

HOPES FOR THE RADIATED BODY: URANIUM MINERS AND TRANSNATIONAL TECHNOPOLITICS IN NAMIBIA*

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ABSTRACT: This article explores the transnational politics of technology and science at the Rössing uranium mine in Namibia. During the 1980s, Rössing workers refashioned surveillance technologies into methods for trade union action. When national independence in 1990 failed to produce radical ruptures in the workplace, union leaders engaged in technopolitical strategies of extraversion, and became knowledge producers about their own exposure to workplace contaminants. Appeals to outside scientific authority carried the political promise of international accountability. But engaging in science meant accepting its boundaries, and workers ultimately discovered that technopolitical power could be limiting as well as liberating.

KEY WORDS: Namibia, southern Africa, health, mining, technology.

RESPONDING to the relentless marginalization of Africa in scholarship on ‘globalization’, Africanists have demonstrated how diverse places on the continent have long been connected to other parts of the world. Making such connections visible, they insist, disrupts the illusion of smooth, flowing networks that the contemporary notion of the global invokes: Frederick Cooper and James Ferguson thus insist on the ‘lumpiness’ of ‘global’ power, the way it ‘hops’ from point to point.¹ In a parallel vein, Jean-François Bayart uses the term ‘extraversion’ to describe how Africans strategically seek international connections and resources in waging battles for sovereignty and survival. Examining how such strategies shaped decolonization struggles, Cooper cautions that appeals to ‘universal’ values and supra-national authority, while often powerful, also expose ‘the limits of the connecting mechanisms’.² For Bayart, extraversion strategies both reveal the

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¹ F. Cooper, ‘What is the concept of globalization good for? An African historian’s perspective’, *African Affairs*, 100 (2001), 189–213; J. Ferguson, *Global Shadows: Africa in the Neoliberal World Order* (Durham, NC, 2006).

² J.-F. Bayart, ‘Africa in the world: a history of extraversion’, *African Affairs*, 99 (2000), 217–67; Cooper, ‘What is the concept?’, 190.

creativity of Africans and expose the texture of their dependence on other places. Collectively, these fruitful lines of inquiry have focused on areas that conventionally fall into the realm of political and cultural activity – the World Bank, print media, clothing, and more – and have enabled scholars to re-evaluate their structures and power. One domain, however, remains largely unexplored: the technological systems so frequently invoked (by non-Africanists) as material channels for global power in the contemporary world.

The absence is doubtless not deliberate. Nevertheless, it reinforces stereotypes that render ‘Africa’ and ‘technology’ as incommensurable categories. Technology’s omission from analyses of political agency and claims-making makes it appear exogenous, a global force that buffets ordinary Africans and turns them into mere victims. Such a view makes it difficult to grasp how technological entanglements permeate industrial labor in post-colonial Africa, how such entanglements both open and close political possibilities, and how their contradictions sometimes serve as sources of hope.

Uranium mining offers an ideal entry point into these issues. Since its inception during the Second World War, the nuclear industry – which makes profound claims to ‘global’ purview – has depended economically, technologically, and politically upon uranium from Africa.³ Neither nuclear historians nor Africanists, however, have taken stock of the meaning of this relationship for places and people in Africa. Elsewhere, I have written about uranium production in Madagascar, Gabon, and South Africa, juxtaposing these histories with moments when African people and workplaces were written out of global knowledge production on radiation hazards.⁴ In this article, I focus on the Rössing uranium mine before and after Namibian independence. Building on work by Bayart, Cooper, Ferguson, and others, I show that both managers and workers invoked international technical and scientific authorities as sources of authority and legitimacy, and I explore the possibilities for – and limits to – political agency that Rössing workers derived from technological practices and scientific expertise.

From the moment it opened in 1976, Rössing symbolized the capitalist world’s complicity in maintaining apartheid in southern Africa. Although illegal by United Nations decree, the mine supplied large quantities of uranium to nuclear weapons and power plants in Europe, Asia, and the US.⁵ For the liberation struggle – especially the nationalist South West Africa People’s Organization (SWAPO) – opposing Rössing’s operations offered a means of recruiting allies from the anti-nuclear and anti-apartheid movements outside Namibia. Activists kept the mine in the international spotlight

³ G. Hecht, ‘Nuclear ontologies’, *Constellations*, 13:3 (2006), 320–31.

⁴ G. Hecht, ‘Africa and the nuclear world: labor, occupational health, and the transnational production of uranium’, *Comparative Studies in Society and History*, 51:4 (2009), 896–926.

⁵ In 1974, the United Nations Council on Namibia (UNCN) passed its Decree No. 1, which prohibited the extraction of Namibian natural resources without express UNCN permission. Nations such as the US, Britain, Germany, Japan, and France – where Rössing’s customers came from – claimed that the UNCN’s decrees were not legally binding. N. Schrijver, *Sovereignty over Natural Resources: Balancing Rights and Duties* (Cambridge, 1997). See also G. Hecht, ‘The power of nuclear things’, *Technology and Culture*, 51:1 (2010), 1–30.

via hearings, publications, and demonstrations, repeatedly invoking apartheid conditions and exposing the transnational web of capital and technology that supported the mine.⁶ Mine executives countered these challenges by invoking other international authorities. Nevertheless, in the late 1980s, activist efforts started seriously jeopardizing Rössing's ability to do business.

Independence came in 1990. Almost overnight, SWAPO reversed its rhetoric and forged strong ties with Rössing management. Accusations of apartheid collusion faded away. So, too, did threats to nationalize the mining industry, as the new government expressed boundless enthusiasm for foreign investment. Rössing executives accompanied President Sam Nujoma on official visits abroad. Marketing campaigns proclaimed that buying Rössing uranium was akin to development aid for the new nation. The postcolonial state fully backed the company's new slogan: 'Working for Namibia'. But what about those who worked for Rössing?

Throughout the national transition, I argue, workers staked their political claims to technological practices. I refer to such acts of alliance as technopolitics, to stress how they opened some possibilities for political agency and closed down others.⁷ During the 1980s, contesting the racial division of labor led some Rössing workers to refashion surveillance technologies into methods for trade union action. This tactic enabled SWAPO-affiliated union leaders to build support among the workforce, even as SWAPO activists abroad called for an embargo on Rössing uranium that could have shut down the mine. When national independence in 1990 failed to produce radical ruptures in the workplace, union leaders looked abroad for help. In a move we might think of as technopolitical extraversion, they engaged external expertise to help them understand, measure, regulate, and obtain compensation for exposure to workplace contaminants, especially radiation and dust. They became knowledge producers. Appeals to outside scientific authority carried the political promise of international accountability, and offered political channels that bypassed the boundaries of the nation-state. But

⁶ The archives of the most active of these organizations, the British-based Campaign against Namibian Uranium Contracts (CANUC), are housed at the Bodleian Library of Commonwealth and African Studies at Rhodes House, University of Oxford. Notable publications include A. Roberts, *The Rössing File: The Inside Story of Britain's Secret Contract for Namibian Uranium*. London: Campaign Against the Namibian Uranium Contracts (1980) and A. D. Cooper (ed.), *Allies in Apartheid: Western Capitalism in Occupied Namibia* (New York, 1988). See also UNCN, 'Report of the Panel for Hearings on Namibian Uranium. Part Two: verbatim transcripts of the public meetings of the Panel held at Headquarters from 7 to 11 July 1980', 30 Sept. 1980, A/AC.131/L.163; annual reports of the UNCN to the UN General Assembly, especially from the 1980s. The role that nuclear technology played in the international anti-apartheid movement is discussed in P. N. Edwards and G. Hecht, 'History and the technopolitics of identity: the case of apartheid South Africa', *Journal of Southern African Studies*, forthcoming Sept. 2010. CANUC activities are discussed in the wider context of the British Namibia Support Committee in C. Saunders, 'Namibian solidarity: British support for Namibian independence', *Journal of Southern African Studies*, 35:2 (June 2009), 438–54.

⁷ Here I draw upon my usage of 'technopolitics' in G. Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II* (new edn, Cambridge, MA, 2009). T. Mitchell, *Rule of Experts: Egypt, Techno-politics, Modernity* (Berkeley, 2002) deploys the term in a similar way.

engaging in science meant accepting its structures, and workers ultimately discovered that technopolitical power could be limiting as well as liberating.

Given the prominent place of mining in the history of southern Africa, a caveat is in order. Although this article concerns a mine and its workers, its argument is not about mining in the conventional historiographical sense. Readers will find neither a detailed discussion of the labor process nor an extended analysis of the relationship between the political economy of mining and the dynamics of state formation. Rather, this article finds inspiration in the urging of Ferguson and others to explore political circuits that escape the boundaries of the nation-state. I seek to understand the *kinds* of politics made possible by engagement with science and technology, along with the limits of those engagements. Along the way, I also hope to push understandings of occupational illness in southern African mines in new directions, by analyzing an instance in which workers were not merely medical subjects but also participants in the production of scientific knowledge about their bodies.⁸ Ultimately, this article aims to transcend the Afro-pessimism implicit in technology's absence from analyses of Africa-based transnational politics – and Africa's absence from analyses of global technological systems – by showing how Rössing workers were not passive subjects of nuclear structures, even when political and social inequalities severely constrained their possibilities for action.

LABOR MOBILIZATION AND THE TECHNOPOLITICS OF SURVEILLANCE

The Rössing uranium mine resulted from a partnership between the British mining corporation Rio Tinto Zinc (RTZ) and the South African parastatal Industrial Development Corporation. It began producing uranium in 1976 and soon became the largest opencast uranium mine in the world. By 1978 the mine had investors and customers from Britain, France, Germany, Iran, and Japan, with more to follow in subsequent years. Although Rössing tried to keep these contracts secret, activists tracked many of them through assiduous research.

During the first two years of operation, technical problems and spontaneous labor action severely curtailed Rössing's productivity.⁹ For the first

⁸ This rich body of literature historicizes the invisibility of diseases such as asbestosis, silicosis, and tuberculosis; perhaps inevitably, this entirely justifiable concern with the mechanisms of invisibility has led historians to focus primarily on medical doctors, mine managers, state agencies, labor lawyers, and other elites. See, among many others, L. Braun, 'Structuring silence: asbestos and biomedical research in Britain and South Africa', *Race & Class*, 50:1 (2008), 59–78; E. Katz, *The White Death: Silicosis on the Witwatersrand Gold Mines, 1886–1910* (Johannesburg, 1994); J. McCulloch, *Asbestos Blues: Labour, Capital, Physicians & the State in South Africa* (London, 2002); idem, 'Counting the cost: gold mining and occupational disease in contemporary South Africa', *African Affairs*, 108/431 (2009), 221–40; R. M. Packard, *White Plague, Black Labor: Tuberculosis and the Political Economy of Health and Disease in South Africa* (Berkeley, 1989).

⁹ For discussion of labor action in the 1970s, see A. Macfarlane, 'Labour control: managerial strategies in the Namibian mining sector' (unpublished PhD thesis, Oxford Polytechnic, 1990); G. Bauer, *Labor and Democracy in Namibia, 1971–1996* (Athens, OH, 1998).

wave of hiring, the mine had relied on the southern African contract-labor system (although it was already on its way out in Namibia).¹⁰ In 1976, and again in 1978, these employees went on strike to protest their living and working conditions. Rössing readily restored order thanks to the truckloads of South African riot police standing alongside the mine's own security forces. At the time of the second strike, however, independence seemed imminent, with elections scheduled for December. In the end, another 12 years would pass before a successful national transition.¹¹ Nevertheless, at Rössing the sense of political inevitability combined with technological start-up problems to persuade management that it needed a stable, non-migratory labor force to run the mine's complex machinery, and that better workplace relations could help meet productivity goals.¹²

Hoping to head off further strikes, improve production, and bolster the mine's image, top management began to explore a new labor policy for Rössing based on the 'complete abandonment of racial discrimination'.¹³ Via an internal newsletter, new structures for evaluating job grade and pay, a commitment to a permanent labor force, and a variety of social programs, management tried to persuade workers that they were now working under capitalism – not apartheid – and that these two were separate. But workers did not readily accept this distinction. Jobs may have been graded and remunerated according to the Paterson scheme, which coded rank and skill level, but black and colored employees remained on the lower rungs. Rössing relied technologically on apartheid South Africa: managers had trained and worked there (as engineers, metallurgists, chemists, and medical doctors), and most equipment was obtained there (not least because it required regular maintenance and spare parts). The policy of deracialization rarely translated into practice. Many white foremen actively opposed reform. Low turnover limited promotion options. Formally, the location and quality of housing were tied to rank instead of race, but, since rank remained racially segregated, the end result was the same. And management kept the most potent symbol of oppression: the Rössing security force, headed by a former member of the Rhodesian police, and equipped with submachine guns, automatic rifles, teargas, grenades, and other weapons.¹⁴ Before the early to mid-1980s,

¹⁰ On migrant labor in Namibia specifically, see R. Moorsom, 'Underdevelopment, contract labour and worker consciousness in Namibia, 1915–72', *Journal of Southern African Studies*, 4: 1 (1977), 52–87; idem, 'Underdevelopment and labour migration: the contract labour system in Namibia', History Research Paper No. 1 (Windhoek, 1995); R. J. Gordon, *Mines, Masters and Migrants: Life in a Namibian Mine Compound* (Johannesburg, 1977).

¹¹ Bauer, *Labor*.

¹² This discussion of pre-1985 history is based on analysis in Macfarlane, 'Labour control', but supported by my own archival and oral interview research at Rössing in 2004. My analysis of Rössing after 1985 relies entirely on my own research. In 2004, Rössing graciously gave me full access to its archives in Swakopmund (henceforth RAS) and at the mine site (henceforth RAMS). These were organized into binders and boxes, but not formally catalogued. Whenever possible, references in subsequent footnotes correspond to the labels on binders or boxes.

¹³ RUL/R. Walker, 'Social, manpower development and industrial relations policy', January 1978, quoted in Macfarlane, 'Labour control', 173.

¹⁴ Macfarlane, 'Labour control', 211. Police dogs patrolled the site, especially on paydays. Workers suspected that Rössing security collaborated with the South African police by identifying political agitators, and the head of security, Bill Birch, himself freely

therefore, most workers saw little reason to distinguish between mine management and the colonial state.

'Deracialization' took a new turn in 1979, when management created the Loss Control division, a unit that was responsible for accident assessment and prevention. Headed by a white manager, it was staffed by four black and colored men – the first such employees to receive salaries (as opposed to hourly wages) and benefits. As its name made clear, the unit's primary goal was to improve productivity by eliminating losses in work time and equipment.¹⁵ Improvements in occupational safety were presumed to follow. When they finally did (in 1987), management eagerly sought certification from the South African National Occupational Safety Association (NOSA) and the British Safety Council. It trumpeted these certificates in internal newsletters and external brochures, hoping that the legitimacy offered by external recognition would help counter international opposition.¹⁶

Both technologically and socially, loss control functioned as a surveillance unit. Safety officers inspected work areas for ventilation, lighting, fire protection, leaks, and other problems. They conducted accident investigations, wrote safety guidelines, verified compliance, and reported violations. Their findings could ultimately lead to management-imposed sanctions. This gave the loss control officers some authority over (primarily white) foremen.¹⁷

Some white superintendents violently resented the new officers. Willem van Rooyen, a colored member of the initial loss control team, remembers being physically assaulted on one occasion. His assailant was fired, over the objections of some mid-level managers. Now in top management himself, van Rooyen wryly observed that the general manager's 'dictatorial style' in the early 1980s had benefits in such circumstances:

[The general manager] was very focused on setting standards ... and actual compliance. It was ... pre-independence and it was ... harsh in a way that people knew quite extensively, clearly: if you are not obedient and play [by] the rules, you are out of the company ... That regime was ... actually very conducive to what the safety section and the environmental section were trying to do at the time.¹⁸

admitted to holding regular meetings with the police to share intelligence. At one stage, guards on horseback even patrolled the perimeter of the site, though this practice proved impossible to sustain in the heat of the Namibian summers because the horses collapsed from heat stroke. Interview with Bill Birch, Swakopmund, 29 Jan. 2004; interview with Paul Rooi, Rössing, 30 Jan. 2004; interview with Asser Kapere, Windhoek, 25 Feb. 2004; RAMS, *Industrial Relations*, 1978–79.

¹⁵ The unit actually changed names numerous times; for clarity, I have kept the loss control designation, since this is how employees referred to it in their discussions with me. This emphasis was of course common throughout industry, and not just in southern Africa. N. Anderson and S. Marks, 'Work and health in Namibia: preliminary notes', *Journal of Southern African Studies*, 13:2 (1987), 274–92.

¹⁶ Starting in 1987, Rössing received the highest possible rating for its performance from NOSA; the following year, it applied for and received a 'Sword of Honour' award from the British Safety Council. Rössing annual reports and newsletters, 1980s.

¹⁷ Interviews with Paul Rooi, Asser Kapere, Willem van Rooyen (Rössing, 15 Jan. 2004), and John Clarke (Rössing, 27 Jan. 2004).

¹⁸ Interview with Willem van Rooyen.

By imposing safety practices on whites as well as non-whites, the surveillance enacted by van Rooyen and his colleagues became a means of slowly and subtly shifting the racial locus of technical authority.¹⁹

Surveillance also had technopolitical effects that exceeded management's intentions. Loss control officers bore witness to petty injustices and worker grievances. They watched men wrestle with the gigantic machinery to drill, blast, and move rocks in the open pit. They heard the deafening, bone-shaking crushers that ground the rocks. They saw corrosion ceaselessly attacking the pipes in the solvent extraction plant; they smelled the fumes rising from the vats; they breathed the dust that pervaded the site. They learned about the toxicity risks in Final Product Recovery, which roasted and packed uranium ore for shipment. Their reports provided technopolitical evidence by inscribing the links between hazardous conditions and racial inequalities.²⁰

Still, safety surveillance might not have become political action had it not been for Asser Kapere, one of the loss control officers. A longtime SWAPO member, his political ambitions extended beyond the workplace, but his division offered a good place to start. Kapere and his coworker (and fellow SWAPO member) Paul Rooi mobilized their loss control colleagues, including their white manager, who, Kapere later reported, became 'a sympathizer ... If I wanted to go to political meetings or so on, I would tell him ... "tomorrow I cannot come to work, comrade!"'²¹ Loss control officers used their mobility to radicalize other workers.²² They transformed their daily tours of the site's technological activities into occasions for trade union mobilization. Support grew steadily, and in early 1986 they notified management of their intention to establish a union.²³

Momentum for independence was resurging, and the transitional government had begun to support non-party-affiliated trade unionism in the hope that such organizations would offer a political base independent of

¹⁹ Classic studies on skill and worker initiatives in African mines include M. Burawoy, *The Colour of Class on the Copper Mines: From African Advancement to Zambianization* (Manchester, 1972); portions of T. D. Moodie (with V. Ndatshé), *Going for Gold: Men, Mines, and Migration* (Berkeley, 1994); J. Guy and M. Thabane, 'Technology, ethnicity, and ideology: Basotho miners and shaft-sinking on the South African gold mines', *Journal of Southern African Studies*, 14:2 (1988), 257–78. On skill and technology in the workplace more broadly, see (among many others) M. Burawoy, *Manufacturing Consent: Changes in the Labor Process Under Monopoly Capitalism* (Chicago, 1979); D. Noble, *Forces of Production: A Social History of Industrial Automation* (Oxford, 1984).

²⁰ These reports, and other activities of the loss control division, are documented in RAMS, Loss Control, 1979–1989; individual documents are too numerous to cite here.

²¹ Interview with Asser Kapere.

²² For example, Paul Rooi noted that 'we could move around due to the type of work that we used to do – could move around all over the mine ... So we could easily make contact with all these relevant employees' (interview with Paul Rooi). Dozens of interviews with other Rössing workers in 2004, along with many boxes of documents from company archives, confirmed that these loss control officers were the ones to unionize the workforce during their daily tours of the site, as well as through meetings in Arandis. Documents cited in subsequent footnotes represent but a small sample of the evidence.

²³ RAS, Industrial Relations, 1985–87, Security and Services Superintendent to Personnel Manager, Confidential Memorandum re: Rössing Uranium Mine Workers Union, 26 Feb. 1986, 2.

SWAPO.²⁴ Top management realized that backing a union would have long-term advantages after independence. But the SWAPO connections of labor leaders – and the increasing anxiety of many white employees – made things tricky.

During his first meeting with union leaders, the personnel manager Charles Kauraisa (who was Herero-speaking – Rössing had continued hiring black Namibians into supervisory positions) insisted that the company supported the union but noted ‘the nervous attitude of the State’ toward SWAPO. The union, he warned, should ‘be very careful not to prompt an unreasoned response from any part of the State bureaucracy’. Union leaders, meanwhile, complained about supervisors ‘displaying unacceptable fear and interfer[ing] with the rights of their subordinates to join a prospective Trade Union’.²⁵ Kauraisa insisted that management would countermand such interference.²⁶ But labor leaders kept noticing undercover security officers at union meetings, and suspected that the mine’s security service routinely ‘colluded with the police’.²⁷ Despite such difficulties, the union gained formal recognition later that year, and formally merged with the national Mineworkers’ Union of Namibia (MUN) in 1988.²⁸

On site, the union’s first official business concerned workplace racism. Existing disciplinary mechanisms, the union argued, ‘embodie[d], if not the provision, then at least the spirit of ... apartheid and racial discrimination’. Most notably:

Where the supervisor is white and the worker black, the merits of the case are largely subservient to skin colour and the overriding consideration remains the view/opinion/version of the white supervisor. Many of these supervisors still consistently display a ‘baasskap’ [*sic*] mentality ...²⁹

Furthermore, union leaders remained unimpressed by the company’s progress toward the ‘Namibianization’ of supervisory positions.³⁰ The technological knowledge of black workers remained undervalued compared to that of whites: ‘the majority of whites in middle management are promoted

²⁴ Bauer, *Labor*, 86.

²⁵ RAS, Industrial Relations, 1985–87, W. Groenewald to General Manager, 9 Apr. 1986; M. P. Bates to W. Groenewald, 21 Apr. 1986; Personnel Manager to General Manager, Confidential Memorandum re: Rössing Mine Workers’ Union, 24 Apr. 1986.

²⁶ RAS, Industrial Relations, 1985–87, C. V. Kauraisa to B. E. Burgess, P. C. Brown, B. Hochobeb, A. Kapere, and W. Groenewald, Confidential memorandum re: ‘Rössing Mine Workers’ Union’, 16 June 1986; W. J. Birch to Senior Security Officers, ‘Rössing Uranium Mine Workers Union’, 26 Feb. 1986.

²⁷ Interview with Willem van Rooyen; RAS, Industrial Relations, 1985–87, ‘Demands presented by the Rössing Mine Workers’ Union Executive’, 08h00, 31 July 1987.

²⁸ Kapere and Groenewald had become members of the MUN’s National Executive Committee in 1986, and, along with other Rössing labor leaders, played a significant role in the formation of the MUN as a national organization encompassing workers in mines across the country.

²⁹ RAS, Industrial Relations, 1988, Rössing Mine Workers’ Union Statement, 20 Apr. 1988.

³⁰ The political importance of Namibianization at Rössing contrasts somewhat with Burawoy’s findings on Zambianization on the Copperbelt (Burawoy 1972); a fuller analysis of these differences must await another venue.

regardless of qualifications whereas in stark contrast, black semi-skilled workers (performing the tasks of skilled workers) have to obtain qualifications higher than the legal requirement to make any advancement whatsoever'. Workers questioned management's true commitment to racial equality.³¹

The Rössing union's affiliation with the MUN had political and financial benefits, but it also created dilemmas. The MUN General Secretary, Ben Ulenga (a former Robben Islander), had embraced the liberation struggle's extraversion strategies. He traveled frequently to Europe to rally international trade union support. Following the SWAPO line, in these settings Ulenga issued repeated demands for an international boycott of Rössing uranium. Back in Namibia, Rössing management told its workforce about Ulenga's speeches, and cautioned that a successful boycott would shut down the mine and produce widespread job loss.³² Staunch SWAPO supporters defended the primacy of the nationalist struggle.³³ Others were not so sure, and rumblings began about forming a breakaway union.³⁴ Regardless, it became clear that retaining local support required delivering concrete solutions to specific workplace problems. In 1989, with independence around the corner, union leaders returned to their technopolitical origins by focusing on health and safety issues.³⁵

They began by demanding increased worker participation in health and safety decisions. As Kapere and his colleagues well knew, meaningful participation depended on multiple forms of knowledge about employees and their workplaces. Loss control reports only testified to acute accidents. Readings for environmental contaminants, such as dust and radiation, fell under the direction of the company doctor. Making these data meaningful – for example, linking readings of dust or radiation with workplace exposures and health outcomes – required access to individual medical and personnel files. During and after Namibia's transition to independence, such

³¹ Rössing Mine Workers' Union Statement, 20 Apr. 1988.

³² RAS, Industrial Relations, 1988, M. P. Bates to Personnel Manager, Memorandum, 22 Oct. 1987; Namibia Support Committee, 'Blockade southern African uranium: solidarity with Namibian and South African miners', Oct. 1987 flyer; P. C. Brown, Notes of a meeting with the Mine Workers Union of Namibia, 17 Dec. 1987, Windhoek.

³³ Interview with Harry Hoabeb, Rössing, 9 Feb. 2004.

³⁴ Apparently, a few years earlier, Daniel Okamaru (another Rössing worker) had spearheaded a separate effort to unionize workers. Rumors held that SWAPO leaders had stopped him because they wanted to control union formation directly. Whatever the case, Okamaru recast Ulenga's European boycott appeals as a call to shut down. He told the personnel manager that 400 employees would support him in the creation of a new union because like him, they believed 'the Kapere union' to be a SWAPO-dominated organization. Okamaru's move didn't gain much traction among labor or management, but it did indicate some political tension within the workforce. See RAS, Industrial Relations, 1988, 'Ben Ulenga', *The Namibian*, 3 June 1988 (clipping, no page number); 'Position paper on Rössing Mine Workers Union (RMU)', n.a., 16 Feb. 1987; Personnel Manager to Assistant General Manager, Memorandum re: 'Report on break away union discussion', 28 June 1988.

³⁵ RAMS, Industrial Relations, 1985–89, 'Minutes of a company/union meeting held on Wednesday 16 Aug. 1989 at 15h15 in the Management Conference Room', 22 Aug. 1989.

knowledge became the central factor in the conflict between management and workers.

MEDICAL TECHNOLOGY AND DISEASE ONTOLOGIES

In order to understand tensions around the production and use of knowledge about health and exposures at Rössing, we must backtrack a bit. In 1979, Rössing hired Wotan Swiegers, a freshly trained, white Namibian doctor, to build a clinic and devise occupational health guidelines. Swiegers began by visiting uranium facilities in Canada, South Africa, and Britain to learn about their practices and obtain an occupational health certificate.

Radiation exposure and uranium toxicity particularly interested Swiegers because they offered scientific and technological challenges that would distinguish his work from that of other southern African mine doctors. He ordered equipment for a battery of annual tests, including spirometry, x-rays, sputum cytologies, and urine sampling. He set up a system to monitor the monthly radiation exposures of workers in the Final Product Recovery area in cooperation with the South African Bureau of Standards. And – in stark contrast to uranium-producing mines in South Africa itself, which at the time did not track their own radiation levels³⁶ – he developed exposure guidelines based on recommendations by the International Commission on Radiological Protection (ICRP).

It is important – as Beinart, Brown, and Gilfoyle have recently urged historians of colonial Africa – to see the doctor's work in terms of his own scientific aims.³⁷ Swiegers justifiably took pride in his program: 'when I visited Canada, for instance, or even France – and South Africa for certain, you know – we were streaks ahead'.³⁸ Elsewhere, yearly lung function tests and x-rays had been deemed unnecessary. Swiegers, however, plumped for thorough data collection, even when it taxed the patience of management.³⁹ For him, this was 'pioneer work' because, although it might have seemed ordinary 'in a First World country, it's damn difficult to do ... in a Third World country'.⁴⁰ If the mine had hired the doctor to emulate a long tradition of corporate and colonial medicine centered on maintaining worker productivity, Swiegers himself understood that (at the very least) productivity depended partly on trust.⁴¹ Both at the time and in retrospect, he defended his technological choices partly in performative terms: 'If people see that what you do is ... high tech and if you're trying to do it properly, ... it gives them belief in the system.' To the annoyance of line managers, he insisted on transferring workers whose exposures exceeded

³⁶ Hecht, 'Africa'.

³⁷ W. Beinart, K. Brown, and D. Gilfoyle, 'Experts and expertise in colonial Africa reconsidered: science and the interpretation of knowledge', *African Affairs*, 108/432 (2009), 413–33.

³⁸ Interview with Wotan Swiegers, Swakopmund, 18 Feb. 2004.

³⁹ RAS, Medical Services, 1979–81, B. E. Burgess to Dr. W. R. Swiegers, BEB/bs/Objectives file, 29 Dec. 1980.

⁴⁰ Interview with Wotan Swiegers.

⁴¹ On corporate and tropical medicine see, e.g., Packard, *White Plague*.

international standards out of high-radiation zones, and keeping them out until their exposure averages dipped back to acceptable levels. He felt that such measures – which followed international ‘best practice’ – resolved the tensions experienced by ‘any occupational health physician: this whole problem of dual loyalty’.⁴²

Nevertheless, Swiegers did not always recognize how deeply trust was bound up with larger social, political, and epistemological issues. For example, annual spirometry (which tested lung function) required workers to inhale and exhale into a machine following prescribed patterns. Failing to reproduce the patterns precisely could lead to conflicts. These were exacerbated, one worker recalled, when the lung expert whom Rössing retained from Stellenbosch University in South Africa said that black people had weaker lungs than white people.⁴³ The fact that workers did not receive copies of their medical tests or monthly exposure results engendered further mistrust – as did orders to wear uncomfortable protective equipment with little explanation for its purpose. Swiegers’s successor, Jamie Pretorius, later acknowledged that the medical service’s explanations of ‘the concept of radiation’, or ‘why must you wear a respirator, or ... a film badge’, or why workers had to supply urine or blood specimens were ‘paternalistic’.⁴⁴

Workers, of course, had no choice but to accept such dictates: the alternatives were disciplinary measures (at best) or getting fired (at worst). Acceptance did not mean that they trusted experts and high-tech machines. They saw monitoring practices as inseparable from the discipline inherent in the colonial/corporate system. As the SWAPO member and trade unionist Harry Hoabeb later explained, in the 1980s ‘we saw each other as white and black. Oppressor and the oppressed.’⁴⁵ This dynamic permeated how workers saw the medical service – especially when the doctors refused to give workers access to their medical records. For Pretorius, the refusal was a matter of ‘medical ethics ... the data in there belongs to Rössing [and] therefore this information was not to be divulged to any person’.⁴⁶ But Hoabeb and his trade union colleagues refused to accept this rationale:

If you go to your annual medical check-up, that’s the most important information that is in your file ... But during those times, we don’t have a proper definition for ‘mine-related diseases’ ... What would we call occupational disease? So mostly what was in the files were chronic diseases and so forth ... but nothing that would define as occupational disease. So also in that regard really I do not see the point of medical confidentiality.⁴⁷

⁴² Interview with Wotan Swiegers.

⁴³ Interview with Harry Hoabeb. This and other testimony supports the argument about the lasting effects of the deeply racialized history of spirometry in L. Braun, ‘Spirometry, measurement, and race in the nineteenth century’, *Journal of the History of Medicine and Allied Sciences*, 60 (2005), 135–69.

⁴⁴ Interview with Jamie Pretorius, Rössing, 29 Jan. 2004.

⁴⁵ Interview with Harry Hoabeb.

⁴⁶ Interview with Jamie Pretorius.

⁴⁷ Interview with Harry Hoabeb. The company archives document dozens of requests from workers and union leaders for access to medical and personnel files.

Trade unionists challenged the notion that disease ontologies existed separately from social context. In turning that challenge into an instrument of political action, they returned to transnational political circuits established during the liberation struggle.

TECHNOPOLITICAL EXTRAVERSION

Top management had been eagerly anticipating independence for some time, since sanctions had begun to affect business seriously.⁴⁸ Soon after the signature of the independence accord, Rössing arranged a series of meetings with SWAPO, at which the party leadership reassured the company that they saw it as a key player in the Namibian economy.⁴⁹ Rössing proceeded to give 'utmost priority' to 'establishing good relations with the future leaders of an independent Namibia'.⁵⁰ Executives attended social functions in Windhoek; hosted a series of lunches for SWAPO leaders, UN officials, senior diplomats, and other business and civic leaders; and invited all these people to tour the mine. In an internal memo from 1989, the public affairs manager, Clive Algar, advised his colleagues on diplomacy:

Sometimes we – and I am as guilty as anybody – tend to show our satisfaction at Rössing's successes in various fields but this may be the wrong psychological approach when dealing with future cabinet ministers whose whole *raison d'être* is change and improvement of Namibia. Our theme throughout should be not only what we have achieved but what remains to be done, and in speaking about such aims we should make it clear that we are open to suggestion and comment. *This of course hardly applies in the technical area* but is very relevant to the whole human aspect of Rössing.⁵¹

This tactic worked. Shortly after independence, top company executives accompanied President Sam Nujoma and several of his ministers on a week-long visit to the US, thereby 'consolidat[ing] what were already sound and friendly relationships'. In June, Dr. Leake Hangala of the Ministry of Mines and Energy joined Rössing's Board of Directors as the new government's

⁴⁸ In 1986, Rio Tinto hired a Washington lobbyist to mitigate the effects of the US Comprehensive Anti-Apartheid Act on Rössing's American sales, but the best she could do was delay those effects. I discuss this aspect of Rössing's history in Hecht, 'Power of nuclear things'.

⁴⁹ The company's preparations for independence (along with policy during and after the transition) are documented in the Minutes of the Board of Directors starting from the 100th meeting on 19 August 1988 to the 111th meeting on 24 May 1991 (RAS, Board of Directors). By August 1989, SWAPO leaders had formally toured the Rössing site and declared that they would support the normalization of trade as soon as possible. RAS, Independence/MD files, Minutes of the Executive Committee Meeting held on Friday, 18th Aug. 1989.

⁵⁰ RAS, Board of Directors, Minutes of the 104th Meeting of the Board of Directors, 21 Aug. 1989. On SWAPO's state-making in the aftermath of independence, see L. Dobell, *Swapo's Struggle for Namibia, 1960–1991: War by Other Means* (Basel, 1998 and 2000).

⁵¹ RAS, Independent transition (Managing Director files), Memorandum, Public Affairs Manager to Sean James, Acting General Manager, 1st Aug. 1989, p. 3, emphasis added.

nominee.⁵² Most reassuringly, the new administration formally announced that it would not nationalize the mining industry.⁵³

Meanwhile, Rössing invoked international authorities in order to keep 'technical areas' safely outside the political orbit. Anticipating new regulatory legislation, executives preemptively held meetings with experts from the International Atomic Energy Agency (IAEA) and other international nuclear organizations. Armed with their support, Rössing persuaded government officials that special nuclear regulation was unnecessary for the new Namibia. Ordinary mining legislation 'could quite comfortably accommodate' the regulation of uranium production.⁵⁴

The company took similar steps to shape environmental legislation. Clearly, safety certificates from South African organizations would do little to legitimate Rössing's practices in the eyes of the new government. So the company commissioned a Canadian consulting firm to write two reports: a review of Rössing's occupational hygiene and environmental control practices, and a proposal for Namibian legislation on such practices. The reports vetted Rössing's existing code of practice as meeting international standards, and recommended that the Namibian state formally adopt this code along with a licensing and inspection system for enforcement.⁵⁵ The Ministry of Mines eventually adopted these suggestions.⁵⁶ International expertise thus helped the company gain firm footing with the new administration.

This strengthening of the company's relationship with the state posed challenges for trade unionists. Even before independence, Namibian labor leaders had begun to see tensions between the logic of nationalism and their immediate workplace concerns – paralleling Cooper's description of the experience of their counterparts elsewhere in Africa.⁵⁷ Before the transition, such tensions could be spatialized and deferred: the nationalist demand to boycott Rössing's uranium unfolded at the UN and other international

⁵² RAS, Board of Directors, Minutes of a Meeting of the Board of Directors, 1 June 1990. Hangala had been in exile since the mid-1970s, during which time he earned a PhD in economic geology from Helsinki University.

⁵³ RAS, Board of Directors, Minutes of a Meeting of the Board of Directors, 17 Aug. 1990. SWAPO had made clear in previous statements (in 1988 and 1989) that it did not envisage nationalizing industry: Bauer, *Labor*, 99–100.

⁵⁴ RAS, Board of Directors, Minutes of the 104th Meeting of the Board of Directors, 21 Aug. 1989. Concretely, this approach led to the repeal of the South African Atomic Energy Act and the amendment of the Namibian mining ordinance to include uranium ore and to give the Minister of Mines purview over uranium mining.

⁵⁵ RAS, Board of Directors, SENES Consultants Limited, 'Proposed legislation for uranium mining in Namibia', Nov. 1990; SENES Consultants Limited, 'Review of occupational hygiene and environmental control practices at Rössing Uranium Limited', Dec. 1990; Minutes of the 109th Meeting of the Board of Directors, 23 Nov. 1990. The second SENES report did flag potential problems with the eventual decommissioning of the open pit, the waste dumps, and the tailings area, but – unsurprisingly given the nature of the consultancy, and the fact that it was based on discussions with superintendents and managers – recommended only that Rössing 'continue its studies of tailings management' and assess 'the feasibility of upgrading the acid plant as part of the future phase of operations'.

⁵⁶ Although it took some time – such legislation was not apparently a big priority for the new state, and was not passed until 1994.

⁵⁷ Frederick Cooper, *Decolonization and African Society: The Labor Question in French and British Africa* (Cambridge, 1996).

spaces of protest, while serious contestation of the racialization of technical skill and authority occurred in the workplace; spillover from one domain to the other was minor and manageable. After independence, however, the postcolonial state – now run by the nationalists – needed Rössing to help power its economy. As Gretchen Bauer and others have argued, the state's embrace of private corporations compromised the democratic promise of the labor movement.⁵⁸

To meet these challenges, Rössing's MUN also turned outward to international sources of authority – albeit to different ones from those upon which the company relied. Building on their pre-independence successes, labor leaders focused on matters of occupational health. Kapere fired a warning shot in an interview with the *Namibian* in February 1989, suggesting links between radiation levels at Rössing and 'inexplicable ailments' suffered by Arandis residents. The MUN demanded a broad epidemiological investigation of health problems among workers and their families. When union leaders were approached by Greg Dropkin – a British activist who had participated in the Campaign Against Namibian Uranium Contracts (CANUC) in the late 1980s – they seized the occasion. Now working for PARTiZANS, which campaigned against RTZ's global mining operations, Dropkin wanted to investigate dust and radiation exposures at Rössing.⁵⁹ The ensuing publicity, he suggested, might ultimately enable workers to claim compensation. Union leaders gladly provided Dropkin with internal company documents and worker testimonies.⁶⁰

The resulting 1992 report, *Past Exposure*, struggled to reconcile PARTiZANS's agenda with the union's. PARTiZANS advocated closing all RTZ operations. Obviously, however, the union did not want the mine to close. Indeed, it was combating a recently announced retrenchment plan that threatened several hundred jobs.⁶¹ *Past Exposure* managed to find common ground in the retrospective reconstruction of radiation doses. It made the most of the sparse data that Dropkin had obtained on dust and radiation levels, extrapolating cumulative exposure figures that it then compared to international standards. The report concluded that dust levels in some areas considerably exceeded Rössing's own standard; that Rössing's levels of airborne uranium exceeded ICRP guidelines; and that workers in Final

⁵⁸ Bauer, *Labor*. On the transition to independence, including the role of private capital, see also C. Leys and J. S. Saul (eds.), *Namibia's Liberation Struggle: The Two-Edged Sword* (Athens, OH, 1995), especially L. Dobell, 'SWAPO in Office', 171–95; D. R. Kempton and R. L. du Preez, 'Namibian–De Beers state–firm relations: cooperation and conflict', *Journal of Southern African Studies*, 22:4 (1997), 585–613.

⁵⁹ PARTiZANS = People Against Rio Tinto Zinc and Its Subsidiaries. In the copyright page of *Past Exposure*, they describe themselves as follows: 'Founded in 1978 at the request of Australian Aboriginal communities, PARTiZANS monitors worldwide all the activities and intentions of the world's most powerful mining corporation. It does so by linking together groups from across the globe affected by the company's mines, from Alaska to Zimbabwe.'

⁶⁰ Confidential interviews nos. 6 and 7, 2004. The resulting study, *Past Exposure*, claimed that the union had not provided the documents in question. One set of confidential interviewees, however, stated that certain union members had, in fact, provided the documents – even if the union had not done so officially.

⁶¹ This retrenchment would end up cutting one third of the Rössing workforce.

Product Recovery had experienced particularly high radiation levels before 1982 and still had significant exposures.⁶²

Insisting that the allegations were false, company executives suggested that state officials invite independent experts from the IAEA to inspect the mine. The government readily assented.⁶³ In September 1992, the IAEA – together with the International Labour Organization (ILO) – sent a team to take radiation readings at the site.

The state initially touted the inspection as an effort to mediate between the company and the union. Accordingly, the MUN submitted a list of concerns for the team to investigate and named three international experts whom it wanted on the team. IAEA experts rejected these suggestions, however, explaining that they were on ‘an independent technical mission undertaken on behalf of the Namibian Government’. They would address union concerns ‘time permitting’, but they first had to fulfill their own mandate.⁶⁴

The five-member team spent two weeks taking dust, radiation, and other readings. Their report concluded that the mine’s medical surveillance program and facilities were ‘outstanding’, that Rössing’s data were ‘reliable’, and in particular that radiation levels were ‘very low, much lower than current international limits’. It acknowledged that ‘grievances exist about some cases of illnesses, including lung cancer, which are thought to be related to occupational radiation exposure’, but continued ‘However, such cases can only be addressed in comparison to national vital statistics, which do not seem to exist in Namibia at the present time.’⁶⁵ In other words, the lack of control data made any broad epidemiological study impossible. Furthermore, the experts betrayed marked impatience with the union:

... the Union were most upset that the mission did not concentrate solely on their perceived problems.

Many health and safety issues raised by the MUN could be resolved through the establishment of a joint Occupational Health Committee. While the Rössing management is quite prepared for it, the MUN does not seem to move into this area. Also, the local branch of MUN seems to lack specific site knowledge, occupational hygiene information and standards for Occupational Health Committee members.⁶⁶

The team expressed no awareness of the colonial histories and structural inequalities that explained the lack of control data and impeded the union’s ability to gain information. As for union leaders, they were dumbfounded that the team did not gather its own medical data: ‘they did not take ... examinations, properly draw blood ... They just checked with the facilities of the company and they drew their report.’⁶⁷

Rössing was thrilled with the IAEA report. It sent copies to the international press, organized a panel discussion on Namibian television, and

⁶² G. Dropkin and D. Clark, *Past Exposure: Revealing Health and Environmental Risks of Rössing Uranium* (London, 1992).

⁶³ RAS, Board of Directors, Minutes of a Meeting of the Board of Directors, 20 March 1992.

⁶⁴ J. U. Ahmed, et. al, ‘Report of the IAEA technical co-operation mission to Namibia on the assessment of radiation safety at the Rössing Uranium Mine, 31 August–11 September 1992’ (Vienna, 1992), 9.

⁶⁵ *Ibid.* 12.

⁶⁶ *Ibid.* 9.

⁶⁷ Interview with Harry Hoabeb.

printed a pamphlet entitled *Past Exposure Exposed* aimed at reassuring shareholders and customers. All this, however, only further delegitimated the report in the eyes of union leaders, who refused to accept its conclusions.⁶⁸

In response, the IAEA and the ILO invited a group of MUN representatives to visit uranium mines in Canada in 1993. The trip was sobering. Harry Hoabeb was appalled to see open drums of yellowcake, their product leaking onto the floors; he felt that Rössing's standards were 'far better'.⁶⁹ Another delegate was astonished to learn that most of their Canadian interlocutors remained un-unionized.⁷⁰ And everybody was amazed to see white people mopping floors.⁷¹

Nevertheless, the knowledge that other uranium workers endured bad conditions did not exonerate Rössing. MUN representatives returned from Canada knowing much more about international practices but no less determined to find an independent assessment of their own workplace.⁷² Union comrades in South Africa recommended a medical researcher at the University of Cape Town; his fees proved too high, but he in turn suggested Reinhard Zaire, a Herero-speaking medical student working in Germany. Zaire could study Rössing as part of his research, and the union would reap the benefits. MUN leaders liked this plan; the fact that Zaire was a black Namibian helped them trust him.⁷³ In late 1992, they contracted Zaire to conduct an 'epidemiological evaluation of the Mineworkers at Rössing (with specific references to cancers)'.⁷⁴

Management did not take kindly to this initiative. Pretorius refused to turn over medical records and denied Zaire access to the site. Undaunted (and more suspicious than ever), the MUN arranged for Zaire to take blood and urine samples in secret, to prevent the company from meddling with the results.⁷⁵ The company then enlisted its government connections to learn about Zaire's intentions and slow him down.⁷⁶ They helped Pretorius obtain a copy of Zaire's research protocol.⁷⁷ After the mine doctor identified several procedural problems, the Ministry of Health and Social Services revoked

⁶⁸ Leake Hangala, the government representation to Rössing's board, suggested that management might 'give workers access to health and environmental documents to see for themselves. Such openness would minimize bad publicity and could increase our sales.' RAS, Board of Directors, Minutes of a Meeting of the Board of Directors, 27 Nov. 1992.

⁶⁹ Interview with Harry Hoabeb.

⁷⁰ Interview with Erich Beukes, Rössing, 2 Feb. 2004.

⁷¹ This detail was mentioned in every conversation or interview in which the Canadian visit was discussed – even those with people who had not been on the visit.

⁷² Hangala reported to the Rössing board in Nov. 1992 that 'MUN had been invited to institute an investigation on their allegation of sick people'. RAS, Board of Directors, Minutes of a Meeting of the Board of Directors, 27 Nov. 1992.

⁷³ Kapere – who by this time had left Rössing for national politics, but who stayed in touch with his friends there and had managed to keep his house in Arandis – had known Zaire when they were both children at the same school.

⁷⁴ RAS, Zaire file, H. Hoabeb to the Company Representative, 6 Apr. 1992.

⁷⁵ Interview with Asser Kapere.

⁷⁶ RAS, Zaire file, C. Algar (Manager Corporate Affairs) to S. James (General Manager), Ref: CAA/2-133/ct, 6 Apr. 1993.

⁷⁷ RAS, Zaire file, Chief Medical Officer to General Manager, Memorandum, 9 Nov. 1993.

Zaire's research permission.⁷⁸ Zaire ignored these strictures. Clearly, however, the company's careful cultivation of allies in the postcolonial state was bearing fruit.

Zaire's study soon became entwined with other events. In December 1993, Edward Connelly (a former Rössing worker living in Britain and diagnosed with laryngeal cancer) enlisted Richard Meeran (an environmental lawyer who had prosecuted asbestosis cases against South African mines) to sue Rio Tinto for damages in the British courts. Rio first tried to have the case dismissed on the grounds that Namibian (not British) courts offered the 'natural forum' for the case. Pending a decision on this challenge, Pretorius prepared a thick report documenting Connelly's work history.⁷⁹ In 1998, the British courts finally struck out the suit.⁸⁰ But the Connelly case signaled the stakes of Zaire's study; it was never far from the minds of management or MUN leaders.

Zaire took his blood and urine samples from Rössing back to Berlin, where he ran tests to determine blood counts, hormone levels, chromosomal aberrations, and more. In 1995, he began presenting his results at hematology conferences in Europe and the US. 'Namibia', he declared, 'provides a clear test case for the effects of low-dose long-term uranium exposure.'⁸¹ He placed the greatest emphasis on his results for chromosomal aberrations:

Most remarkably, cells with multiple aberrations such as 'rogue' cells were observed for the first time in miners; these cells had previously been found only after short-term high-dose radiation exposure, e.g. from the Hiroshima atomic bomb or the Chernobyl accident. We conclude that the miners exposed to uranium are at an increased risk to acquire various degrees of genetic damage, and that the damage be associated with an increased risk for malignant transformation.⁸²

He thus made two related claims. First, he asserted that working at Rössing increased the risk of cancer. Second, he claimed to have found the first concrete evidence that exposure to low-level radiation had genetic effects. Scientific controversy over the effects of low-level radiation had been raging

⁷⁸ 'Dr. R Zaire, Diary of Events', July 1997. RAS, Zaire file, Dr. S. Amadhila (Permanent Secretary) to Reinhard Zaire, 15 Apr. 1994; Dr. E. G. Burger to The Permanent Secretary, 9 March 1994.

⁷⁹ Interview with Jamie Pretorius. RAS, Connelly litigation packet, Environmental Services and Environmental Health Departments, 'Work and exposure profile of Mr. Edward Connelly, Co No 9679 for the period of 1977–1982. Privileged – produced for and/or in contemplation of litigation', Sept. 1994.

⁸⁰ RAS, Connelly litigation packet and affidavits, 1994. See also the description of the case by one of Connelly's lawyers: R. Meeran, 'The unveiling of transnational corporations: a direct approach', in M. K. Addo (ed.), *Human Rights Standards and the Responsibility of Transnational Corporations* (Leiden, 1999), 161–70, full text available at <http://www.labournet.net/images/cape/campanal.htm> (accessed 4 June 2009). In 1998, another case was brought against Rio Tinto by the widow of Peter Carlson, who had worked at Rössing from 1977 to 1984 and died of esophageal cancer in 1997.

⁸¹ RAS, Zaire file: R. Zaire, M. Notter, W. Riedel, and E. Thiel, 'Unexpected rates of chromosomal instabilities and hormone level alterations in Namibian uranium miners', 1995 typescript, 2.

⁸² R. Zaire, M. Notter, W. Riedel, and E. Thiel, 'Unexpected rates of chromosomal instabilities and alterations of hormone levels in Namibian uranium miners', *Radiation Research*, 147 (1997), 579.

for decades by this point.⁸³ Zaire clearly saw his intervention as a career-making scientific breakthrough.

By early 1996, Zaire had posted these texts on the Internet. With help from colleagues at Stellenbosch, Pretorius proceeded to dissect the findings. They found many potential problems: the absence of control data made epidemiological comparisons impossible; Zaire lacked accurate radiation exposure profiles for employees, so he could not correlate exposures with chromosome abnormalities; increased chromosomal aberration did not necessarily lead to increased malignancy.⁸⁴ Rössing's general manager forwarded this analysis to Rio Tinto headquarters in London.⁸⁵ Meanwhile, an article on the study in the German press prompted Rössing to warn its lawyers in Windhoek to stand by.⁸⁶

By the time Zaire presented his work to the MUN in July 1996, therefore, Rössing was well prepared. Pretorius attended the meeting and challenged Zaire at every turn.⁸⁷ Quite on their own, however, MUN officials had begun to express disappointment in Zaire. They had expected more from his study. Apparent increased *risk* of cancer was the bottom line; this was less powerful than increased *incidence* of diseases with clear workplace origins. Still, it was something. To rectify the absence of national epidemiological data (invoked by the IAEA in 1992 and again by Rössing in 1996), MUN officials wanted the health study to go national. Indeed, they wanted it to identify *all* the occupational health hazards posed by work at *all* Namibian mines.⁸⁸

Local MUN officials also pushed Zaire for stronger results. Obtaining these, however, would require access to medical records and other company data. Rössing proposed that the union and the company engage additional independent experts to conduct a verification study of Zaire's findings; the company would make more data available, and Zaire would participate. Everyone agreed to this plan, and they began searching for mutually acceptable experts.⁸⁹

Along the way, however, Zaire's behavior grew increasingly disturbing. He had begun holding press conferences without notifying the union,

⁸³ R. Proctor, *Cancer Wars: How Politics Shapes What We Know and Don't Know About Cancer* (New York, 1995); J. S. Walker, *Permissible Dose: A History of Radiation Protection in the Twentieth Century* (Berkeley, 2000); S. Boudia, 'Les problèmes de santé publique de longue durée: les effets des faibles doses de radioactivité', in C. Guilbert and E. Henry (eds.), *Comment se construisent les problèmes de santé publique* (Paris, 2009), 38–53.

⁸⁴ RAS, Zaire file, Chief Medical Officer to General Manager, Memorandum, 15 Mar. 1996.

⁸⁵ RAS, Zaire file, A. Hope to J. Leslie, 22 Mar. 1996.

⁸⁶ RAS, Zaire file, J. S. Kirkpatrick to S. James, 4 Apr. 1996.

⁸⁷ RAS, Zaire file, R. R. Hoveka, File Note: Presentation by Mr. Zaire at the Arandis Club on 12 July 1996.

⁸⁸ RAS, Zaire file, File Note: 'MUN Press Conference—Zaire, Meeting held on 18 Sept. 1996', 19 Sept. 1996.

⁸⁹ RAS, Zaire file, 'Summary of meeting between Rössing Uranium Limited and the Mineworkers Union of Namibia held on 23 Sept. 1996 at Block F in the Ministry of Health and Social Services', n.d.; 'Summary of the meeting between Rössing Uranium Limited and Dr. R. Zaire on the 03 Oct. 1996, at the Rössing Uranium Mine', 3 Oct. 1996.

in which he sometimes made contradictory statements.⁹⁰ Union leaders gradually realized that Zaire had developed other agendas, independent of their mandate. He had accepted 'financial support' for his research from anti-nuclear groups. One worker spoke bitterly of the risks of extraversion strategies:

Once you start getting involved with external people – what do they want? ... You get help and whether it means something to you in the end you [are] not sure ... You are under obligation for certain things and then you need to be very clever in dealing with these external people because some of them [have] other interest groups that supports them or fund their projects but you[re] not clear of what is the project ... So that's ... an international problem especially if you're from the Third World countries.⁹¹

Zaire began to demand outrageous consulting fees, promising more 'comprehensive' health data in return.⁹² But MUN leaders had grown disillusioned. Anti-nuclear groups had 'come along and hijacked' their study.⁹³ By 1998 it was clear that the attempt to find a credible independent expert had taken a disastrous turn. In the words of one union official, 'The value of Zaire's study is very great but his personal ambitions, his personal greed ... overshadowed his scientific work.'⁹⁴ And then the man himself went missing: 'we couldn't trace him later – no emails, no phones ... then government start[ed] looking for him ... that was quite a bad angle.'⁹⁵ The union's attempt at technopolitical extraversion had been badly derailed by Zaire's behavior.

Both the company and the union, therefore, placed considerable hope in the verification study. Company managers hoped that it would help to counter the bad press from the Connolly case.⁹⁶ Union leaders hoped that it would confirm, and perhaps strengthen, Zaire's findings. But they took nothing for granted anymore, and determined to learn as much as possible on their own: 'We had to start reading up on research protocols. [For] any human fluid or tissue, there are certain international criteria. These things we had never known before and then afterwards we start learning about these things'.⁹⁷

The company and the union together selected two experts to conduct the study: Joe Lucas, an American scientist who had originally designed the chromosome aberration tests used by Zaire; and David Lloyd, a British scientist. Lucas and Lloyd initially proposed a three-part research plan: first,

⁹⁰ RAS, Zaire file, T. Siepelmeyer and R. Zaire, 'High risk of cancer at Rössing', typescript, n.d.

⁹¹ Interview with Erich Beukes, 2 Feb. 2004.

⁹² RAS, Zaire file, R. Zaire to A. Muheua, 3 Jan. 1997. Zaire demanded that the union pay his air fare plus a consulting fee of 1000 DM a day, with a minimum of 6000 DM ('Which means that in the event you consult me only for one day during this trip, you will pay me a 6000 DM honorarium.').

⁹³ RAS, Zaire file, File Note: Zaire Meeting held 23 Jan. 1997.

⁹⁴ Interview with Erich Beukes.

⁹⁵ Interviews with Erich Beukes and Paul Rooi.

⁹⁶ Interview with Gida Sekandi, Windhoek, Feb. 2004. Interestingly, Rössing's managing director waited until 1997 to raise the subject of Zaire in the company's Board of Directors meetings. RAS, Board of Directors.

⁹⁷ Interviews with Erich Beukes and Harry Hoabeb.

to ‘confirm or refute the Zaire data’ by searching for chromosomal aberrations among the ten most highly exposed miners, as against a control group of equal size; second, to evaluate clonal expansion (‘an initial step in all cancers and leukemias’) in miners; and third, to ‘identify and evaluate any cancer patients for exposure at the Rössing plant’. The second and third parts of this proposal would have gone well beyond Zaire’s work, though they still would not have fully addressed union concerns. But Rössing balked at the extra cost. The agreement specified only a verification of Zaire’s published results; there was no obligation to go further. The study was limited to the first point. Even after he disappeared, therefore, Zaire’s legacy – via his choice of research topic – continued.

US research protocols dictated that the project be overseen by an Institutional Review Board (IRB). In order to forge political consensus, the IRB included Rössing managers and doctors, union representatives, politicians (including Asser Kapere, who by then had left Rössing to join the government), and community residents. Lucas and Lloyd collected blood samples, analyzed them independently of each other, and found no chromosomal aberrations. In 2001, the IRB admitted their report as conclusive.

Officially, the MUN accepted the results of the verification study and dropped efforts to obtain independent assessments of worker health. Individually, some workers expressed relief at the results of the study, and confidence that Rössing really did run the safest possible workplace. Others seemed disappointed that the verification study dashed their hopes for compensation. Still others noted that chromosomal aberrations were only one possible consequence of exposure, and continued to fear other negative health effects from working at Rössing. Overall, however, they saw little recourse. As Harry Hoabeb concluded:

Those people were internationally renowned people and where do you go after those people? Where do you go? You are not going to have any leg to stand on if you dispute those – those type of bigheads, you know. Where do you go? The only way that you had to go is probably these anti-uranium people and they will tell you definitely another story and you are going to become confused. This Greenpeace, *neh?* You go to Greenpeace, they will tell you another story.⁹⁸

CONCLUSION

The Rössing mine offered a powerful symbol to the Namibian liberation struggle. In representing the transnational character of apartheid and corporate power, it provided a concrete expression of the argument that South African colonialism was not merely a Namibian problem, and that international action against South African colonialism (in the form of a boycott) could be effective. But the political significance of Rössing went beyond the discursive domain of symbolism. The material specificities of the uranium mine mattered, not just for political economy but also for labor politics.

Cooper has described how trade unionists in decolonizing French and British Africa appealed to ‘universal’ human rights and living standards

⁹⁸ Interview with Harry Hoabeb.

articulated by international bodies in order to make political claims.⁹⁹ We can understand the efforts of Rössing's labor leaders in parallel terms. The company itself invoked international sources of authority – the IAEA, the ILO, and others – in order to certify the safety of its workplaces. These bodies offered supranational legitimation: a way (both before and after independence) of bypassing the state and appealing to universal standards, an invocation of science and technology as domains that were beyond politics.

Colonial rule, however, had taught workers that neat separations between technology and politics did not exist. Loss control employees in particular had found that technical inspections could transcend their utility as tools of corporate surveillance and profitability, and open political opportunities. In the delicate balance between nationalist extraversion strategies and local imperatives – between calls for a boycott of Namibian uranium and the daily need to maintain employment and improve the workplace – Rössing trade unionists had maintained their political stature and relevance by directing their efforts toward access to medical and administrative knowledge.

Power inhered in technology and knowledge: workers absorbed this not as an abstract point but as lived experience. When independence failed to bring the sweeping changes they had imagined, workers found creative ways to apply the lesson. They engaged in their own strategies of extraversion, separate from those of the new state and its political party. They cultivated alliances with European activists and hired an expert of their own. Along the way they became participants in the production of knowledge about their workplaces and their bodies. They invoked 'universal' scientific and technological standards: of exposure, contamination, and safety. Convinced that the knowledge they produced would ultimately show that Rössing did not measure up to these standards, they invested their hope in scientific authority.

And then they discovered the limits and vulnerabilities of these technological strategies of extraversion. The problem was not merely with their choice of expert, disappointing as he was. Another problem lay within the financial, social, and epistemological structures of science itself. The verification study was scientifically impeccable because of its narrow frame as a problem of nuclear research, focused only on the effect of low-level radiation exposure on chromosomal aberrations. Broadening it in the ways imagined by the two scientists – namely, to include an investigation of cancers and their etiologies – required resources that the company was unwilling to commit, and the labor union certainly did not possess. Broadening it in the ways imagined by the union – to include all contaminants, at all mines – would have required not only even greater financial resources but also a national knowledge infrastructure, beginning with a cancer registry, to make the data collected at mines meaningful.¹⁰⁰

Yet another problem – this one by no means unique to technopolitical strategies of extraversion – was that external allies had their own agendas. Again, Zaire's cupidity was only part of the difficulty. European environmentalists had much to offer when it came to making and interpreting measurements, but their ultimate aim was to shut down RTZ mines, or

⁹⁹ Cooper, *Decolonization*.

¹⁰⁰ I especially thank Julie Livingston for helping me understand this point.

nuclear facilities, or both. They could make common cause for a while, but in the end they ran up against this fundamental contradiction. Attempts to resolve the paradox, as Hoabeb said, seemed only to cause confusion. Environmentalists might ‘tell you another story’, but the punch line of their narrative was unacceptable.

Each in their own way, Bayart, Cooper, and Ferguson all argue that careful attention to extraversion strategies, to the transnational ‘lumps’ and ‘hops’ of postcolonial African politics reveals both agency and structure, creativity and limits. We see similar dynamics at work in the history of Rössing. Yet we also see how the specifically technopolitical texture of these dynamics matter. Like other ‘universals’, in order to gain traction technological and scientific standards must acquire local meanings that articulate with international discourse and institutions.¹⁰¹ At Rössing (as elsewhere), making meaning required measurement (of contaminant levels and health indicators), trust (in experts and instruments), and allies (in international institutions and political networks). As Rössing workers discovered, these types of work and forms of knowledge contained their own specific limits and vulnerabilities.

We should not let the ultimate disappointment endured by Rössing workers tempt us into dismissing the liberatory possibilities of transnational technopolitics in Africa, even as we attend to the challenges posed by patterns of inequality. Balancing present employment with future health, regulating industrial activity, building national scientific infrastructures, developing independent expertise: these constitute fundamental problems of governance in postcolonial Africa. Addressing them will require every ounce of technopolitical creativity that Africans and others can muster.

¹⁰¹ The field of science and technology studies has studied this subject in depth. For some examples relating to occupational health and exposure, see M. Murphy, *Sick Building Syndrome and the Problem of Uncertainty: Environmental Politics, Technoscience, and Women Workers* (Durham, NC, 2006); A. Petryna, *Life Exposed: Biological Citizens After Chernobyl* (Princeton, 2002); C. Sellers, *Hazards of the Job: From Industrial Disease to Environmental Health Science* (Chapel Hill, NC, 1997).