996:75) and that this would eventually rise to between 3.5–4.5 metres (OTML 1996:Fig.4.3-4.4). In a

recent review of the Porgera mine's program, CSIRO (1996:ES5) counselled Placer to 'monitor for impact' as opposed to narrowly complying with government requirements. This needs to be widened at all projects to provide for public scrutiny of the results and an openness about submitting to reviews. The lesson for mining companies is that managed science is bad science. No one gains from this; arguably the most harmed by the practice are shareholders, for they have paid out millions of dollars for poor information.

Fourth, in the title of my paper I have suggested that the company was taken by surprise by the litigation against it. But did it not have community relations people to look into the grievances of villagers? How can the company have been surprised when, as I have shown, staff did report what the villagers were worried about with accuracy? But it is a general criticism of all mining projects that too few community affairs staff are recruited as graduates and frankly feeble efforts are made to help staff upgrade their qualifications at relevant training institutions. (For example, while Environment Departments routinely send their scientists overseas for postgraduate studies, this has never happened with community relations staff.) Higher qualifications do not always bring greater professional respect, but as things stood it was unlikely that anyone in community relations could have produced the kind of influential briefing paper that might have swayed management opinion and steered policy onto a preventative course of action prior to the court case. The kinds of letters, petitions and verbal complaints I have presented here to unravel the origins of the crisis lay filed away in forgotten corners, noted and replied to but not effectively absorbed into the intelligence of the organisation.

Fifth, I have picked out the discovery paradigm for extended criticism because it misleads managements—and the stock market—about the political economy in which mining takes place. I don't detect a change in attitude amongnew players. Referring to the Sepik headwaters Nena prospect a recent article is headed 'Highlands says mine another "Kalgoorlie"' (*Canberra Times* 5 July 1997). The quality of the resource is discussed, but mirroring Ok Tedi's early press, the factoring-in of the costs of making tailings physically *and politically* disappear in a mountainous part of Papua New Guinea passes without mention. It is clear to me that a management has yet to encounter the political process of the downstream Sepik people. The lesson that mining jump-starts political process is clear from Ok Tedi's history, but is this a lesson that new miners are aware of?

Postscript: the 1997 election results

A feature of the 1997 national elections in Western Province were the candidacies of the Ok Tedi litigants, Alex Maun in North Fly Open, and Rex Dagi and the lawyer Dair Gebara in the Regional seat. It might have been thought that these men, having won a famous victory against a mighty foe, could have translated their role in the litigation into votes. Perhaps in a highlands electorate (as Opis Papo, running for the Peoples Resources Awareness Party, seems to have done in Porgera) or a New Guinea islands electorate (such as the anti provincial reforms Ephraim Apelis over Julius Chan), they could have done. But in North Fly, their bids for power ran into the limiting factors I have described. With few connected traditional political structures above the lineage they had little chance of binding people together into viable political voting blocks, no matter how well-known they were.

In North Fly, Kala Swokin, regional member 1977–92 and Minister for Urban Development in Somare's 1982 cabinet, but absent at a campaign rally attended by most candidates in Tabubil on 16 May 1997 and (obviously incorrectly) described as a 'has been', was the winner. Max Hasepa Miyoba, a pidgin-speaking Nomad welfare officer who lives outside the electorate and whose campaign poster proclaimed modestly he was for 'Grassroot ignorant people in remote areas. 'Illiterate people' were the equally surprising runners-up. Thus, despite activist's credentials the match of any seen in an Australian, North American or European election (world-travelling, feted by Inuit etc), Alex Maun's third place only proved the fruitlessness of trying to run on an issue in this electorate. A total of 22 candidates contested.

In Western Regional, Norbert Makmop, the former Provincial Premier and a Faiwol aligned with the mine lease area landowners, and not connected with the litigants, was the winner. The runner-up was Kayama Sinba, a well-known Suki crocodile-skin dealer and one of the few rural businessmen operating with moderate success anywhere between Kiunga and the Fly Estuary (see Burton 1995b:43–4; Plates 7, 8). None of Dair Gebara, Rex Dagi, Warren Dutton, and Isidore Kaseng made it into the top five. A total of 26 candidates contested.

Notes

The data this paper is based on was obtained during fieldwork for the 'Ok–Fly Social Monitoring Project' between 1991 and 1995, a project of Unisearch PNG Pty Ltd on contract to Ok Tedi Mining Ltd. The main

team members were myself (reporting in 1991, 1993 and 1994), Colin Filer (1991), David King (1993 and 1995), Stuart Kirsch (1993), David Lawrence (1995) and Budai Tapari (1995). I was the project coordinator 1992–95. I thank all my colleagues for their efforts and I am specifically grateful for the support given to all of us by Murray Eagle, both as a senior manager at Ok Tedi and subsequently as a BHP Environmental Affairs manager.

* Editors' note: see cover photo, this volume.

1 I am grateful to Hank Nelson for a photocopy of this source.

2 It was Austen who preferred 'Tedi', his transcription of its name among the Yonggom, 'Ok Deri', to D'Albertis's 'Alice'. He also noted its Ningerum name Ok Ti (Burton 1991:6); other languages call it Wai Tri (Awin—Burton 1993b:v) and Wok Teil (Wopkaimin—Hyndman 1994:30). However, the people who live along it almost always say 'Alice', rather than the 'Ok Tedi' better known to outsiders and brought into use by the existence of the mine 50–90km upstream from their villages.

3 Health in the Star Mountains is not the best in Papua New Guinea. On some measures, notable mother–child health, high standards have been achieved, but it is unlikely that this still undereducated and still growth-stunted population is in better shape than people living in nutritionally better off and better educated parts of Papua New Guinea near comparable health facilities.

4 In 1968, as the manager of the Lake Murray Co-operative Society, Dutton was elected to the newly created North Fly Open and served one term (Territory of Papua and New Guinea 1968:34).

5 In May 1997, one informant in Tabubil had not physically seen Bubec for three years, despite the fact that he lived just outside the town.

6 Later revised to 3.5 m (Markham 1991:Table 3.5).

7 Yonggom is alternately spelled 'Yongom', 'Yongum', 'Yongkom' and even 'Yong'gom' in various documentation. 'Yonggom', however, is the preferred spelling. Note that no Awin villagers were receiving royalty payments.

8 Curiously, in the private briefings with the state, the company appears to have accepted around August–September 1991 that mine wastes were mainly responsible for the sediment buildup in the Alice. This quite considerable switch in position was not shared with me, to the best of my recollection, during my initial fieldwork in September 1991. Another intriguing point is the growth in the estimates of material shed by the slide; in 1991 this was put at 119.5 million tonnes (Markham 1991:Table 2.14), but in 1994 at 160 million tonnes (Wood 1994).

9 The wet lasted a short time only. From a situation of widespread inundation in October 1996, the Southern Oscillation Index switched abruptly, heralding the longest dry spell since 1970. In

June 1997, OTML suspended copper shipments because barges had been unable to move the ore stockpile at Kiunga for several months.

10 Letter to 'Matinbos [Marty Bos] Jefes [Jeff Ransley] Ok Tedi Mining Ltd' From Cllr. Woke Aloneng, Walawam village. File 35-2-5 District Office, Tabubil. Dated 16 January 1984.

11 'One eye', probably an English rendering of a Ningerum idiom meaning 'to turn away from and ignore'.

12 Letter: 'One eye government - Oktarim landowners, Western Province' From Mr Kubana Yuntem and six others. File 35-2-1 District Office, Tabubil. Dated 15 July 1990.

13 Letter to OTML Public Relations from Daniel Atemyok and three others: 'First men that lived around Mt. Fubilan and further west to Ningerum speaking side'. Dated 13 July 1992.

14 'Giant Fly River': probably an idiomatic rendering of the Boazi/ Zimakani *Waima Qa*, or 'big/broad river', that is the Fly River.

15 Thus. 'Being' and 'been' are commonly interchanged in written forms of PNG English.

16 Filer (this volume) notes a resolution of mine waste dumpingpassed by delegates of the United Church, a minority church in the North Fly, at a convention in Daru in October 1989.

17 Letter 'To District O.I.C. Tabubil, WP. Wurumkanatgo Village, 96km Ningerum District, Western Province P.N.G.' From Kubina Wangapmon three others. Dated 1 August 1992.