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Health and demography in late 19th century Kimberley : a palaeopathological assessment

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Citation

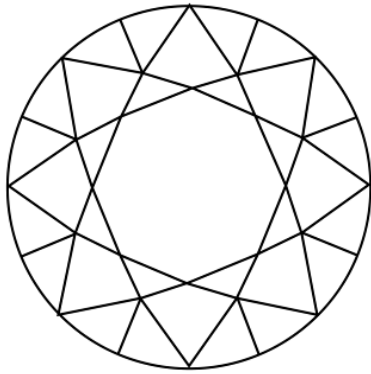
Merwe, A. E. van der. (2010, September 8). *Health and demography in late 19th century Kimberley : a palaeopathological assessment*. Barge's Anthropologica, Leiden. Retrieved from <https://hdl.handle.net/1887/15931>

Version: Corrected Publisher's Version

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CHAPTER 1

Introduction

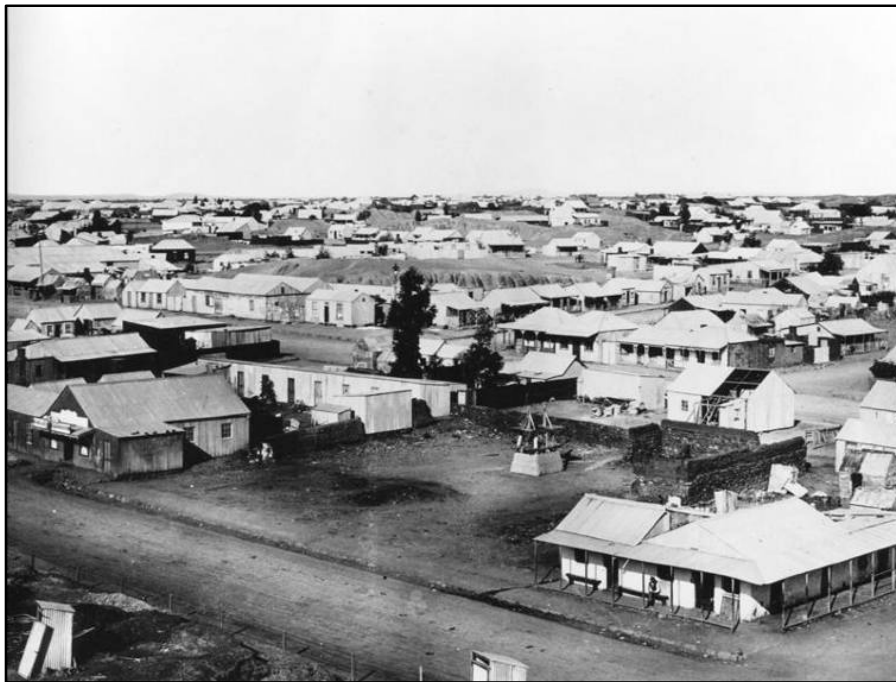
Modified from article accepted for publication as:

The history and health of a nineteenth-century migrant mine-worker population from

Kimberley, South Africa

A.E. Van der Merwe, D. Morris, M. Steyn, G.J.R. Maat

South African Archaeological Bulletin



Kimberley town, 1882

(McGregor Museum Kimberley Photography nr.7623)



De Beers Mine compound, 1896

(McGregor Museum Kimberley Photography nr.829)

1.1 The study of palaeopathology

The distribution and frequency of disease and trauma in a population is rarely a function of chance. It is often directly related to the populations' genetic composition and the environment, pathogens, stress and activities they are exposed to on a daily basis (Wells, 1964). The medical literature is littered with terms such as painter's colic, tennis elbow and chauffeur's fracture as a constant reminder of this important principle (Graham *et al.*, 1981; Helm & Tonkin, 1992; Faro & Wolf, 2007). Through the study of pathology present in human skeletal remains, palaeopathologists attempt to reconstruct the fragile balance between living creatures, disease micro-organisms and environmental stresses throughout history (Angel, 1981; Ortner, 2003).

As can be expected, the primary use of human skeletal material to reconstruct health and disease in the past is filled with inherent difficulties. In most cases, no soft tissue evidence will be available for examination and, depending on the archaeological context, skeletons are often fragmented, incomplete or damaged. This is of great importance when interpreting the prevalence of pathological conditions in a study population as some diseases only affect certain parts of the skeleton. For example, rheumatoid arthritis mainly affects the hands and feet and the pathognomonic lesion of tuberculosis, Pott's disease, is found on the vertebrae (Ortner, 2003). Therefore, the study of extremely fragmented, damaged or incomplete skeletal material may result in an underestimation of disease frequencies.

A second difficulty researchers are often faced with is the ambiguity of lesions and associated diagnostic complications (Wells, 1964; Dastugue, 1978). Bone can only react to pathology in a limited number of ways: via the deposition of new bone, the resorption of bone or a combination of the two (Dastugue, 1978; Mann & Murphy, 1990). As a consequence, some diseases result in morphologically similar bone lesions. It is often possible to differentiate between diseases resulting in comparable bone reactions by assessing the skeletal distribution of the lesions and taking into consideration the demographic groups in which the diseases are most likely to manifest. Techniques to support the macroscopic evaluation of lesions, such as X-ray investigations or histological analyses, may also aid in the diagnostic process. However, differentiating between potential pathological conditions is not always possible. Therefore, thorough description and differential diagnosis of lesions are of great importance, not only to prevent

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misdiagnosis of pathological lesions, but also to permit other researchers to interpret the lesions observed (Ortner, 2003). It has even been suggested by some authors that specific disease diagnoses should be avoided. A suggestion was made that the pathological lesions observed should be classified according to broader, more inclusive categories to minimize the misdiagnosis of disease (Milner *et al.*, 1996)

The question then arises - is the prevalence of pathological conditions observed in a skeletal sample representative of the health of the once living population from which the sample came? It is generally accepted that a direct association exists between the prevalence of specific pathological lesions observed in a skeletal sample and the pathogen load or frequency of the causative diseases in the once living population from which the sample came. Hence, it has been suggested that an increase in the frequency of a specific skeletal lesion can be interpreted as an increase in the risk of being affected by the disease most likely to have produced the lesion (Wood *et al.*, 1992; Van der Merwe, 2007). However, Wood and co-workers (1992) suggested that the samples being used to reconstruct past population health are biased since they are only representative of those individuals that died. Thus, no matter how large the skeletal sample, it will never be representative of the once living population. As a result of the inherited selectiveness of skeletal sample populations, the observed prevalence of diseases will most likely be an overestimation of the true frequency of the pathological conditions present in the once living population (Wood *et al.*, 1992).

Furthermore, Wood *et al.* (1992) suggested that an increase in the presence of pathological lesions (e.g. enamel hypoplasia or infectious lesions) does not necessarily suggest poor general health in a population. It must be kept in mind that skeletal evidence of disease only develops as a result of chronic disease or trauma. Thus, individuals presenting with no skeletal lesions may either have died as a result of a disease that does not cause skeletal changes or else their immune system was strong enough to eliminate the disease before its associated skeletal lesions could develop. It is also possible that the seemingly 'healthy' individual could not withstand the initial onslaught of the pathogen and died before any skeletal lesions could develop. Determining which of these scenarios is applicable to those skeletons free of pathological lesions is usually impossible.

On the contrary, a population sample comprised of individuals presenting with extensive evidence of pathological bone alterations as a result of chronic disease was most likely in good health. The immune systems of those affected were strong enough to prevent

death but not strong enough to completely eradicate the disease (Wood *et al.*, 1992; Larsen, 1997; Ortner, 2003).

Taking the selectiveness of a skeletal sample population and the paradox related to the interpretation of pathological lesions into consideration, it becomes clear that the prevalence of pathological conditions observed in a skeletal sample may not be representative of the health of the once living population from which the sample came when viewed in isolation (Wood *et al.*, 1992). Goodman (1993) suggested that to overcome the majority of these ‘inherited’ difficulties, skeletal lesions indicative of disease should not be interpreted in isolation. It is essential that archaeological and historical findings describing the subsistence, demography and environmental and cultural contexts of the sample should be taken into consideration at all times (Goodman, 1993; Larsen, 1997).

In conclusion, it can be said that although there are difficulties and limitations in the study of palaeopathology and the reconstruction of health in the past, a significant contribution can still be made to our understanding of human history and modern disease, when results are interpreted with caution (Bosch, 2000; Ortner 2003).

In this study an attempt will be made to describe and discuss the pathological lesions observed in a skeletal sample population salvaged after accidental disturbance, taking the available historical documents and archaeological findings into consideration. The historical setting of the site from which the remains were salvaged, as well as an account of the city and time period in which these individuals laboured will be briefly discussed, followed by a detailed description of the purpose of the study.

In the second chapter, general details of all methods used to analyze the skeletal remains will be given. Results concerning the archaeological findings of interest for this thesis, a description of the demographic composition of the sample, as well as a summary of all skeletal pathological lesions observed will be presented in the third chapter. Chapters four and five are detailed reports and discussions of lesions suggestive of trauma and metabolic disorders, respectively, observed in the study sample. The chapters on skeletal pathology will then be concluded by a description of the formation and remodelling of ossified haematomas when viewed microscopically.

Chapters seven and eight deal with the dental health of the salvaged skeletal sample, with the first summarizing the prevalence of carious lesions, antemortem tooth loss, periapical granulomata and cysts and bony evidence of periodontal disease, and the second

reporting on supernumerary teeth and the possible demographic detail this finding added to the study.

Lastly, a description of the ancestry of the salvaged remains and a discussion taking all the evidence presented in the dissertation into consideration can be found in the final two chapters.

1.2 Kimberley – Historical setting

Several tales exist describing how diamonds were first discovered on Colesberg Kopje in South Africa. The most plausible story states that in 1871, a prospector, Fleet Rawstone, had a cook, Damon (Esau Damoense), who had a habit of drinking too much and misbehaving. Consequently, Damon was sent away from their digging party with only a few cooking utensils and food, and was instructed to go do some digging on the hill as punishment. He returned a few nights later with two or three diamonds, which he claimed he discovered on Colesberg Kopje (Colesberg Hill). That same night, all the men in the camp rushed to the hilltop and started marking their claims in the dark (Roberts, 1976).

The discovery of diamonds on Colesberg Kopje gave rise to the town of Kimberley in what is today the Northern Cape Province of South Africa. The first diggings on the ‘Diamond Fields’, in 1870, were along the banks of the nearby Vaal River and at a few ‘dry diggings’ dotted around the region of Kimberley. New finds would spark a rush as diggers scrambled to stake out claims, one of the most famous being the ‘New Rush’ when Colesberg Kopje – now Kimberley Mine – was discovered. In time it was realised that the gems being recovered in the vicinity of and at Colesberg Kopje were located in diamondiferous kimberlite pipes, which could be mined to great depths. Open-cast mining resulted in the famous ‘Big Hole’ and other similarly deep excavations, but shafts were soon being sunk to retrieve kimberlite even deeper. Kimberley became the hub of industrialisation in South Africa, transforming the country’s agrarian economy into one increasingly dependant on its mineral wealth. The demand for ‘black’ labour in the mines drew workers on an unprecedented scale from throughout the subcontinent.

By the end of the 19th century, the 2000 or so men who at first had mined on Colesberg Kopje had burgeoned into a population of 41 000, numbering 14 500 Europeans and 26 500 ‘black’ persons (Stoney, 1900a). The efforts of many individual prospectors and claim-

holders had been swallowed up as companies amalgamated, with De Beers Consolidated Mines Ltd establishing a monopoly by the end of the 1880s.

Apart from the 'Native Locations', several closed labour compounds for housing 'Black' mine workers were established in the Kimberley district in the mid-1880s (Leary, 1891; Roberts, 1976; Worger, 1987). The compounds were developed to improve security and limit the theft of diamonds, while enhancing production by controlling the movements of workers. Although intended to provide adequate shelter and nutrition, the living conditions in the compounds were in fact poor (Leary, 1891; Barnes, 1895; Jochelson, 2001).

Disease and death was an everyday occurrence from the outset on the Diamond Fields. Thousands of people were digging in extremely dry surroundings, without proper housing, natural water sources and proper arrangements for waste disposal. Doctors Otto, Dyer and Matthews were the first to arrive at the fields in 1871 (Booth, 1929; Kretsmar, 1974). Kimberley's first hospitals attracted trained doctors who were assisted by the women and nurses of the Community of St. Michael and All Angels, headed by Sister Henrietta Stockdale (Booth, 1929; Kretsmar, 1974; Swanepoel, 2003). In 1882, the amalgamation of the Diggers Central Hospital and the Carnarvon Hospital gave rise to the Kimberley Hospital (Booth 1929), which at the time was the largest regular hospital in the Cape and the best training school for nurses in the country (Kretsmar, 1974). By the late 1890s, Kimberley Hospital had a 'Native surgical ward' and a special ward for 'black' women and children. Together with the compound hospitals, it was responsible for the migrant workers and paupers who fell ill (Cape of Good Hope Votes and Proceedings of Parliament, 1898; 1899; 1900). Hospital records indicate that between 1897 and 1899, 7 853 patients were admitted to Kimberley Hospital, of whom 5 368 were 'black'. Of those who were treated, 1 144 died (*ibid.*).

During this period the most frequently treated disease was 'zymotic disease', which resulted in 34.8% of admissions and 48.1% of deaths. 'Zymotic disease' was a term given to describe any contagious disease. A total of 977 patients were admitted for dietetic diseases, which probably included scurvy, and 52 (5.3%) died as a result thereof. Constitutional diseases, which most likely referring to inherited disorders, diseases of the respiratory system and diseases of bones and joints were also observed. Injury and violence (as it was termed in historical documents) brought 893 patients to the hospital in the aforementioned three years, of whom 40 died. Although it is unclear precisely how the

different diseases were categorized, it seems that the main causes of death in the last three years of the 19th century were tuberculosis, pneumonia, scurvy, syphilis, diarrhoea, mining accidents and interpersonal violence (Cape of Good Hope Votes and Proceedings of Parliament, 1898; 1899; 1900; Stoney, 1900b).

Paupers who died in the Kimberley or other surrounding compound hospitals were buried in the Gladstone cemetery. Use of this cemetery began informally prior to its official proclamation in March 1883, by which time half the ground were being used for

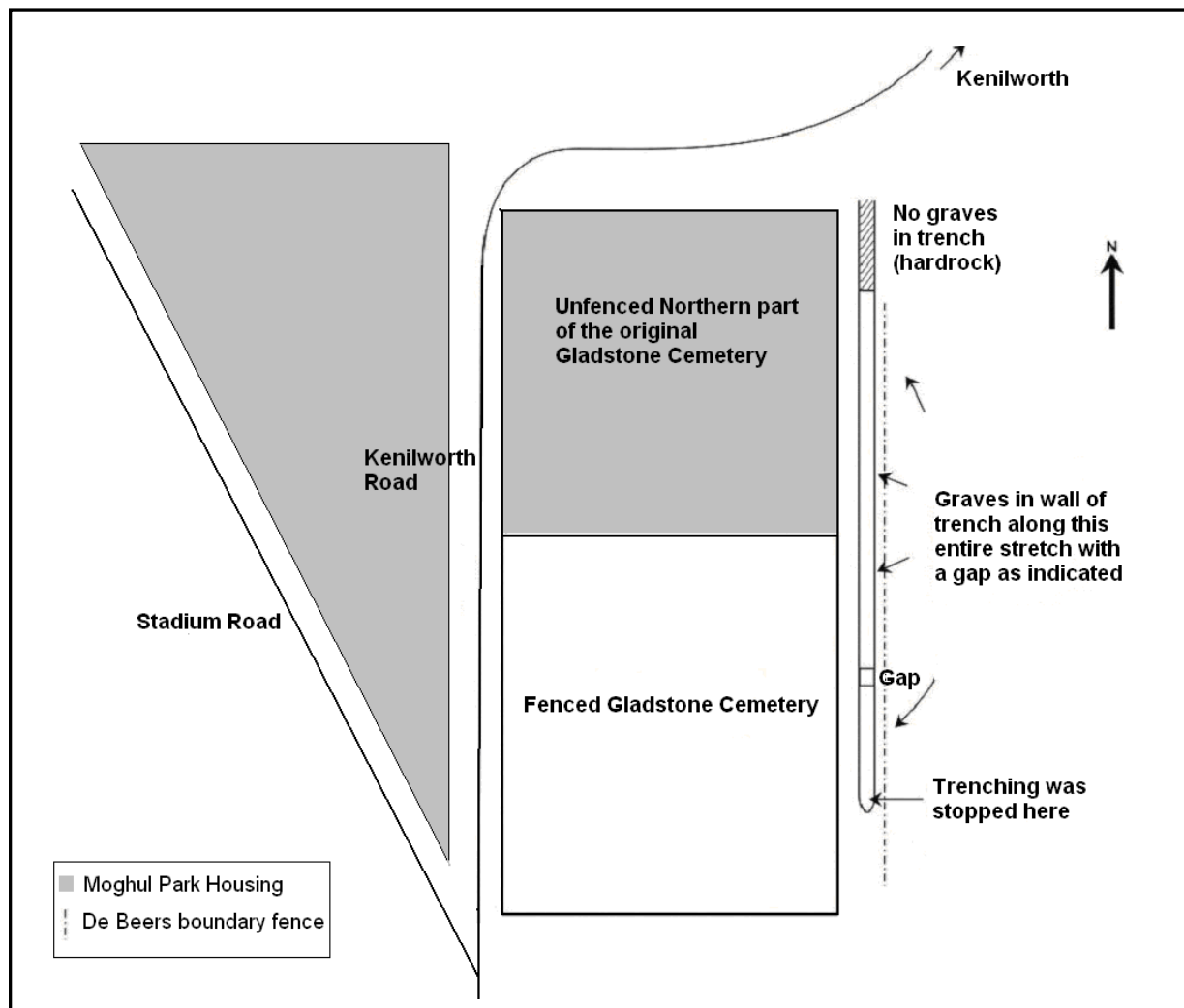


Figure 1.1 Map indicating the fenced as well as the northern build-over sections of the Gladstone cemetery and the trench which uncovered the human remains assessed in this study (modified from van der Merwe *et al.* 2009b). The trench was 180m long.

‘native’ internments – by then numbering approximately 1500 graves (Manager of Vooruitzicht Estate, 1883, cited in Swanepoel 2003). Some of the early registers were lost in a fire but one surviving register indicated that nearly 5 000 ‘black’ burials took place

between 24 June 1887 and 28 November 1892, while another 611 'black' burials were recorded for the period between February and June 1900. These were mainly paupers' burials. At least some of these individuals were buried without coffins for lack of funds and were transferred to the grave wrapped only in blankets or coverlets (Swanepoel 2003).

In 1897, the cemetery was enlarged along its eastern border with an extra strip of land donated by De Beers. The cemetery was closed in mid-1900, and opened again in April 1902 for 'European' interments only. Decades later the visible cemetery was fenced, with those areas containing unmarked graves going unnoticed and falling outside of the new boundary. Municipal records confirm that in 1883 the cemetery measured some 7.2 ha; that it was enlarged by the addition of a strip of land in 1897; but the extent of the demarcated cemetery in 1998 was only some 3.6 ha. The original cemetery was nearly double its present size, and it has since been partly built-over at its northern end (Morris, 2003).

It was exactly in the strip of land given by the De Beers Company, right up against the mining area fence, but outside of the presently demarcated cemetery, where trenching by the Sol Plaatje municipality, in 2003, accidentally intersected 145 unmarked graves (see Figure 1.1). Acting on information received, staff of the McGregor Museum in Kimberley intervened to halt the trenching, and alerted the South African Heritage Resources Agency (SAHRA). As there had been no prior impact assessment, archaeologists of the McGregor Museum and community helpers spent the next several months investigating the damaged graves.

1.3 The purpose of the study

This study is a direct outflow of unpublished preliminary results obtained from a M.Sc study conducted by the author at the University of Pretoria, South Africa. The purpose of the Ph.D study was to re-evaluate and extend the abovementioned results in depth and diversity in order to unravel and interpret the archaeological context, demographic composition, health status and possible ancestry of the skeletal remains recovered, as one unit. It was anticipated that the results would shed more light on the previously disadvantaged and unknown individuals who laboured in the mines and the influence this important period of economic and social growth had on them.

A general description of the skeletal remains was done with regards to the age, sex and stature of each individual (details on each of the individuals assessed can be seen in

Appendix 1). Particular attention was given to pathological lesions observed on the bones, with special reference to those indicative of infectious disease, scurvy, trauma and enthesopathy (indicators of possible regular participation in strenuous physical activities). The dental health of the sample was also assessed and all dental pathology, as well as indications of normal variation, was recorded.

The prevalence of all pathological conditions observed in the Gladstone population was compared to other skeletal studies from South Africa as well as other countries. Diseases observed in this study were also interpreted in relation to archival documents describing the health of mine labourers in 19th century Kimberley, as well as hospital records reporting the prevalence of certain pathological conditions during this period. Although numerous historical documents are available describing Kimberley in the late 19th century, very little is known about the lowest class of mine labourers during this time period. Therefore, this study will give valuable insight into a relatively unknown group of people.

It has been suggested that skeletal lesions caused by specific pathological conditions can be accurately diagnosed on the bases of their histological characteristics (Schultz, 2003; Von Hunnius *et al.*, 2006). A high prevalence of pathological conditions, especially diseases such as treponematosi s and scurvy causing lesions on the anterior tibiae, were present in this sample. Since lesions on the anterior tibiae are often ambiguous on a macroscopic level, a decision was made to employ microscopic investigation in order to firstly, test the methods available in cases where a reliable diagnosis could be made on a macroscopic level and secondly to evaluate as to whether histological investigations can improve the accuracy of diagnosis of these lesions.

Lastly an attempt was made to determine the ancestry of the individuals salvaged from the trench using craniometric methods. These results were compared with historical documents describing the various groups represented in the mine during the late 19th century.

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Chapter 1

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