

Missionary Medicine, Moral Sanitation and Fabrication of the Heathen Heart

Chapter 4 has shown how the Classificatory age produced the African body as a one-dimensional specimen consisting in the geometric measurements of facial and bodily surfaces by which these bodies were compared to one another, grouped according to their perceptible resemblances, and arrayed on a hierarchical chain of being from man to ape. Exemplifying the power implications of this knowledge that fabricated the body as a flat surface without volume was the taxonomy of terror which accompanied it, from the spectacles of public torture and execution that inscribed their pain upon the body, to the *cordon sanitaires* that kept separate the geographical spaces occupied by disease through violent prohibition of the movement of bodies between them.

As argued in Chapter 2, the Classificatory age was by the end of the eighteenth century beginning to give way in Europe to the new regime of disciplinary power and the three-dimensional body as an anatomical container of disease which the gaze of hospital medicine produced as its object and effect. Among the consequences of this respatialization of illness to the deep interior of an individual anatomy was problematization of the boundary zone between the interior space of anatomy and the external space of the environment. As Armstrong (1993) has shown, this occurred through the installation of lines of hygienic surveillance directed to monitoring the passage of substances between the inside of the body and the outside:

Air, water and food originated in this external environment but had to pass into the body; equally, all those substances such as faeces, urine, sweat, semen, etc., which departed the body had to cross into the world of places. Thus the focus of late nineteenth-century public health became the zone which separated anatomical space from environmental space, and its regime of hygiene developed as the monitoring of matter which crossed between these two great spaces. (Armstrong 1993: 396)

Finding rapid expansion through crowded Victorian cities, these tech-

niques marked the mid-1800s as the dawn of a disciplinary regime in which, for the first time, it became possible through sanitary science to 'dissect the mass and recognise separable and calculable individuality in the form of anatomical space in the crowd' (Armstrong 1993: 405).

Far from restricted to the formal centres of imperial power, these power transformations provoked an equally dramatic mutation within the margins of colonial expansion. Contemporaneous with the expansion in Europe of sanitary science through the previously unanalysed mass of the crowd, so Africa grew 'dark' with the barbarism of its native inhabitants as Victorian explorers, missionaries and scientists flooded it with a light refracted through the gaze of a new power targeted to the analysis and abolition of 'savage customs' in the name of 'civilization' (Brantlinger 1985: 166). Where conquest had previously operated through the exercise of sovereign force directed to domination through demonstrations of the power to inflict pain and kill, it could now be conceived of as a 'humanitarian' and productive endeavour aimed at liberating Africans from the 'chains of grossest ignorance' that made them 'prey to the most savage superstition' (Buxton 1840, in Brantlinger 1985: 173).

Analogous to how sanitary science in Europe individualized the body by delineating the boundaries between it and environmental space, this new colonial power constellation emerged in the formation of missionary medicine as a device of 'moral sanitation' directed to the boundary between the African body and a surrounding space of customs, rites and superstitions. Where in Europe environmental space was seen as a reservoir of dangerous substances whose passage into the body could cause disease, so in Africa it became possible to think of the 'moral' space surrounding the African body as harbouring every variety of vice and superstition calculated to corrode its vitality and render it susceptible to sickness. Similarly, as the regime of sanitary science demanded that prohibitions be set in place to prevent the contamination of environmental space by bodily wastes, so missionary medicine gave rise to methods that could protect this moral space from further corruption by disabling the influence of the 'witch doctor' as this was circulated through the beliefs and the behaviour of ordinary Africans.

The tactics through which missionary medicine installed an anatomical space in the diagram of colonial power marked it as far from a purely disciplinary regime. While possible only in the cognitive context of a clinical gaze that spatialized sickness to the body's deep interior, missionary medicine drew at the same time upon the sovereign power of the spectacle, to crystallize in the shape of the dramatic theatres of

healing that until well into the twentieth century typified this practice of moral sanitation.

Creation of the African with a soul and a body of organs

In performing most severe surgical operations they sit, both men and women, as if they had no feeling ... The spirit of God alone can affect their hearts. (Livingstone 1841, in Schapera 1959: 40)

No one can be certain who it was or how they may have chanced upon the surprising powers invested in the simple act of medically examining and treating the infirm African body. Perhaps it was Theodorus van der Kemp, who some twentieth-century historians claim to have been among the first medical missionaries in Africa (Burrows 1958; Gelfand 1984), while for British readers in the mid-nineteenth century it was without doubt David Livingstone. An 1858 book review in the *British Medical Journal* exalted:

The triumph of DR LIVINGSTONE in having been the first European – indeed we may say the first human being – that has ever made his way across Africa ... The various savage tribes whose territories he had to traverse were dumb to the voice of the missionary, but were capable of appreciating the good services of the medical man. A knowledge of the healing art is acknowledged by Dr Livingstone to be indispensable to those who would penetrate the wilds of this vast continent ... This is indeed a high testimony to the benevolent and all powerful character of our profession. (Anon. 1858: 52)

Important as they are to presenting an accurate history of the past, concerns about the identity of the first medical missionary are of less significance to this genealogical study than identifying when it became possible to speak freely of the African with a soul and a body that could somehow be impacted upon by the practice of medicine. For only then can it be concluded that there was in fact a mutation occurring in the anatomy of power – away from its dependence on the unalloyed tactics of terror enabled by the Classificatory episteme, towards a new way of functioning that played less upon the bodies of Africans than into and through them.

This leads into the late 1840s and 1850s. For it was here that just such a shift towards a nascent regime of medical practice and knowledge as disciplinary power was revealed in a swarming of anecdotes, teaching texts and institutions concerned with mapping a set of relationships between medical practice and the African with a body of organs and a soul. In an 1842 letter David Livingstone recounted an incident that

occurred in the course of his surveying the African 'tribes' around Kuruman, and which seemed 'to indicate that even the darkest minds feels [*sic*] the need of a something [*sic*] to speak peace to their troubled thoughts' (Livingstone 1842, in Schapera 1961: 20).

On one occasion Sekomi, having sat by me in the hut for some time in deep thought ... said, 'I wish you could change my heart. Give me medicine to change it, for it is proud, proud and angry, angry always'. I lifted up the Testament and was about to tell him of the only way in which the heart can be changed, but he interrupted me by saying, 'Nay, I wish to have it changed by medicine, to drink it [and] have it changed at once' ... He then rose and went away. (Livingstone 1842, in Schapera 1961: 20)

Compare this to a similar observation made by Dr J. P. Fitzgerald who, unlike the missionary David Livingstone, was a secular practitioner recruited to participate in Sir George Grey's campaign to 'civilize' South Africa's eastern frontier around Grahamstown and King William's Town. Following his arrival in King William's Town, Fitzgerald had ridden through the country on horseback to 'take stock' of the situation, and reported of the Africans he encountered:

I have performed some minor operations amongst them and not even a semblance of an objection is ever raised ... They tell me that through every part of Kaffir Land wherever I may go I will be well received with affection and kindness ... Before ten years pass over many a savage heart will be won to the British Govt. (Fitzgerald 1856, in Cory Library: Folder 1, 9)

These are doubtless but two of countless medical experiences with 'natives' (whether in China, India, Africa or elsewhere) that struck their European interlocutors as surprising enough to report upon. What was it about the gaze of their authors that rendered such seemingly trivial incidents important enough to record in writing?

The answer lies in the notion that such anecdotes at once discovered and were productive of the conditions of possibility for a new form of power. For in these reports appeared an eye that saw not only the surface, but into the very heart of the African body, a way of seeing that through the techniques of surgery penetrated deep within it to constitute as its object and effect the African as an anatomized body. Or, more accurately, their innovation was to invent the African as a body of organs and a soul, between which and the surrounding space of African tradition there lay a gap in which to discern the workings of custom and belief upon the individual body. This gap was made visible by the device of illness itself, which in its occurrence, its manifestations on the body, and attempts to treat it, signalled the perverse play of

African tradition and invited the purifying counterpoint of Christian medicine. Hence the Bishop of Bloemfontein's authoritative statement on 'the sacredness of the medical calling': 'The body [is] ... the instrument of the soul, by means of which that soul is brought into relations with its surroundings, and is, moreover, trained and disciplined for its own perfection' (Hicks 1896: 87). It thus became possible to conceive of this three-dimensional corporeal space (extended by the soul into the social) as the central object for a new strategy of colonial power premised upon its existence. This was the 'medical missionary method'.

Moral sanitation and the medical missionary method

In his 1849 *Medical Missions. An Address to Students*, Miller aimed 'to shew how we might profitably blend ... cure of the body with care of the soul' (Miller 1849: 4). Proof of this lay in the diseased body of 'the heathen' itself:

Are the hearts of the distant heathen less impressible than our own? ... Spiritually, they are dying and dead. Morally, their very virtues are vice. Intellectually, they are uncultivated, feeble and depraved. Socially, they are little removed above the beasts that perish. Their bodies are peculiarly the prey of sickness, and their flesh, as if not racked enough by disease, is maimed and torn by their so called religious rites. (Miller 1849: 24)

Although somewhat dramatically, this vision of the diseased body of the 'distant heathen' condensed within it precisely the same relationships between the interior space of anatomy and the exterior context of superstition evoked in the anecdotal reports of Livingstone and Fitzgerald. Only anecdote had now become a formalized object of missionary medical knowledge, a device to inform the gaze of the student doctor by inculcating a sound appreciation of the fundamental premise underlying missionary medicine: 'The sickness of the body is a continued type of sin' (Marley 1860: 45). Concretizing this generic formulation of the relation between sin, disease and the heathen body, Holden wrote in 1867 that 'consumption' in Africans

is not so much hereditary as bought on by undue exposure. One great source from which it springs is their night orgies, in which singing, dancing and adultery are often carried on to great excess ... This is kept up until a late hour, until the body becomes exhausted; the pores are thrown open, and a chill ensues, which entails disease and death. (Holden 1963/1867: 371)

It followed from this connection between the diseased body and sin that 'the medical attempt "to do cures" remains cognate to the mission-

ary attempt "to cast out devils", even to the end of the world' (Marley 1860: 49). But how was such benevolent exorcism to be translated from the rhetoric of sermonizing into practice?

For the practitioner of missionary medicine up until the 1920s (when theatrical healing began to be dissolved by the less spectacular methods of hospital medicine), this demanded that he be as accomplished an actor as he was a doctor. For not only should his actions in treating the sick heal their sins, but so too should they be witnessed by as many others as possible. Speaking to the reticulation of words through the very community this method constructed, Burns Thomson (1854) advised that practitioners recruit each and every patient into the role of publicist, and in this way build an ever-expanding network of the converted around the body of the healed.

When the man sick of palsy was healed, he was charged to tell no man. But he went out and began to publish it much, and to blaze abroad the matter ... The missionary will be known, talked of and beloved, in circles in which he has never personally made his appearance. Multiply the services of the medical missionary and groups of grateful hearts are multiplied throughout the community ... Every person in the neighbourhood of the medical missionary knows his liability to disease, to the very evil which the benevolent power in his vicinity has come to mitigate or remove; and there is awakened in all hearts a feeling of comfort at the thought that, in the event of sickness or pain, that power will manifest itself in their behalf. (Burns Thomson 1854: 22)

Dependent upon the medical instruments being displayed and the work of healing witnessed, the likelihood of this method's success was enhanced where the doctor could maximize the spectacle of an operation, the setting of broken bones, or even the routine administration of medicine. Alluding to this, G. E. F. M. wrote in 1898 that 'wherever the Medical Missionary pitches his tent, spreads out his surgical instruments, and opens his medicine chest, he may well exclaim, "the weapons of our warfare are mightily through God, to the pulling down of strongholds"' (G. E. F. M. 1898: 5). It is therefore appropriate to make at this point a visit to one such theatre of healing, and join the audience as they observed the doctor at work.

Within the theatre of healing

The fame of the cures effected spread far beyond those that had experienced these benefits; and of the vast numbers of strangers who throng the capital, few return to their homes without paying a visit to the dispensary, to witness the benefits conferred upon others or to seek relief for themselves. (Lowe 1886: 67)

Foucault began *Discipline and Punish* (1977) by reproducing a description of the public execution of Damians the Regicide which took place in March 1757. As argued in Chapters 2 and 4, Foucault chose this example to exemplify how sovereign power operated by being visible to those on whom it had its effects, the presence of the king signalled by dramatic public displays and outward shows of ostentation.

Strange as it may seem, it was with these same mechanisms of sovereign visibility and outward display that the nineteenth-century theatres of missionary healing were built. Only within them it was not the executioner who represented God or the king, but the doctor; not the body of the condemned that swayed above the onlookers on a gibbet, but the body of the infirm African which lay sprawled on the examination table; and not the tools of torture and pain that glinted and bubbled in the sun, but the instruments of healing – the scalpel, the stethoscope and the catheter. This was evident in all its splendour as Dr J. P. Fitzgerald set to work on a distended bladder in 1856.

Late this evening three Kaffirs belonging to Siwani's Tribe ... came to me one of them suffering excruciating agony from retention of urine which has been coming on for the last five days. The bladder was very much distended and he could not pass a single drop of water. I placed him standing against the wall in my consulting room, took out my Instruments and after a little delicate manipulation I succeeded in introducing [*sic*] a small Catheter into the Bladder; and drew off an immense quantity of Urine; when the Urine began to flow through the Instrument, the Kaffirs were struck with wonder. The two wild painted children of Nature who were standing at my back looking over my shoulders exclaimed 'Nothing can beat the English, or the English can do anything' ... His two friends said, they would leave him with me, and as it was late hurried away filled with delight and astonishment. This will travel all over Kaffir land and the removal of leaves, branches and Trees, Sticks and Stones, Lizards and Toads as practised by my Professional Brethren in their uncivilized state, will in future make but a faint impression either on this patient, his two friends, or my two interpreters who saw with their eyes my whole proceedings, the flow of urine, and the relief afforded. I dare say in a very short time this will reach the trans-Kei constellation and help to extinguish his [the witch doctor's] light. These are practical illustrations for the Natives, which all the prophets and Witch Doctors in South Africa cannot gainsay ... There was a man suffering agony which all the Witch Doctors in the world could not relieve, they saw me place the patient against the wall, take out my instruments, select one, pass it into his Bladder, they saw the Urine flow, and the man instantaneously relieved, they saw with their eyes and believed, just as old Macomo told me the other night 'I believe in your work, because I see with my Eyes'. (Fitzgerald 1856, in Cory Library: Folder 1, 65–6)

A quintessential instance of sovereign power at work, this spectacle in Fitzgerald's theatre of healing spoke to the simultaneous play of discipline as it circulated through the deep gaze of pathological anatomy. For even as the drama unfolded with Fitzgerald at its centre and the 'wild painted children of Nature' looking on, so there crystallized before the very eyes of the watching the African body with organs.

This day I had three Kaffirs from the Chief Sandilli's place beyond the Kei River ... One of them was very bad suffering from disease of the lungs and spitting of blood. I examined him with the stethoscope and over the part affected I had to apply the Cupping Glasses they were surprised at the flow of blood. (Fitzgerald 1856, in Cory Library: Folder 1, 16)

The spectacle of sovereignty addressed the onlookers in whose beliefs and deeds were reproduced the forces of darkness that had to be made to bow to 'civilization'. But running alongside, almost incidental to the drama that attracted the Africans' attention, coursed the whispering currents of disciplinary power: through the doctor, through the catheter and stethoscope, and through the body of the patient whose blood filled the cupping glass.

Reflecting the instability of this power regime, further confirmation of the dual powers invested in these rituals oscillated between accounts that privileged their sovereign component and others that isolated the play of the disciplinary gaze. For instance, the sketch of Dr de Prosch at work near the Zambezi singled out the onlookers' awe at his actions, to leave the patient an almost invisible prop: 'Doctor de Prosch is surrounded by sick folk waiting their turn, and watching with gaping mouths and craned necks the application of the magic art. He is just bandaging with some lineament ... the limbs of a leper' (Collard 1900: 218). Elsewhere, the focus swerved from the drama of doctoring to isolate for scrutiny the reactions of the patient and the sympathetic ripples through the community of converts created by the cure.

It is surprising how soon an isolated case of sickness will become an epidemic, as soon as it has become known that the 'Moruti' has dispensed medicine. At one place a man came to me saying he was suffering from certain pains in the stomach. I treated him for indigestion. On the morrow I was amazed to find some dozen or more people coming to my wagon. They all wanted medicine, and strange to say, for the same complaint as that I had treated the previous day. (Williams 1887: 115)

Just as the act of cupping blood and the treatment of indigestion interpolated ordinary Africans as active participants in this diagram of missionary medical power, so too were more calamitous disasters

rendered productive. Relating the increased number of Africans attending catechumen classes to drought and rinderpest in Bechuanaland, Dyke (1898: 216) wrote: 'this is a black picture, but it has its reverse ... The trials and losses which have come upon the Basutos have not been without fruit. The spiritual harvest has been rich and abundant.' However, in some situations the theatre of healing operated to produce less than the unambiguously positive results claimed for it by most mission doctors. Thus, a 1906 account of surgery to the anaesthetized body of an African patient revealed the procedure as producing a distinct sense of unease on the part of the audience, owing to the doctor's apparent power over both the death and the life of the patient.

A curious moment is at the end of an operation. We operate at 7 in the morning before consultation hours. A convalescent stands outside our reed enclosure to prevent people coming too near. Then when it is all over, there is a whole crowd of people sitting at a distance watching us carry the patient, still asleep, in our arms. We lay him down on his mat and leave him while I see the new patients, change dressings, and my wife cleans and dries the instruments. The natives look on distrustfully; there is still some blood on my blouse. What if I suddenly decided to kill them too, and bring them back to life like the one they have just seen? (A. C. J. 1934/1906: 34)

Despite such exceptions, the repeated confirmation in practice of techniques that blended the spectacle of sovereignty with the silent force of the deep gaze found their formalization in teaching texts of the 1920s that instructed readers in the art of making spectacular the mundane (see Martin and Weir 1923; Moorshead 1926): 'The way of the doctor ... [is] a mighty highway to the human soul ... Impossible as it seems to influence suspicious and hostile peoples by any other method, medical, and especially surgical work,¹ provides a way which leads to the very citadel of their being' (Moorshead 1926: 49).

Even as these texts that drew upon the diagram of sovereign power to shape the medical missionary endeavour were being written, so a new strand was beginning to unwind into the discourse of missionary medicine: this was the hospital. For while permanent dwellings of a rudimentary nature had often served alongside the wagons and other temporary staging points at which mission doctors conducted their theatres of healing, it was only in the 1920s that there began to emerge any accounts of the relationship between Africans and the fixed space of the hospital.

Mission hospitals and the manufacture of African misery The theatre of healing had deployed the tactics of clinical medicine upon infirm African

bodies as a vehicle of visibility to broadcast outwards and towards the watching the sovereign power of God and 'civilization'. Installation of the hospital reversed this relationship of visibility, and the dominant power investing in the work of the medical missionary switched from that of conspicuous sovereign to silent surveyor of African suffering and superstitions that 'rudely and barbarously destroy the last remnants of decency and modesty ... and envelop the intelligence in a perfect maze of lies, deceit and folly' (McCord 1926: 197).

Loathsome lepers ... sleeping sickness victims, hideous and demented ... babes, bellies pendulous and eyes lack-lustre ... This ugly aspect of Africa's need is highly coloured. No one needs to paint it to emphasise its hideousness. The real truth is that one dare not reveal to an unprepared Western public all the horrors of it. (Tilsley 1924: 44)

Where the healing spectacle had allowed more than a glimpse of the barbarism that made African bodies prey to illness, it was the 'ward round' and the 'outpatient department' that could now serve as moral microscopes which magnified not the figure of the mission doctor, but the misery consequent on immersion of the African patients they treated in the beliefs of witchcraft.

Next comes a woman grandly dressed in skins, horns and bones. A lady friend, during a difference of opinion, has bitten her at the base of her thumb ... This lady is a witch-doctor, and during the dressing of the hand is asked why she has not treated it herself ... She replies that witch-doctors cannot cure themselves, only other people. (Grist 1924: 9)

Exemplifying this reversal was Aitken's *Who is My Neighbour?* (1944). A book that 'does not contain any dramatic accounts of wonderful operations and amazing cures' (Preface), this replaced the drama of the doctor at work with a vision of 'the lame, the blind and the possessed' as seen in the ward round:

I have just finished the evening round of the wards and here are some of the patients whom I saw. In a corner of the male ward is Andries ... The poor fellow has a fractured spine, and is completely paralysed from the waist downwards ... Not far away from him is Hlamalini, the boy whose leg was bitten by a crocodile. His amputation stump is healing now and he is making a good recovery ... Out on the verandah are two men suffering from consumption ... In the female maternity and surgical ward we have several mothers with newly born babies, and three or four expectant mothers ... In a ward by herself we have a woman who is suffering from mental disorder. She firmly believes she has been bewitched by some of her relatives. (Aitken 1944: 33-5)

A device for seeing far beyond the individual bodies into which it located disease, the ward round also functioned as an observatory that radiated the gaze of mission medicine into the space between African beliefs, behaviours and bodies to cement these as their objects of intervention. 'Because he believes that his racking cough is due to a pursuing spirit, the African creeps into his dark, stuffy hut to escape, and lies there at night with his family round him; so tuberculosis becomes the scourge of the Bantu race' (H. P. Thompson 1932: 11). Repeated like a litany in other texts of the 1950s and 1960s (Barker 1959; Doell 1955, 1960; Ingle 1963; Kjome 1963; McCord 1951; Schimlek 1950), the patients seen in the ward round and the ills of each were first recited – 'Sinoia, who had a bladder stone ... Koko, an old woman ... was suffering from high blood pressure' (Doell 1955: 28) – and in response followed a story or more probing analysis of the social conditions and cultural beliefs that lay behind the suffering of each individual. As Paterson commented after two accounts of children who had each had a leg amputated as a consequence of their parents' 'backwardness, ignorance and superstition', these 'are not extraordinary stories at all', the point in telling them being to

indicate ignorance and superstition rather than evil intent or wilful neglect. The average native parents are not neglectful of their children, and, though strict, are usually very fond of them and treat them very well according to their lights. The fact remains, however, that their lights are exceedingly dim when it comes to illness and accident ... It is impossible to estimate the number of Native lives that must be lost every year as the result of sheer ignorance and superstition, to say nothing of the ghastly amount of suffering that must be going on at this very moment all over the country, suffering which could be relieved if only reasonable medical care and attention were available. (Paterson 1950: 94)

The purpose of the medical missionary endeavour being to lead Africans 'from darkness into the light of the Gospel' (Grist 1924: 9), accounts of mission hospital practice illuminated not only the suffering that called for the African's salvation, but also the missionaries' success in countering it. As if the hospital's clinically sanitized domain were the very light of the Gospel, Turvey's (1951) description of the 'Mkambati Leper Settlement' juxtaposed the space of misery in which it was set with the benign and regimented order achieved within: 'The colony busies itself daily with the tremendous task of healing those who come with bodies mutilated, disfigured and pain-racked, with minds filled with fear, ignorance and superstition' (Turvey 1951: 8). Against this grim parade of corporeal corruption:

In neat rooms, surrounded by flower beds, live the patients who are able to partly look after themselves: they stream up early each morning to their special bath enclosure for their daily bath and unction of Oil Chaulmoogra,² then they file over to the surgery block to drink their daily dose of yeast and fruit juice, or for special dressings and treatment which often includes painful injections, and, for most of the patients, large doses of the sulphide drugs ... It is nothing for them to swallow up to 30 tablets a day. (Turvey 1951: 9)

The mission hospital thus constituted a sharp line of separation between two great systems of power, which Gale (1943) delineated in a health propaganda pamphlet aimed at convincing Africans that 'they ought to use the new doctors and nurses and hospitals, and not go to the witch-doctors any more' (Gale 1943: 3). Beyond the space of hospital medicine lay a world of animism in which it was 'the spirits which caused sickness ... They did things on purpose and they were very clever. They were much stronger than men, but they were the same as men in being able to be angry, to hate, to try to get the better of others, and so on' (p. 4). By contrast, the space of the hospital was a clinical world governed by 'the laws of nature', where sickness was caused by things which did not think and did not see. 'Some, but not all, of these are living things. They are called "germs". "Germs" grow (like plants) and get bigger in numbers, but (again like plants) they have no thoughts, no understanding. They do not know what they are doing' (p. 5).

When African bodies crossed this threshold separating superstition and magic from salvation and science, its impact could be clinically observed in the very physiology of the patient:

One boy came in for an operation; he did well and was at the point of going out ... when I was called to see him. The nurse told me that he was running a high temperature and was in a very excited condition. I went very carefully over him ... and I could find nothing to account for his mental condition or the high temperature ... Next morning I enquired about him. The nurse said he was normal and quiet. 'Only' she said, 'he wants to be a Christian.' Medically I should not have thought much more about it had not a similar thing happened to another patient. (Drewe 1925: 41)

For many mission doctors (e.g. Grist 1924; Humphreys 1958; Turvey 1951; Schimlek 1950), the greatest symbol of the hospital's power over the heathen was the witch-doctor patient.

It was with fear and trembling that a witchdoctor patient came for treatment. All seemed well until the hands of the white sister touched her. 'Please need it happen again?' she appealed to one of her race, because she

had not slept for great restlessness after the first contact, and was afraid she might lose the powers of witchcraft. (Turvey 1951: 6)

In Doell (1960), and presented as the climax of a moral fable illustrating how 'good can come out of evil', hospital treatment of a witch-doctor patient resulted in the draining of his 'magic' along with the blood of his body. The story related how a witch-doctor, 'the Great Horse', had been pilfering needles, sutures, scissors and scalpels from the hospital to remove cysts from the heads of his patients. Unfortunately for him, one such operation was upon a 'cirroid aneurysm'. Plastering the patient's head with cow dung to staunch the blood, 'the Great Horse' then stole his car, but while fleeing a tyre burst and the car crashed not far from the hospital. Both he and his patient were soon in the same hospital for treatment, and the scene was set for the final denouement as told from the mission doctor's viewpoint.

I went to his bed and woke him ['the Great Horse']. 'Friend', I said, 'a man has just arrived whom you nearly killed yesterday morning by cutting into his head. He has lost so much blood that he needs some blood from someone else. I will test your blood to see if you have enough and if it suits him; if it does you will have to give me some for him' ... 'I will not give the blood', said the Great Horse, 'it is special blood and must not be used for other people' ... With that I inserted the needle into his vein and drew off the required amount of blood. He protested all the time, but to no avail ... Among the people the story spread that Ihashinkhulu's magic had been drained; the doctor had 'taken off all his blood', and his power over evil spirits with it. White magic was stronger than Black magic ... Not many months later the Great Horse contacted the mission and started his preparation for baptism. His son and daughter followed him into the fold. Several years later he sent his son to university to become - a medical student. (Doell 1960: 72-3)

From revelation to confession: the speaking subjects of missionary medicine

A system of moral sanitation that deployed disease and its cure to make visible the superstitions of witchcraft and replace these with a Christian belief in God, the gaze of missionary medicine pervaded the soul of the African that alongside the body was its object and effect. The problem was how to 'free' this soul from the grip of superstition so that Africans could be taught and transformed into agents of 'civilization'. In Tilsley's words:

The disease of Africa's dismal past and of her dark present is diagnosable in one word. That word is CARELESSNESS. Careless in life, the Ethiopian is

equally careless of death, amazingly, unbelievably careless. He has got to be made afraid by outsiders. He needs inoculating with a virulent fear. Fear of disease, for instance, fear of death, fear of sin, fear of ignorance, fear of carelessness, and, above all, comprehendingly all, a holy fear of righteous God. (Tilsley 1924: 46)

Because it aimed so explicitly at producing new subjectivities, the African's voice rang loudly through the theatres of healing, hospital halls, clinic waiting rooms, and the pages of the journals, teaching texts, books and propaganda pamphlets that composed the discourse of missionary medicine. Indeed, since 'spiritual data are not of a kind to permit of tabulation' (Moorshead 1922: 18), verbal accounts from the mouths of African patients were the most important form of 'evidence' for success that medical missionaries could marshal. It is therefore appropriate to conclude this investigation of the medical missionary method by giving the final say to the Africans that were contingent on this regime of moral sanitation. For the words put into their mouths were presented both as proof of African recruitment into the power of the medical missionary endeavour, and parables that confirmed its power as a device of colonial and Christian expansion.

Corresponding to the two phases of this regime (the first exemplified by the spectacular theatre of healing, the second by the ordered observation of the hospital), there was a discernible shift in what was said by the African subjects produced in each of them. In the theatres of healing, their ostentation was mirrored in the revelatory character of the words spoken by the Africans it interpolated, as the surprising cures they witnessed disclosed to them the benign truth of Christianity. In the mission hospital – where 'every patient was a treasure, an investment in the golden future; we examined each with exemplary thoroughness and treated those who came like dukes' (Barker 1959: 47) – the words of its African patients were more confessional in nature, the speaking subject being also the object of what was said.

To begin with the theatre of healing, its emphasis on the spectacular echoed in the emotionality of what the converted had to say as they verbally prostrated themselves at the doctor's feet. In some instances, their words no less than deified the medical missionary to construct the Africans that uttered them as awe-struck supplicants to the power of God's Medicine. Take the 'native prince', who on being healed of wounds inflicted by a witch doctor said to his European 'preserver': 'It is vain to tell my people you came from this or that place, they will have you came down from above' (G. E. F. M. 1898: 28). Or again, 'Chief Kabuti', who at being saved from death exclaimed: "You are my saviour! You have brought me back from the grave! You have resurrected

me!" Such were the words of Chief Kabuti, as he stood near the dispensary door' (Church Missionary Society 1902). In other instances the confirmation of conversion was conveyed through the metaphor of death, the medical missionary God's killer of African profanity and evil. Hence 'A Black Woman's Description of a Missionary's Work' published in 1896 had her say of medical missionaries:

You are ... hunters who are returning from your expedition. You have had good success. We are the elephants and hippopotami, we blacks, and you are come from shooting us down. Many have been killed outright for the glory of the Lord Jesus. But there are some who have only been wounded by the Word. Then you have looked at the ground, and you have followed their bloody traces in order to overtake and despatch them ... We are glad that you are like the warrior who returns from the battle living and victorious. (Anon. 1896: 209)

Other examples of what African patients said in the theatres of healing were more mundane but, perhaps because of this, they better illuminate the underlying diagram of a medical power that in the corporeal proof of the healed body entered into even the remotest of huts and removed of communities. Thus, following treatment to her legs and feet at the hands of a mission doctor, an African woman left: 'carrying a new message, a new hope. She said "We have not understood the people at God's station. They are for our good. See me. I was carried, now I walk"' (Lynch 1900: 297).

Before examining the African identities formed through the statements of patients in the space of the mission hospital, it is important to pause and consider these words, for their contrived quality makes it unlikely they were ever actually spoken by Africans. Neither, however, is there any evidence in texts of the time to indicate that they were considered outright fictions. But questions as to whether they really were said by Africans, or whether those who read them at the time of authorship believed in their authenticity, are less significant to this analysis than the fact of their centrality to missionary medical discourse. Indeed, that they may have been pure fictions on the part of their authors only underlines the nature of this power as one that required not only the African body as an object, but also a consciousness that could be made visible in words and monitored through speech.

The identity of the African emanating from the revelations induced by the theatres of healing was typified by its emotionality and outward focus on the figures of God and the doctor. By contrast, and doubtless a manifestation of how 'the native people were becoming more and

more hospital conscious' (Paterson 1950: 91), the words spoken in the space of the mission hospital were of a more confessional character, suggesting how the gaze had been internalized to recruit each patient as a self-objectifying cell in the diagram of discipline.

Schimlek (1950) could thus describe the following conversation, in which a cured patient reflected upon the error of his ways in having first sought treatment at the hands of a witch doctor:

As soon as he saw the missionary who had translated all his complaints to the doctors he said: 'Father, you know I wasted 17 oxen on our medicine-men, only to become worse. Now I have been here for a few days and can move all my limbs except my little finger. But the doctor says that will come right too, and I believe what he says, because he is a great doctor. All I had to pay so far were a few shillings. The white man is indeed the doctor of all doctors.' (Schimlek 1950: 80-1)

By the late 1950s, and converging with Aitken's earlier call to avoid 'the temptation when writing or speaking of medical work among Africans ... to emphasize what I may call "horror stories"' (Aitken, 1944: 18), the words reportedly spoken by African patients increasingly reflected the routine of work done in ante-natal clinics, child welfare clinics and hospital outpatient departments. For instance, in Barker (1959) the reader could eavesdrop on an exchange between the doctor and a patient's husband who refused to let his wife remain in the hospital.

With an outward show of reasonableness Thomas Gumede arrived on the fifteenth day. 'About my wife, doctor.'

'Yes?'

'We have an important feast at home which I wish her to attend.'

'When is that?' He mentioned a date a few days ahead. 'She's not ready to go home yet, you know,' I told him.

He countered: 'It is most important according to our custom that she should be there.' ...

I lost my temper first. 'For heaven's sake don't be a fool, man,' I raved, 'this is your child that I'm trying to save and you come here bleating about some abominable custom which you ought to have left behind with your skins when you put on trousers.'

Gumede looked pained. All the advantages were with him. 'I understand the doctor's view perfectly, but I'm afraid my wife must be at home for the feast.' (Barker 1959: 145-6)

By the mid-1970s the last of South Africa's mission hospitals and dispensaries had been brought under a state umbrella and became components of a secular clinic and hospital network (Gelfand 1984). With this secularization the remarkably stable discourse of missionary

medicine, and the loquacious African as its object and effect, vanished as abruptly as they had emerged some 120 years earlier.

A watershed of power

The mid-nineteenth-century emergence of moral sanitation marked a key moment in the transformation of the anatomy of power. From a conventional perspective on power as a weapon to be seized and wielded by one group over another, its significance as a watershed between sovereignty and discipline is likely to be ignored in favour of emphasizing how this discourse misrepresented the 'truth' of African illness and the place of traditional medical beliefs. Such readings are flawed in two respects. First, no matter how exaggerated missionary descriptions of African evil and misery may have been, they none the less spoke to a power that for the first time allowed the body and beliefs of the African to emerge from below the threshold of description and become the target of discipline as opposed to the brute force of sovereignty alone. Second, arguments that traditional African illness beliefs are not the evils that the missionaries claimed them to be only became possible from the mid-1970s onwards. For, as shown in Chapter 10, it was only then that a further mutation in the anatomy of power allowed for a medicine that instead of suppressing traditional healers sought to recognize their role in the social fabric as a constructive one, and recruit them into the socio-medical enterprise.

This study now turns to a very different organ in the anatomy of power. This was the machinery of mining medicine, which as a vast industrial Panopticon spread an observing network of disciplinary surveillance throughout Africa to create its workforce of migrant labourers as a strictly regimented army of individual bodies. In sharp contrast to the regime of moral sanitation with which it coexisted, this was a medicine not of loquacious bodies, revelations and confessions, but of numbers and the mechanical medical examination of individual bodies, both dead and alive; a medicine not of a quest to 'civilize' but of a drive to make each individual a docile object of industrial exploitation. Underlining these differences between mining and missionary medicine, and also between missionary medicine and the more general discourse of public health (see Chapter 8), the 'civilized' bodies of missionary medicine were for these secular methodologies not part of the solution to African illness, but instead part of its cause. For as many secular doctors noted in their submissions to the 1914 Tuberculosis Commission:

In and around the townships and elsewhere where European influence is

felt, large huts are built with little windows which is a good thing but the more civilized native affects European clothing and I think is more easily affected by cold: he ruins his teeth and digestion by eating biscuits and sweets and by drinking tea. The missions are largely responsible for this, I think. A raw native may be covered with dust, but the mission boy is too often covered by clothes saturated with decomposing sweat. (Union of South Africa 1914: 297)

Notes

1. Confirming the status of surgery as the medical missionary's technique of choice, Holland (1923: 1) wrote: 'What department of Medical Mission work is most effective? I would ... without the slightest hesitation reply "surgery". For there can be no doubt that among savage and uncivilized races surgery makes a far deeper impression than medicine. It is also more effective from a spectacular point of view.' Similarly, a 1919 Editorial in *Medical Missions at Home and Abroad* chose to illustrate 'God's providence in modern medical missions' by showing how ether, chloroform and antiseptics had 'at once widened immensely the field in which safe operative surgery was possible. The whole body indeed became the surgeon's field' (Editorial 1919: 270).

2. 'Chaulmoogra Oil is their chief treatment. A line of men stands, each rubbing it into his neighbour's back, while they sing a native song. Then many have a dose of it injected, or others take it as a medicine; the nastier it is, the more good they expect from it' (H. P. Thompson 1932: 45).

The Industrial Panopticon: Mining and the Medical Construction of Migrant African Labour

Foucault's *Discipline and Punish* (1977) linked the eighteenth-century rise of capitalism with the spread of discipline that enabled supervision of a massively expanded workforce: 'It would not have been possible to solve the problem of the accumulation of men without the growth of an apparatus of production capable of both sustaining and using them; conversely, the techniques that made the cumulative multiplicity of men useful accelerated the accumulation of capital' (Foucault 1977: 221). This dovetailing of accumulative technologies characterizes many labour-intensive industries across Africa. It is, however, most obvious in the medical micro-powers which accompanied the expansion of South Africa's gold-mining industry between 1900 and 1950. For the industry's crystallization around the calculable bodies fabricated by mining medicine epitomized the disciplinary diagram inscribed in the Panopticon's abstract formula of a very real technology, that of the body and of individuals. Such is the omnipresence of this Panoptical schema that since the late 1970s when critical histories of the industry's labour practices began appearing (e.g. Crush 1992a, b; Crush et al. 1991; Marks and Andersson 1988; Moodie 1976; Packard 1989; Van Onselen 1980), these studies have themselves participated in its reproduction, studiously ignoring the Foucauldean perspective on power in favour of repressionist analyses that fabricate precisely the authentic African subjects they claim to liberate.

This chapter presents the Foucauldean alternative to these conventional perspectives, by analysing how mining medicine fabricated African mine workers as visible objects possessed of distinct attributes that provoked particular strategies for their management in health and disease. Indeed, rather than concealing and repressing the authentic African body, it was precisely through this industrious medicine that the African body as a target of repression existed at all. The operations

of sovereign power and discipline are never mutually exclusive, and interpenetrated each other in this context of mining medicine to sustain a quintessential regime of discipline and punishment.

The heat chamber as punishment and Panopticon

In 1935 Dreosti described 'the experimental chambers' and 'heat tolerance test' developed to assess African mine workers' capacity to withstand the heat and humidity that prevailed underground, and which induced in some instances a 'hyper-pyrexial' type of 'heat-stroke'.

The native, usually of good physique, while working, and without any premonitory signs or symptoms, suddenly develops a condition of acute mental excitement or wild delirium. He shouts and rushes about blindly, struggling violently if any attempt is made to restrain him. He becomes a danger both to himself and to those who are trying to control him. The European miner in charge will report that the native was working quite normally and 'suddenly went mad, requiring four or more men to control him in order to strap him on to the stretcher for transport' ... This condition of mental excitement is soon followed by muscular tremors going on to generalised muscular twitchings and often convulsions of an epileptiform type; coma supervenes and finally death may occur in the comatose condition. (Dreosti 1937: 32)

Aimed at modifying the African body to prevent such reactions, the 'experimental chambers' were lined with perforated pipes that released humidifying steam, and by unperforated pipes that circulated steam to generate heat. Running through each chamber were two trays for rock, 'the shovelling ... of which is similar to the type of work on which most natives are employed underground where hot working conditions exist' (Dreosti 1935: 44). Observation windows made visible the interior of the chambers to an external observer. During the 'heat tolerance test' Africans were ordered to strip naked and each given a shovel. Monitored by a 'boss boy' to mimic underground conditions and ensure constant work, they were lined up along each tray, whereupon 'each native shovels the rock to his neighbour until all the rock is accumulated at one end of the tray, and so on' (Dreosti 1935: 46). Situated outside the 'experimental chamber', a mine medical officer supervised the proceedings, to make general notes on the behaviour of the Africans, and treat any special cases. After the first and second half-hours of work, the subjects were seated and their temperatures recorded a second and third time. They then remained in a 'cooling chamber' for a further hour, at the end of which their temperatures were taken a fourth time.

According to their 'heat tolerance' as revealed by this test, Africans would be allocated to different 'acclimatization' groups, where they worked in a controlled environment until re-testing indicated they had developed sufficient 'heat tolerance' to work underground.

Clearly, much more occurred during this procedure than the creation of medical knowledge about the body's heat response (e.g. Jokl 1935). In addition to fabricating a new physiology, it can be read in at least two ways. First, it was a ritual of debasement that demonstrated the mining industry's power over its African recruits. This reading reflects the idea of sovereign power, and it is this reading which underlies conventional critiques of mining medicine. Commenting on the 'heat tolerance test', a 1976 study concluded that the enforced nakedness and other privations seemed 'unnecessary, except as a way of initiating the miners into a subculture which is deprived of any values about human dignity' (Moodie 1976: 6).

But the 'heat tolerance test' was also an instrument of discipline, a clinical Panopticon that produced the individuals and bodily attributes it observed through the techniques deployed to monitor the workings of African bodies. The very design of the 'heat chamber' ensured that those examined could not see their examiner; the repeated temperature measurements made each body its own control, and through photographs, tables and charts the attributes of the resultant individuals were turned into information upon which calculations, comparisons and selections could be made. The 'heat tolerance test' thus combined in a single technique the operation of discipline and the force of sovereignty simultaneously to create and punish the individual.

Turning to the domains of anatomical pathology and epidemiology, the mine medical examination, and the design of the compound, this underlying diagram of the Panopticon repeated itself throughout this regime of mining medicine to maintain the perpetually visible and constantly calculable body of the African miner as its object and effect.

Inventing an economy of human bodies: anatomical pathology and epidemiology

Rose (1988: 184) noted that a prerequisite for managing an economy is to conceptualize a set of entities and relationships as an economy amenable to management. Analogously, the birth of the migrant labour population as an economy of human bodies required the deployment of methods able to transform the collective and individual bodies of Africans into a systematized domain of knowledge about how disease, deviance and normality circulated within it.

Thus, when Brodie and Rogers (1894) anatomically dissected the bodies of African miners,¹ they introduced the possibility of a medically disciplined African labour force by making visible the previously irrelevant inner structures and organization of the African body. For in so doing they confirmed the localization of disease to the inner confines of the body, since disease was constituted in anatomical pathology and the medical task thus became the identification and treatment of that discrete lesion. Their work, however, pre-dated by some twenty years the widespread application of anatomical dissection, during which time the less penetrating but equally productive technique of epidemiology was applied to invent the collective contours and boundaries of the migrant labour population.

Prior to the formation of the Witwatersrand Native Labour Association (WNLA) in 1900, the recruitment of miners from across Africa was haphazard, left to 'independent individuals' (Irvine and Macauley 1905: 344), who more often than not 'sent all but the most obviously sick and lame, including many recruits only marginally fit for mine labour' (Packard 1989: 69; Transvaal Archives Depot, SNA 162/275/02). Similarly, there was no monitoring of disease and deaths among African miners, a 1904 Chamber of Mines inquiry reporting that before September 1902 'it was impossible to tell what the death rate was. No one knew how many died – no records were kept' (Transvaal Archives Depot, FLD 15/147/57). Unanalysed by this coercive system of sovereign exploitation, African miners were as much a risk to the industry as a benefit, its efficiency undermined by high levels of disease that provoked increasing African antipathy to recruitment. While this problem was undoubtedly recognized by the mining houses themselves, it was only under pressure from the state that in 1903 (Cartwright 1971: 17) there commenced application of the indirect, aggregating technique of epidemiology.

The first statistical profile of disease and death by territory of origin among Africans on Transvaal gold mines appeared in the evidence of the 1904 Transvaal Labour Commission (The Transvaal 1904: 75–80). This transformed the previously perplexing mass of bodies into an ordered statistical community by which the Commission drew a qualitative picture of the 'character of the natives' and districts from which mine workers were recruited.² In the same year, the Chamber of Mines began making the recording of death and disease a constant feature of all mine hospitals, recommending a uniform set of procedures, listing the information to be obtained, and defining the format for monthly reporting (Transvaal Chamber of Mines 1903).

This epidemiological mapping turned the otherwise negative fact of

death and disease into an opportunity for the surveillance of not only illness, but also the disease-resisting capacity of 'normal' Africans in the regions from which miners were drawn. Repeatedly applied, it could render visible changes in how disease was distributed among Africans employed on the mines, isolating for closer investigation particularly problematic mines and sectors of the migrant labour population. Why were death rates among Mozambique recruits from north of latitude 22° south excessive, while among miners from south of this line they were acceptable? However, while it created the possibility of asking such questions, epidemiology could not show what underlay the disease patterns created by these statistical techniques.

Pathological anatomy presented itself as the technique by which to provide the answers, and by 1910 was increasingly applied. As an introduction to their comparative investigation of 'Bantu natives from Portuguese East Africa', Maynard and Turner (1914) evaluated the labour potential of nine 'tribes', each illustrated by drawings of 'native faces ... chosen as typical of the race they represent' (Maynard and Turner 1914: 129). The 'Shangaan', 'an uncircumcised race of superior type to their neighbours' (p. 125) and the 'Agawa', 'the predominant race, both mentally and physically' (p. 127), distinguished themselves from the 'Parapatos', 'a tall but otherwise not physically a fine race' (p. 129). Acknowledging that 'it is not so easy to determine the tribe of a native when seen in the mortuary after death' (p. 125), their investigation none the less demonstrated the interaction between 'tribal' classification; anatomical variables such as 'skull thickness', the weight of organs (spleen, cerebrum, heart), height and full body weight; and exposure to mining: 'The native with the heavier brain and shorter stature conforms more closely to the European ratio of cerebrum weight to height, and he may therefore represent a higher type of development than the mean of his race, and thus be less stable, also less resistant to abnormal conditions' (p. 140).

Other papers, like Maynard's (1913) enquiry into pneumonia among 'tropical natives', were more circumspect about the aggregation of Africans by 'tribe', preferring to do so by geographical district instead, since 'in recent years so much intermarriage has taken place that, except on very broad lines, tribal distinctions are not maintained' (Maynard 1913: 2). However, whether aggregation was by 'tribe' or district, these studies confirmed this as a medical regime that constructed Africans first and foremost as members of groups, 'and it was these groups, rather than individuals, who were said to possess distinctive psychologies and bodies' (Vaughan 1991: 11). Further, it was from the physiological and anatomical make-up of these composite bodies that differences in

death rates emanated, a 1913 editorial observing that 'no one factor can explain them, and there must be a more or less complicated interplay of various factors of race and environment' (Editorial 1913: 254). By mapping its geographical distribution, the migrant labour population was partitioned into aggregates of differing disease susceptibility, and an anatomical topography to guide the practices of recruiting superimposed upon the geographical face of the continent.

By the mid-1920s a more differentiating and individualizing gaze had developed. Conceptually articulated in the 'virgin soil theory' of tuberculosis (Cummins 1929), this viewed tuberculosis susceptibility as determined not by evolutionary forces, but rather by the body's exposure to the conditions of industrial life. As such exposure was prolonged, so immunity should increase, and it was possible for an individual to move from immunity to susceptibility in the space of years. It was this assumption that shaped the work of the Tuberculosis Research Committee (hereafter TBRC) between 1925 and 1932. Using the most sophisticated methodologies available, it was regarded at the time of its release as the most exhaustive enquiry into tuberculosis among Africans yet produced. As an instrument of discipline, its surveys, tuberculin tests, radiographic examinations and pathological investigations impelled the gaze of mining medicine into the most distant corners of the migrant labour empire, and the deepest recesses of the African body.

Pathological anatomy (Fischer 1929, 1932) and radiographic pathology were prominent among the Committee's methods, and photographs of lungs labelled with the age, tribe and mine number of the deceased illustrated its report. The lungs were 'removed intact along with the trachea and larynx. The lungs were then inflated through the trachea with a bicycle pump and Kaiserling's No. 1 fixing fluid run through them ... The main mass of the heart [was] cut away and the photograph was then taken' (TBRC 1932: 123). Through repeated application these techniques first fabricated and then confirmed the interior of the individual body as an object of social consciousness, to be classified according to what its structure revealed about its functioning in life. It was, moreover, in this medicine's capacity to erase all signs of the productive relationship between method and object that its ability to create individual and racial anatomical differences resided. Hence the Committee could write that conclusions as to racial differences in anatomy and physiology (e.g. in lymph nodes and movement of the chest walls) 'were gradually forced on us during the course of investigation' (TBRC 1932: 178). This gaze was reluctant, even resistant to perceiving such difference, and it was not the method that constructed its object, but rather the object that imposed itself upon the medical gaze:

This want of resistance to tuberculosis is ... a biological character of the African Native which can only disappear with the lapse of time and during many successive generations of industrial contact. This biological lack of resistance exists quite apart from any risk incurred in the mining industry or any other industries. (TBRC 1932: 254)

The African body fabricated as a disease container, technologies were required to monitor the transmission of disease between bodies, and the practice of anatomical pathology was soon matched by an elaborate system of surveillance that radiated into the spaces between bodies to create these as a space traversed by power. Through the device of perceiving bacterial exchange between the sick and the well as the means of disease transmission, tuberculin tests, random sputum examinations and household surveys comprised an extended medical gaze that spread surveillance from inside the body to its exterior, and into the spaces of social contact between the sick and the well. This 'Dispensary Gaze' established 'the reality of the social by identifying diseases of social space, of contacts and relationships' (Armstrong 1983: 11), and in 1927 Lyle Cummins could note that the repatriation of tuberculous Africans to the native territories 'is calculated to disseminate infection and depreciate health' (Chamber of Mines Archives 2308/1544).

Consequently, and as clearly set out in the Tuberculosis Committee's report, the 'Dispensary Gaze' brought the history of each miner's contacts and his family into sharp resolution within the industrial Panopticon. 'The third line of investigation was the tracing of Natives repatriated from the Rand with tuberculosis. Those who could be seen were examined and also as many contacts in their families as possible' (TBRC 1932: 234). Thus the intimacy with which previously anonymous individuals could now be known, such as:

Disc 5499, Tom Ngqukumbana, aged 43 of St. John's district, a Pondo. Married, three wives and three children, all healthy. Repatriated on 29th July, 1926. Examined on 24th September, 1928. This man appeared well-to-do, and when seen he was selling his crop of mealies. He is able to walk about and carries on his own farming operations. He had no cough and no sputum, and his general condition was very good. (TBRC 1932: 238)

The 'Dispensary Gaze' fabricated not only the social networks of individual miners but also the cultural practices that the path of disease illuminated. Among the more central factors determining the spread of infection from person to person was contact with European civilization, which eroded traditional values and practices (e.g. farming and dietary

habits) that for mine doctors would have lessened the risks of infection were they to have remained intact. As a report on the tuberculosis survey of the Ciskeian and Transkeian territories noted:

Tuberculosis is stated to be on the increase among the natives, and the reason for this increase is that the natives are discarding the red blanket. If this is taken symbolically, it is probably true, for the natives are discarding many of their old customs which acted as a safeguard. (Chamber of Mines Archives 2308/1544)

As pathological anatomy fabricated the biology of the individual miner as insufficiently evolved to withstand the assault of the mining industry and disease, so too was the body of the social, which through the survey was invented as having yet to attain a level that could sustain the individual 'when a life of monotonous leisure is suddenly exchanged for one of strenuous and unfamiliar exertion' (TBRC 1932: 264).

In thirty years the migrant labour population was transformed from an inchoate corporeal mass into a closely supervised army of individuals, the device of infectious disease a constant monitor of African movement through social and geographical space. These procedures were not, however, designed to identify diseased and otherwise deviant individuals at the point of recruitment. To do so required a human sorting house, a technology able to inspect the interior and exterior of the living body, and, by comparing individuals within a group, establish a norm to isolate those who failed to measure up to it.

Debasement and discipline: the mine medical examination

Among the practices by which mining medicine constructed its objects, the initial and periodical medical examinations were central. Until the 1940s the primary purpose of screening miners for illness and infirmity was linked into the repressive strategies of confinement that banished diseased Africans to the 'native territories'. For instance, the Miners' Phthisis Act of 1916 stated that wherever Africans entered urban and industrial areas there be instituted medical examination procedures 'sufficiently stringent to detect any native suffering from active tuberculosis so as to prevent him leaving his district for the Rand' (Union of South Africa 1916: 142). Within each mine, the initial medical examination determined which bodies were acceptable, 'detentions' to be retained for further scrutiny and 'fattening up', and 'rejects', who were 'sent home' (Maynard 1913: 3). The 1916 introduction of periodic weighing wove the examination into a miner's career as a constantly repeated ritual,³ and from 1925 all miners were examined at the end of their

contracts (TBRC 1932: 110). In short, the mine medical examination was the cornerstone that fixed individual miners in organizational space.

This analysis, however, accords the examination a power only as great as that of the authorities who conduct the procedure. This is a 'clinical power [that] can be likened to sovereignty, the doctor equated with the king in the control exercised over bodies' (Armstrong 1987: 69).⁴ Such interpretations of the examination's sovereign function may be of value in challenging the more debasing elements of its earliest incarnations. But what of the modern examination, or even that of the mid-1950s, where in some recruiting agencies veterinary tactics gave way to more humane and discrete procedures? Did their arrival mean the body was no longer in power's grip, that somehow it was free? To answer these questions requires descending to the immediate point where the techniques of examination play upon the examined, into that capillary space of power where discipline fabricates its object, the individual.

In 1906 Dr George Turner, a WNLA medical officer, investigated pulmonary tuberculosis and 'kindred diseases ... in the kraals south of latitude 22°' (Turner 1907: Foreword). Using a camera, weighing scale and measuring tape, he produced a set of anthropometric and somatometric standards for selecting individual African miners. Reflecting the early fabrication of composite bodies, his report minutely detailed individual bodies as 'specimens' of 'tribal' units. A relay of disciplinary power, the report configured the subjectivities of its readers (mine medical men and recruiters charged with selecting and classifying migrant labourers), whose scrutiny of the photographically regimented bodies would enhance their ability to calculate, compare and discriminate. 'The following illustrations ... permit one to judge of the physique of the East Coast native as compared with other classes of recruit. Picked specimens of each type of boy have been taken' (Turner 1907: 78).

Production of these images and anthropometric measurements required considerable manipulation of the Africans' bodies. After being weighed, heights noted and chest measurements at forced inspiration and expiration taken, they were made to strip naked and adopt a uniform posture against a portable white screen. This regulation rendered the collected photographs isomorphic to the perfect comparability of the numerically tabulated anthropometric indices. Mathematically combined into an equation, these supplied a fixed measurement standard for recruiters accurately to compare 'kaffirs of different tribes' and 'individual boys and gangs of boys' (Turner 1907: 77). This trained the medical gaze towards greater 'objectivity', for 'I would warn the

observer not to be deceived by the black colour of the skin, which usually leads people to over-estimate the measurements, and to infer the subject of observation is a much finer specimen of humanity than he really is' (Turner, in TBRC 1932: 302). Textual comments and other photographs underlined the violence of this gaze, which debased and primitivized the human objects that were its effects. As well as constructing elusive tribal differences,⁵ this cemented a gulf between 'civilized' European and 'barbarous' African. Eight pictures inspected the open mouths of men with teeth filed to sharp points, the accompanying text and a 1911 article (Turner 1911) presenting this as evidence of cannibalistic tendencies (pointed are better than straight teeth for tearing human flesh). Eighteen images of cicatrized torsos offered corporeal confirmation of their subjects' 'paganism', and depictions of albinism, hermaphroditism, dwarfism and 'other deformities' suggested the teratological potential of these atavistic races (Turner 1907: 70).

Turner's report epitomized early mine doctors' perception of the African bodies that were the effect of their corporeal investigations. The Panoptical layout of its photographs (four per page arranged in a grid to permit comparison of the bodies) also reflected how the recruiting examination itself occurred in the concrete space of interaction between doctor and recruit. From the early 1900s to the 1970s, the examination commenced with recruits being 'paraded' and inspected in 'batches'. In so doing the observer could establish a norm for each group and isolate those individuals who failed to measure up to it. Because stationary bodies might conceal a lack of agility or physical deformity, the 'parade' also included a regimen of physical exercises. A 1923 examination schedule (Chamber of Mines Archives 2325/713: 5) thus listed 'bodily defects' that 'are definite causes for rejection' (e.g. 'weak chest'; 'flabby muscles and loose skin'; 'weight under 105 pounds, unless under five feet in height'), and in 1928 a further set of guidelines choreographed the ideal examination procedure:

Line up all the natives entirely stripped (they must not be allowed merely to drop their trousers and retain them about their ankles). Stand them in line about 20 feet away from the medical examiner. Make each boy walk towards the examiner, observing his gait and whether he is lame etc. When about five feet from the examiner cause him to rise on tip-toe, then squat, then rise again, then extend both arms above his head, extend the arms at right angles to the body laterally, then forward, then flex the elbow joints. When in this position cause him to clench and open his hands, and then rotate each arm parallel to the long axis of the body. Turn him around and look at his spine ... Ask the native a simple question in an ordinary voice to ascertain whether he is deaf. Look at his ears, his gums and teeth. Cover each eye

separately, and ask him to count the fingers of your hand to test for blindness. Look at the skin, noting the presence of any large scars or varicose veins, or herniae, or flabbiness of muscles or skin. Now examine heart and lungs. (Native Recruiting Corporation Ltd 1928: 7–8)

Aimed at inducing systematic bodily contortions to externalize any signs of infirmity, the procedure was also a form of 'dressage', where the will of the examiners must subdue that of the Africans examined.

When examining the chest, and with the effect of confirming the African body as a container of disease, some doctors used 'a screen to prevent the boys breathing in one's face while one is examining them' (Stoney 1923: 4). The screen was a sheet of zinc, the back of a paraffin tin, or a chart-board, and 'one got a native attendant to hold it in front of the patient one was examining'. For some doctors it gave those examined more confidence to breathe freely, and assisted stethoscopy by keeping breathing sounds from the stethoscope; for others it hampered examination, as 'some of them [Africans] ... have a sort of idea it was used for some express purpose other than what the medical man used it for' (Stoney 1923: 4). It was surely to such suspicion that Fanon referred when he described a 'visit to the doctor': 'The doctor rather quickly gave up hope of obtaining information from the colonized patient and fell back on the clinical examination, thinking that the body would be more eloquent. But the body proved to be equally rigid. The muscles were contracted. There was no relaxing' (Fanon 1978: 234).

This same rigidity of resistance where the body contorted against the doctor's gaze appeared in materials documenting the 1951 examination ritual at WNLA's Johannesburg compound hospital (Chamber of Mines Archives 1898/3642). Following deverminization: 'the recruits parade naked and in daylight carrying their medical history cards completely filled in. They are then grouped according to how they were recruited ... and again according to good physique, poor physique and poor condition' (Skaife 1925: 2). This device of multiple groupings ensured that a visual norm was established to select individuals, and that the parade functioned to monitor the standards used by recruiting agencies in various districts. Thereafter, 'the Natives are drafted in batches to the examination rooms' (TBRC 1932: 84) where they underwent a procedure that quite literally brought their breathing patterns into conformity with the 'European chest' against which the techniques of auscultation and stethoscopy were designed. Because 'raw natives are exceedingly stupid and do not try to expand the chest when observations are being taken' (TBRC 1932: 309), or, in a more charitable view, 'very nervous and apprehensive', training in 'how to breathe

deeply' (p. 84) was essential. The recruits' resistant breathing patterns reconfigured to permit accurate evaluation of their lungs, the naked recruits were then lined up in rows before the medical examiners, and their lungs examined: 'the native standing with his hands clasped behind his back. He is then made to turn around, and, with his arms folded in front, the posterior aspect of the lungs is examined' (Skaife 1925: 2-3). 'A [chalk] mark on the chest' (TBRC 1932: 84) coded bodies requiring further investigation, following which were X-rays and inspection of 'the limbs, eyes and glands, [and examination of the genitalia for] ... signs of venereal disease' (p. 84). With fingerprinting and pass allocation the regularizing gaze of the medical examination inscribed the individualized body of each miner in the archival apparatus of the state.

Beyond the bodily resistance provoked by these veterinary examinations, some records show them inciting more direct opposition. In 1909, the Government Native Labour Bureau temporarily suspended the examination of mine workers in a nude condition. Following complaints by 'chiefs' in recruiting districts, it was feared that naked examination may exert 'a prejudicial effect on recruiting due to some of the natives disliking this mode of examination' (Transvaal Archives Depot, GNLB 5/2910). In 1957, also due to its disruptive effects, the examination procedure at WNLA's central compound depot dispensed with enforced nudity and collective examination. Instead, miners were examined in individual cubicles. Walled on three sides but open to the front, this Panoptical arrangement allowed doctors to view each recruit but not the recruits to see one another. Individuals entered clad in trousers, which they removed only when the doctor examined them. Before examination they viewed a filmed depiction of it, designed to lessen their anxiety. Although by 1976 (Moodie 1976) not all mining houses had made similar changes to the initial examination, the trend was clearly away from its construction as a humiliating ceremony of sovereign power towards the more subjectifying lines devised for white miners.⁶

Correctly, it has been the excessive brutality of this most unnatural selection of the fittest that has incited resistance by the Africans examined and by social scientists. It is, however, the notion of sovereign power on which such resistance rests that both creates and restricts its value in understanding the interplay of power and the body in the mining industry. The prominence of punishment in the early examination procedures undoubtedly achieved some success in defining the roles of dominator and dominated. It is also certain that resistance to such tactics forced their abandonment, to leave a clinically sanitized domain in which the doctor, distant behind a battery of electronic

body-investigation devices, was scarcely visible, as during the 1945 procedure of mass miniature radiography:

Two rotating anode tubes face two upright stands, while two patients stand side by side. A smooth mechanism moves the camera-cum-screen from one patient to the other. Two high speed lifts are provided, having nine height adjustments, so that patients from 5ft. to 6ft. 3in. can be accommodated. The patients are lined up 70 at a time, tallest on the right, shortest on the left ... As the two patients step on to their respective height adjusted platforms, their numbers are placed against permanent magnets within the top left of the screen areas ... Next, the tube opposite the first patient is excited; next, by pressing a button, three operations take place. First, the spool in the camera is wound to position; second, the high tension is switched from the first to second tube position, and third, the camera-cum-screen is moved to the second position and then the second tube is excited. Both men then step down and are replaced by two more men. (Collender 1945: 37)

However impersonal, whenever the medical examination occurs it renders those inspected for ever subject to the knowledge that they have been observed and cannot know what about them has been seen, heard and recorded, or how such information may be used. It is this silent induction by the medical examination of its objects into ceaseless surveillance that remains hidden by those who resist only the repressive components. By provoking increasingly inconspicuous procedures for investigating the body, sovereign resistance widens the gap between the knowledge gained of the individual and what the individual knows to have been gained.

A therapeutic operator: compound design and disease control

Channelling patterns of production, reproduction and social interaction, buildings fill bodies with power: 'Stones can make people docile and knowable. The old simple schema of confinement and enclosure – thick walls, a heavy gate that prevents entering or leaving – began to be replaced by the calculation of openings, of filled and empty spaces, passages and transparencies' (Foucault 1977: 172). This is particularly apparent among buildings intended as 'total institutions', such as the asylum and the mine compound. By design, these are keyed to the medically fabricated nature of their inhabitants and the mechanisms by which diseases and disruption spread between them.

In mining medicine's pre-bacterial era of contagionist theory (c. 1880 to 1920), high-level carbon dioxide levels promoted the spread of disease between bodies. Consequently, the chief architectural weapon

against disease was the manipulation of cubic air space and the forced ventilation of huts. Under the 1905 'Coloured Labour Ordinance' (The Transvaal 1905), this truth produced the 'Rand Mines Type of Hut' in which sleeping arrangements for occupants were 'shelves and nothing between the shelves' (Orenstein 1922: 3), while large ventilators producing cold draughts of air prevented the build-up of dangerous levels of carbon dioxide (Pearson and Mouchet 1923: 31). The huts were distributed around the interior walls of a large open square. Entrance to the compound was by a single gate next to the mine manager's office. The manager could thus survey from his office the entire square, monitor workers' movements into and out of their rooms, and control their movements into and out of the compound (see Crush 1992a; Pearson and Mouchet 1923).

In the early 1920s pre-bacterial theories of contagion gave way to the knowledge that 'infectious diseases are either transmitted by immediate contact or by indirect contact' (Orenstein 1922: 3). With this knowledge the previously latent disease prevention potential of compound arrangements that maximized the balance between surveillance possibilities and physical techniques of separation could now be realized.

The great anti-hygienic factor in compounds is, of course, the aggregation of a large number of people under one roof ... Something much better must be provided to counteract the effect of this bringing together of thousands of people from various parts of the country and from various tribes and races, of different susceptibilities to disease. (Orenstein 1922: 2)

Criticizing recommendations of the Gorgas Report (Gorgas 1914) that family housing replace the barrack system which divorced labourers from their families, Orenstein argued for a mechanism that could separate individuals and maintain a high number of occupants per compound hut.

It is not necessary to separate people by so many yards of air space – the same can be achieved by introducing some mechanical obstruction to the projection of bacteria from the nose, throat, or mouth ... [This] can be achieved by ... simply interposing some isolating mechanical device during the hours of sleep when they may, and do, come in close proximity. (Orenstein 1922: 3)

This 'device' was a simple pair of boards. Placed on either side of the bed, they created 'a sort of cubicle principle' (Orenstein 1922: 6), just large enough to contain a single supine body. A better example would be hard to find of the disciplinary principle of partitioning by which space is 'divided into as many sections as there are bodies' so that 'each

individual has his own place, and each place its individual' (Foucault 1977: 143), and by the 1930s (A. Gordon 1935) most mines had complied with Orenstein's prescription to partition sleeping arrangements.

Complementing this individualizing system of isolation within the dormitories, compounds were also partitioned along ethnic lines. This precluded the dangerous intermingling of Africans of differing disease susceptibility, and minimized the traffic of infection across tribally defined borders of personal cleanliness.

The Shangaan has a mania for washing himself and keeps his body beautifully clean and oiled, the Zulu and Swazi are clean personally, the Xosa is indifferent and usually dirty, while the Pondo is one of the dirtiest of mankind and often does not wash himself for six or nine months. (Chamber of Mines Archives C2309/F1806)

Not only beds and barracks, but each and every surface was calculated to minimize contact between individual bodies, like the latrines: 'of a special design ... and so constructed that it is almost impossible for a native to squat on the seat. The flush is automatic, [and] ... 5 gallons per seat is delivered at required intervals, usually twenty minutes when the natives are not at work underground' (Gordon 1935: 9).

Beyond the dormitories, both underground and in the open spaces of the compound, separation gave way to surveillance. Here the concerns of mine doctors fused with those of mine managers to maximize the transparency that compound arrangements afforded in relation to the behaviour of their inmates. Published in 1923, Pearson and Mouchet's *Practical Hygiene of Native Compounds in Tropical Africa* lent strong emphasis to surveillance in its discussion of compound arrangements: 'The general features which we should seek to embody in any arrangement are those which conduce to easy supervision and maximum accessibility to all installations combined with as great a degree of compactness as possible, in view of the necessity for avoiding too great proximity between natives' (Pearson and Mouchet 1923: 23).

The importance of surveillance to disease control emanated from construction by the 'Dispensary Gaze' of the social as a space of danger through which disease-causing bacteria were constantly passing from one individual to another. Spitting was perhaps the most conspicuous habit to be isolated as a mechanism of disease transmission, and in 1925 tuberculosis prevention campaigns were 'centred against the carrier and distributor of the infection: for his sputum is the cause of all the trouble' (Chamber of Mines Archives 2309/1777). To police such behaviour required that all mine workers be subject to constant observation and the knowledge that whoever 'expectorated' would be seen and punished.

Hence a system of 'sputum espionage' wherein 'Whenever a native, or indeed anyone, is seen to expectorate anything more than saliva, a smear should be made and sent to the Institute with the name of the expectorator attached to it; the Institute would report to the Mine Medical Officer the result of the examination' (Chamber of Mines Archives 2309/1777).

While the ranging characteristics of the 'Dispensary Gaze' meant it could be deployed independently of any particular spatial configuration, its efficiency was enhanced where such arrangements facilitated supervision and hierarchical observation. Noting this, Pearson and Mouchet (1923) paid special attention to the compound arrangement deployed at the City Deep mine on the Rand.

The dwelling-huts are erected in long lines which radiate fanwise from a centre at which the compound offices are situated. The plan is devised to give maximum ease of supervision by the compound manager, who can survey the whole, or almost the whole, of his compound area whilst sitting at his office window. (Pearson and Mouchet 1923: 26)

In 1923 this 'fan compound' was the only example of its kind, and as Crush (1992a: 6) has also noted it would be difficult to find a more precise architectural realization of Bentham's Panoptical design for the maximization of surveillance. In addition to affording visibility, the 'fan compound' overcame the limitation on building expansion imposed by the closed square format, since extra huts could be added along each spoke of the wheel 'without sacrificing the possibility of instant surveillance from the compound manager's office' (Crush 1992a: 6). Coinciding with the expansionist phase of the mining industry, the Panoptical compound design became, from the late 1940s through to the 1970s, 'the industry standard' (p. 6).

The disciplinary descent of mining medicine

In each domain of mining medicine this chapter has examined, clear changes occurred in the discourse by which African mine workers were constructed and controlled from 1900 to 1950. By briefly extending the time-frame into the 1990s, it is evident that techniques of anatomy no longer fabricate racially distinct bodies, but instead discern individual differences in the internal structure and organization of bodies. The concept of 'susceptibility' has been displaced by the ideas of deprivation, poverty and exploitation in explaining the incidence of tuberculosis (e.g. Packard 1989), and in place of the earlier 'Dispensary Gaze' by which culture was fabricated as a determinant of disease exposure,

there are now open-ended interviews and attitude surveys (Steinberg 1993). Such techniques work not through the eye and observation, but rather through the ear and hearing, to constitute their respondents not as mute and passive objects, but as the subjectified authors of their own attributes and identities, whose most intimate secrets concerning sexuality and personal sanitation are entered into the space of surveillance and the design of disease prevention programmes.

The examination remains a key component in the machinery by which the bodies of individual miners are graded, allocated and monitored. Along with the increasingly sophisticated manner in which it is conducted, so has there crystallized an increasingly subtle discourse around the possibility that miners may consciously or unconsciously manipulate or resist the examination, in the shape of psychometric and psychiatric scales and interviews designed to test for somatization, malingering or deliberate symptom minimization.

Complementing these medical procedures for the fabrication of a more autonomous individual are changes that have occurred in the design and layout of the mine and mine compound. Since the mid-1970s, and in the face of an upsurge of worker protest on the mines, mine compounds started to be known instead as 'mine villages'. In these, the stark square or radial arrangements of the compound, which broadcast to those observed the fact of their constant surveillance, were replaced by interior environments that create a sense of openness, with park-like surrounds and less bleak living quarters (Crush 1992b: 833). But in them is a system of surveillance 'without windows, towers, walls or guards' (Poster 1990: 93), these having been replaced by the computer, the barcode and the swipe card, through which it is possible constantly to monitor the movement and location of every worker, both above and below ground (Crush, 1992b).⁷ All these developments point clearly to a decline in the importance of sovereign power as a means of achieving control over the individual and social bodies of miners. But, at the same time, every development represents a conscious attempt to increase the intensity, intimacy and invisibility of the monitoring gaze by which disciplinary power articulates itself within the individual and pervades the social.

Notes

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1. Brodie and Rogers' 1894 paper on 'acute specific rhinitis' was one of the first instances involving the application to Africans of pathological anatomy. Attempting to explain the relatively sudden onset of death (when compared to Europeans with the same disease) in the African miners they examined, they concluded: 'the brain of the uncivilized Kaffirs – and they were all raw Kaffirs – is less responsive to the effect of disease than that of the highly organised brain of the white man' (Brodie and Rogers 1894: 181).

2. This Commission operated as an extended Panopticon, the evidence collected from observers in different regions of the sub-continent allowing the state and the mining industry simultaneously to survey and compare the 'usual work ... food ... pay ... physique, aptitudes, (and) special ailments' (The Transvaal 1904: 2) of Africans from different regions of South and Central Africa. In addition to a majority of sober evaluations from its witnesses, the evidence included descriptions of 'cannibals' and 'pygmies' (see The Transvaal 1904: 380).

3. In 1936, Dreosti described how:

All natives are weighed once monthly and their weights recorded. Any native who shows a loss in weight of 5 lbs. or more, since his last weighing, or 6 lbs. or over on three consecutive weighings, is brought up before the medical officer for examination. The weighing is done by specially trained Europeans whose duty it is also to look out for any apparent ill-health in the natives being weighed and to bring such natives before the medical officer irrespective of weight. (Dreosti 1936: 8)

4. This was also the level at which it was most commonly contested by individual miners. For instance, in 1920 a miner named Nontswaku was the centre of a dispute between WNLA medical officers and the medical officer on the mine to which he was allocated.

I was told (at the WNLA compound) there was nothing wrong with my chest and that I was to return to work at the mine. I returned to the mine but the Mine Medical Officer contends I have something wrong with my chest and I am not allowed to go to work ... I have made a mistake in not complaining to the Inspector before this. (Transvaal Archives Depot, GNLB 211/29151)

5. In the introduction to his report on the survey, Turner alluded to the necessity of an active gaze in discriminating tribe from tribe: 'It has been a difficult matter to keep within any very strict lines of description, the native tribes and their customs seem to merge into one another so much that for the sake of comparison one has often to diverge considerably in describing them' (Turner 1907: 5).

6. A 1939 report on anthropometric indexes and average values by which to establish the condition of miners, noted that European miners are weighed 'in trousers and socks only, but braces or belt (unloaded) may be retained' (Bedaux Company for Africa 1939: 7).

7. For instance, by the early 1980s on the HJ Joel mine in the Orange Free State, Anglo American's 'Human Resources Information System' was installed

to monitor constantly the movement and location of every worker, both above and below ground:

At Joel, the mine complex (itself enclosed by security barriers and guards) is partitioned into a series of self-contained spatial zones – including the residential ‘village’, kitchen and dining rooms, indoor and outdoor bars, shops and recreation areas. These zones are bounded by impenetrable physical barriers (such as walls and fences). Each zone has a fixed entry and exit point at which there is a gate or turnstile and check-in points where workers have to swipe their bar-coded ID cards before proceeding. Each transaction is automatically logged in the data banks of the mine computer in the central security tower. The movement of every worker around the mine can thus be continuously monitored and their geographical location fixed in an instant. (Crush 1992b: 835–6)