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Water supply and utilization in Johannesburg, 1886-1905

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WATER SUPPLY AND UTILIZATION IN JOHANNESBURG, 1886 - 1905

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A dissertation submitted to the Faculty of Arts
University of the Witwatersrand, Johannesburg
for the degree of Master of Arts

Johannesburg 1987

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Water-pipe laying in Johannesburg, *circa* 1891.

ABSTRACT

This dissertation demonstrates that supply and non-supply of water significantly affected Johannesburg's early development.

The introductory chapter examines the singularity of Johannesburg with regard to water sources, and the dearth of material addressing this subject. The second chapter considers the rapid transition from an *ad hoc* to a formal privatized water supply system in the context of the political and economic climate of the Transvaal; the discussion centres on the profiteering of water companies and the concomitant inadequacy of supply, which had a detrimental effect on industry and health. The third chapter depicts the emergence of local government and its attempts to improve the water supply, demonstrating that the powerlessness of the local state enabled an inferior supply to persist. An examination of the British authority's structural reorganization of municipal and water affairs in the wake of the *Tweede Vryheidsoorlog*, and the limited effectiveness of these measures owing to the dilapidation of the supply system concludes the argument.

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I declare that this dissertation is my own, unaided work. It is being submitted for the degree of Master of Arts in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other University.

C M Cross

1st day of December, 1987.

To Monty and Carole, my parents.

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PREFACE

Some good must come,
of mud and water. Rupert Brooke

The writing of geographical studies which focus upon certain public utilities has become an acceptable, indeed fashionable, pursuit within Human Geography. Investigations into urban themes, such as housing and transport, enjoy wide recognition. Water supply, however, has received little attention. Yet water is significant because it is fundamental to human existence - in every sphere from its raw consumption to agriculture, cleansing, health, building, and industry. An analysis of the evolution of water supply, therefore, discloses much about other facets of a society, especially in a young settlement where there is no regulation of water provision. Johannesburg is an especially interesting case in this regard; a consideration of its history reveals that because sources were few and the demand for water great, the whole community was attuned to the vicissitudes of the water supply system - no doubt the sentiments of Rupert Brooke echo those of Johannesburg residents who had to contend with an intermittent and polluted water supply. In view of the poignant interrelationship between water and community development which characterized Johannesburg's early existence, I have attempted to redress the neglect of water supply - both as an issue in itself and as an aspect of a holistic appraisal of settlement and the process of urbanization.

The material upon which the study is based is, perforce, largely official documentation. Consequently there is a dearth of information depicting the plight of the poor and disenfranchised sectors of the community; however, their position is considered wherever possible in order to suggest a representative picture.

I am most grateful to the Human Sciences Research Council and the University of the Witwatersrand for their generous funding which made this

study possible. The kindness of the Rand Water Board and, especially, Dr H.T. Ramsden in making their important archival collection available to me, is also much appreciated. I suspect that Geography has a unique breadth of scope and a sensitivity to space which makes it an amenable context for this type of study; I am indebted to Prof K.S.O. Beavon and Mr G.H. Pirie for introducing me to this singularity of Geography over the last six years. I am also grateful to Mr Pirie for his gracious and perceptive supervision of this dissertation. Furthermore, I am grateful to each of my colleagues and mentors at the University for their assistance and encouragement in the compilation of this document. The proof-reading skill of Mrs J.A. Lindesay and Mr M.C. Cosser, and the assistance of the latter and Mr P. Stickler with the reproduction of the maps is much appreciated.

Finally, the preparation for this work coincided with preparation for my marriage; I am almost equally grateful to Michael, my husband, for his part in both of these endeavours.

INTRODUCTION

The growth of Johannesburg was contingent upon the availability of water. The city has an unusual location for a major urban centre as it is situated on a continental divide some distance from any sizeable water source. This has meant that inhabitants have always been in a precarious position with regard to water acquisition. In the earliest years of the settlement's existence, townspeople experienced the devastating effects of the mismanagement of the little available water. Consequently, water supply was a salient issue in the community, impinging on many facets of development, such as health, industry, investments, and local and national politics. Water, then, may be regarded as a *sine qua non* of Johannesburg; a consideration of its supply elucidates other dimensions of urban structure. In the light of a recognition of the singularity of water provision in an urban context, the present study moves beyond a technical review of water sources and reticulation networks to disclose the interrelationship of water with the broader mechanisms of society. Interwoven with these theoretical issues is an examination of the individual's experience of the supply and non-supply of water. Moreover, this study attempts to demonstrate that a recognition of the implications of water provision and acquisition is essential to a holistic appraisal of an urban community.

This dissertation forms part of the literature of Historical Geography. Water provision is not, however, a recognized theme within the sub-discipline. As a topic, it differs markedly from the traditional concerns of historical geography, in which units of space or landscape dominate and circumscribe the subject matter.[1] Recent innovative

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[1] H.C. Darby, 1921, *The Domesday Book* (Cambridge University Press, Cambridge); 1951, The Changing English Landscape, *Geographical Journal*, 117, pp. 377-398; 1953, On the Relations of Geography and History, *Transactions of the Institute of British Geographers*, 19,

treatises have disregarded the fundamental importance of water supply in the examination of the urban landscape. Although a growing interest in the impact of public utility provision has developed among the geographical community in southern africa and abroad,[2] water supply has not been adopted as an issue in its own right. The *Journal of Historical Geography*, for example, boasts just one article on the subject.[3] The reason for this neglect is puzzling. Perhaps water consumption is such an unselfconscious part of commodious modern living that its formative significance is easily overlooked. Nonetheless, water supply is of critical importance in the *ad hoc* communities of the present and the past and, therefore, its scholarly neglect deserves redress.

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pp. 1-11; C.O. Sauer, 1925, The Morphology of Landscape, in J. Leighly, ed., *Land and Life: A Selection on the Writings of Carl Sauer* (University of California Press, Berkeley); 1941, The Personality of Mexico, *Geographical Review*, 31, pp. 353-364; 1941, Foreword to Historical Geography, *Annals of the Association of American Geographers*, 31, pp.1-24; M.S. Kenzer, ed., 1987, *Carl O. Sauer, A Tribute* (Oregon State University Press, Corvallis, Oregon); D.W. Meinig, 1979, Symbolic Landscapes, in D.W. Meinig, ed., *The Interpretation of Ordinary Landscapes* (Oxford University Press, London) pp. 164-192.

[2] cf. A.J. Christopher, 1971, Colonial Land Policy in Natal, *Annals of the Association of American Geographers*, 61, pp. 560-575; 1976, *Southern Africa: an Historical Geography* (Dawson, Folkestone); 1983, From Flint to Soweto: Reflections on the Colonial Origins of the Apartheid City, *Area*, 15, pp. 145-149; J.S. Crush, 1980, The Genesis of Colonial Land Policy in Swaziland, *South African Geographical Journal*, 62, pp. 73-88; L. Guelke and R. Shell, 1983, An Early Colonial Landed Gentry: Land and Wealth in the Cape Colony, *Journal of Historical Geography*, 9, pp. 265-286; G.H.T. Hart, 1984, Urban Transport, Urban Form and Discrimination in Johannesburg, *South African Geographical Journal*, 66, pp. 152-167; A. Mabin, 1985, Concentration and Dispersion in the Banking System of the Cape Colony, 1837-1900, *South African Geographical Journal*, 67, pp. 141-159; W. Norton, 1981, Settlement in the Cape Province: Three Centuries of Change, 1652-1970, *South African Geographer*, 9, pp. 119-128; S.M. Parnell, 1987, Council Housing Provision for Whites in Johannesburg, unpublished MA Dissertation, University of the Witwatersrand, Johannesburg; G.H. Pirie, 1985, Toward an Historical Geography of Missions in Nineteenth Century Southern Africa, *South African Geographical Journal*, 67, pp. 14-30; 1987, African Township Railways and the South African State, 1902-1963, *Journal of Historical Geography*, 13, pp. 283-295; C.M. Rogerson, 1986, Feeding the Common People of Johannesburg, 1930-1962, *Journal of Historical Geography*, 12, pp. 56-73.

[3] J. Sheail, 1982, Underground Water Abstraction: the Indirect Effect of Urbanization on the Countryside, *Journal of Historical Geography*, 8, pp. 395-408.

Whilst being a specific thematic study pertaining to Johannesburg, this dissertation embodies more than a "local history"[4] or catalogue of descriptive minutiae:[5] the difficulties surrounding water supply in Johannesburg are not unique, but echo the vicissitudes of growing urban communities elsewhere in the world. Moreover, this study complements other idiographic studies concerning the provision of services and the urbanization process as a whole, especially in Southern Africa. The individual theoretical issues examined also resonate with analyses of such issues as municipalization, capital accumulation, and interlocution of state and private interests, thereby giving the work a scholarly context beyond that of Geography.

The focus of this dissertation concerns the conflicting forces in Johannesburg which sought to organize and control water, and the ramifications of the resolution of these differences in the town. Effectively, the work constitutes an analysis of process in the context of certain physical, political, and economic constraints. From a philosophical standpoint, the adoption of a focus on *process* within Historical Geography, is conspicuous in the light of the theoretical schisms manifest in this field. Process is the key-word of Marxian Historical Geographers who tend to define their position in contradistinction to the traditional landscape-based studies.[6] However, the theoretical stance adopted here is largely eclectic because the focus on process does not exclude approaches to *landscape* that are typical of

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[4] A.J. Christopher, 1977, Historical Geography and Local History, *Contree*, 1, pp. 11-15.

[5] G.H. Pirie, 1978, Urban, Regional and National History, *Contree*, 3, p. 28; N. Kagan, 1978: African Settlement in the Johannesburg Area, 1903-1923, unpublished MA Dissertation, University of the Witwatersrand, Johannesburg.

[6] A.R.H. Baker, 1979, Historical Geography: a New Beginning?, *Progress in Humen Geography*, 3, pp. 560-570; 1982, On Ideology and Historical Geography, in A.R.H. Baker and M. Billinge, eds., *Period and Place* (Cambridge University Press, Cambridge) pp. 233-243; J. Crush and C.M. Rogerson, 1983, New Wave Historiography and African Historical Geography, *Progress in Human Geography*, 7, pp. 203-231; D. Gregory, 1978, Rethinking Historical Geography, *Area*, 8, pp. 295-299.

much traditional Historical Geography. This work cannot begin with relict features of the landscape,[7] as most of the water-related features of the past terrain - such as springs and reticulation equipment - have been destroyed. It is possible in this instance, however, to move retrospectively from the present landscape back to the origins of the contemporary form.[8] With regard to Johannesburg's water supply, the metaphorical landscape of today is dominated by a public water board which controls all water provision. But a retrospective search reveals that the present landscape is quite different to that of the past, and that it was wrought through much hardship and opposition. A backward-looking stance is, therefore, a useful departure point. By identifying the processes operating within the Johannesburg landscape, this study combines elements of Historical Geography's diverse heritage in order to elucidate the influence of water supply in the town's first two decades. Moreover, it is hoped that this work may contribute to the "increased historical sensitisation of human geography"[9] by disclosing the relevance of the issue of water supply to the study of the evolution of urban places.

This dissertation will consider the evolution of water provision in Johannesburg, beginning, in the first chapter, with a discussion of the first protagonists - both individual vendors and private water companies - who came to establish and control the supply of water, and the ensuing conflict between the consumers and the purveyors of this supply. The significance of local- and national-state influence upon the welfare of the incipient gold-town will be reviewed. Interwoven with the discussion

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7 H.C. Prince, 1969, Relict Landscapes, *Area*, 1, pp. 29-31.

8 As Sauer (1941, *op. cit.*) may have traced the origin of an indigenous American grain to the culture of its cultivators centuries before, one may seek out the roots of an element of today's landscape.

9 R.A. Butlin, Theory and Methodology in Historical Geography, in M. Pacione, ed., 1987, *Historical Geography: Progress and Prospect* (Croom Helm, Beckenham) p. 16.

of the struggles for control, the impact of the quality of water provision on the community's health and industry will be considered.

The key-note of the second chapter is the shaping of bureaucratic involvement with the water supply question whereby a number of inquiries concerning the water supply and related health situation in Johannesburg are launched. It will be demonstrated that the local authority in Johannesburg was in a contradictory position, at once being responsible for the health of the community and yet operating in a position of relative powerlessness as a mere instrument of Volksraad policy. Furthermore the position of local capitalists, including water company directorates, will be examined in order to evaluate the conflict of interest implicit in their role as both profiteer and consumer of the water utility. The initiatives towards improving the water supply will be shown to have been temporarily neglected as forces gather for the beginning of the *Tweede Vryheidsoorlog*.

In the concluding chapter the outcome of the inability of the private sector to adjust to the demands of the townspeople and local government for a more efficient supply is reviewed as the victorious British colonial government responds by expropriating the private Companies. This action, and other aspects in the evolution of the Johannesburg water supply system, are demonstrated to reflect a trend in the development of water provision in other urbanizing communities. Thus a complete reversal of control will be depicted from the earliest days of makeshift and independent water provision to a new bureaucratic order with a unitary supplier of water in the form of the - still existing - Rand Water Board. Two Commissions which were initiated by the colonial government will be considered because they reveal the dire effects of the insufficient water supply in Johannesburg, especially in the poorer areas. The findings of these inquiries will be shown to reinforce the theme of the relevance of water supply to the question of health in the growing settlement. Moreover, it will be shown that, whilst the control of water provision

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had initially appeared as an attractive means of generating wealth for both the state and individual water companies, this strategy eventually led to dissatisfaction among both parties and the entire Johannesburg public. Finally, the effectiveness of the new dispensation of water provision will be evaluated in the light of those contingencies of supply encountered by the former retailers of water

CHAPTER TWO

THE EMERGENCE OF PRIVATE WATER RETAILING IN JOHANNESBURG

Water, in plenty and in dearth, played a fundamental part in the evolution of Johannesburg. Originally, settlements of indigenous people in the area were sustained by the streams and springs flowing from the Reef.[1] The Boers who laid out the first farms in the area named the district and their lands in celebration of the abundant clear water they found - hence farms such as Doorn*fontein*, Wonder*fontein*, and Braam*fontein* within the *Witwaters*rand region.[2] The presence of water was linked to the first discoveries of gold, the association between the two commodities was to persist after the exploratory phase of mining. H. Struben, a prominent figure amongst the earliest prospectors on the Reef, reported to Shepstone, the Governor of Natal, in 1876 that the Witwatersrand was a promising area where gold could be found in the streams flowing off the ridges.[3] The quest for gold precipitated a notable influx of people during the early 1880s.

Early Forms of Water Acquisition

Diggers from other mining centres such as Barberton and Kimberley began to move to the Reef and it was soon evident that the Witwatersrand area was another 'eureka'. The hopes of the first prospectors were rewarded with the proclamation of the gold fields in the Johannesburg area on 20

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1 S.A. Rochlin, 1956/7, Early Impressions of the Witwatersrand, *Africana Notes and News*, 12, pp.106-108; P. Maylam, 1986. *History of the African People of South Africa: from Early Iron-Age to the 1970s* (David Phillip, Cape Town).

2 Literally, "fountain" and "white waters".

3 H.W. Struben, 1920, *Recollections of Adventures* (Maskew Miller, Cape Town).

September 1886.[4] This was an ominous year, however, for the summer months were dry and water was in short supply for domestic and mining purposes. Water had become even "scarcer and more precious than gold"[5] and, reputedly, in the tough competition of mining life the one issue upon which there was consensus was the urgency of the water supply question. Nonetheless, the mining camps grew rapidly, initially comprising between two and three hundred prospectors in 1886 and increasing to a lively three thousand people in 1887.[6] In 1886 there was not a single stamp in the Johannesburg area, but by 1887 there were nearly five hundred. This development precipitated an enormous demand for water since each stamp required three hundred gallons of water per hour for the crushing process. Ground water sources had to be relied upon by the ore crushing stamps and by settlers. Even within this first year the struggle to find sufficient water took its toll on the community and life was difficult for miners, labourers, and householders alike.[7] The explosive pace of urbanization in Johannesburg had already left the evolution of public services such as water provision far behind.[8]

The diggers' camps were clustered beside the streams amongst the ridges and the beginnings of a water-oriented geographical configuration of the

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[4] Prospecting in the area had been prohibited by the state in order to avoid a large influx of foreigners. *South African Mines, Commercial and Industry*, 24 June 1903; Rochlin, *op. cit.*

[5] H.J. Filmer and C. Parry, 1958, *Reefs of Fortune* (Central News Agency, Johannesburg) p. 26.

[6] E.L. Gray, 1937, *Payable Gold* (Central News Agency, Johannesburg); Filmer and Parry, *op. cit.*

[7] E.P. Mathers, 1887, *The Goldfields Revisited, Being Further Glimpses of the Goldfields of South Africa* (Davis, Durban); E. Pritchard, 1889, *A Visit to South Africa, 1888* (Reprinted from Birmingham Daily Post); C. Jeppe, 1906, *The Kaleidoscopic Transvaal* (Chapman and Hall, London); *Star* (Special Historical Edition), 20 September 1926; B. Ronan, 1933, *Forty South African Years* (Heath Canton, London); Filmer and Parry, *op. cit.*

[8] The situation in Kimberley, directly after the discovery of diamonds in 1870, was markedly similar to that in Johannesburg (G. Beet, n.d., *The Grand Old Days of the Diamond Fields, Memories of Past Times with the Diggers of Diamondia* [Maskew Miller, Cape Town]).

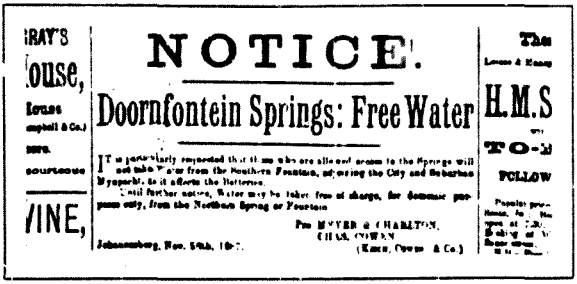
settlement were evident. The water from the Jukskei- and Natal-*spruit*, the springs of Doornfontein and Braamfontein, and the *vleis* at what became known as Bertram's Township and Fordsburg was relied upon by other groups of diggers. The prospectors collected rain and stream water in butts and tanks for their domestic use. But the scarcity of water necessitated the erection both of their dwellings and of the rock processing batteries beside the streams and springs. The ore was carted some distance from the digging sites to batteries for processing.[9]

The vital and limited water sources became progressively polluted by the ever increasing multitude of settlers and by the mining operations. In the crushing of the ore, many gallons of water were muddied and simply returned to the streams. At the outset of mining operations, the position of industry with regard to the water supply was contradictory: the mines and the other industries that began to appear on the Rand required clean soft water for their operations, yet they were also primarily responsible for the contamination of the local water sources. Competition intensified; there was rivalry among the miners and between domestic and industrial demands for water. In some cases miners' zeal went to the extent of damming and fencing off sections of the streams for their own use, and, furthermore, they charged for the drawing of water for domestic purposes. In the same vein a notice appeared in the local newspaper, in the summer of 1887, designed to lure the village s inhabitants away from a spring which was of strategic value for a local ore processing battery.[10]

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[9] Literally "stream or small river" and "large pans".
Mathers, *op. cit.*; Pritchard, *op. cit.*; *Star*, *op. cit.*; Gray, *op. cit.*; L.E. Neame, 1961, *City Built on Gold* (Cape Times, Cape Town); J.R. Shorten, 1970, *The Johannesburg Saga* (J.R. Shorten, Johannesburg).

[10] *Standard and Diggers' News*, 21 May 1889; Jeppe, *op. cit.*; *Municipal Magazine*, February 1927; Gray, *op. cit.*
Refer Figure 1.


NOTICE.

Doornfontein Springs: Free Water

Figure 1. Competition between mining and domestic interests. Source: *Eastern Star*, 28 November 1887.

It became necessary to supplement water drawn from the streams, but expertise and equipment required to drill deep wells was rarely available in Johannesburg. Many people who were desperate for water simply dug holes just a few feet deep near their dwellings and these water sources began to decline. The wells were roughly made without any protective lining or sealant; consequently, pollution of water was a sinister threat as the population of Johannesburg increased. The seepage from sewerage, the brickyards, the cemetery, and overcrowded areas was a grave danger.[11]

Johannesburg had acquired some vestiges of civilization by late in 1887. A market was held regularly in the village square, a church and a school had been built, and the Stock Exchange was in operation. Along with these enlargements, water provision also developed. Various persons took to the business of traversing the rough streets and offering water

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[11] Mathers, *op. cit.*; *Standard and Transvaal Mining Chronicle*, 28 April 1888; Pritchard, *op. cit.*
Wells were typical components of embryonic water systems in urbanizing communities elsewhere in South Africa and in Victorian England and the New World. Moreover, the problem of contamination was ubiquitous, since there was no control over well-digging or pollution. Similarly it was usually the poor who continued to rely on wells after the rest of a town's populace had graduated to more sophisticated and hygienic methods of water acquisition (Beet, *op. cit.*; B.C. Tait, *circa* 1947, *Cape Cameos* [Stewart, Cape Town], C. Bridenbaugh, 1938, *Cities in the Wilderness* [Oxford University Press, London]; L. Numford, 1946, *The Culture of Cities* [Secker and Warburg, London]; A. Briggs, 1963, *Victorian Cities* [Odhams Press, London]).

for sale.[12] Local African people drew water from the wells and streams and, with buckets slung across their shoulders, walked through the scattered community selling water. The increase in size of the settlement exacerbated the difficulty of bringing water to dwelling places. As allocation of land came to be dictated by the mineral potential and by the proximity of water for milling the ore, the choice of land for dwellings was limited and the distances involved in obtaining domestic water supplies increased. It is not surprising that several early inhabitants related that vendors were a welcome, if expensive, addition to Johannesburg life.[13]

> It was a common sight to see niggers [*sic*] trailing water barrels, with a swivel at each end, through the streets.[14]

Although water vending was a simple enterprise, it represented the first stage in water trading in Johannesburg. The physical locality of the settlement ensured that water was a scarce commodity, the lucrative potential of which had been grasped by the vendors.

Water vending provided a livelihood for a number of individuals, filling a very important niche in the community. Little is known about these vendors except that which can be gleaned from the occasional mention in the autobiographies of pioneers, and from a few photographs. Water hawking, like well-digging, was a feature of many towns at the formative stage of the development of public services. The services of the water hawkers came to be augmented by that of horse drawn carting. Both these strategies were, however, eventually superseded by more sophisticated

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[12] *Eastern Star*, 2 November 1887.

[13] L. Phillips, 1924, *Some Reminiscences* (Hutchinson, London); Gray, *op. cit.*; L. Sowden, 1964, *Both Sides of the Mask, the World of Muriel Alexander* (Howard Timmins, Cape Town).
The price ranged from half-a-crown to sixpence per bucket depending on the availability of water and the distance which the vendor had to travel (A. J. Henochsberg, 1933, *An Old Stager's Memories* [Central News Agency, Johannesburg]; B.H. Hart, 1961, *When Hart was Young* [published by the author, n.p.]).

[14] T. Newbigging, 1900, *Personal Experiences in South Africa* (Chrystal, Manchester) p. 34.

methods of sale, although water carting was resumed in later years by recognized water supply companies in order to supplement their water reticulation system in times of drought.[15]

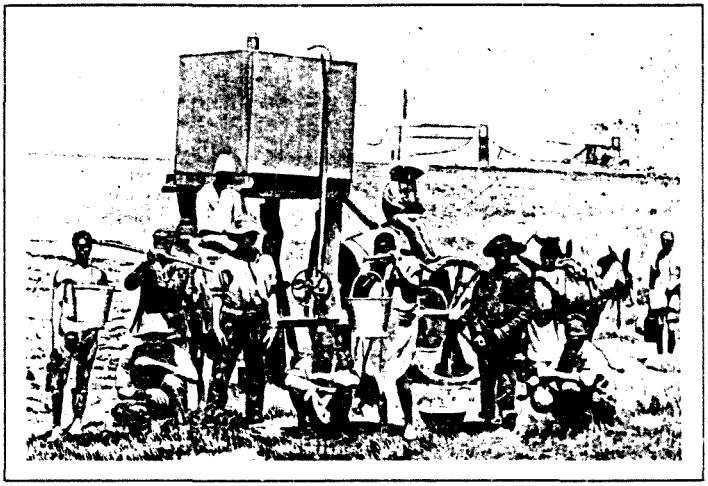


Figure 2. Vendors and labourers drawing water.
Source: Johannesburg Public Library, Photographic Collection (628.1 Water Supply).

Even in this early period when settlement was relatively sparse, most of the available water was impure and even muddy. This lack of wholesome water was not surprising, however, as the water sources were thoroughly communal: they were utilized for people, ore stamps, as drinking places for live-stock, and as a playground for ducks. For those who were fortunate enough to live near a spring, small quantities of water could

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[15] Beet, *op. cit.*; Newbigging, *op. cit.*; Bridenbaugh, *op. cit.*; Briggs, *op. cit.*; P.M. Hohenberg and L. Lees, 1985, *The Making of Urban Europe, 1000-1950* (Harvard University Press, Cambridge); T. Pakenheim, The Boer War, in D.J. Ricci, ed., 1986, *Reef of Time* (AD. Donker, Johannesburg) pp. 55-56.

be rolled home in a barrel. Baths were a fantastic luxury throughout Johannesburg; those who could not afford soda water for this purpose sneaked out under cover of darkness to secure an extra barrel of water. Housewives were constantly told to use water sparingly, and this added to the many hardships in the primitive settlement.[16] The position of the darker-skinned inhabitants, on the fringe of urban development, was even more precarious.[17]

The Formalization of Water Provision

As mining camps coalesced to form the town of Johannesburg, it became obvious that a coherent system of water provision was necessary. The situation was addressed on two fronts: as a business proposition by a group of wealthy Johannesburgers, and as a community problem by the Diggers' Committee which had been formed[18] in order to regulate the miners' activities.

In the first months after the proclamation of the Johannesburg Gold Fields, the Diggers' Committee was the only civic authority. The body operated under the authority of the central Volksraad in Pretoria, and the members' task was to ratify diggers' claims and water rights, and settle any disputes. The Committee members began to liase with Kruger, towards the end of the President's first term of office in 1887, regarding the needs of the Johannesburg community, including the increasingly serious water situation.[19] The Volksraad had little experience in dealing

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[16] Mathers, *op. cit.*; Sowden, *op. cit.*; *Star, op. cit*

[17] T.R.H. Davenport, 1971, *The Beginnings of Urban Segregation in South Africa*, Institute of Social and Economic Research, Rhodes University, Occasional Paper no. 15 (Rhodes University Press, Grahamstown); Kagan, *op. cit.*; Parnell, *op. cit.*

[18] In accordance with the Gold Law of the Republic (M.S. Appelgryn, 1985, *Johannesburg 1886-1889, Onstaan en Eerste Bestuurreelings* [Universiteit van Suid-Afrika, Pretoria]).

[19] *Standard and Transvaal Mining Chronicle*, 25 April 1888; *Standard and Diggers' News*, 21 May 1889; Gray, *op. cit.*; Filmer and Parry, *op.*

with such problems, however, and although Kruger was reasonably sympathetic, he had small means at his disposal to improve the situation. The Volksraad responded by purchasing five hundred acres of land on the farm Braamfontein as a commonage for Johannesburg. The single spring on the land was then cleared by order of the Landdrost and the water was made available to the community. But the yield of the spring was weak and it provided an insufficient increment to the water resources of the community.[20] This spring was all the state offered and it became evident that, by default, public services would have to be brought to Johannesburg by other means.

Simultaneous with official efforts to improve the water situation in Johannesburg, a group of businessmen had become involved in initiating a water supply system. They began their work independently, without any sanction from the Volksraad; indeed, they formed an unregistered syndicate.[21] The group comprised prominent White individuals such as A. Mosely, T.Y. Sherwell, D.M. Burton, S.B. Height, and C. Jeppe. The Syndicate received its overall direction from the mining magnates Rhodes and Rudd in Kimberley, and it appears to have been purposefully established in order to pave the way for a larger concern. The creation of the Syndicate demonstrates that, from their inception, waterworks were viewed as a profitable enterprise especially useful in association with mining endeavours. Soon after the formation of the group, negotiations

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cit.; S. Marks and S. Trapido, 1979, Lord Milner and the South African State, *History Workshop*, 8, pp. 50-80; Appelgryn, *op. cit.*

[20] *Eastern Star*, 14 November 1887; Mathers, *op. cit.* Refer Figure 3

[21] The documentation of the existence and activities of this Syndicate is significant because other accounts of Johannesburg's history credit the instigation of a water supply system to the Company which superseded the Syndicate, rather than the Syndicate itself (R. Symonds, 1953, *The Johannesburg Story* [Frederick Miller, London]; Neame, *op. cit.*; A.A. Telford, 1969, *Johannesburg, Some Sketches of the Golden Metropolis* [Books of Africa, Cape Town]; R.J. Laburn, 1970, *A Historical Review of the Water Supply of the Witwatersrand* [Johannesburg Historical Society/Rand Water Board, Johannesburg]; Shorten, *op. cit.*).

began with Rhodes and Rudd for the floating of a formal company which would take over all the stocks and operations of the Syndicate. At this initial stage in the development of a formal water supply system for Johannesburg, there was a contest between public and private interests. Because the private concern occupied a more commanding financial and managerial position than the still embryonic Volksraad, the private initiative succeeded at this stage. But these early public-orientated manoeuvres had nonetheless taken root and proved to be a continual thorn in the flesh of private enterprise.

The Syndicate began its activities by making roads, and purchasing and leasing stands in Doornfontein. During the course of 1887 the building of a reservoir was begun, and the water-pipes which would be required for a reticulation system were ordered. The rights to a water source situated on a part of the farm Doornfontein were acquired on lease. The agreement allowed the group to sell water, or the right to its use, to various townsfolk and tradespeople in the immediate area.[22]

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[22] Rand Water Board Archives, Johannesburg (RWB) Unsorted Collection, Syndicate Minutes, 18 August 1887.
Refer Figure 3.

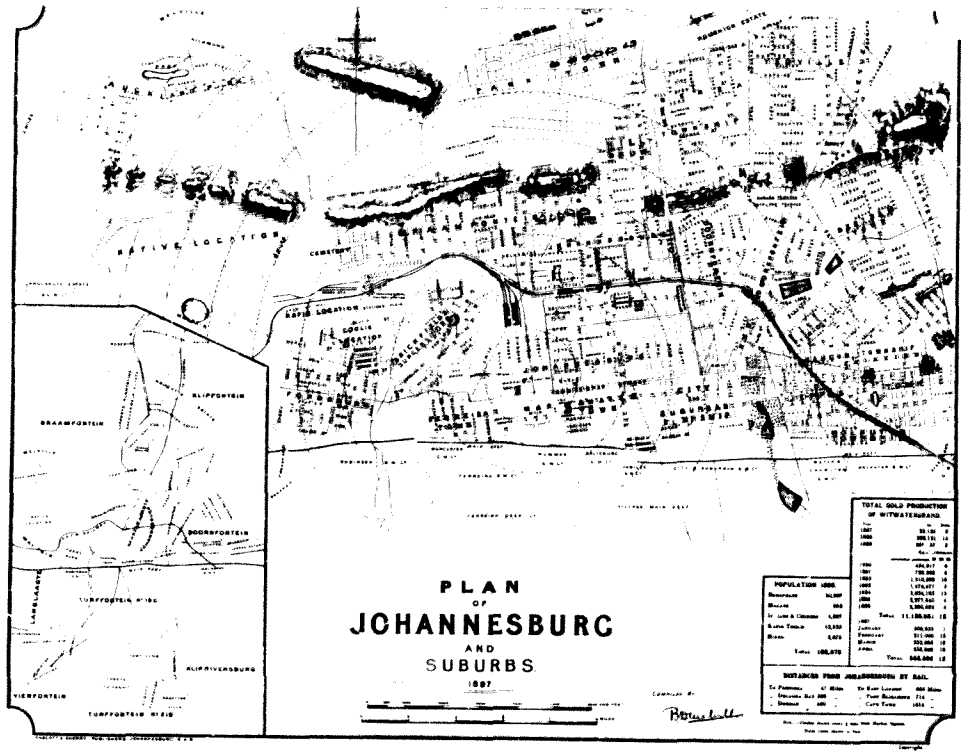


Figure 3. Johannesburg and environs in 1897.

Source: Africana Library, University of the Witwatersrand.

amidst negotiations and the beginnings of construction work, the Syndicate endeavoured to elicit permission from the Volksraad for the laying of water-pipes in Johannesburg.[23] It soon became clear that the Volksraad was not willing to grant such permission to an unregistered concern. Consequently, the Syndicate resolved to reapply as an independent group of individuals. In the interim an attempt was made to float the take-over Company in Kimberley in July 1887. Response to the launch was dismal. Subsequently, the Volksraad acquiesced to the Syndicate's modified application, and it notified the entrepreneurs of the conditions of its acceptance. The directors were disconsolate, however, because of the abortive flotation of the Company, which had deflated local interest in the venture. Fortunately an offer appeared from a Cape Town financier, James Sivewright, who was willing to try floating the Company again in Johannesburg.[24] With Sivewright's support the Syndicate brought all its influence to bear upon the Volksraad, including a personal missive to the Vice-President urging the hastening of the concession.

Sivewright was, in the event, one of three petitioners who went before the Volksraad in pursuit of the potentially lucrative concession to lay pipes in Johannesburg. Sivewright had requested a monopoly right, but the Volksraad refused this aspect of his petition. Despite this set-back the Syndicate's lobbying bore fruit and Sivewright emerged triumphant. On 8 December 1887 he was awarded a concession to lay pipes through Johannesburg. Presumably the other petitioners were unaware of the negotiations which had taken place between the Syndicate's directors and the Volksraad; the Johannesburg public was certainly oblivious. It is

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[23] Permission for the provision of such public services had to be obtained from the state; it was usually granted in the form of a "concession", which bound the holder to fulfil certain conditions. Refer to Sivewright concession in Appendix 1.

[24] RWB Unsorted Collection, Syndicate Minutes, 15 September 1887. Sivewright was a prominent colonial figure who served as Commissioner of Crown Lands and was subsequently knighted (R. Lewinsohn, 1937, *Barney Barnato* [George Routledge and Sons, London]).

not known on what basis the choice of concessionaire was made, but there was some suggestion in the local press of collusion between the Volksraad and Sivewright.[25]

The concession which was granted to Sivewright in December 1887 stipulated that no monopoly was granted, but it did not stipulate that water had to be supplied: it was essentially a concession for the laying of pipes. The maximum tariff which could be charged by the new Company for water was fixed at four shillings per one hundred gallons[26] and it was stipulated that whatever water was supplied had to be "pure and fit for use."[27] Significantly, however, the Volksraad explicitly refused to guarantee the public the right to any water which the Company might supply.[28] The concession was, therefore, based upon good faith with regard to how much water was to be supplied because there was no stipulation as to the minimum quantity of water which had to be provided.

The Volksraad arranged concessions in private, thereby minimising public participation in the creation of services. In the Sivewright case, the Volksraad had concluded most of its negotiations over the conditions of the concession in September of 1887. The question of whether or not to grant a monopoly to Sivewright was the one point open for discussion. Two public meetings were held in Johannesburg for the purpose of gauging local opinion. The Mining Commissioner, as representative of the state, chaired the first meeting, and announced that a vote was to be taken on the granting of an exclusive right to a particular company to bring water to the town.[29] But those White townsfolk who assembled were not willing

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[25] *Eastern Star*, 31 October, 2 November 1887; *Standard and Diggers' News*, 3 March, 12 September 1890; Pritchard, *op. cit.*

[26] Refer to Sivewright concession, Article 9, Appendix 1.

[27] *Ibid.*, Article 6.

[28] *Ibid.*, Article 17.

[29] *Eastern Star*, 31 October, 2 November 1887.

simply to vote on this matter without a general discussion. Many of those present were indignant at the suggestion that a service as vital as water supply could be entrusted to a single concern. Furthermore, a monopoly had been applied for, which rendered Sivewright's approach suspicious. When the people expressed their reservations concerning the Sivewright proposal, presumably they were aware of the situation in Kimberley and Pretoria where a water company had a monopoly in each case. In Pretoria, where water was plentiful, the townspeople's needs were satisfied; in Kimberley, where water was scarce, the supply was dirty and poor: in each case the public was at the mercy of a private company.[30]

The consensus of both meetings was against a monopoly and the Mining Commissioner accepted this verdict. It was finally conceded by the officials that a monopoly was not approved by the Johannesburg people who were present. Significantly, however, the townspeople's opinion on various other matters was not considered. Numerous issues were raised at the meetings, including the maximum tariff rating, the question of a guarantee of supply, the gratuitous supply of water to government institutions, and the possibility of rival companies ensuring a competitive supply. Objections concerning the whole gamut of private control of the town's water supply system were dismissed, ostensibly because of the urgency of the situation; apparently there would be time enough for clarifying the so-called details of the scheme once the concession had been granted. Those assembled were advised not to be concerned, however, for although Sivewright had asked for a concession only to lay pipes rather than specifically for the right to *supply* water, it was unlikely that any company would lay water piping unless it had water with which to supply the town. Much ill-feeling was engendered through the officials' manoeuvring of the meetings; murmurs arose that

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[30] *Standard and Diggers' News*, 11 April 1899.

water provision ought to be in the hands of a corporate or municipal body.[31]

These meetings in 1887 were small but portentous incidents in Johannesburg's history. The townsfolk were left with the vague hope that other water companies would evolve in the town and that the ensuing competition would ensure a reasonable supply. Yet the irony of the reservations expressed by the Johannesburg people became all too clear in the next decade. Furthermore the suggestion that the water supply should be under the jurisdiction of public authorities had taken root and was to be the counterpoint to the private control of water in Johannesburg during the 1890s.

After the concession was granted to Sivewright, the Syndicate busied itself with transferring its property to the new waterworks Company, which was to be called the Johannesburg Waterworks Estate and Exploration Company (JWEEC). At the close of its dealings it appears as though the Syndicate was a financial success: £1,200 was distributed amongst shareholders in May 1888 and a further £1,418 was made available when the Syndicate finally concluded its business and went into voluntary liquidation in March 1889.[32] The flag of business enterprise, which had been fashioned by the former syndicate, was grasped and borne aloft by Sivewright. Early in 1888, on the foundation which the Syndicate had secured, the JWEEC was successfully launched. The equipment and the water rights were taken over by the new Company. More significantly, the *precedent* of the private appropriation and control of the water supply system in Johannesburg was assumed by the JWEEC.

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[31] Mathers, *op. cit.*; *Eastern Star*, 31 October, 2 November 1887; *Standard and Transvaal Mining Chronicle*, 21 January 1888.

[32] RWB Unsorted Collection, Syndicate Minutes, 3 March 1889.

The concession was a familiar device for the provision of public services in the Transvaal, although Sivewright's was the first such agreement pertaining to the township of Johannesburg.[33] Two similar water supply concessions were subsequently granted, but neither of the two was immediately productive. Firstly, a few months after Sivewright's success, another water concession was drawn up between a land owner, L.G. Vorstman, and the Volksraad on 18 October 1888. This enabled Vorstman to divert water from a point on the Klip River ten miles from Johannesburg, with the object of supplying the town. This agreement was similar to the Sivewright concession in that the owner was obliged to form a water supply company within a fixed period. Accordingly, the Klipriver and Johannesburg Waterworks Syndicate (KJWS) was established in order to exploit the concessional rights, but this did not occur within the time period stipulated in the agreement and Vorstman effectively allowed the concession to lapse. Nonetheless, the KJWS did investigate the possibility of supplying Johannesburg's industrial water requirements from the Klip River and the streams on the Vierfontein farm.[34] These investigations were important in that they reflect the development of a perception that industrial and domestic demand for water warranted the formation of separate companies. Whilst the rights were never appropriated by this group, their lapsed concession subsequently formed the basis of another water company, the Vierfontein Syndicate (VS). This Syndicate took up the notion of a separate supply for industrial purposes and assumed a significant role in water provision for the mines in Johannesburg. Another concession was granted to the owner of the farm Wonderfontein, B. A. Kloppers, on 17 June 1891.[35] This gave Kloppers the

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[33] The township was the central area of the settlement and did not include fringe suburbs such as Parktown or Westcliff (*Municipal Magazine*, September 1917). Refer Figure 3.

[34] Johannesburg Archives, Strange Collection, Johannesburg Public Library (JAH) Box 318, London Directors to KJWS, 9 March 1899; Pritchard, *op. cit.*; RWB Unsorted Collection, "RWB Arbitration: Vierfontein Syndicate Limited", Title Deeds.

[35] *Municipal Magazine*, February 1927.

right to channel water from his farm to Johannesburg for the town's supply. This concession was subsequently bought and appropriated by G.H. Goch, and, although no work was done on the site, it became a concern which was greatly favoured by the Town Council in the subsequent decade.

The creation of Sivewright's concession followed a pattern typical of such procedures in the Transvaal. Some years later, a British investigation concerning all the concessions granted by the Volksraad before 1899 disclosed that the concessions did not serve the interests of the public for whom they were designed. Rather, they promoted the interests of the Volksraad and the concessionaires. The concessionaires won the right to supply a scarce resource; and, as bureaucratic apparati, concessions demanded a very meagre outlay of expertise or finance on the part of the Volksraad, and were consequently useful tools in the state's infancy.[16] Furthermore, each concession entailed a substantial fee for the Volksraad and thereby ensured that the treasury of the South African Republic could benefit from the growing wealth of the Reef. Irrespective of the benefits accruing to the Volksraad, however, the indiscriminate granting of concessions later proved to be a counterproductive means of providing public services. Ironically, Kruger created an opportunity for bureaucratic corruption within the Volksraad rather than the basis for economic independence which he had intended.[17]

The prejudicial nature of concessions exacerbated polarization in the Republic: the Volksraad in Pretoria viewed the activities of the Uitlanders on the ridge with the utmost suspicion because the sudden influx of so many foreigners seeking gold threatened the peace and sovereignty of the rurally-orientated Afrikaners. It is not surprising

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[16] Neame, *op. cit.*; R. Crisp, 1964, *The Outlanders. The Story of the Men Who Made Johannesburg* (Mayflower Books, St Albans).

[17] *Standard and Diggers' News*, 11 April 1889; T.R.H. Davenport, 1978, *South Africa: A Modern History* (Macmillan, Johannesburg); Marks and Trapido, *op. cit.*

then that concessions appear to have been widely regarded by the ordinary diggers and settlers as part of the Volksraad's exploitative armoury, which included severe taxation and the denial of the vote. The animosity of Kruger's Volksraad towards the Uitlanders grew with Johannesburg itself and directly encumbered the productive efforts of the mining settlement.[38]

The lack of self-government in Johannesburg was a dominant theme in the first years of the settlement The Diggers' Committee persistently struggled to fulfil its responsibilities, including the provision of water. The issue of sanitation, which impinged substantially on that of water supply, was the subject of many urgent appeals to the Volksraad. A set of Amended Health Regulations for Johannesburg was published in the Government Gazette on 6 June 1888 which provided for the long-awaited election of a Sanitary Committee.[39] Although this was undoubtedly a positive step on the Volksraad's part, the jurisdiction of the Committee was very limited owing to its meagre budget and limited authority. The diggers' camps had grown to the extent that people wanted Johannesburg to be declared a town, for thereby some autonomy could be gained from Pretoria to manage local affairs effectively. In the meantime, the Sanitary Committee dealt as best it could with disease, fires, rubbish removal, water supply, and sanitation in Johannesburg. Many of the Committee's tasks were reliant on a plentiful water supply and the Committee became an outspoken critic of the JWEEC when the services of the Company were found to be unsatisfactory.[40] But this was the limit of the Sanitary Committee's influence, for the water provision system was

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[38] *Standard and Diggers' News*, 11 April 1889; Mathers, *op. cit.*; Johannesburg Public Library (JPL) Strange Collection, D. Draper, 1923, History of the Johannesburg Water Supply; Filmer and Parry, *op. cit.*; Rochlin, *op. cit.*; Davenport, 1978, *op. cit.*

[39] *Standard and Diggers News*, 21 May 1889; Gray, *op. cit.*; Filmer and Parry, *op. cit.*; Appelgryn, *op. cit.*

[40] *Standard and Diggers' News*, 18 April, 28, 30 May, 22 June, 3 August, 3 September, 3 October 1889, 17, 18, 20 January, 27 February, 3 March 1890; *Eastern Star*, 16, 18, 20 January 1890.

the legal domain only of the concessionaires, and the Sanitary Committee could not institute its own schemes.

Creation of Water Retailing Companies

Sivewright initiated the JWEEC on the foundations of the unregistered Syndicate. The firm was floated as a public company with a capital fund of £150,000; shares were sold at £1 a piece and soon began to appreciate.[41] Offices were established in London and Johannesburg in order to serve local and foreign shareholders. Sivewright took the position of chairman. The first directors of the Company were men who became part of the illustrious history of Johannesburg; they were prominent businessmen such as B. Barnato, O. Staib, and W. Mitchell, many of the whom had established their fortune and reputation in the Kimberley Diamond Fields. Consequently, these men continued the close association between the JWEEC and mining interests which had begun with the founding influence of Rhodes and Rudd and culminated in the involvement of the Johannesburg Consolidated Investment group.[42]

The task of establishing the water reticulation system began in May 1888 with a little less speed than the preliminary negotiations. The JWEEC began its operations by acquiring waterworks equipment. Machinery and stock were taken over from the Syndicate's workings, and it was also necessary to order some materials from England as only second-hand piping was available locally. The problems inherent in the contemporary transport system acted as a significant delaying factor for the JWEEC and all other businesses in Johannesburg which had to import materials and fittings from England. Goods had to be railed and carted from the coast

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[41] RWB Unsorted Collection, "JWEEC Ltd. Claimants, RWB Respondents", JWEEC Balance Sheet 1889; Report of Transvaal Concessions Commission, Johannesburg and Zuurbekom Water Supply, Article 3, p. 124, 1901.

[42] *Standard and Diggers' News*, 12 September 1889; RWB, 1967, *Sixty Years of Meeting a Demand*, Mercury Printing Works, Johannesburg; Laburn, *op. cit.*; A. Smith, 1971, *Johannesburg Street Names* (Juta, Cape Town).

by ox-wagon as there was no railway from the Transvaal border to Johannesburg. Work began on a service reservoir and continued on the storage reservoir begun by the Syndicate. Water mains and leadings were gradually installed, carrying water from the springs in Doornfontein. The first private house was connected to the water mains on 23 June 1888. The foundation stone of the service reservoir was laid by Mrs von Brandis, the wife of the Mining Commissioner, with much ceremony in September 1888 - although there was apparently deplorably little water to fill the reservoir.[43]

The forty-year lease of part of the farm Doornfontein, which had been obtained in September 1887 by the former Syndicate, was taken over by Sivewright shortly before his concession was finalized An area of more than 210 acres was secured, and all rights including those to the minerals and water were transferred. Interestingly, parts of the lease drawn up for Sivewright echoed those of his concession; both as concessionaire and lessee he was bound to form a company, namely the Johannesburg Waterworks Estate and Exploration Company, within four months Hence Sivewright was doubly bound to begin a waterworks. Both the Volksraad and Bezuidenhout as lessor were therefore certain of fruition of the scheme and the financial benefits which would accrue to them. The purchase of the lease with the water rights was, however, a costly affair which accounted for two thirds of the Company's initial £150,000 capital.[44]

The title to Doornfontein was a worthy weight upon the JWEEC's budget: over and above the real-estate value, the rights to the springs which became the Company's main water source in its first years of operation were included in the agreement. According to the report of the JWEEC's

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[43] *Standard and Transvaal Mining Chronicle*, 14 May 1888; RWB Unsorted Collection, Memorandum by Andrews, 1898; Jeppe, *op. cit.*; Draper, *op. cit.*; Gray, *op. cit.*; Crisp, *op. cit.*

[44] RWB Unsorted Collection, "JWEEC Ltd. Claimants, RWB Respondents", JWEEC Balance Sheet 1889; *Municipal Magazine*, February 1927; Gray, *op. cit.*

engineer, the springs produced 56 000 gallons of water per day at the close of the 1880s. Early in 1888 the Company set about work on Doornfontein by deepening the eye of the Natal Spruit in order to increase its yield, and clearing the decomposing debris which had accumulated from the farms and residential areas.[65]

In tandem with the development of waterworks, the JWEEC pursued its estate interests. A substantial income was generated by the sub-letting of land in Doornfontein. The availability of water in this suburb, along with the trees and roads, began to enhance the attractiveness of the area. Furthermore, by means of the lease of Doornfontein, the Company initiated a *de facto* monopoly over the area which it supplied. The monopoly was orchestrated through a clause in the sub-tenants' leases which forbade the sinking of wells on the properties.[66] This prohibition effectively forced the residents in the area to buy water from the JWEEC: they were dependent on the Company, in plenty and in drought. A similar contract was drawn up with the owners of Bertrams Township in 1889 whereby the Company received the dual benefit of the water from the Bertrams Vlei and the sole right to supply in the suburb. Before the turn of the century more than twelve similar documents had been drawn up between the Company and various property owners and developers. The substance of these agreements was that if the JWEEC contracted to supply a suburb with water, it would do so with the proviso that it would be the sole and exclusive supplier in the area. By 1892 the JWEEC had assumed control of water provision - by means of land ownership or supply contracts - in the major part of Johannesburg. Through this strategy, the JWEEC assembled the

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[65] *Standard and Transvaal Mining Chronicle*, 14 May 1888; Andrews, *op. cit.*
The water from these springs quickly became contaminated, but the JWEEC had to continue its lease of the area because the Sivewright concession's continuance was predicated upon the Company's lease of the area as per Article 2 of the agreement.

[66] RWB Unsorted Collection, "JWEEC Ltd. Claimants, RWB Respondents", JWEEC Balance Sheet 1889; Municipal Reference Library (MRL) Johannesburg, "Johannesburg Water Supply" Volume 1, Doornfontein Lease.

water supply monopoly which had been denied by the Volksraad within the Sivewright concession. Furthermore, a symbiotic relationship between property development and water retailing is apparent in the JWEEC's dealings with suburb owners. On the one hand, water provision was vital to suburban development, on the other, water supply contracts secured a market for the JWEEC. As with the Company's property at Doornfontein, the provision of water for any suburb was the key to attracting prospective residents. The alliance between the large-scale property owners and water purveyors was an alliance of moneyed interest.[47]

As the 1890s drew to a close, life in the Reef town became especially difficult. Dust storms, disease, and drought were rife. As the water shortage continued, vitriolic complaints were voiced concerning the Company's feeble efforts to meet the needs of the town. The quality of the little water that was supplied was dreadful: pollution was a persistent problem because the filth which accumulated in the burgeoning town found its way into the valleys and hollows whence the water was collected.[48] The engineer of the JWEEC later admitted that the water was unsatisfactory:

> indeed about the colour and thickness of coffee grounds: the inhabitants of Johannesburg dying on all sides through drinking the water supplied by that company, which water was drained off the surface of the streets of Johannesburg, yards of houses and the drainage from cowsheds and stables.[49]

Amidst the denigration of his company, Sivewright assured the public that the JWEEC was supplying 750 000 gallons of "wholesome" water daily. But

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[47] An incident occurred in 1891 which further testifies to the importance of property interests for the JWEEC. Work on a new reservoir was halted because of insufficient funds, yet at the same instant the Company was securing purchase options for land bordering Doornfontein, known as the Fox Reserve and The Plantation. The JWEEC's policy was designed to favour its real estate interest, at times, at the expense of its less profitable waterworks endeavours (RWB Unsorted Collection, Syndicate Minutes, 18 November, 11 December 1891).

[48] *Standard and Transvaal Mining Chronicle*, 28 April, 14 May 1888; *Standard and Diggers' News*, 22, 26 October 1889; Andrews, *op. cit.*

[49] Andrews, *op. cit.*, n.p.

the people of Johannesburg knew the falsity of these declarations all too intimately.[50]

The JWEEC's unpopularity echoed its financial ill-fortune. The fact of the Company's beleaguered reputation was addressed at the first annual meeting, held in September of 1889. Sivewright asserted that the Company had had "bogies held over their heads, to the effect that there was not sufficient water, and that what there was, was unfit for use."[51] The Company simply refused to acknowledge the inadequacy of its services, stating that it was not a "charitable institution"; rather its task was to make a profit for the shareholders. Despite the bravado of the chairman, however, the financial situation of the JWEEC was not very secure through the drought of 1889. The balance sheets reflected an overdraft of more than £20,000, and there was just £10 cash in hand. A great deal of capital was spent purchasing the Doornfontein rights, and in buying, transporting, and installing reticulation equipment. Notwithstanding these liabilities, the Company became progressively established in Johannesburg by making skilful use of all possible opportunities within and outside of the original concession.[52] The JWEEC had the upper hand because it was charging less than the stipulated maximum of four shillings per one hundred gallons of water supplied and was overall in a commanding position because the public could not legally compel the firm to supply any water at all.[53]

An important change in the financial position of the JWEEC occurred in 1892 when the majority share of the Company was taken over by B. Barnato's Johannesburg Consolidated Investment Company (JCI). Barnato

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[50] *Standard and Diggers' News*, 12 September 1889; *Municipal Magazine*, February 1927.

[51] *Standard and Diggers' News*, 12 September 1889.

[52] RWB Unsorted Collection, "JWEEC Ltd. Claimants, RWB Respondents", JWEEC Balance Sheet 1889; Draper, *op. cit.*

[53] Article 17, Sivewright concession, Appendix 1.

had been a prominent shareholder in the JWEEC for some time before he amalgamated his interests. The significance of this event was that the support of JCI strengthened the financial position of the water Company, and brought the JWEEC fully into the fold of mining capital.[54] This development was influential in confirming the JWEEC's approach to civic issues such as health. It would appear that the JWEEC, like private water companies in Britain in the nineteenth century, operated on a short-term profit maximizing policy in order to secure immediate returns for shareholders. Water was valued as a marketable commodity by the capitalist water companies.[55] In effect, therefore, community welfare was considered only when this did not interfere with the Company's interests. Furthermore, it may be postulated that water was reticulated in limited quantities not only because of a lack of sources but also in order to retain its value as a scarce commodity. Water was available for such services as fire-fighting where property had to be protected. Although public health and crucial long-term sanitary planning were inextricably linked to water provision, these matters were left to the authorities.

In addition to the JWEEC's appraisal of the value of water, the physical operation of the Company undermined its efficiency as a town supplier. Firstly, the efficacy of the JWEEC's supply was chiefly contingent upon the amount of rain which fell each year. The springs and streams which were drawn upon were neither prolific nor reliable because their yield varied according to the amount of surface runoff. Secondly, the brevity of the Transvaal rainy season necessitated that storage facilities had to be particularly good; but most of the JWEEC's reservoirs were not enclosed and this allowed a great deal of evaporation and contamination by the dusty Johannesburg air. The floors of the reservoirs were also so roughly made that they were quickly transformed to muddy

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[54] MRL, "Johannesburg Water Supply Volume 1", JWEEC Chairman's Annual Report, 1892.

[55] J.A. Hassan, 1985, The Growth and Impact of the British Water Industry, *Economic History Review*, 38, pp. 531-547.

bogs; thus, when the water level was low in the reservoirs, a liquid quagmire was borne through the pipes to the town. Thirdly, water was reticulated through narrow second-hand hot-water pipes which were hopelessly small. The drought of 1889 brought these problems to the fore with awesome clarity and the Johannesburg public would not to be pacified by inept excuses. Finally, locals gave up any confidence in the financial gods in the JWEEC offices and a Sunday in November 1889 was set aside as a day of prayer.[56] Providentially, a few days later rain fell and the JWEEC's precarious supply was restored.

The JWEEC ushered in the 1890s with the announcement that water would be supplied in Johannesburg for only three hours each day, ostensibly to curb water wastage. These measures worsened the water shortage, and further encumbered the industries and mines in the town. Work stoppages became a frequent occurrence. The chronic health situation of the town also suffered because of the shortage of water for drinking, cleansing, and sanitary purposes. The incidence of and death resulting from typhoid fever had increased alarmingly.[57] One member of the Sanitary Committee declared that the water supplied by the Company was dangerous to the community because it contained an "undue proportion of solid matter."[58] Other vituperative comments were evoked in the daily press as more and more people were stricken with disease. One letter specifically challenged the water company's engineer, who had been singing the praises of his company: "He knows perfectly well that if he quenched his thirst with it *unadulterated* for a fortnight, its *pureness* would soon gain for him six feet of evil on the hill."[59] A consummate description of the

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[56] *Standard and Diggers' News*, 5 November 1889; Andrews, *op. cit.*

[57] *Standard and Diggers' News*, 11, 20 January 1890.

[58] *Ibid.*, 10, 16, 17, 20, 24 January, 11, 20 February 1890.

[59] *Ibid.*, 16 January 1890.

[60] *Ibid.*, 21 January 1890.

Company as "the retailers of death" seemed to typify the public's opinion.[61] It was increasingly evident in Johannesburg that the corollaries of the JWEEC's control of water provision were shortages, pollution, and disease.

Fortunately, the year 1890 closed with good summer rains and the desperate water shortage was temporarily averted.[62] The JWEEC announced a tariff reduction, and, despite the losses incurred through the drought, infrastructural work was continued. Plans were drawn up for the building of a storage dam, the first twelve fire hydrants were installed in the town, and it was resolved to begin work on another service reservoir. The directorate issued a new set of shares and increased the capital of the Company by £125,000 in order to finance the new works. A profit of £6,000 was also declared at the end of the financial year.[63] The resilience of the JWEEC, based on its property assets and the near monopoly over water provision, enabled it to withstand the ravages of the drought.

The people of Johannesburg must have had the distinct notion of *déjà vu* in 1892. The poor rainfall once again led to inadequate supply. Many people, including the hospital authorities, sent complaints to the JWEEC because there was so little water available in the town - especially in the high-lying areas occupied by affluent townspeople. The Sanitary Committee sent an urgent letter to the JWEEC enquiring what steps had been taken to redress the scarcity of water. The directors' fatuous reply (which contained the first mention of the drought in that year's minutes)

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[61] *Ibid.*, 17 January 1890.

[62] *Ibid.*, 17 February 1891; RWB Unsorted Collection, JWEEC Minutes, 12 December 1890, 19 June 1891.

[63] RWB Unsorted Collection, JWEEC Minutes, 20 February, 3, 8 April, 26 June, 5 August 1891.

asserted that the Company was quite in control of the situation and there was no need for concern.[64]

Despite the JWEEC's apparent complacence concerning their reputation, the granting of two other water concessions early in the 1890s (to Kloppers and Vorstman) must have been a cause for concern because of the possibility of competition. Indeed, the JWEEC soon lost its opportunity for soliloquy on the Johannesburg stage.

The Braamfontein Water Company (BWC) was formed in 1892. It appears to have derived its name from the ownership of a small plot of land in Braamfontein. Notwithstanding this nomenclature, the Company was involved in developing suburbs to the west of town, namely Parktown, Westcliff, Forest Town, The Terrace, and Marienhof. Little is documented about the inception of this Company, or how and whether a concession was obtained to supply water in Johannesburg. It is known, however, that the BWC was a member of the Corner House mining group and that the Company was largely concerned with the development and supply of water to the 174 residential properties within its jurisdiction.[65] The Company supplied water at a low tariff in order to enhance the residential attractiveness of the suburbs.[66] This demonstrates once again the close link between property development and water provision

The water supply of the BWC, like that of the JWEEC, was based upon ground water supplies. The Company initially relied upon the yield from two pits in the Sans Souci area, but the water became polluted as adjacent settlement became more dense. The BWC's waterworks system was similar,

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[64] *Ibid.*, 15 July, 30 November, 30 December 1892.

[65] RWB File 19H, Mr Leitel's Report No. 2, 6 December 1904; RWB Unsorted Collection, "RWB Register of Title Deeds and Contracts". Refer Figure 3

[66] *Ibid.*, BWC Director's Report in Mr Pimm's Report No. 1, 5 December 1904.

in its simplicity, to that owned by the JWEEC. Water was pumped from the sources into two large water towers, and then led by gravitation to the individual houses. Some months after the BWC was registered, the Company began to augment its water resources with a supply purchased from the JWEEC. By the turn of the century, the BWC purchased half of its daily water requirements from the JWEEC.[67]

Irrespective of its real estate assets, the position of the BWC was not assured. The Company had to contend with problems similar to those which beset the JWEEC. As the population of the suburbs in the BWC's area increased, especially that of the catchment area in Parktown and Westcliff, the contamination of water sources became a severe problem. Besides the contamination of water sources, moreover, the deterioration of the piping in the reticulation system reduced the quality of supply within the first decade of the Company's existence.[68] Yet despite these problems the BWC extended its operations beyond Johannesburg to the west, and springs in Struben's Valley, Krugersdorp, and the Magaliesburg were utilized.[69]

A few months after the establishment of the BWC a third water company, the VS, was registered. In contradistinction to the JWEEC and the BWC, whose predilection was for domestic supply, the VS was specifically created in order to supply water to the mines in and around Johannesburg.

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[67] *Ibid.*, Dr Kynaston's Report No. 1, 6 November 1904; Mr Leidman's Report, 29 November 1904; *Municipal Magazine*, June 1921; RWB File 19B, Memorandum concerning Arbitration between RWB and BWC; Report on BWC by Dr F.H. Hartel, 6 December 1904; Hudson and Frames, Solicitors to Secretary, RWB, 2 December 1904; RWB File 19E, Secretary, BWC, to Secretary, RWB, 22 March 1905.

[68] RWB File 19H, Mr Gerrard's Report No. 1, 5 December 1904; Dr Pake's Report, 26 December 1904; Mr Leidman's Report, 29 November 1904; RWB File 19B, Memorandum concerning Arbitration between RWB and BWC; Report on BWC by Dr F.H. Hartel, 6 December 1904; RWB File 19A2, RWB Chief Engineer's Report to Finance and Executive Committee, No. 183.

[69] D. Stephenson, 1980, *The White Waters of the Witwatersrand* (University of the Witwatersrand Press, Johannesburg).

The history of this company is convoluted; its rights date back to the concession which was granted to L.G. Vorstman on 18 October 1888.

The original concession belonging to Vorstman was sold to a group of individuals who constituted the KJWS. This firm was directed by E. Lippert, a prominent mining figure - revealing the characteristically close relationship between private water companies and mining capital. The rights which the Syndicate acquired included the right to pump water from the farm Oliphantsvlei to supply Johannesburg and the Witwatersrand goldfields. The water intake was to be situated on the Klip River, twelve miles from Johannesburg. This was a relatively convenient locality as it was situated at an elevation of only one hundred feet below the level of the Market Square in Johannesburg, and although water would have to be pumped from its source up to the town, the difference in gradient was within the scope of the contemporary pumping equipment. The prospect of a more efficient water supply service was envisaged with the creation of the KJWS, but whilst it was noted in the daily press that the JWEEC was a "confessed failure" and that the KJWS was likely to supersede the ailing local supplier, there is no evidence that the plans for the new scheme were ever realized. In the meantime Vorstman had also allowed his concession to lapse, and thus the KJWS was only in possession of a concession which was in abeyance.[78]

Some years later the directors of the KJWS entered into a contract with the VS. As with other water supply ventures in Johannesburg, the VS comprised an assembly of personalities who were influential in the Johannesburg mining sphere. The agreement which the KJWS entered into

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[78] *Eastern Star*, 27 January 1890; RWB Unsorted Collection, "RWB Title Deeds", Vierfontein Syndicate Limited Title Deeds, Cession KJWS to Vierfontein Syndicate Limited.
The question of relative gradient was a significant one for all the water companies. Sources - such as the Doornfontein springs - which were situated at an elevation which allowed water to be led by gravitation were preferable. All pumping was done by coal power, which was a costly procedure.

bound itself to cede all its rights to the VS, in the event of the latter purchasing a portion of the Vierfontein farm which the KJWS did not possess. In return for this pledge, the VS assumed all the liabilities of the first syndicate in 1892. The VS, which was registered in 1893, was created because of the desperate water shortage which had plagued the local mining industry since its genesis.[71] It appears that it was a firm with an immense amount of potential, in terms of both capital and water resources, although it remained dormant for several years.

It was only in September 1897, at a time when there seemed little hope of an affordable and plentiful supply of water in Johannesburg, that the VS purchased the remaining portion of the Vierfontein farm. Thereafter the KJWS was obliged to sell its rights to the VS in terms of the earlier agreement.[72] Just prior to this transaction the VS had been registered as a limited liability company and was therefore known as the Vierfontein Syndicate Limited (VSL). Moreover, directly after the acquisition of the rights from the KJWS, the VSL ceded its rights to the Consolidated Gold Fields of South Africa (CGFSA), which further strengthened the capital base of the nascent Company. The involvement of the CGFSA is also indicative of the continued urgency of the need for a sufficient water supply for the mining industry.

The evolution of the VSL is complicated, but it bears testimony to the predicament of Witwatersrand mining. Prior to 1893 the mines improvised water supply systems, relying on the water which they could draw out of the mine shafts and from any water sources on mining land.[73] Contemporary ore crushing techniques necessitated the provision of a great deal of

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[71] RWB Unsorted Collection, "RWB Arbitration: Vierfontein Syndicate Limited", Title Deeds, Cession Vierfontein Syndicate Limited to Consolidated Gold Fields of South Africa; J. Fulton, 1985, Johannesburg's Early Water Supplies, unpublished paper, Johannesburg City Engineer's Library.

[72] RWB Unsorted Collection, "JWEEC Ltd. Claimants, RWB Respondents".

[73] Fulton, *op. cit.*

water (as was mentioned with reference to the earliest prospectors), hence it was not long before the mines outstripped water resources which were reasonably accessible. The notion of the VSL emanated from the mines themselves and the syndicate was designed to fulfil a chiefly industrial need, unlike the JWEEC and the BWC which were, in effect, addressing chiefly domestic and commercial needs. The establishment of a separate company for the mines' supply is evidence of both the obvious dearth of water in the region and the deepening polarity between competing water consumers - domestic and industrial. Although the JWEEC was no longer the sole water company operative in the Johannesburg area, it remained the largest and most dominant force in the water supply scenario.

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The advent of water retailing in the form of individual vending and large-scale capital investment water companies had a significant impact on Johannesburg. The impact was no more appreciable for the fulfilment of the required services as for the failure to supply water. All the suppliers of water, and therefore all the consumers, were hindered by a reliance on ground water sources - which were very limited - and by the inevitable contamination of those sources in a settlement with rustic sanitation. The local authorities were hamstrung by a lack of power and resources with which to fulfil their duty as guardians of health and community well-being. The Volksraad must be seen to have misused its power both through the limitation of the jurisdiction of local government and through neglect of the concessionaires who had been given control over scarce resources such as water. The latter provided an inept service in contravention of the original agreements, and the Sanitary Committee - whilst opposing this situation - was effectively excluded from improving on the water companys' service. It was evident that, whilst a water supply was desperately needed, the emergent supply system exacerbated many of the health and community administration problems inherent to the emergent town.

CHAPTER THREE

THE IMPACT OF BUREAUCRATIC INITIATIVE ON WATER SUPPLY

Private water companies continued to operate in Johannesburg during the eight years following the dry summer months of 1892. The populace and industry of Johannesburg expanded despite uncertainty over the longevity of the mines and water supply remained problematic. Yet these years are distinctive for they featured the stirring of the power of national and local government in the town. The growth of bureaucratic involvement in water supply did not evolve as distinct from the activities of the private companies, but as an element which intertwined with independent efforts in the pursuit of an acceptable water supply for Johannesburg. This particular era is demarcated by the upsurge of local government involvement in 1892, through the years of successive inquiries and investigations into potential water supply schemes, and the diminuendo of bureaucratic efforts with the outbreak of the *Tweede Vryheidsoorlog* in October 1899.[1]

The Sanitary Committee had taken over from the Diggers' Committee in 1887 and had begun to take an active role in the turmoil of the local water supply after receiving an extension in its powers from the Volksraad. Subsequently, in the latter half of 1892, the Sanitary Committee called for tenders for the development of water schemes for Johannesburg. This step signified the beginning of constructive official involvement in local water supply which differed from its former role as a lobbying body and public watch-dog. Although the Sanitary Committee was excluded from the right to provide water for the town by the Volksraad's concession policy, it began to seek alternatives to the inadequate service provided

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[1] Literally, "Second Freedom War".

by the existing companies. Whilst the water supply situation had been a matter of concern for local government since the days of the Diggers' Committee, 1892 heralded the Sanitary Committee's potentially *creative* involvement in water supply issues. This attempt to find alternative schemes was the first of many forays in this direction before the turn of the century. During the period between 1892 and 1900 the Sanitary Committee, in liaison with central government, utilised its available power to find better water sources and schemes by means of several inquiries and commissions regarding potential water vending concerns. These attempts bore little fruit with respect to actually improving the water supply system, but they did provide a greater understanding of the particular nature of local water supply problems and possible solutions. Moreover, irrespective of the tangible benefits of these ventures, they were prominent features in this stage of Johannesburg's evolution, especially as a measure of the town's growth towards municipalization.[2]

The Evolution of Local Government

The Diggers' Committee, as mentioned earlier, had been established in 1886 in Johannesburg in accordance with the Gold Law. Five of the eight Committee members were elected; the remaining three were appointed by the Volksraad. The group's function was to advise the Mining Commissioner in token of local representation. Not surprisingly, the inadequacy of this form of administration and representation was soon felt, and after the proclamation of Johannesburg and the subsequent deluge of diggers, the Mining Commissioner petitioned the Volksraad to allow Johannesburg to become a Municipality. His request was refused, initially, but later he was empowered to form a Sanitary Committee (otherwise known as the Sanitary Board). The Committee was given a stipend for its operations by the Volksraad, but the funds proved to be inadequate. Shortly

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[2] Transvaal Archives, Pretoria (TAD) SS 4371 (R 14284/93), Cuttings Volume, p. 137, Newspaper Report, 29 September 1893; *Municipal Magazine*, May 1921; J.P.R. Maud, 1938, *City Government: The Johannesburg Experiment* (Clarendon Press, Oxford).

hereafter the members' dissatisfaction concerning their lack of autonomy prompted the whole *corps* to resign in 1889: they were - in their own estimation - merely local agents of the Volksraad. The situation was remedied in the following year when a new constitution for Johannesburg was drawn up by the Volksraad. The renovations involved in this new dispensation gave the White male land-owning members of the Johannesburg public the right to elect twelve out of fifteen Sanitary Committee members, and also the right to elect a chairman. Six wards were delineated in Johannesburg, each with two representatives. The most significant innovation was, however, that the Committee was empowered to borrow money and levy taxes, albeit with the consent of the Executive Council of the Transvaal and the White ratepayers of Johannesburg. The monies from stand licenses, pound fees, and market dues were also made available for inclusion in the local coffers.[3] The Committee's work was further enhanced by the full-time services of the Government Commissioner, who had previously been responsible for several districts besides Joh Ironically, however, the Commissioner embodied the Volksraad er the Committee, for he was obliged to seek the state's appro every venture of more than twelve months duration or which involved an expenditure exceeding £150.[4]

In the light of these restrictions it is evident that the Sanitary Committee, like the Diggers' Committee, could be only superficially involved in the issue of water supply. The responsibility for civic affairs was vested in the Volksraad which in turn delegated control over utilities such as water, gas, tramways, and electricity to certain private concerns. This procedure actively excluded the Sanitary Committee from involvement in the provision of these important services.[5] The Sivewright

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[3] JAH Box 316, Volksraad Resolution, Section 1.820, 22 September 1894.

[4] Gray, *op. cit.*; Maud, *op. cit.*; Appelgryn, *op. cit.*

[5] Initially the Volksraad's policy of delegating responsibility for civic services was justifiably attributable to a lack of funds, but, as Maud (*op. cit.*, p. 17) points out, state revenue had increased from £218,000 in 1886 to one-and-a-half million pounds by 1889 from the

concession, for example, was a contract drawn up between a private financier and central government. The Sanitary Committee had no authority over the execution of its clauses and the Sanitary Committee could not orchestrate an independent water supply system of its own. As in other primitive settlements, however, the quality of the water supply was perhaps the most significant factor influencing public health. The Committee was effectively obliged to accept the abominable supply of the *Johannesburg Waterworks Estate and Exploration Company* (JWEEC). In addition to observing the Volksraad's hegemony, the Sanitary Committee had to share its influence with the Chamber of Mines. The latter was responsible for all health and sanitary arrangements on proclaimed mining land, of which there was a great deal in and around Johannesburg.[6]

The question of the servile status of the Sanitary Committee was of particular importance with regard to the problem of the provision of water in Johannesburg. Despite the fact that the Sanitary Committee had no control over the supply of water, several of its duties required the use of water. Various amenities such as public drinking fountains and latrines, as well as the fire-fighting, cemetery-watering, and street-watering services had to be provided.[7] Water for these services was obtained - when available - from the JWEEC. In addition, the Committee also endeavoured to monitor the health situation in the town. A report from the Medical Officer of Health provided something of a cameo of Johannesburg, indicating the plight of the many people who could not afford the luxury of reticulated water:

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gold earnings without a corresponding increase in provision of public services.

6 *Standard and Diggers' News*, 20 January 1890; Gray, *op. cit.*; Maud, *op. cit.*

7 *Standard and Diggers' News*, 30 May, 19 August 1889, 23 September 1892, 27 September 1895; JAH Box 200, Report of the Chief Officer, Fire Department, 1893.

> A large number of persons obtain their whole water supply from wells, from several analyses which I have made, I find that in every case the wells (some of which are in the better portions of the town) were badly contaminated ... and totally unfit for drinking or household purposes. *Unfortunately there is no regulation existing* by which I can stop the use of these wells beyond warning the users of them the dangers they are running.... in one case in particular where the well is especially badly contaminated, the residents though well aware of it refused to discontinue its use with the result that typhoid broke out. So soon as the public realise the dangers of contaminated water from polluted wells or butts, so soon will typhoid practically die out.*

This comment bears testimony to the wan ineffectualness of the local authorities in contending with the magnitude of the health problems associated with water consumption. It was the poor of all races in Johannesburg who were in a pitiful situation with no alternative but to glean water from their self-made wells. These people had no representation in local government, but they were most in need of the Sanitary Committee's assistance with respect to water acquisition and prevention of disease.

The obstinate reluctance of the Volksraad to give more control over civic affairs to the Johannesburg Sanitary Committee must be appreciated in the context of contemporary local government in the Transvaal. The notion of local government, as opposed to the centralized government of the Volksraad which functioned as a diffuse authority, had enjoyed little success in the region. Potchefstroom was the first settlement in the Transvaal to attain a Municipal Council. This measure was effected in 1867, and it survived for just two years. Pretoria had been allowed to institute a Municipality in 1864, but the capital preferred to be under the dominion of central government, and the local version was dissolved within a year. By contrast, the situation in Johannesburg was quite unfamiliar to the Volksraad, for the population of the town comprised many foreigners who were anxious to control their own activities - including water provision, which was vital for the mining industry. However, the central Volksraad desperately needed all the revenue which the Reef's

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* Emphasis added.
JAH Box 200, Sanitary Department Annual Report, 31 December 1893.

mining activity could produce, and was reluctant to squander control of the blossoming town. Another factor behind the Volksraad's reluctance to give Johannesburg any appreciable autonomy was the pervasive suspicion that the settlement would have a very short lifespan. From the experience of other mining booms in the region and abroad, a mining camp was a place fo speculating, not for implementing administrative or infrastructural edifices. Thus Johannesburg was regarded as a peculiar entity, and it seemed to the Volksraad that this strange progeny had better remain under the parental wing of Pretoria.[9]

As 1892 drew to a close it was evident that the quality of the water supply in Johannesburg was declining steadily. Private enterprise had not produced any real improvements to the service. A petition was forwarded to the Sanitary Committee in September 1892 by 317 enraged local ratepayers, several of whom were the proprietors of prominent businesses. The signatories implored the Committee to attend to the water problems which were hampering their livelihood. Five areas of grievance were outlined in the document. The petitioners alleged that the supply was so bad that the water was scarcely drinkable, and they believed that a complete cessation of supply was imminent owing to the rapid growth of the town. Furthermore, the severe dust storms which plagued the town necessitated a capacious supply in order to control the hazard. The petitioners also argued that Johannesburg needed plentiful water in order to contend with fires and to develop gardens in the town to make the place habitable.[10] This petition appears to have been the final catalyst towards the Sanitary Committee's decision to take a potentially creative part in the saga of water supply. Shortly thereafter the Committee called for the submission of tenders for water schemes to supply Johannesburg. With respect to the evolution of the Sanitary Committee itself, it is evident that the small extension of powers granted in 1890 by the Volksraad -

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[9] Maud, *op. cit.*

[10] JAH Box 317, Petition of Ratepayers to Sanitary Committee, September 1892.

which made provision for the derivation of income from taxation - had given this body the means to take some initiative in water supply. Although the Committee could not itself implement a supply, it sought an alternative strategy in the hope that this would engender interest and support from the Volksraad.

On 3 January 1893, approximately ten waterworks tenders were considered by the whole Sanitary Committee. Two days later the Sanitary Committee reorganized its ranks and formed a special Water Committee which, with the assistance of the Government Commissioner, was to investigate the six most promising schemes. Their objective was to find an inexhaustible supply for Johannesburg.[11]

Without any delay the new Water Committee set about inspecting the water schemes which had been offered. Its activities raised much alarm amongst riparian farmers - whose lands abutted water-courses - in the region because many of the water sources under consideration involved underground reserves, and farmers were afraid that the tapping of these sources for a town supply would diminish the usual yield. The Sanitary Committee received at least two urgent petitions from the Potchefstroom district against the use of water for Johannesburg. This district allegedly contained the sources of three rivers, but the available geological knowledge could do little to confirm or dissipate these fears.[12]

Johannesburg's Water Committee handed its preliminary investigative reports to the main Committee in February after what can only be described

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11 JAH Box 316, Memorandum by Water Committee Secretary for Sanitary Committee, 14 February 1893; TAD SS 4371 (R 14284/93), Cuttings Volume, p. 137, Newspaper Report, 29 September 1893; p 138, Newspaper Report, *circa* September 1893.

12 JAH Box 318, *Memorie, circa* 1893.
Concern over this issue persisted and some years later a Government Commission was initiated in order to establish the extent of water source linkages in the Klip River system.

as a superficial appraisal of the proposals. The reports dealt with water sources on the farms Steenkopjies, Wonderfontein, Gemsbokfontein, Vierfontein, Misgund, and Witstinkhoutboom.[13] The initial report was subsequently augmented by further research, which involved the chemical testing of water to ascertain purity levels, topographical surveys of the farms, and much deliberation concerning the legal details of riparian rights.[14] For the Vierfontein Syndicate (VS), this opportunity to have its scheme considered by the Water Committee was especially welcome in view of the fact that it had waged a long campaign to secure the Committee's interest in its scheme.[15]

In September 1893 the Water Committee concluded its deliberations. In the quest for a bountiful supply the most prominent problem was not so much a dearth of water as the obstructions encountered within common law, which so elaborately protected riparian rights. This situation made it necessary to enlist legal aid for the appraisal of each scheme. In the light of legal advice, the Wonderfontein and Vierfontein schemes appeared to be the most practicable and accessible: the water supply was reasonably pure and abundant, and the legal ramifications were manageable. Wonderfontein, however, was finally declared the better of the two because of certain complication with the Vierfontein scheme.[16]

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[13] JAH Box 317, Report to Sanitary Board of Inspection *in loco re* Water Tenders, by Van Boeschoten and Lorentz, Attorneys; JAH Box 316, Reports by Aburrow, Water Committee Engineer, 4 March, 25 March 1893. Refer Figure 4.

[14] *Ibid.*, Aburrow, to Secretary, Sanitary Committee, 24 February 1893; Memo Water Committee Secretary to Sanitary Committee, 14 February 1893; Sherwell and Fisher, owners of Steenkopjies, to Sanitary Committee, 6 April 1893; JAH Box 316, Certificate of Analysis by Dr P.J. Loevy, 31 March 1893; Sherwell to Water Committee, 8 June 1893; Sanitary Committee to Sherwell, 2 June 1893; C. Aburrow, Water Committee Engineer, to Sanitary Committee, 6 May 1893; JAH Box 315, Water Scheme Proposal from Vierfontein Syndicate to Sanitary Committee, 27 April 1893, Memorandum by Solomon and Thomson, Solicitors, to Sanitary Committee, 22 April 1893.

[15] JAH Box 315, Solomon and Thomson, Solicitors, 9 January 1892, 8, 10 March 1893.

[16] JAH Box 317, van Boeschoten and Lorentz, Attorneys, to Secretary, Sanitary Committee, 20 January 1893; Memo regarding Wonderfontein concession, Opinion, by C. Jeppe and E. Esselen, 15 August 1893.

The latter scheme relied on a single - though prolific - fountain on the Vierfontein farm, which was eminently situated for damming. But the fountain's supply would need to be augmented by water drained from the surrounding lands for sufficient water to be accumulated for the town. The proposed supplementing of pure underground water with runoff water involved the risk of contamination, for the catchment area drained a cattle enclosure and also a line of mines which were using cyanide in their gold extraction process. Furthermore, the Committee was not quite as confident that the legal rights had been secured in the Vierfontein case.[17] Thus the VS's long-standing campaign failed, and the final pronouncement of the Water Committee recommended the Wonderfontein scheme.

It would appear that in addition to the relative freedom of Wonderfontein scheme from the enclosures of riparian [illegible] suit of a scheme was attractive because the instigation [illegible] pro network by the Sanitary Committee meant that the resultant [illegible] would be free from the vices of private control. This pre[illegible] of the Sanitary Committee for moving away from circumstances [illegible] involvement in water provision grew more defined during subsequent years - an attitude made manifest through every inquiry into water provision for Johannesburg, wherein significant pressure was placed on the Volksraad to allow the local civic body to control the water supply.

Buoyed by the confidence in the Wonderfontein scheme, the Sanitary Committee provoked a great deal of controversy as it began to search for the means to finance the implementation of the project. The Town Engineer's seemingly conservative costing of the Wonderfontein scheme was £400,000. The Committee arranged for three parties to suggest ways of raising the money. The schemes ranged from additional taxation to a levy

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[17] JAH Box 316, *Rapport aannet Water Comite*, [illegible] September 1893.

on the price of retailed water.[18] In the midst of these endeavours, one of the advisors sounded the first of many opposing calls when he alleged that the basic costs of the scheme had been underestimated.[19] The Sanitary Committee, however, had confidence in its engineer's proposals and prepared to seek approval for them amongst the townspeople. It was necessary to gain sanction by a ballot in order for the Sanitary Committee to adopt this scheme with its potential levy. The Sanitary Committee met with representatives of the Johannesburg Chamber of Commerce and the Mercantile Association in order to gauge their opinion and enlist support for the Wonderfontein scheme.[20] But the Committee encountered opposition from both parties and from members of the public. The Chamber of Commerce would not support the scheme, its fundamental objections being that the town was not sufficiently mature to warrant such an investment, and that there was little certainty regarding the future of Johannesburg. Moreover, it contested that the Sanitary Committee's estimates for the costs of the scheme and for the expected water consumption were not reliable.[21] The Chamber advised that it was unnecessary to install an entirely new waterworks scheme: it was more feasible to augment the existing installations.

In contradistinction to these businessmen's views, a letter was sent to the Committee from the representatives of a London firm which specialized in the flotation of companies and was prepared to support the Sanitary Committee in establishing the Wonderfontein scheme. The

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18 JAH Box 316, Hugo and Fraser to Water Committee, 5 October 1893; Additional Report to Water Committee, 21 October 1893.

19 TAD SS 4371 (R 14284/93), Cuttings Volume, p. 141, Newspaper Report.

20 JAH Box 317, Minutes, Mercantile Association Meeting with Sanitary Committee, 14 February 1893; Minutes, Chamber of Commerce Meeting with Sanitary Committee, 14 February 1893; Secretary, Johannesburg Mercantile Association, to Secretary, Sanitary Committee, 4 December 1893; Filmer and Parry, *op. cit.*

21 JAH Box 316, Hugo and Fraser to Water Committee, 5 October 1893; TAD SS 4371 (R 14284/93), Cuttings Volume, pp. 91-123, Memorandum from Residents - signatures included - to Sanitary Committee.

syndicate was willing to advance the £400,000 against debentures.[22] After the relative financial success of the JWEEC, water supply was evidently considered lucrative even from as far afield as England. Despite this eleventh hour show of confidence in the scheme, local business opinion remained opposed to the venture. With the Chamber of Commerce and the Mercantile Association contending the scheme, the Sanitary Committee had little chance of success.

Nonetheless, the Sanitary Committee decided to convene a public meeting to consider the desirability of acquiring the rights to the Wonderfontein concession and levying the necessary loan and tax. A meeting of ratepayers was held on 16 November 1893, but no consensus was reached during the fiery proceedings. The gathering did, however, produce a petition to the Volksraad, which was endorsed by some of the most powerful commercial companies in Johannesburg[23] and by numerous individuals. The petitioners declared that under no circumstances would they accept the Wonderfontein scheme.

The Sanitary Committee had been thwarted in its first attempt to upgrade the water supply system in Johannesburg. The Committee's task had been complicated by the polarities of opinion, by legal ramifications which apparently barred access to most of the water sources, the insubstantial geological knowledge which precluded more reliable appraisals of water sources, and, inevitably, by its own inexperience. Irrespective of failure, however, this foray signified the Committee's determination to work around the Volksraad's concession policy in search of a water scheme which could be publically managed.[24]

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[22] JAH Box 318, F. Mosenthal and Company, to Sanitary Committee, 11 November 1893.

[23] JAH Box 317, Petition endorsed by Johannesburg Chamber of Industries, Africa City Properties Trust Ltd., Argus Printing and Publishing Co. Ltd., Johannesburg Market Concession and Business Co. Ltd., Anglo American Investment Corporation.

[24] The importance of the issue of local water supply was evident in the 1893/4 Sanitary Committee elections, where positions regarding the

While the Sanitary Committee was stretching its wings and the townspeople of Johannesburg were languishing without sufficient water, the JWEEC continued to enjoy the fruits of domination over town supply. The Company had been developing some of its assets in the early 1890s, spurred on by the attempts of the Water Committee to secure a rival scheme. Early in 1893 it was recorded that the Company, like the Sanitary Committee, had received various offers of water supply schemes. Shortly thereafter a proposal from the Barnato Brothers was accepted, which involved the purchase of a concession to the value of £2,000 containing rights to water from the Vaal River. Work began on making the concession viable and on negotiating the legal constraints concerning piping the water across country between the Vaal River and Johannesburg.[25] Meanwhile, the Company's existing waterworks were not in good condition. On inspection the directors found their reservoirs - the cornerstone of their reticulation system - collapsing and in general disrepair.[26] Yet, as the directors and shareholders of the JWEEC were aware, the legal position of the Company was enshrined in the Sivewright concession, which effectively rendered the JWEEC inviolate as new water sources were sought and old grievances raised.

In the meantime the people of Johannesburg had not had a pleasant summer: the rainfall was just average, and the supply was appalling. The Sanitary Committee harangued the Company for guarantees that the citizens of Johannesburg would have sufficient water for 1894.[27] Whilst the Committee was limited to superficial attempts to prevail upon the JWEEC for a reasonable supply, it continued in its important role of monitoring the standard of health in Johannesburg. The findings acknowledged, in a

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public control of the water supply featured in candidates' election manifestoes (Filmer and Parry, *op. cit.*).

[25] RWB Unsorted Collection. JWEEC Minutes, 1 February, 25 March 1893, 20 April, 25 May 1893; Transvaal Concessions Commission, 8th day, note 1502, Thompson for JWEEC.

[26] RWB Unsorted Collection, JWEEC Minutes 23 March 1893.

[27] RWB Unsorted Collection, JWEEC Minutes, 22 March 1893.

small way, the plight of those who were self-reliant for their water supply. These people continued to rely on wells, water-butts, and water vendors, either because they lived beyond the jurisdiction of a water company, or because they could not afford such a service. For example, in one report it was revealed that the whole of Fordsburg was dependent on water drawn from shallow wells.[28] The pollution and contamination which had begun to embroil the town was due to the expansion of the population and industry. All faecal matter and waste water had to be carted out of the town, a procedure which was quite inadequate and inefficient.[29] This situation further exacerbated the problems of those water companies and individuals reliant on ground-water.

Responses of Central Government to the Water Question

It was six months after the petition of December 1893 before the Volksraad took decisive action regarding water supply in Johannesburg. Eventually, on 27 June 1894, the Volksraad appointed an investigative commission. This step marked the beginning of the Volksraad's direct involvement in the Johannesburg water supply. The inquiry was to be undertaken by three men - A.D.W. Wolmarans, S.W. Wierda, and W.E. Bok - whose task was to investigate the various ways in which Johannesburg could best be supplied with plentiful potable water. It was stipulated that their investigation was to involve on-site inspections of the schemes and thereby contribute to the information gleaned during the previous investigation. The twelve water sources which were considered were situated on various farms scattered within a thirty-five mile radius of Johannesburg, namely Rooikop, Klipfontein, Gemsbokfontein, Alewynspoort, Klipspruit, Rietvlei, Rietfontein, Oliphantsfontein, Steenkopjies,

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[28] MRL File 352.06822 JOH, Bi-Annual report of the Public Works Department of Johannesburg Sanitary Committee, year ending 31st December 1894, 31 January 1895.

[29] JAH Box 315, Report to Sanitary Committee on Proposed Sewerage Scheme, 22 November 1895.

Vierfontein, Wonderfontein, and the JWEEC works.[10] The types of water sources (four of which had already been considered by the Water Committee) ranged from springs to surface drainage, and at least five of the twelve sources were deemed to have substantial water-bearing potential. Irrespective of the type of source, however, be it fountain or str the question of riparian rights impinged on all the schemes.[11]

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[10] Several farms in the Witwatersrand area have the same name and therefore contextual approximations were made of the locations of certain farms mentioned in the i quiries. Refer Figure 4.

[11] JAH Box 316, Report to Sanitary Committee on Inspection *in loco*, February 1893; JAH Box 317, Memo by Town Engineer, 2 November 1900.

Table 1. Findings of 1894 Water Commission
Source: TAD SS 4372 (R 10375/94), Commission Report, September 1894.[12]

FARM	SOURCE TYPE	QUANTITY	WATER TYPE	COMMISSIONERS' COMMENTS
Rooikop	independent	insufficient	good	flows into Klip River ∴ public stream
Klipfontein	river water	-	-	component of Jukskei River ∴ public stream
Gemsbokfontein	independent	strong	-	source of public stream used for irrigation
Klipspruit	spring eye	insufficient	-	source of Klipspruit ∴ a public stream
Alewynspoort	-	-	-	-
Rietfontein	fountain	sufficient (1,5 m.g/d)		component of Bronkhorstspruit
Rietvlei	fountain	-	-	component of Bronkhorstspruit
Olifants-fontein	fountain	variable (1-2 m.g/d)	-	riparian rights negotiable, scheme available for £254,000
Steenkopjies	-	rich (15 m.g/d)	pure	barred by Volksraad Resolution 10 June 1893; source of Magalies River
Vierfontein	fountain & runoff	strong	mixed	riparian rights assured; danger of contamination from surface drainage
JWEEC works	springs & runoff	insufficient	mixed	secured by concession; polluted by suburban surface drainage
Wonderfontein	fountains & stream	sufficient	pure	one quarter of stream flow secured by concession; scheme available for £400,000

[12] m.g/d - million gallons per day.
The descriptive terms in the table are those used in the report; their meanings and distinctiveness are not always clear.

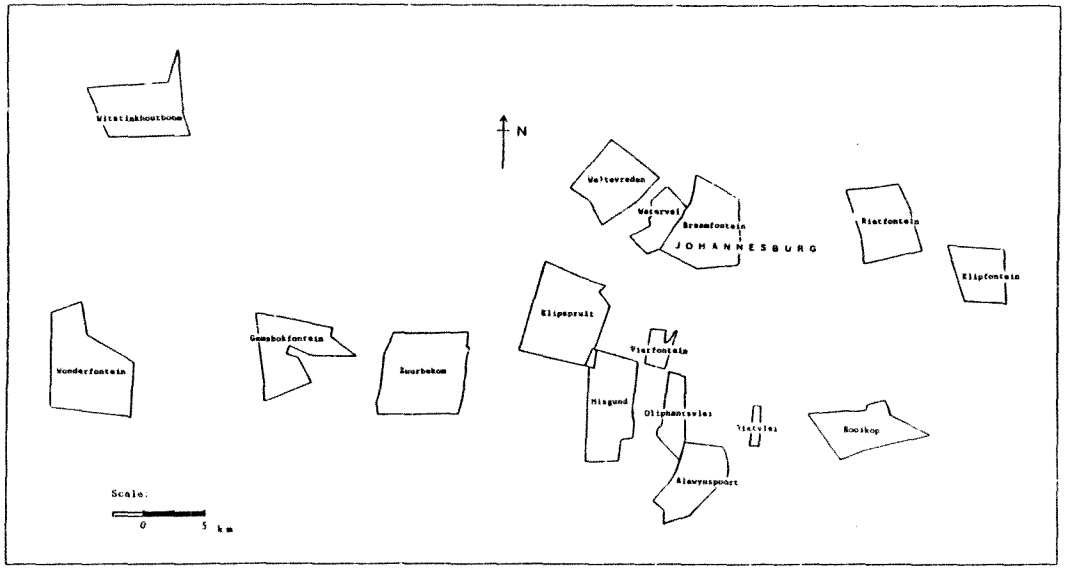


Figure 4. Water-bearing farms in the Johannesburg area.

Source: Atlas of Southern Africa, 1984 (Readers' Digest Association South Africa, Cape Town); H.T. Ramsden, 1985, The Status Powers and Duties of the Rand Water Board: a Legal History and Analysis, unpublished PhD Thesis, University of the Witwatersrand, Johannesburg.

The Commission concluded its investigations within three months and two reports were produced. Commissioners Wolmarans and Wierda recommended the Wonderfontein scheme. But Bok, the third Commissioner, offered a dissenting appraisal of the situation. He would not endorse the recommendation of Wonderfontein and advocated that the time available to the Commissioners had been too short to enable them to arrive at a reliable decision. Furthermore, the riparian legislation which had been utilized as the criterion for evaluating the suitability of the various schemes had, in his opinion, been applied in a narrow and uncompromising manner.[33] Several of the schemes which had been considered possessed an adequate water source, but only the Wonderfontein scheme was entirely free from legal problems because it included a concession which suspended riparian claims. Bok alleged that the other schemes had been cursorily rejected and that Wonderfontein was chosen by default rather than on the sheer merit of its quality as a water source.

During the course of the 1894 Water Commission, the Volksraad enacted a law regulating the use of water from public streams in the South African Republic.[34] This legislation chiefly clarified and affirmed the principles which had previously been operative as part of common law with respect to riparian rights. It referred to "public streams", which were defined as any watercourse - perennial or seasonal - which flowed in a defined channel.[35] In view of this expansive definition, any sizeable stream was likely to be classified as a public stream, and indeed all twelve sources considered by the Commission involved public streams. The import of this classification was that all such sources were subject to the stipulations regarding the use of public-stream water, whereby only the immediate riparian landowners could use the water flowing through

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[33] TAD SS 4372 (R 10375/94), Bok's Report, 20 September 1894.

[34] *Laws of the Transvaal - up to 1899 in force in 1903*, London, 1903.

[35] Law 11, 1894, Article 1.

their lands for their own immediate purposes.[36] Water could be diverted out of a stream for the aforementioned purposes, but any surplus had to be returned to the stream within the boundaries of the immediate property.[37] Law 11, like its common law precedents, allowed the holder of a concession to lead water only within the perimeter of the property. The Law was evidently devised in order to protect the farmers with riparian rights lower down the streams and to ensure an equitable sharing of water. Commissioners Wolmarans and Wierda, however, remained steadfast to the letter of the law.

In reviewing the 1894 Water Law some years later, the officials of the Inter-Colonial Irrigation Commission seem to have understood Law 11 of 1894 in a similar fashion to Bok.[38] His contention was that the riparian rights of lower land owners could be protected within the law even if water was drawn off for purposes other than immediate domestic and agricultural use. In the event of a town supply scheme being implemented, the protection of all riparian rights could be achieved by building dams for the landowners to compensate for the water which would be taken for a town supply. Bok was suggesting that the Water Commission at least consider accommodating riparian rights rather than reject, as the Sanitary Committee's inquiry had done, all instances in which Law 11 of 1894 was effective. He advocated that further investigation was required especially because some of the schemes which were offered were either much closer to Johannesburg or simply less expensive overall than the Wonderfontein scheme.

The severity of the water situation in Johannesburg during the investigations of the Commission should not be underestimated. As part of the Commission's enquiries, information was obtained from various

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[36] Law 11, 1894, Article 2.

[37] Law 11, 1894, Article 10.

[38] Report of Inter-Colonial Irrigation Commission, 1907.

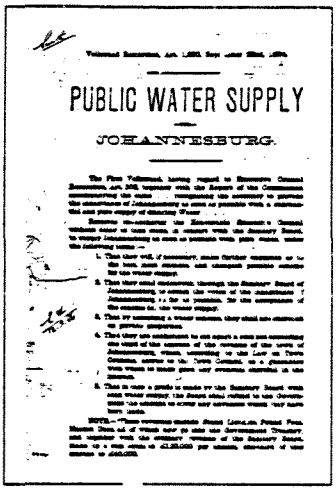
medical practitioners in town concerning the relationship which they had identified in their practices between the quality of water and standard of health in Johannesburg. In response, one doctor stressed that the prevalence of disease was due to the foul water, which was often contaminated by decomposing animal matter. The contamination in the water was spread about the town in a number of ways, including through the sale of milk, which was fraudulently diluted. In his view, many of the diseases which beset the Johannesburg people were attributable to impure water. The particular susceptibility of poor people to the dangers of foul water was also mentioned at this time.[39] The two reports from the Johannesburg Water Commission were discussed by the Volksraad and an immediate decision was taken to continue with investigations in view of the opposing opinions offered by the Commissioners. Notices to this effect were posted about Johannesburg on the following day (Figure 5).

It was clear that, as the Volksraad's proclamation had outlined, no action could be taken until the situation had been studied more fully. Meanwhile, the Sanitary Committee sent a resume of its plans for Wonderfontein, including funding proposals, to the Volksraad in February 1895. This submission was the last of a collection of documents concerning the Johannesburg water supply situation which were directed to Pretoria for the Volksraad's perusal. The people of Johannesburg waited impatiently for some action to be taken.[40]

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[39] JAH Box 316, Dr W. Stanley, to Secretary, Water Commission, 31 August 1894; Dr F.P. French, to Secretary, Water Commission, 7 September 1894.

[40] *Johannesburg Times*, 6 February 1895.



PUBLIC WATER SUPPLY

JOHANNESBURG.

Figure 5. Volksraad's announcement in response to water question. Source: JAH Box 316, Volksraad Resolution, Section 1.820, 22 September 1894.

During the months after the Volksraad gave notice that more time and investigation was required in the quest for a satisfactory water supply, Johannesburg suffered the worst water shortage in its short history. A census conducted during the year documented 102 078 residents in Johannesburg.[*1] More than half of the populace were people of colour who were not supplied with water for domestic purposes by any water company. They relied on the most primitive ground water sources, which were most adversely affected by the drought.[*2] With regard to the general reputation

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[*1] Map of Johannesburg and Suburbs, 1896, Cullen Library, University of the Witwatersrand (WITS); *Municipal Magazine*, February 1927.

[*2] RWB, 1912, *Origin and History of the RWB*, Hortors, Johannesburg. The Sanitary Committee had reportedly requested the JWEEC to supply Fordsburg, which was a comparatively poor suburb, with water. But despite promises to the contrary, the Company never extended its supply to the area. The JWEEC owned Fordsburg, but real estate was evidently more profitable than water provision in that suburb (*Standard and Diggers' News*, 23 October 1897).

of the water companies, it was stated in the press that the drought had finally proved the JWEEC's inability to meet the demands of the town. In the "Coolie Location" near Fordsburg, the water situation became so critical that locals scavenged about the town for water. Both the tiny dam in the "location" and the water-holes usually used by the ranks of the African *Amawasha* people for their clothes washing service became the focus of desperate attempts to secure drinking water.[43] Even the water storage tanks belonging to the fire brigade were besieged and drained by panic-stricken people. The JWEEC went to bizarre lengths to try to procure rain by firing rockets into the clouds above the town. The rockets precipitated little rain, but a veritable storm was wrought in the Volksraad, where one member accused the sacrilegious Johannesburgers of sticking their fingers in the very eye of God.[44]

The livelihood of most sectors of the community was plagued by the dearth and filthiness of water. For example, the South African Association of Engineers and Architects bewailed the amount of solid matter lurking in the water, which clogged boilers and generally hindered and even halted industries in the town. Hoteliers in Johannesburg had difficulty serving their guests. Apparently it was almost impossible to order a glass of water at any establishment, even at the best tea-room in town. A general store owner observed that in one of the hotels notices had been posted in the washrooms above replete hand-basins: "Please do not pull out the plug as there is no water."[45] Bathing was almost unheard of; soda water was the only available liquid for this purpose, both privately and at hotels, and it was frightfully expensive. As in previous years, an extreme water shortage coincided with a shortage of food. The

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[43] *Standard and Diggers' News*, 8 February 1896; *Star*, 21 September 1936, C. van Onselen, 1982, *Studies in the Social and Economic History of the Witwatersrand* (Ravan, Johannesburg), Volume 1. Refer Figure 3.

[44] E.L. Kelly, 1937, *I ..... Alone* (Shuter and Shooter, Pietermaritzburg); *Municipal Magazine*, February 1927.

[45] Henochsberg, *op. cit.*, p. 33.

Reef was dependent on food brought by transport riders from more fertile regions and, because grazing was especially sparse, the ox drawn wagons were slow to reach the stricken town. This drought took a stranglehold on Johannesburg: all spheres of activity - from the domestic to the industrial - were stifled.[46]

The word "drought" seems to have been synonymous with the experience of conditions in Johannesburg in the early years. To say that this denoted hardship may seem a truism, but the impact of a "drought" or the perception of conditions as constituting a "drought" posed a real threat to existence. "Drought" was the term given to a conglomerate of phenomena, which included duststorms, disease, lack of food, decreased productivity in industry, and barren veld and gardens. The paradox of the "drought" years in this early period of Johannesburg's history, however, is that the rainfall figures do not constitute what is commonly recognised as a drought - for the region - in climatological terms. In 1895, for example - the year described as one of awesome drought - a fairly average rainfall of 29.14 inches was recorded. The rainfall figures belie the experiential accounts.[47] Indeed, according to some experimental climatological work concerning this era, in the years 1888 to 1896 *above*-average rainfall was registered by weather stations in the Transvaal.[48] This scientific record is challenged by investigations which

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[46] *Johannesburg Times*, 1 March 1895; Phillips, *op. cit.*, Draper, *op. cit.*; *Municipal Magazine*, February 1927; Kelly, *op. cit.*; Filmer and Parry, *op. cit.*; H. Altman, 1939, *Overdrafts and Overwork* (Howard Timmins, Cape Town); Sowden, *op. cit.*

[47] The recorded average rainfall for the period 1889 to 1905 was 29.55 inches. As a measure for assessing mean annual rainfall, one may reasonably compare the mean for 1889-1905 to the mean for the years 1921 to 1950. Mean rainfall in the latter case was 30.33 inches. (Weather Bureau, South Africa, *circa 1950, Climate of South Africa, Part 2: Rainfall Status*, WB 20 [Government Printer, Pretoria]). Both periods are sufficiently long in order to accommodate the postulated eighteen year oscillation in wet and dry periods. The latter figure is equatabl with the mean for the earlier period and, therefore, theoretically the 1895 rainfall figure was not exceptional. (P.D. Tyson, 1986, *Climatic Change and Variability in Southern Africa* [Oxford University Press, Cape Town]). Refer Table 2.

[48] Tyson, *op. cit.*

supports the notion that, irrespective of the rainfall figures, these years were "drought" years for the people who lived through them.[49] Thus when considering the conditions prevailing in Johannesburg in this early era the rainfall record is useful as a relative measure of fluctuations in rainfall, but the experiential record of the relative availability of water is equally important.

Table 2. Rainfall measured in Johannesburg, 1889 - 1905.
Source: MRL File 352.06822 JOH, Town Engineer's Report, 1906.

YEAR	ANNUAL RAINFALL IN INCHES
1889	19.85
1890	25.85
1891	40.85
1892	27.54
1893	no accurate records
1894	35.41
1895	29.14
1896	23.23
1897	28.98
1898	29.31
1899	29.24
1900	29.54
1901	29.99
1902	30.25
1903	27.23
1904	36.15
1905	30.24
Average	29.65

In June 1895 the Sanitary Committee was still awaiting the Volksraad's decision on the water question. Nonetheless, there were rumours that the controversial Wonderfontein scheme was a *fait accompli*. In the meantime the Sanitary Committee continued to receive new offers of water schemes for the town, including one proposal to bore for water.[50] Finally, in the midst of the drought, a second water commission was inaugurated by the Volksraad later in 1895 in the hope of discerning a good and practicable alternative for Johannesburg. The Commission's ranks remained unchanged

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[49] C.H. Vogel, 1987, The Reconstruction of the Nineteenth Century Cape Climate Using Documentary Evidence, unpublished MA Dissertation, University of the Witwatersrand, Johannesburg.

[50] *Johannesburg Times*, 28 June 1895.

except for the inclusion of an extra member as secretary. Despite the period of forced inactivity whilst awaiting the Volksraad's action, the Sanitary Committee and the Johannesburg people had at least gained the assurance of the Volksraad's preparedness to invest a substantial amount of capital to solve the water supply problem.[51]

The Commission produced a report in December 1895. Once again the Commissioners' efforts involved inspecting the twelve potential schemes and testing the chemical quality of the water sources. One report concerning the JWEEC works, which was elicited during the investigations, revealed that the town supply was astoundingly fetid - particularly in the latter half of the year when the rainfall was especially meagre. The chemical analyst disclosed that only seventeen samples out of the forty-one analyses he made were safe for human consumption. Of the remainder, nine samples were suspicious, four unsuitable, and eleven very much contaminated. The conclusion drawn from this investigation was that the water supply was unacceptable in terms of public health and ought to be condemned. The pronouncements of the second Commission were only vaguely more innovative than the first, and the overall conclusion favoured Wonderfontein once again. The scheme remained the most accessible, if expensive, option that could be found in the face of the seemingly intractable riparian legislation.[52]

In view of the number of parties who put forward schemes for the Commissioners' consideration, it seems reasonable to suggest that, on the Rand, large-scale water retailing was regarded as a profitable business. It must also have been clear that, in view of the Volksraad's Resolution, Section 1.820 of 1894 (Figure 5), the state was prepared to support a new water scheme. No-one could dispute the fact that the town on the ridge

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[51] TAD SS 4372 (R 10375/94), October 1895.
Refer Figure 5.

[52] JAH Box 316, Dr P.J. Leevy, November 1895, JAH Box 317, *Uitvoerende Raadsbesluit*, Article 841, December 1895.
Refer Table 3.

was desperate for water, and although most of the proposed schemes were likely to fail because of their legal standing - and indeed some had been discounted by the first Commission - it is evident that the prospect of devising a successful and therefore lucrative water scheme was attractive to entrepreneurs.

Table 3. Resume of findings of the 1895 Water Commission. Source: TAD SS 4372 (R 10375/94), Commission Report.

FARM	PROHIBITIVE FACTORS - over and above strictures of Section 1 of Act 11, 1894.
Highveld Oliphantsvlei Weltevreden Misgund Klipspruit	Water available deemed insufficient
Highveld Steenkopjies Oliphantsvlei	Scheme and compensatory works considered too expensive
JWEEC Works Vierfontein Waterval	Limited capacity of the water schemes renders them inappropriate
Gemsbokfontein Witstinkhoutboom	Legally prohibited from providing water for Johannesburg because of clauses in the Wonderfontein concession (2 March 1891)
Kromdraai	Not specified beyond legal constraints

The Wonderfontein scheme remained the choice of the statutory bodies. The conclusion of the report of the 1895 Commission stated that, if the 'public' agreed to the scheme, the tenets of the Volksraad Resolution, Section 1.820 of 1894 would be enacted and the Sanitary Committee would be empowered to take over and execute the Wonderfontein concession and

borrow the capital to exploit the scheme. Accordingly, after the required fourteen days notice, those White townspeople who were entitled to vote on Sanitary Committee matters went to the ballot.[53] At this stage the plans for the Wonderfontein scheme had lain in the Sanitary Committee's offices for two years. Whilst many people and organizations in Johannesburg had shown their opposition to and suspicion concerning the scheme, the town had also endured seven years of what was described as being "at the mercy of a private money-making machine" which retailed exorbitantly expensive "abominable death dealing liquid" with "absolute inefficiency."[54]

The ballot which was organized in February 1896 did not run smoothly. It later transpired that the JWEEC had spent £3,000 in trying to buy influence on the Sanitary Committee prior to the voting. The Company had also allegedly tried to bribe various other townspeople in order to undermine support for the Wonderfontein scheme. In Fordsburg, for example, company officials apparently went about propagating the notions that residents would be excessively taxed if the Wonderfontein scheme were put into operation. A petition signed by more than seven thousand ratepayers complained about the allocation of voting rights. In view of these circumstances, debate raged in the town, and the ballot turned out to be something of a fiasco. As a result of all the irregularities in the proceedings, Goch withdrew the offer of his scheme shortly after voting began because of the JWEEC's foul play. The ballot was duly abandoned: the Wonderfontein scheme was thwarted once again.[55]

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[53] JAH Box 317, *Uitvoerende Raadsbesluit*, Article 841, December 1895; JAH Box 316, Volksraad Resolution 1.820, Clause 2, 22 September 1894; TAD SS 4372 (R 1037b/94), Synopsis of 1895 Water Commission; *Standard and Diggers' News*, 15 February 1896. Refer Figure 5.

[54] *Standard and Diggers' News*, 15 February 1895.

[55] Report of the Witwatersrand Water Supply Commission (WWSC),1901-1902, Article 236; JAH Box 317, Ratepayers' Association to Sanitary Committee, 11 February 1896; *Standard and Diggers' News* 15 February 1896, 23 October 1897.

The popularity and support which the Wonderfontein project had aroused in some sectors of the Johannesburg public galled the JWEEC. The Company was jealous of its virtual monopoly in the town, and thus made use of opportunities to oppose and discredit Goch's proposals and the Sanitary Committee's plan for funding the scheme. The Company continued to feather its own nest, and made provision for expansion. In 1895, as in most of the past years, the chairman declared a profit despite the perpetual *dissatisfaction of the consumers.*[56] And, whilst the fracas raged over Wonderfontein and the reasons for the collapsed ballot, the Company purchased the rights to the farm Weltevreden. The Company's experts had investigated the water source on the farm and a new boost for the town supply was expected. Meanwhile, townspeople were disillusioned with the abortive ballot and quite satiated with the JWEEC's farcical promises of plenty. One of the local newspapers aptly captured their frustration:

> While Johannesburg breathed dust and death, the Waterworks people champagned and made merry out there at Weltevreden, where the water is supposed to be, and prattled prettily about the things that are to be.[57]

Unfortunately the geological experts and the water Company were soon disgruntled too, for Weltevreden yielded a dismal amount of water.[58] With no feasible water scheme in sight Johannesburg remained in dire straits.

As the year 1895 progressed, water consumers were plied with more assurances of the JWEEC's ability to withstand the "drought", but ironically it was also announced that there were to be severe supply cuts in the town: water would be available for domestic purposes only between 5am and 8pm. The Company's hackneyed excuse for this measure was that water was wasted on gardens. As the census had confirmed, the reality in Johannesburg was that the town was rapidly expanding, and the water

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[56] RWB, Unsorted Collection, "The JWEEC Ltd. Claimants, and RWB Respondents", Balance Sheets.

[57] *Standard and Diggers' News*, 28 March 1896. Refer Figure 4.

[58] RWB Unsorted Collection, "RWB Arbitration Depo . A", JWEEC Annual General Meeting Report, 1890 and 1896.

supply had in no manner kept pace with this growth. Typhoid and dysentery plagued the town, and mining and industrial activities were repeatedly halted.[59]

Renewed Local Efforts to Improve Water Supply

The Sanitary Committee, foiled by the dissolution of its ballot and confronted with a populace suffering a devastating drought, reoriented itself to follow another water supply option. If it was to be prevented from implementing what it believed to be a satisfactory water scheme, it would have to buy an existing operation and improve it. Interestingly, this plan of action echoed the suggestions offered by the Chamber of Commerce in preference to the adoption of the Wonderfontein scheme late in 1893. In accordance with this new strategy, negotiations began with the JWEEC for the sale of all its assets. The Sanitary Committee argued with the Company directors that the supply had been inexcusably inadequate for too long, and, therefore, that it "ought to be in the hands of the community."[60] From the point of view of the Committee, the JWEEC's performance - as an example of private water retailing - did not augur well for the continuation of the private regime. Barnato, the main spokesman for the Company, ostensibly agreed with the Sanitary Committee's reasoning, but the crux of the matter was the terms on which the JWEEC was prepared to part with its assets. Problems arose because the Company possessed exclusive supply contracts for various suburbs. The Directors were more than reluctant to let these keys to their monopoly out of their grasp. The negotiations continued for some months, but were finally dissolved in disagreement.[61] Nonetheless, the Sanitary Committee

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[59] *Standard and Diggers' News*, 28 November, 5 December 1896; JAH Box 200A, Sanitary Department Annual Report, 1895.

[60] JAH Box 317, Sanitary Committee Morning and Afternoon Meeting Minutes, 26 March 1896.

[61] *Ibid.*, Minutes of Meeting, Sanitary Committee and JWEEC, 26 March 1896; Secretary, JWEEC to Secretary, Sanitary Committee, 10 April 1896, 6 April 1898.

continued to be involved with other concerns which were offering their water schemes for the Johannesburg supply, and the JWEEC proceeded to develop its area of supply and arrange more sole-supply contracts with residential suburbs such as Faucus Township, Judith's Paarl, Troyeville, and Bellevue.[62]

After the Sanitary Committee's unsuccessful efforts to obtain local approval for the Wonderfontein scheme, Goch, the scheme's proponent, attempted to circumnavigate local officialdom and approach the Volksraad directly. In April 1896 Goch's lawyers suggested to the Executive Council in Pretoria that - with the Volksraad's support - a private company could be formed in order to exploit the Wonderfontein concession. No decision was taken on the matter. Later in the year, however, the Volksraad decided to make £20,000 available to support the development of the Wonderfontein source. The money was to be derived from licensing fees in Johannesburg. By the end of August the Volksraad was ready to approve the whole operation. A contract lay before the State Secretary awaiting President Kruger's signature in October 1896.[63]

Meanwhile, innovations were underway in Johannesburg's local government. In October 1897 the Sanitary Committee was dissolved and Johannesburg was granted a Town Council by the State President. This substantial change came about after the Jameson Raid. Kruger was aware of the now blatant opposition of the Uitlanders towards his Volksraad. He sought to strengthen his influence in the Transvaal through the formation of a partisan Town Council in Johannesburg. Unlike the constitution of the Sanitary Committee, however, which had a relatively free franchise - White men who possessed property which had a ratable value of £40 per annum could be elected - the new Town Council had to have

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[62] MRL "Johannesburg Water Supply" Volume 1; JAH Box 317, F. Beck to Sanitary Committee, 18 March 1896.
Refer Figure 3.

[63] WWSC Article 241; TAD SS 4372 (R 10375/94), State Secretary to Kruger 6 October 1896.

half its ranks filled by *burgers*.[64] This constituted a significant change in Johannesburg's representative 'freedoms'.

The Town Council's sphere of jurisdiction was, like that of its predecessor, essentially that of sanitation. The increments to the muscle of Johannesburg's local government were small. The raising of loans still had to be passed by the Volksraad; there was still no control over education and very little over taxation. The local authority remained rather ineffectual.[65] Furthermore, in view of the fact that the three water companies operative in Johannesburg at that time (Braamfontein Water Company [BWC], Vierfontein Syndicate Limited [VSL], and, and JWEEC) had British directors and affiliations, greater distance was wrought between the Town Council and these civic suppliers. The precise effect of this distancing can only be surmised. However, since relations between the Sanitary Committee and the JWEEC had been rather fractious even before 1897, it is likely that liaison, co-operation, and ultimately improvement of services would not have been enhanced by the enforced predominance of Afrikaners in the Council. Moreover, with the benefit of hindsight, it is clear that local polarities must have been deepening, as the outbreak of the *Tweede Vryheidsoorlog* was at hand.

Fortunately for the JWEEC, bounty was within reach: a particularly prolific aquifer was found for the Company at the farm Zuurbekom, twenty-seven kilometres to the south-west of Johannesburg.[66] The directors of the JWEEC were initially reluctant to invest in Zuurbekom, because they had spent and lost so much money on other water sources which had proved disappointing. But when drilling was begun a large body of water was found within the dolomite. This type of source was precisely

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[64] Literally, "citizens".
MRL File 352.06822 JOH, Report of the Burgermeester, 1897; Gray, *op. cit.*; Maud, *op. cit.*

[65] Maud, *op. cit.*

[66] Refer Figure 4.

what was required, for it was included within a concession which allowed for its use in a town supply. The JWEEC bought the right to this concession and began to utilize its potential.[67]

The discovery of this source, however, did not quite achieve what was hoped, despite the fact that the yields from Zuurbekom surpassed those from the Company's other sources in Doornfontein, Weltevreden, and Steenkopjies combined. Pollution, which had always been the bogey of the JWEEC's endeavours, continued to beleaguer the town supply. The water sources and reservoirs of the Company were extremely polluted. Consequently, contamination was spread as pure and foul water mingled in the reticulation system; the quality of the water supply as a whole remained unsatisfactory.[68] As in previous years, inspections of the town reservoirs and water analyses by the Town Engineer's Department testified to the impurity of the supply. And, despite the availability of water to the JWEEC, the town's fire chief still complained of inadequate water supplies for fire-fighting purposes.[69] The overall town supply was only marginally rejuvenated by the discovery of the Zuurbekom source. The potential of the aquifer was effectively squandered because the JWEEC's waterworks had become so decrepit that the injection of pure water was insufficient to remedy the situation.

Irrespective of the potential of the JWEEC, gained and lost, the perspective and experience of those in the town who continued to live without a reticulated supply remained unchanged. For many, the price of water from the JWEEC was still prohibitive.[70] The Company continued to refuse to supply areas such as Fordsburg, where residents described

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[67] Draper, *op. cit.*

[68] MRL File 352.06822 JOH, Annual Report of Health Department, 1897.

[69] *Ibid.*, Annual Report of Fire Department, 1897.

[70] The *de facto* price (including meter rent fees) for the water was 15 shillings per one hundred gallons (*Municipal Magazine*, September 1917).

themselves as being on the verge of a "water famine".[71] The Town Council drilled one bore-hole in the "Coolie Location" and this went some way to relieve the immediate shortages in the area, but in less than two years even this source was found to be too contaminated for use. The Inspector of Natives continued to report on the occurrence of small-pox in these areas, and the high death rate persisted.[72]

The local authorities subsequently turned their attention to improving the water supply, because the Zuurbekom scheme made little impression on the health of the town.[73] At the end of 1898 the Council followed the strategies of the Sanitary Committee and made a public call to the owners either of water sources or of water schemes to negotiate the sale of their assets for a town supply. It was requested that the schemes be presented to the Council by the end of January 1899; this deadline was, however, extended by some weeks. But this final attempt of the local authorities to supersede the JWEEC as a supplier of water was never realized. Relations between central government and the JWEEC took an interesting turn at this point. Correspondence indicates that the JWEEC was liasing directly with the Volksraad concerning water provision in Johannesburg.[74] Evidently the state was in something of an ambivalent position regarding private enterprise. Despite its earlier overtures towards Gooch and the Wonderfontein scheme, the Volksraad was once again parleying with the blackguards of the Johannesburg water scenario. This change may indicate that the state had become wary of courting disfavour with the JWEEC in view of its substantial mining and financial

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[71] JAH Box 317, C.F. Duncker to Sanitary Committee, 16 March 1896. It was reported that the water levels of the springs in the area which became Johannesburg had begun to decline even before the rush of diggers to the area, which had further taxed the diminishing underground reserves (*Municipal Magazine*, February 1927).

[72] JAH Box 201, *Rapport van Kantoor van den Inspekteur over Kleurlingen en Publiek Verkeer*, 3 January 1899; MRL File 352.06822 JOH, Annual Report of Sanitary Department, 1897.

[73] MRL File 352.06822 JOH, Annual Report of Health Department, 1897.

[74] JAH Box 317, Secretary, JWEEC, to Secretary, Town Council, 2, 5 November 1899.

associations, but in the absence of documentary evidence, this remains conjecture. Shortly thereafter, the tensions and frustrations which had developed in the Transvaal culminated in the declaration of war.[75]

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In Johannesburg, the years 1892 - 1900 were characterised by the local and national state's ineffectual attempts to improve the water supply system, and by the persistent insanitary condition of the town. Each of the inquiries comprised insufficient staff with little scientific knowledge or time at their disposal and little advancement was achieved through their machinations. Moreover, whilst the facade of local government in Johannesburg had undergone significant changes in this period, the body remained essentially powerless. Through the course of the various inquiries, however, two significant problems had been disclosed: the law pertaining to riparian rights severely hampered the utilization of available water sources, and, more generally, vague geological understanding of the underground water system hampered the discernment of public and private initiatives. It was also made evident, by the discovery and exploitation of Zuurbekom, that plentiful water alone could not rectify Johannesburg's reticulation system. Furthermore, there were many people who remained outside the sphere of formal water provision and perforce continued to rely on their own primitive means of water acquisition. Finally, the *Tweede Vryheidsoorlog* put a stop to all development of facilities in the town and more chaos was brought into the water provision scenario. Throughout this period Johannesburg was becoming progressively more polluted and unhealthy because the water and sanitation system was completely inadequate - the pace of urbanization had far outstripped the pace of services provision.

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[75] Maud, *op. cit.*

CHAPTER FOUR

THE ECLIPSE OF PRIVATE ENTERPRISE BY THE STATE

The *Vryheidsoorlog* imposed an entirely unique order on the functioning of Johannesburg: the water supply system was fundamentally changed during the conflict. The progress towards the creation of an alternative to the Johannesburg Waterworks Estate and Exploration Company (JWEEC) was halted as the authorities were occupied with more pressing concerns. The private water companies' dominion was disturbed as they were required to supply water at the command of the government to officials and troops in the town. Furthermore, financial losses were incurred when many of the residents fled from the Reef and left their accounts with the water companies in disarray. It is evident that this era was one of enormous upheaval, which resulted in the British occupation and take-over of the town, a move which finally precipitated the consolidation of the private controllers of water supply into one public concern. This reorganization was prompted by the resumption of state interest in the provision of public services. Two commissions were influential in this process. The first investigated the credibility of all the concessions which had been granted by the Boer Government prior to its deposition; the second was an expansive enquiry into the water supply of Johannesburg and the Rand. These two investigations, along with concurrent evaluations of the health situation in Johannesburg, confirmed the necessity of expropriating private water interests. The period between 1900 and 1905 was, therefore, simultaneously, the last post for private enterprise, the dawn of bureaucratic control over water affairs, and the ponderous beginning of a better supply system.

The Implications of the Conflict in the South African Republic

The war initiated a period during which the water supply system was placed under more strain than ever before, despite the exodus of many consumers from Johannesburg. The expansion of waterworks was also hindered by the hostilities. The JWEEC, for example, had considerable difficulty obtaining the necessary rail transport for equipment, which was ordered from England early in 1899 and awaited collection at East London. The cargo included pumping equipment, boilers, and engines, which were urgently required to refurbish and enlarge the Zuurbekom plant.[1] Rail transport was at a premium for the military, and the Boers' practice of train-burning and raiding exacerbated the shortage of railage for civilian purposes. Finally, the JWEEC had to accept the promise of the military to transport a portion of the equipment.[2] The Vierfontein Syndicate suffered extensive damage to its Oliphantsvlei works during the course of the fighting: the plant was pillaged by soldiers in search of iron and wood for use in their campaigns.[3]

The resources of the JWEEC were taxed further by the fact of the company's obligation gratuitously to supply the encamped military with water.[4] This was in compliance with the Sivewright concession, which specified that government installations had to be supplied with a basic amount of water free of charge.[5] The meaning of this clause was disputed on various occasions by the military government, which alleged that the

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1 TAD CS 35 (4706), Acting Town Clerk, to Secretary, Transvaal Administration, 12 September 1901; Minute 4706 by Secretary, Transvaal Administration, 19 September 1901.

2 *Ibid.*, Financial Secretary, to Military Governor, 23 September 1901; Davenport, 1978, *op. cit.*

3 TAD CJC 804 (1515/02), Claim for Compensation from the Military Compensation Board, 16 October 1902.

4 TAD CS 35 (4706), Acting Town Clerk, to Secretary, Transvaal Administration, 12 September 1901.

5 Refer Article 8, Sivewright concession, Appendix 1.

prison and railway buildings in the town were government concerns and therefore entitled to the special rate.[6] These suggestions were vehemently contested by the JWEEC.[7]

As a result of these contests of rights, and of the decline in the JWEEC's service during the war, suggestions of the desirability of a state-controlled water supply were mentioned in official circles.[8] These overtones were resonant with the endeavours of the Sanitary Committee in earlier years to obtain an alternative water scheme, and echoed the very first objections to the granting of the Sivewright concession voiced at the public meetings in Johannesburg in 1887. Evidently a broad spectrum of officials and civilians recognized that the liabilities contingent upon the private control of water hampered Johannesburg's development.

The cessation of the conflict in the Transvaal achieved little in easing the poverty of the water supply situation. The aftermath of the war left many people destitute, and those who returned to Johannesburg found the town in chaos. Many householders had been forced to leave very hurriedly by the Boer Government and they had not had time to arrange their affairs before their departure. Thus, with regard to houses supplied with water, the owners returned to find large debts awaiting them for water meter rentals. Worse still, some houses had been illegally occupied in the absence of the owners, and bills for water had

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[6] TAD CS 46 (6209), Director of Prisons, to Secretary, Transvaal Administration, 12 November 1901.
A basic amount of eight hundred gallons had to be supplied free of charge (Article 8). But this amount had been set down in 1887 and was a fraction of what the state installations required by 1900. Institutions such as the Military Office appear to be appealing to this principle here.

[7] *Ibid.*, Acting Secretary Transvaal Administration, to Director of Prisons, 19 November 1901; Government Commissioner, to Secretary, Transvaal Administration, 23 November 1901; TAD CS 21 (2559), Secretary, JWEEC, to Secretary, Transvaal Administration, 21 June 1901.

[8] *Ibid.*, Note on File Cover from Prisons Department, *circa* 26 November 1901.

accumulated. This situation caused a furore in the town because the JWEFC refused to continue supplying water until all the arrears were paid by the 'offending' parties. A desperate situation prevailed, and eventually the services of the local authorities and of Lord Milner, Governor of the Transvaal, were enlisted to vouch for the householders right to water and to investigate their supposed debts.[9]

Apart from the difficulties of the householders with access to reticulated water, the poor people of the town also suffered after the war. Ground water was becoming scarcer and the Town Council was becoming more aggressive in its response to the sanitation problems of the town. Various areas, such as the "Coolie Location", the "Kaffir Location", the slaughterhouses, and the washing sites were considered a "nuisance" by the authorities. Their envisaged solution, which has often been used subsequently, was to move these undesirable settlements and activities to the periphery of Johannesburg.[10]

The position of the Johannesburg water supply companies came into focus after the annulment of the sovereignty of the South African Republic. The return to civilian affairs allowed the British conquerors to focus their attention on the administrative reorganization of the Transvaal. Subsequently, the Secretary of State for Colonies made provision for a commission of inquiry into the concessions policy of the former regime. The validity and usefulness of the individual agreements was to be assessed.[11] Representations from concessionaires and other interested

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[9] TAD CS 1076 (028), Telegram to Curtis, 19 June 1901; Memorandum for Transvaal Administration by Secretary, Transvaal Administration, *circa* May 1901, TAD CS 15 (1789), J.A. Pringle (Johannesburg resident), to Secretary, Transvaal Administration, 17 May 1901; Government Commissioner, to Secretary, Transvaal Administration, 17 May 1901; Davenport, 1978, *op. cit.*

[10] TAD CS 14 (1635), Acting Medical Officer of Health (M.O.H.), Johannesburg, to M.O.H., Transvaal, 9 May 1901.

[11] Report of Transvaal Concessions Commission (TCC), High Commissioner's Notice, para. 2, 8 September 1900.

parties were heard in Cape Town and in Pretoria during October 1900. The Commission also sat in London to hear the supplications of those who could not or dared not come to South Africa.[12] The concessions owned by the JWEEC, namely the Sivewright and the Zuurbekom agreements, and the Wonderfontein concession owned by Goch, were considered by the Commission, along with other agreements involving what they deemed to be "Rights of a Municipal Character".[13]

The Commissioners compiled a scathing report concerning the JWEEC. The crux of their condemnation of the company arose from the nullification of the Volksraad's proviso - *in the Sivewright concession* - forbidding a monopoly. The circumlocution of this stipulation had been achieved by the acquisition of exclusive rights to supply various privately owned suburbs. The report estimated that four-fifths of the area of Johannesburg was under the jurisdiction of the JWEEC. Furthermore, the concession was doubly violated through the provision of foul water.[14] The Chamber of Commerce and the Imperial Military and Municipal Authorities presented formal objections to the Commission regarding monopolistic exploitation and the deplorable water supply offered by the JWEEC. Their objections focused on the fact that water consumers were powerless before the JWEEC which, in turn, carried out its business with no consideration for the community.[15] The long history of public complaint was also acknowledged in the report.

During the hearings, the JWEEC's officials defended their position, arguing that disputes over riparian rights had prevented them from

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[12] *Ibid.*, paras. 5 and 19.

[13] *Ibid.*, Introduction, para. 21.
This categorization reflects the attitude of the Commissioners to the question of the proper control of water, they apparently regarded it as belonging - by definition - within the realm of public affairs.

[14] Refer Article 6, Sivewright concession, Appendix 1.

[15] TCC, Evidence, Article 1522.

bringing more water to the town,[16] and that the original agreement was entered into with the Boer Government and therefore responsibility rested on the state to act against the company if there was any dissatisfaction regarding the service.[17] Both these points contained a measure of validity: legal problems were acknowledged in all the inquiries into the Johannesburg water situation, and the state had consistently avoided confrontation with the JWEEC. Indeed, only the Volksraad had the power to prevail upon the concessionaires.

The recalcitrant attitude of the company was disclosed during the inquiry and this served to confirm its disreputability: when a representative was asked whether the JWEEC would have any objection to being obliged to supply sufficient water, the man wanted to know what benefit would accrue to the company.[18] The principle of profit maximization was patently dearer to the JWEEC than consumer satisfaction; an examination of all the company's balance sheets revealed that, through the years of distress in Johannesburg, only the shareholders benefited from the company's existence. The JWEEC had exercised its rights, and exceeded them, unscrupulously. Sheltered by the Volksraad within a concession, it pursued profit rather than quality of service. The demise of the JWEEC was imminent.

The Commission heard more favourable reports about the Wonderfontein scheme and finally reached a positive conclusion regarding this project. The Commissioners were not presented with any objections to the scheme and they were compelled to acknowledge the favour which Wonderfontein had won in the eyes of the Sanitary Committee and the Town Council in the earlier inquiries.[19] The concession was deemed to have been lawfully

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[16] *Ibid.*, Evidence, Article 1502.

[17] *Ibid.*, Evidence, Article 1530.

[18] *Ibid.*, Evidence, Articles 1526-1528.

[19] *Ibid.*, Wonderfontein Section, paras. 12, 14, and 16.

obtained by the owners of the farm and subsequently taken over, in accordance with the law, by Goch. Moreover, he was willing to enter into a contract with the Boer Government for the supply of a specific amount of water by a given date.[20] This co-operation and general propriety of the management of the concession over the years, even in the face of the alleged subversive opposition by the JWEEC during the ballot, was made clear in the Concessions Commission Report;[21] the Wonderfontein venture had something of an advantage over the JWEEC, however, because it remained only a mooted concern, whereas the JWEEC constituted a functioning waterworks. Nonetheless, the Commission concluded that the existence of the JWEEC was not in the public interest.[22]

The Witwatersrand Water Supply Commission

Congruent with the conclusions of the Concessions Commission, the Johannesburg Town Council made representations to the Transvaal Civic Administration for the formation of a full inquiry into the water supply situation.[23] This led to the establishment of the Witwatersrand Water Supply Commission (WWSC) on 4 November 1901, the most incisive of all the inquiries into water supply in this early period of Johannesburg's history. The task before the Commission was much broader than that which had been set before previous inquiries. The water requirements of the whole Reef as an economic region were to be investigated. A scheme for the creation of an unfailing water supply for the communities and the mines had to be prepared in the light of an examination of all available water sources in the area.[24] By virtue of the breadth of its focus and the extent of expertise included in consultation, this inquiry was much

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[20] *Ibid.*, Wonderfontein Section, para. 13.

[21] *Ibid.*, paras. 12 and 16.

[22] *Ibid.*, Johannesburg and Zuurbekom Section, conclusion.

[23] RWB, 1912, *op. cit.*

[24] Report of WWSC, 1901-1902, para. 7.

more comprehensive than any of its forerunners. The abortive inquiries of 1893, 1894, 1895, and 1898 were poignant reminders of the need for innovative research.

Significantly, the goal of the Commission was to arrange for the constitution of a public body to execute the chosen water scheme.[25] It is clear that the *raison d'être* of the Commission signalled the end of private control of water provision in Johannesburg. Moreover, the Concessions Commission precipitated the final condemnation of the chief exponent of private water enterprise - the JWEEC. The momentum of more than a decade of dissatisfaction with private companies' supply and non-supply had forced the state (arguably the new British regime was more receptive to the public's demands) to create a new order in the water supply scenario. Perhaps the merits of the Sanitary Committee's endeavours were realized only at this late stage when, at last, the usefulness of public control of water supply was accepted; the Commission's objective was thus to pursue a fundamentally different path by considering the actual constitution of a public body.

Determining the domestic water requirements of the Rand was made difficult by the disparity of expert opinion as to how much water was required per person. The racism of the day emerged resplendent in this issue: Africans were allotted much less water than Whites. The consulting engineer for the JWEEC suggested that only twenty gallons per day was required by Whites, as against six gallons daily for Africans. On the other hand, another expert recommended one hundred and twelve gallons for *every* person. This estimate was dismissed by the Commission as being "the counsel of perfection".[26] Perhaps the JWEEC's estimate was conservative because the company had never supplied more than 800 000 gallons a day for the Johannesburg population, which had reached 150 000

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[25] *Ibid.*

[26] *Ibid.*, para. 10.

in number by 1901.[27] The Town Council's suggestion was more middling: it estimated an immediate requirement of between forty and sixty gallons per person per day for Whites and just forty gallons for each African. These figures, mundane in themselves, reflect the uncertain milieu of the day, where the nature of basic requirements - let alone the associated engineering and geological problems - was a contentious subject. Furthermore, there was no basic standard for comparison in the region because amounts of water provided were quite different on account of factors such as proximity to water sources, rainfall, and population densities.

Table 4. Water provision statistics per capita for South Africa in 1901. Source: Report of WWSC, Evidence (G.S. Burt Andrews, Acting Town Engineer), Articles 882-887.

Town	Gallons per person per day
Pretoria	64
Durban	54-58
Pietermaritzburg	42
Cape Town	29,5
Bloemfontein	17
Port Elizabeth	13
East London	13,5

Apart from the water needed for the people on the Reef at the time of the Commission, the mines required a supply more than six times greater than that for Johannesburg.[28] The Chamber of Mines - unlike those considering the town needs - was able to present definite estimates of the expected water consumption of the mines. Representatives of the Chamber based their calculations on the water usage for each ore-crushing

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[27] *Ibid.*, paras. 7 and 10.

[28] *Ibid.*, para. 12.

stamp: prior to the *Tweede Vryheidsoorlog* there were approximately 6 000 stamps on the Reef and it was anticipated that there would be a total of 17 000 such machines in operation by 1908.[29] As each stamp used 2 000 gallons daily, water consumption on the mines was vast. The Chamber expected to need twenty million gallons per day by 1908, over and above the amount of water which could be supplied from its own sources (such as those developed by the VSL and from shaft-water).[30] Despite the extent of their demands, however, the mines had managed to meet their own needs more effectively than the town suppliers had met domestic requirements.

When the Commissioners considered the sources from which to obtain the water necessary for the Rand, the extent of the increase in the demand for water on the Witwatersrand was enunciated. Referring to the report of the previous Water Commission in 1895 as an essentially redundant document, the Commissioners concluded that the local conditions had changed so much that the water sources discussed six years previously could provide only a fraction of the contemporary demand.[31] A clear predilection for underground water sources was expressed.[32] The reason for this preference was twofold. Firstly, underground water was less likely to involve legal complications, and secondly, it was deemed suitable for domestic use - except in especially polluted cases - without costly filtration.[33] The Commissioners were, therefore, loath to entertain the prospect of water diverted from a source such as the Vaal [*dirty*] River.[34] In contradistinction to the twelve sources considered in 1895, the 1901 report mentions the potential of Steenkopjies (owned

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[29] *Ibid.*, Statement of Transvaal Chamber of Mines, Evidence, Articles 1366 and 1371.

[30] *Ibid.*, para. 12; Evidence, Article 2660.

[31] *Ibid.*, para. 33.

[32] *Ibid.*, para. 14.

[33] *Ibid.*, para. 16.

[34] *Ibid.*, para. 19; Evidence, Articles 613-661.

by the JWEEC), Zuurbekom, Wonderfontein, the Klip River Valley, and the schemes of the VSL.[35] Interestingly, however, no one particular source was chosen. Rather, the strategy of taking water from several sources was advocated: it was unwise to rely on a single source which could be damaged by accident or intent. Moreover, there was no sound knowledge regarding the long-term potential of any of the water sources.[36]

Although the report of the 1901 Water Commission was not prescriptive regarding the water sources to be used, bold recommendations were propounded regarding the logistics and control of the whole Witwatersrand water supply system. Most significantly, the practice of the private provision of water was denounced because consumers were likely to suffer wherever the quest for profit was a corollary of water provision.[37] Water could never be too cheap nor too plentiful for the promotion of industry and health, and therefore there was "no room for promoters' profits or companies' dividends."[38] The JWEEC, for example, regarded water provision in the same way as the provision of any other commodity, whereas, in effect, the availability of water has a profound effect on the industry, health, and well-being of a community. Furthermore, in view of the urbanization of the Johannesburg area, it became increasingly difficult for people to be self-reliant, and a generally accessible system of water supply was essential. As the town had grown, the JWEEC and the Braamfontein and Vierfontein water companies clung to the practice of providing water only for the wealthy, and a situation of extreme water shortage and deprivation was allowed to develop in poor areas.

As an alternative to the actual and potential abuse of the right of private concessionaires to supply Johannesburg with water, the 1901

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[35] *Ibid.*, paras. 23-32.

[36] *Ibid.*, para. 44.

[37] *Ibid.*, paras. 37 and 43.

[38] *Ibid.*, para. 38.

Commission proposed a radical reorganization of the existing system of water retailing. This scheme outlined the possible absorption of all existing water companies into one body, to be named "The Rand Water Board" (RWB).[39] The essence of this suggestion resonated with the very words of Chamberlain two decades previously, who, whilst surveying the ailing water supply system of Birmingham, said:

> When the purchase of the Water Works comes before you, it will be a question concerning the health of the town.[40]

Indeed, throughout the Commission's deliberations reference was made to examples of British problems and solutions regarding the water question. Even the *final* suggestions of the Commission resembled the London Water Law which was designed to rationalize the water industry. It was proposed that the RWB should supply water in bulk at a uniform price to the various municipalities and mines along the Rand, from Randfontein to Springs.[41] The Commissioners also suggested that the Board should be financed by the Colonial Government.[42]

The report of the WWSC unsettled the JWEEC, which, as the largest and most infamous of the water companies in Johannesburg, had most to lose if the Commission's proposals were implemented. The company endeavoured to negotiate with the Colonial Government directly in order to safeguard its assets.[43] It argued that, in view of the capital invested in the Zuurbekom works, some sort of state donation was necessary to uphold further development.[44] Officialdom responded flatly to this ploy, and was merely strengthened in its determination to create a role for the RWB

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[39] *Ibid.*, para. 36 (i).

[40] Briggs, *op. cit.*, p. 221.

[41] Report of WWSC, para. 36 (v), (vi).

[42] *Ibid.*, para. 36 (iii), (iv).

[43] RWB Unsorted Collection, JWEEC Minutes, 27 November 1902.

[44] *Ibid.*, Letter to Lord Milner, transcript in JWEEC Minutes, 27 November 1902.

entirely distanced from private interest.[45] A new hegemony in the water supply scenario in Johannesburg had arisen.

The Inception of the Rand Water Board

The reign of private water companies, which had lasted nearly two decades, was brought to an end with the first meeting of the RWB on 7 March 1903. The chief concern of the Board appears to have been a quest for suitable staff - especially an engineer - and the drawing up of legislation for the official promulgation of the Board in accordance with the directives of the WWSC.[46]

After the RWB ordinance was published in the Government Gazette of 22 May 1903, the complex problem of the dissolution of the various water companies was tackled.[47] An Arbitration Committee was established in order to value each of the water company's assets. As the Board began to plan for its operations, it was faced with the perennial problem of the expected longevity of the mines and towns on the Rand. A spokesman for the Chamber of Mines postulated that the average life of these mines after 1905 would be no longer than thirteen years.[48] This modest view was proved incorrect, but it held considerable sway with the authorities of the day, who were cognizant of the ephemeral El Dorados elsewhere in the sub-continent. It is reasonable to assume that, at this stage, the Board was planning for only a relatively short-term bulk demand for water on the Rand.

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[45] *Ibid.*, Transcript of letter in reply to JWEEC from Colonial Government, JWEEC Minutes, 27 November 1902.

[46] Report of RWB to Colonial Secretary, 1906; RWB Unsorted Collection, JWEEC Minutes, 7 March, 25 April, 1, 15 May 1903.

[47] Ordinance No. 32 of 1903.

[48] RWB File 108, Report by Acting Secretary Chamber of Mines, to Acting Secretary, RWB, *circa* November 1904.

As the process of the expropriation of water companies began, it was clear that the Braamfontein Water Company and the Vierfontein Syndicate Limited were in a better position than the JWEEC to bargain with the RWB officers, when they came to face the prospect of selling their works and titles. The JWEEC had acquired a poor reputation, whereas the chairman of the VSL approached arbitration confident of the importance of the role of his group in the dealings of the Board: "if they [the VSL] stay out of the Water Board, the Board will only be a partial success."[49]

Although the BWC served a relatively small area, it had a reasonable record of service. This enabled the company to enter into negotiations with the Board without prejudice arising from a poor record. From the two wells in the Sans Souci area, the suburbs of Parktown, Westcliff, The Terrace, and Marienhof had been supplied. The minimum daily quantity available had always been acceptable.[50] The chief concern regarding the ultimate worth of the company was the uncertain quality of the water piping and general reticulation system.[51] Nonetheless, as a whole, the reticulation network and the water sources of the BWC were significant.

The JWEEC maintained a resigned opposition to the RWB's directive for expropriation. Suddenly, after all the years of providing an inadequate service for the Johannesburg populace, the company began to champion the community's needs, and displayed uncharacteristic anxiety over the future provision of water requirements. In concert with this masquerade, the JWEEC pressed ahead with extensions to the reticulation system and pumping plants. These developments were transparent attempts to enlarge the

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[49] RWB Unsorted Collection, Directors' Report of VSL, "Vierfontein Syndicate Limited Ltd. Claimants and Rand Water Board Respondents", 23 September 1903.

[50] RWB File 19E, Secretary, BWC, to Secretary, RWB: RWB File 19B, Memorandum concerning BWC Arbitration, Report by Dr F.H. Hartel, 6 December 1904.

[51] RWB File 13A, Report of the RWB New Arbitration Committee, 10 February 1905.

assets and rescue the credibility of the company as it faced the arbitrators' scrutiny.[52] At an extraordinary general meeting of the company, the chairman declared that it was lamentable that the RWB was compelling it to abandon its schemes when profits appeared so promising.[53] This attitude reflects the company's unswerving patronage to profit, even in its last days.

The process of arbitration was a complex procedure involving, in the instance of each water company, a reckoning of all the relevant assets - from minutiae such as water-level gauges to horses and reservoirs - by the appointed assessors.[54] Eventually the awards for settlement were made - amid much disappointment, for each retribution was lower than the amount proposed by the respective companies' experts. The Board acquired a number of loans which enabled the payment of expropriation bills, and some of the costs of the expropriation payments were recouped when water companies' reticulation systems were sold to the Johannesburg Town Council.[55]

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[52] RWB Unsorted Collection, Special Meeting of JWEEC Directors, 8 April 1904; JWEEC Minutes, 26 November 1903, 26 May, 12 August 1904.

[53] RWB Unsorted Collection, Minutes JWEEC Extraordinary General Meeting, 12 August 1904.

[54] RWB File 13A, Report of New Arbitration Committee, 10 February 1905.

[55] *Ibid.*
Each municipality on the Rand was to be responsible for distributing the water from the Board and therefore needed to purchase the piping and pumping equipment.

Table 5. Arbitration claims and payouts to water concerns. Source: Report of RWB to Colonial Secretary, 1906; *Municipal Magazine*, April 1926.

Water Concern	Amount Requested	Amount Received
JWEEC	£4,031,360	£1,602,191
VSL	£541,405	£505,811
BWC	£115,875	£51 499
Wonderfontein	unknown	£40,088

In the context of the devolution of Johannesburg water companies, it is important to note that private water companies existed in many emergent communities around the world. The history of such companies had aspects similar to those of their Johannesburg counterparts. It would appear that the initial systems of water provision in many cities were devised by private companies, and generally the service was poor. The JWEEC, for example, furthered its ends whilst sheltered within the concessions policy; similarly, the Manhattan Company of New York focused its attention on exploiting its special banking and capital privileges rather than attending to the d .ent local water supply.[56] The common inability of the state to produce better alternative water systems in competition with private enterprise has been attributed to the fact that the provision of water works necessitates a large capital investment and sophisticated long-term planning incommensurate with the capabilities of nascent civic authorities. The eventual sequel to inefficient supply in a town, once the respective bureaucracies have matured to the extent that the necessary administrative and fiscal power can be commanded, is that private concerns are ousted. It is evident, therefore, that the JWEEC's misdemeanours - irrespective of the physical dearth of water which hampered the Company - are typical of the performance of water companies in other urban

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[56] Briggs, *op. cit.*, refers to water companies in England and Australia; H.P. Chudacoff, 1981, *The Evolution of American Urban Society* (Prentice Hall, Englewood Cliffs), refers to New York and other American examples; Hassan, *op. cit.*, also refers to British examples.

communities. The records of the BWC and the VSL were more satisfactory than the record of the JWEEC, albeit within their confined areas of jurisdiction. Yet, in the attempt by the WWSC to rationalize the supply of the whole Rand, the two smaller water companies were also expropriated. This does not signify, however, that the private provision of water is necessarily impractical. In some British towns private water companies established in the eighteenth century continue to function efficiently.[57]

Two government inquiries, which followed directly after the WWSC, indirectly but powerfully reinforced the recognition of the continued urgency of the water supply situation in Johannesburg. The first of these, the *Insanitary Area* Commission (ISAC), concluded its dealings early in 1903.[58] The second investigation, led by the Rand Plague Committee (RPC), confirmed the seriousness of the health situation in parts of Johannesburg. The area which was declared insanitary covered about one hundred and fifty acres of land to the west of the town. It included the "Coolie Location", the streets around the gas-works, and Burgersdorp.[59] The housing in the locale was described as "low class, poor and unsightly"[60] and "crowded like a rabbit warren."[61] The water supply was obtained from shallow wells which were dug by the residents within their dirty yards. Not surprisingly, when the water was analyzed it was found to be polluted; 20 out of 21 samples taken in Burgersdorp by Dr

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[57] Hassan, *op. cit.*

[58] Report of ISAC, 1903.

[59] Report of RPC, 1904, Dr Porter M.O.H., Evidence, Articles 785-788. Refer Figure 3.

[60] *Ibid.*, Dr Porter, Evidence, Article 793 and 840.

[61] Despite the level of overcrowding on site which occurred, the urban fabric of Johannesburg had fortunately not yet progressed to the development of multi-storey buildings, where the arduous physical task of hauling water up stairs made acquisition of water even more difficult. The British case has been documented by D. Fraser and A. Sutcliffe, eds., 1983, *The Pursuit of Urban History* (Edward Arnold, London) p. 209-210.

Porter, the M.O.H., were condemned as being unsafe.[62] The sanitary arrangements were generally primitive: washing, excreting, dumping of rubbish, and drawing water were, perforce, conducted adjacently in the cramped surrounds.

> In the middle of each slop-sodden and ... bestrewn yard there is a well, from which the people get their water supply, and, as in other places, they choose this well for washing purposes, the urinals and water closets being in the immediate vicinity. In one case, the closet is about one pace from the well. I suppose they are a kind of mutual source of supply to each other.[63]

As Dr Porter predicted, the direness of the pollution in the area was a serious danger to the health of the whole town; indeed, shortly thereafter, pneumonic plague broke out in the "Coolie Location".

The Committee which investigated this epidemic further emphasized that the appalling water supply, combined with the overcrowded conditions and decrepit buildings, amounted to a very unsavoury environment, which bred plague. These two reports were poignant reminders of the vital relationship between health and water supply, especially in the poor areas of Johannesburg. The officials commented on the monopolization of water supply by private profit-orientated companies, noting that "every saving in the cost [of water provision] will tell its tale in health returns."[64] The loss of life through the plague showed that it was imperative that plentiful water be accessible to all sectors of the community. Some of the White townspeople in Johannesburg were anxious over the threat to their health which was contained in the squalid areas of town, in view of the interrelationship between water supply and disease had been enunciated through reports on the plague. Subsequently, much concern was voiced in the press regarding the dubious sanitary conditions and the health of those persons who continued to rely on wells for their

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[62] Report of RPC, 1904, Dr Porter, Evidence, Articles 787, 793-5, 802; Church of the Province of South Africa Archive, WITS (CPSA) A 1913; *Cape Times*, 16 March 1903.

[63] Report of RPC, 1904, Dr Porter, Evidence, Article 8

[64] Report of WWSC, para. 38.

water supply.[65] These complaints spurred the initiatives to create a new order in the water supply system of Johannesburg. Furthermore, a great deal of interest was expressed regarding the possibility of the implementation of a water-borne sewerage scheme in Johannesburg. Although this would involve a substantial increase in the demand for water, the benefits which the community would derive in combating disease would be enormous.[66]

Irrespective of the vicissitudes which the townspeople of Johannesburg had to endure, the process of the incorporation of the water companies was well underway before the outbreak of plague. In due course, the RWB acquired the properties of the JWEEC, the VSL, and the BWC.[67] Thereafter the Board assumed responsibility for supplying all concerns on the Rand with water.

Initially, the Board took most of its water from the shafts at Zuurbekom, along with a small contribution from the sources which had previously been exploited within Johannesburg. Plentiful water was not a feature of the initial service, however, as only two-and-a-half gallons was supplied each day to consumers on the Rand - a quantity which even the Board's officials later described as "barely sufficient".[68] A further example of the persistence of long-standing water supply problems is elucidated in the pages of the analysts' reports which were submitted to the M.O.H. in Johannesburg. Investigations conducted some months after the Board took control in Johannesburg revealed that the quality varied

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[65] CPSA A 1913; *Rand Daily Mail*, 30 January, 15 December 1903; *Star*, 11 March 1903.

[66] CPSA A 1913, *Transvaal Leader*, 11 September, 9 October, 2 December 1903; *Star*, 4 July, 19 August, 20 August, 11 September 1902.

[67] RWB, 1923, *Souvenir of the Opening of the Vaal River Scheme by His Royal Highness Prince Arthur of Connaught, Governor-General of the Union of South Africa*, Hortors, Johannesburg.

[68] *Ibid*, p. 4; RWB File 1, *Transvaal Leader*. 7 September 1903; *Rand Daily Mail*, 8 September 1903.

greatly from "excellent for drinking purposes" to "unfit for human consumption."[69] As had been the case with the JWEEC's supply, water from disparate sources mingled in the pipes and contamination from the poor sources was spread about the town. The water sources in Braamfontein and Parktown, and the Sans Souci wells formerly used by the EWC, became polluted because of the expansion of settlement in the immediate catchment area.[70]

Not surprisingly, the RWB began work on devising a scheme for the purification of water soon after the submission of the chemists' reports in 1905.[71] This was the obvious solution to the problem of contamination from surface runoff and seepage into underground water sources, but it had ostensibly been out of reach for private companies which could not afford the expense. The immensity of the task of purification was recognized by the 1901 Water Commission, which argued that river water was barely worth considering because it required filtering. However, as the water in Johannesburg had become steadily more polluted since the inception of formal settlement, the Commissioners' counsel was short-sighted. As the RWB discovered, the risks associated with the use of raw ground water became prohibitive in an urban community. Fortunately the Board had access to the necessary finance, and the town itself was at a sufficiently mature stage to launch a purification scheme which mitigated against the long-suffered problem of foul water. The advent of filtration was subsequently followed by the establishment of the first sewerage scheme in Johannesburg, which further militated against the threat of water contamination and disease.[72]

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[69] RWB File 193, Report by W. Parkes, Government Analyst, 17 September 1905; Report by A. Heyman, Chemical Analyst, 5 October 1905.

[70] RWB File 19 A2, RWB Chief Engineer's Report to Works Committee, no. 182, 23 May 1906; RWB, File 193, RWB Chief Engineer's Report to Finance and Executive Committee, no. 183.

[71] RWB, 1923, *op. cit.*

[72] Shorten, *op. cit.*

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The RWB had certain financial and authoritative advantages over the ousted private water companies, including much closer co-operation from the government, more freedom within legislation, and access to the colonial budget. However, the Board inherited the water supply scenario of its predecessors: despite its innovative strategy of pooling the water from all the accessible sources, the new water authority had to contend with the aging reticulation systems, the climatic peculiarities of the Rand, and the ever increasing contamination of underground water. Consequently, the quality of its initial service was not a great deal better than that of the former retailers. Nonetheless, the formation of the RWB was a structural achievement in that the Board rationalized the previously disparate water sources into a system which operated - at least theoretically - for the purpose of meeting consumers' needs rather than for the creation of profit. Ironically, however, the new control of water provision comprised a monopoly - which was precisely the arrangement that had been so adamantly contested by the public authorities themselves. Thus in a multitude of ways the RWB received and perpetuated the weaknesses in the previous system, and, consequently, community well-being and the experience of water acquisition in the houses, slums, industries, and mines of Johannesburg was scarcely ameliorated.

CONCLUSION

The main protagonists influencing water provision in early Johannesburg were the state, both local and national, and private entrepreneurs. Each of these parties, in isolation and in response to one another, had a specific impact on the water scenario.

The Volksraad's response to Johannesburg's water needs was circumscribed by its fiscal and administrative weakness. Through the concession policy, control over water was delegated to a small number of monied individuals. The state did not oversee the execution of the agreements, however, and unsatisfactory service was overlooked. The central state made some ineffectual attempts to find alternative water schemes in concert with the Johannesburg authorities, but the reign of the concessionaires went unchallenged. It was not until the imposition of British rule that this situation was addressed. The new regime drew upon the financial resources of the colonial empire and experience gained in British towns in its attempts to reorganize the water supply system. It is clear that, whilst the Volksraad was an immature body in comparison with British state apparatus, it avoided responsibility for the water supply. Besides, it espoused corruption by reaping the financial benefits of the concession system without ensuring the provision of an adequate service.

Prior to the *Tweede Vryheidsoorlog*, Johannesburg's local authorities endured a menial status. They merely operated within the narrow confines set down by the Volksraad, and did not have the autonomy to implement significant municipal innovations unless underwritten by the central government. Moreover, the state received a great deal of revenue from the Rand without any reciprocal largess with the provision of services. With respect to water supply, the local authorities in Johannesburg -

unlike the Volksraad - recognized and opposed the ineptness of the private water companies. Further distance was wrought been central and local state, after the granting of Municipal status, through the introduction of preferential representation for *burgers*. As a result of the authorities' lack of autonomy, considerable tension was generated through the juxtaposition of the officials' role as custodians of community health and their relative powerlessness concerning the water supply: their control over health was contingent upon control over water. Prompted by their dissatisfaction with the water supply, the officials undertook independent and joint investigations into alternative water schemes. However, little was achieved because of the superficial nature of these inquiries. The net result of the impotence of the local authority was the *further untrammeled reign of the private water companies*.

Between the two levels of state authority resided the private water companies. The power of these firms which originated in their right to supply water, was underpinned by mining capital and land ownership, and this combination was an effective thrust and parry against the demands of the local state. These companies did not provide a widely affordable or efficient service because of their orientation towards short-term profit maximization: water was merely supplied as a profit making venture with no regard to the social corollaries of its supply or non-supply. The varying degrees of reputable and disreputable service offered by these companies, however, manifests that private control of water supply is not necessarily flawed: the system of private control invited exploitation through the monopolization of a scarce resource, but it was not intrinsically inappropriate.

The people of Johannesburg did not remain mute through the hardship caused by the continual dearth of water. The monied and enfranchised sectors of the community protested against the hindrance caused to industry, mining, and community well-being. Their views won representation from the local authorities and in the press, but to no

avail. The poor and the disenfranchised in the settlement could neither afford reticulated water nor were they likely to be supplied by a water company. Furthermore, they were severely affected by the decline in the quality and availability of ground water. This sector of the community bore the brunt of the health-related problems caused by foul water.

In Johannesburg's early years conflict arose over water provision and consumption because of a quintessential difference in perceptions of the value of water. Arguably, in an urban community, water may be regarded either as a marketable commodity or as a public utility. The private water companies which operated in Johannesburg supplied water as they might have supplied any other commodity - in order to create the most profit. The local authorities were more sensitive to the simple human need for plentiful water, and supported the right of individuals to its supply. The central government, on the other hand, vacillated in its patronage of either view, at once deriving income from the concession policy and attempting to initiate a more efficient water supply system. Moreover, the Volksraad sequestered access to water sources through its cumbersome riparian rights policy. The various spheres of activity in Johannesburg, from the individual household to the shops and the mines, keenly felt the opposition of views regarding the value of water. Townspeople's day-to-day experience of the paucity of water supply underlined the necessity for open accessibility to water provision.

It is clear from the aforegoing discussion that the pace of the provision of services in Johannesburg was at no time equal to the pace of urbanization. With regard to water supply, most facets of life were adversely affected by this imbalance and the resultant deplorable water supply - a thorough analysis of the evolution of the town cannot discount the pervasive effect of this deficiency. In the broader context, the corollary of a demonstration of the importance of water supply within the urban scenario, is that other elements of a settlement - such as bureaucracy, wealth creation, industry, or health - cannot be fully

apprehended without the recognition of the role of the provision of this basic public utility. Moreover, the intertwining of water provision and the evolution of a town is not peculiar to Johannesburg, but to all urban places. In considering urbanization, therefore, human geographers should be cognizant of the issue of water supply because it has a critical impact on a community, and because it elucidates others aspects of development. Furthermore, the significance of water provision and consumption is especially marked in the formative years of a settlement, making this issue particularly relevant to Historical Geographers concerned with urban landscapes of the past. In Johannesburg's early years as a burgeoning mining town, water provision, which had the potential to be the cornerstone of development, became instead a stumbling block to industrial and community progress.

APPENDIX 1

Source: RWB Unsorted Collection.

Text of Deed of Agreement entered into between the Government of the South African Republic and James Sivewright of Cape Town granting him the right to lay pipes along the streets of Johannesburg on the following terms:

1. That the Contractor or his assigns shall within six months form a Company and register the same according to Law, the Company shall be named the Johannesburg Waterworks Estate and Exploration Company Limited.

2. That the right will remain in force as long as the Company is the owner or lessor of water on the farm DOORNFONTEIN.

6. The water must be pure and fit for use.

7. That a start shall be made with the work within four months (4 months) and it shall be completed within two years reckoned from the date of this concession.

8. That the water shall be delivered free of charge to all Government Offices, buildings, and Hospitals at Johannesburg provided that the maximum of 800 gallons per day is not exceeded.

9. That the price of water delivered to the public shall not exceed (4/-) four shillings per hundred gallons.

10. That all excavations made by the Company in streets or roads shall be fenced in and at night lights shall be placed at distances of fifty yards apart.

16. That no encroachment on private property shall be made without the consent of the owners.

17. The Government does not guarantee the right of this water to the public.

18. Should the Company, at any time, lose its rights to the aforementioned water, the Government has the right to take over all pipes and other equipment belonging to the Company.

ADDENDUM

It must be distinctly understood that no monopoly is created by the granting of this right, and that by the granting hereof other persons or companies are not prohibited from bringing water to Johannesburg.

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The references are organized in terms of a basic division between primary and secondary sources. The category of primary sources is divided into sections consisting of archival material, commission and inquiry reports, and newspapers and periodicals. The category of secondary sources includes all books, articles, dissertations, and theses referred to in footnotes in the text.

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Author Cosser Elaine Margaret
Name of thesis Water Supply And Utilization In Johannesburg, 1886-1905. 1987

PUBLISHER:
University of the Witwatersrand, Johannesburg
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