Frankfurter Wirtschafts- und Sozialgeographische Schriften

Herausgegeben von
G. Gruber • H. Lamping • W. Lutz • E. W. Schamp

Schriftleitung R. Müller

Heft 60

Namibian Roads in History

From the 13th Century till Today

Klaus Dierks

Im Selbstverlag des Institutes für Wirtschafts- und Sozialgeographie
der Johann Wolfgang Goethe-Universität Frankfurt/Main
1992

Überseeische Strukturforschung

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This book is dedicated to my wife
Karen Dierks

Contents Page

Editors Notes

Der vorliegende Band ist die dritte Veröffentlichung, die aus der Zusammenarbeit der Deutsch-Namibischen Gesellschaft e.V. (Klaus A. Heß) und des Instituts für Wirtschafts- und Sozialgeographie der Johann Wolfgang Goethe - Universität Frankfurt am Main (Prof. Dr. H. Lamping) hervorgegangen ist.

Diese Arbeitsgemeinschaft ist, wie dieser Band zeigt, nicht auf Frankfurt beschränkt, in ihr können alle anderen Institutionen und Personen mitarbeiten, die sich wissenschaftlich mit Namibia befassen. Die Arbeitsgruppe in Frankfurt versteht sich als Kristallisationskern für die Zusammenarbeit und den Austausch im Bereich wissenschaftlicher Forschung. Kontakte zu und mit allen relevanten Institutionen/Personen sind angestrebt.

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Foreword

The history of Namibian roads is a story of the creation and development of one of Namibia's biggest and most vital assets - its roads system. Roads are a prerequisite to progress. The prosperity, welfare and socio-economic development of all inhabitants and the success of the country can be accurately measured in terms of the quality and quantity of the roads that will serve it. Compared to other African countries and seen in relation to the small population and the large size of the country, Namibia possesses an exceptionally well developed but unbalanced roads infrastructure. This comprehensiveness of the development of a roads system is all the more remarkable since the long distances, the wide dispersal of the population, the lack of professional and other personnel and the numerous natural obstacles make the construction and maintenance of roads an expensive undertaking.

The pace of progress in the unfolding of Namibia's roads infrastructure cannot be overlooked - it was not achieved easily or cheaply. The problems and difficulties of this development were sometimes demoralising, often unique and always onerous. Namibia is a land of many faces: from inhospitable deserts and hard rocky outcrops to rugged mountains and undulating plains. Each of these presented different problems to the road builder - some areas, barren and waterless, while others offer -one

of the biggest structural problems- no appropriate road building materials. Substitutes had to be found, new techniques had to be devised and applied and many innovations had to be developed. Due to its experience in unused and widely diversified conditions the Namibian road authorities are today recognised as a world authority on certain aspects of appropriate road construction techniques in developing countries.

It is against this background that I wish to commend Klaus Dierks for his profound historical study of the build-up of Namibia's history of roads. This history reflects not only the technical growth of Namibia's roads system but a history of a land filled with many contrasts. It is a troubled history which mirrors a remarkable but painful chronicle of Namibia's unfolding. The study is significant in many respects.

Firstly, the study is meaningful because of its impressive originality. Namibia's history of its technical infrastructures, like roads, has received less or no attention in academic literature than have many other fields of Namibian history.

Secondly, Namibia's history of roads presents a number of features which it has in common with other socio-economic developments. Klaus Dierks has, in my view, succeeded in describing Namibia's history in the mirror of its history of roads. This history can be divided into the pre-colonial era from approximately 1250 A.D. for which time the first archaeological evidence for human made transport routes exists to 1884 when the German colonial power was established. This period can be subdivided into four eras: firstly the prehistoric era from ca 1250 to ca 1770, secondly the era of the Orlams and the first Europeans from ca 1770 to 1840, thirdly the era of Jonker Afrikaner from ca 1840 to ca 1860 and finally the pre-German era from ca 1860 to 1884. The period of German administration from 1884 to 1915 can be subdivided into two sections: the initial (1884-1896) and the consolidation (1896-1915) eras of the German occupation. The South African era can be sub-divided into five periods: firstly from 1915 to 1937 (taking over of roads by the SWA Administration's Works Branch), secondly from 1937 to 1945 (appointment of first professional engineering staff), thirdly from 1945 to 1952 (establishment of a separate Roads Department), and then from 1952 to 1965 (beginning of the modern expansion of the Namibian roads system) and finally the period of the recent roads developments to the date of independence of the Republic of Namibia on 21 March 1990.

Thirdly, Dierks' study showed with evident clarity that from the middle of the 19th century onwards Namibia's roads were developed solely for the interests of the different colonial powers in Namibia. It were the missionary/trader alliance since the

1850's, later the German and since the First World War the South African colonial powers who were the main beneficiaries of any road building activities. Namibia's history of colonisation, oppression and exploitation as well as land alienation is echoed by its roads history. However, the study traces not so much the history of domination as that of Namibian resistance against the various colonising powers. Even roads played a great role in the history of the Namibian resistance struggle against colonialism and apartheid with the final objective of complete independence.

It is in the light of above remarks that I believe that Dierks' works on the roads history of Namibia constitutes not only a mirror of Namibia's troubled history of colonising development to the final victory of the people but also a significant contribution to the technical history of physical infrastructures in this vast country. It is against this background that I recommend that this study should not only be read by the engineering planners, designers and builders of roads but also by those who wish to understand better Namibia and its people, its physical and technical features as well as their past and present problems and the future prospects of road developments in the interest of all its people.

Sam Nujoma

President of the Republic of Namibia

State House
22 January 1992

1. Introduction to the History of Roads in Namibia

If all existing scientific, historical and political as well as socio-economic bibliographies on Namibia are studied, the striking fact comes to mind that of more than 1.500 different publications not one deals with roads in Namibia.[1]

Before any optimised appropriate roads model for the independent Republic of Namibia can be developed, the history of roads in Namibia should be known. Due to the fact that this sector of Namibian history is so far "terra incognita", new findings can be expected. The history of transport, as far as roads are concerned, will be investigated from the early days of Namibia (around 1250) to the year 1987. 1987 was chosen because this was the year the author left the Namibian Department of Transport, the former Roads Department. During more than 20 years of involvement in Namibian roads he was involved in the rapid development of a modern roads system which had taken place to the current high but unbalanced status-quo of roads in Namibia.

The History of Roads is divided into the precolonial era from approximately 1250 A.D., at which time the first archaeological evidence of human made roads exists, to 1884, when the German colonial power was established. This period will be subdivided into four eras: firstly the prehistoric era from circa 1250 to circa 1770, secondly the era of the Orlams and the first Europeans from circa 1770 to 1840, thirdly the era of Jonker Afrikaner from circa 1840 to circa 1860, and finally the pre-German era from circa 1860 to 1884. The period of the German administration from 1884 to 1915 will be subdivided into two sections: the initial and the consolidation eras of the German occupation. The South African era will be sub-divided into five periods: firstly from 1920 to 1937 (the roads function was taken over by the SWA Administration's Works Branch), secondly from 1937 to 1945 (the first professional roads staff was appointed), thirdly from 1945 to 1952 (a separate Roads Department was established), and then from 1952 to 1965, the beginning of the modern expansion of the Namibian roads system with the final period of the recent development.

The first phase of the Namibian history of roads gives some quite unique problems to the historical researcher which are of particular interest and concern. Except for

1 Eriksen, Tore Linne: The Political Economy of Namibia - An Annotated, Critical Bibliography, The Scandinavian Institute of African Studies in Cooperation with the United Nations Institute for Namibia and the Norwegian Institute of International Affairs, 1985. See also: "NAMLIT": database query of the University of Bremen: Namibia Project: for "roads".

the fragmentary, contradictory or completely missing historical sources in regard to road and transport matters in the early days of Namibia, the gothic handwriting of German missionaries and officials creates an exceptional problem which is not always easily overcome. Especially the pre-German era is a difficult period in which to trace reliable historical sources relating to transportation and roads in Namibia prior to 1890. At least since 1898, the German colonial period is well documented as far as roads are concerned. The sources from the period of the South African mandatory power ignore all road developments prior to 1920, partly due to the fact that no systematic research regarding the early roads system have ever been undertaken. It presents no problem to find the necessary material to write the history of roads after 1920. The records of the South African and the SWA-Roads Department periods are mainly in quite an unsorted state of affairs and consequently add to the difficulties,of the researcher.

The starting point for all research on the first Namibian roads is represented by Heinrich Vedder's books. Frequently, however, these works have to be used with caution because in many cases they do not relate directly to any primary historical source. From Vedder the research on roads will be expanded into the early traveller's narratives as well as the missionaries and traders reports. Two particular important sources are the Carl Hugo Hahn diaries and the Andersson papers.

Other historical data referring to the pre-colonial period can be found in the missionary records of the Rhenish and the London Mission Societies. Of the missionary reports the outstanding works of the Wesleyan missionary, Benjamin Ridsdale, have to be mentioned as a primary source of the history of road developments in the pre-colonial era. Reliable travelling, trader and settler transport and especially road building evidence are only scarcely available from this period. However, other important evidence is available in the publications by the Van Riebeeck Society in Cape Town, the records of the Wesleyan Missionary Society and the extensive extracts done by E. Moritz in 1915 as well as in the "Jahresberichte" (Annual Reports). Some isolated sources from the Cape Archives, such as the reports of the Special Commissioner of the Cape Government in the 1870s, Palgrave, and from the Cory Library in Grahamstown have provided some useful material.

The early recorded history of Namibian roads cannot be separated from that of the early European explorers, adventurers, traders and missionaries who opened up this country to the outside world in the 18th and 19th century, but who also created the basis for the colonial status of Namibia, a period ended only in 1990. The history of

the opening of Namibia for modern transport will be investigated and also the first ox-wagon road network will be evaluated. An assessment of these first road systems will be undertaken for the years 1836/37, 1845, 1879, 1894 and 1904. The last evaluation will make a comparison to the present-day roads system. Before 1836/37 no reliable maps of Namibia exist. Due to the fact that the Namibian ox-wagon roads in the 19th century were not set up and constituted in a legal sense, that is to say they were not proclaimed, this investigation and appraisal of the pre-colonial roads systems will result in many new findings as far as the transport history of the country, the early transport routes and ox-wagon roads and the identity of forgotten places are concerned. From 1898 onwards, roads in Namibia were proclaimed by means of road proclamation acts, and from this date onwards they were fixed in a legal sense.

In order to write the early history of transportation in Namibia before the advent of the German colonial system, it is necessary to study and evaluate the above mentioned early historical sources and numerous publications by explorers, travellers, adventurers, traders and missionaries from 1761 onwards. This work is mainly a re-constructive one, but it is pertinent to evaluate as many available historical sources as possible, in order to bring them into a logical order and to assess them from road and transport viewpoints.

The manifold old road records from the German colonial period from the 1890s to 1915 as well as some literature dealing with transport and road matters will be worked through and evaluated in order to document a consistent transport and road development for this era of the Namibian history. An effort will be made to show the colonial character of the roads system which has mainly been geared to create the basis for a German "settler's colony" with the grim consequences for the Namibian indigenes, as far as dispossession and depriving of human rights are concerned.

The mandatory period of the Union, the later Republic of South Africa, is in many aspects a continuation of the objectives of the German colonial era as far as the further development of a roads system in Namibia is concerned. For the periods 1920 to 1987 the old road records in the Windhoek State Archives and in the Department of Transport as well as the reports from the mandatory power, the Union of South Africa, to the League of Nations and the findings of the Namibia court case before the International Court at The Hague will be investigated in order to assess the status quo of the Namibian transport system as far as roads are concerned. Besides these reconstructive works efforts have been made to verify as many historical facts as possible by comparing the findings with the present-day real situation in the field as

far as these old road tracks are concerned. The author's profound knowledge of the Namibian roads system, which has been gained during more than twenty years of experience as roads engineer, is of great value in this regard.

2. The Precolonial History of Namibian Roads

2.1 The Prehistoric Era circa 1250 - circa 1770

Nothing is known about roads in the early days of Namibia. In pre-historical times the Namibian indigenes used tracks made by elephants proceeding from one water hole to the other. The original hunter and gatherer society as well as the early pastoral communities in Namibia did not have a need for systematic transport links. This pattern apparently changed in the 13th century when a re-arrangement of economic scale took place from the early stock-farming enterprises to much larger pastoral structures. During this period people began to leave the mountains and move to the plains with the consequent first developments of some form of trade patterns.[2]

Somewhere during this period the first human initiated road links must have come into existence in Namibia. This has been established by archaeological research whose results can be dated to approximately 700 years ago.[3]

Nomadic people in the central Namib Desert built these first pathways. For many centuries this pastoral, nomadic way of life, which created the basis for these roads, dominated the economy in the western parts of Namibia. These early roads are not mentioned in recorded history, which began only in the 18th century. It was the archaeologist and not the historian who found proof of these first transport links in Namibia.

A unique site of these pathways was discovered by John Kinahan during 1983 and is situated in the south-western parts of the Brandberg mountains in the Hungorob River valley, which dewaters into the Messum River. From the entrance of the Hungorob valley into the interior of the Brandberg massif there is only one practicable route within the ravine itself. In the higher regions of the Brandberg the terrain is relatively open. This also holds true below the 1.000 m contour where there is easy access from the plains to the waterholes within the mountains. It was the most difficult part on this access route to the waterholes between 1.000 m and 1.200 m which required improvements by means of an artificial pathway. Kinahan (1986) reported as follows:

2 Kinahan, J.: Personal information to author during April 1987.

3 Kinahan, J.: The Archaeological Structure of Pastoral Production in the Central Namib Desert, SA Archaeological Society, Goodwin Series, Volume 5, 1986, p. 78

"The pathway leaves the course of the ravine just above the 1.000 m contour by way of an erosion gully. Its route is marked by two distinctive kinds of features. Small cairns of cleared rubble occur on the sides of the pathway, which is rendered more navigable still by filled ground where fissures and sudden drops occur. In some places, vertical gaps between boulders have been tightly packed with rubble and near the top of the pathway, rough walling delineates the route and deflects it from steep slopes. Several reliable waterholes are situated within reach of the pathway and a series of camp sites marked by the remains of huts and stock enclosures lie along its route. Beyond the 1.200 m contour, no further sign of the pathway was found in this part of the ravine. The pathway appears to have been repaired and to have occasionally altered its course during use. If this was the route used by all the herders who exploited the upper Hungorob pastures, the pathway represents their combined labour beyond the residential sites."

Although the Hungorob pathway site is the only indication of any road making activity in the early days of Namibia, it can be assumed that more such sites may exist. The recorded history of roads and road transportation begins, however, only around 1750 when, due to the arrival of European settlers, the pastoral economy of the early Namibian times was already in a stage of collapse. A similar pathway has recently been established at the old Nama fortress //Khauxa!nas or Schans Vlakte, the oldest systematic urban structure in Namibia which has been discovered by the author of this paper, and which will be dealt with at a later stage.

The very limited data of the prehistoric era of Namibian transport routes reflects the available historic source material. However, it has to be mentioned that it is possible that many more pathways than the two identified ones existed in the early days.

2.2 The Era of the Orlams circa 1770 - circa 1840

As from the second half of the 18th century Orlam communities of Nama descent escaping from the growing colonialising efforts of European settlers in the Cape Colony in South Africa as well as European adventures, explorers and traders began to penetrate Namibia. Before the Orlam migrations the different original Nama groups in the southern parts of Namibia lived in well-structured, independent and resourceful African societies, as reported by the first missionaries of the London and Wesleyan Societies.[4] This favourable socio-economic pattern was not only drastically disturbed

4 Cape Archives: LMS Journals: Albrecht 1808, Schmelen 1816, Kitchingman 1820 as well as many other references in the 'Transactions of the London Missionary Society' and the 'Wesleyan Missionary Notices'.

by an increasing European influence but also by the Orlam immigrations. The first few European explorers who arrived in the second half of the 18th century and the first missionaries who arrived shortly after 1800 did not mention any Nama or Orlam road-making activities.

The Orlams and the first European travellers all came from the south because the barren Namib Desert prohibited any access into the Namibian interior from the Atlantic coast. Most of them came from the Copper Mountains in the Cape Province of South Africa, where the town of Springbok is now situated. The ox-wagon route to the Orange River contained difficult sandy stretches and rugged mountainous terrain, and water was scarce, but it must have been well-known to some of the local inhabitants, because three grants to graziers of loan-places on the south bank of the Orange had actually been made as early as 1776-77.[5]

The first explorers on record who entered Namibia from the Orange River were Jacobus Coetzee and Hendrik Hop as well as the surveyor Carel Frederik Brink, who drew up the first map of the Namibian south.[6] Pieter de Bruyn, Willem van Wyk and others reached and probably crossed the Orange during 1738. Many more were to follow, such as Wikar, Paterson, Gordon, Le Vaillant, Willem van Reenen and Pieter Brand.[7] They all more or less followed the same direction to the Orange River. It is not surprising that in this arid region successive travellers adhered to the same well-proven route.[8] They reached the Orange most probably at the drift of Goodhouse, whose name has been derived from the Nama name "Gudaos" (Sheep Ford), the closest and most accessible point to a traveller coming from the Copper Mountains. Because of deficient pasturage at Goodhouse many travellers preferred to cross the Orange at Ramans Drift (also: "Compagnies Wagedrift", near //Haraxas Drift (Knorhaan Ford)).

5 Mossop, E. E. ed.: The Journal of Hendrik Jacob Wikar (1779), p. 16-201; The Journals of Jacob Coetzee (1760), p. 279-283 and Willem van Reenen (1791), p. 301-317, The Van Riebeeck Society, Cape Town, 1935

6 Mossop, E. E. ed.: The Journals of Brink and Rhenius, being The Journal of Carel Frederik Brink of the Journey into Great Namaqualand, (1761-62), made by Captein Hendrik Hop, The Van Riebeeck Society, Cape Town, 1947, p. 25-61; p. 94 and p. 113-115

7 Vedder, Heinrich: Südwestafrikas Geschichte bis zum Tode Mahareros 1890: 1.Teil: Namaland und Hereroland, Amboland: Kapitel 1: Entdeckung und Erforschung, SWA Wissenschaftliche Gesellschaft, Windhoek, 1973, p. 18-40

8 Le Vaillant, Francois: Traveller in South Africa: Vernon S. Forbes: Le Vaillant's Travels in South Africa, 1781-1794, Library of Parliament, Cape Town, South Africa, 1973, p. 80-91

Jacobus Coetzee proceeded during 1760 to Dabi≠gabis (Dabegabis 122 (present-day farm numbers)) at the western bank of the //Houm River (Hom River), a point north of the hot springs of Warmbad, while the expedition of Hendrik Hop reached the Chamob River (Löwenfluss) north of the Great Karas Mountains on 22 November 1761. During the Hop expedition Jacobus Coetzee and Pieter Marais proceeded to the Fish River on 25 November 1761. Hendrik Jacob Wikar visited the areas south and north of the Orange in 1778/79. During the years 1778 and 1779, William Paterson undertook two journeys to areas in the vicinity of the Orange River, which was named by Robert Jacob Gordon in honour of the Dutch Royal dynasty in 1777.[9] Before this it was called Garieb (!Garib) or Great River. Francois Le Vaillant reached the Orange in 1783. The long journey that Le Vaillant claims to have made into what is now Namibia can only be regarded as imaginary. During 1791/92 Willem van Reenen and Pieter Brand proceeded as far as to the area of Rehoboth and probably to the Auas Mountains. They did not, however, reach Hereroland in northern Namibia. Two brothers of Willem van Reenen, Dirk Gijsberg and Sebastiaan Valentijn van Reenen, and Pieter Pienaar sailed with the ship "Meermin" to Walvis Bay in 1793 and were the first travellers on record who entered the Namibian interior through the Swakop valley.[10]

All these explorers, fortune seekers, game hunters and adventurers used rugged ox-wagons to cross Namibia's natural terrain without having any constructed, man-made roads at their disposal. They followed the easiest way which they were able to find, here and there improving some difficult stretches in order to be able to surmount the most impossible obstacles on their way into the unknown interior of Namibia.

The first "White" to settle in Namibia was most probably Guilliam Visagie, who around 1785 established himself in ≠Nu≠goaes (Swartmodder), the subsequent Keetmanshoop. The brothers, Abraham and Christian Albrecht, from the London Missionary Society in Warmbad initiated the first brick house in Namibia on 3 February 1806. But it took many more years before any roads in a modern sense came into existence. Heinrich Vedder writes the following about the period of circa 1810:[11]

9 Paterson, William: Into the Country of the Hottentots and Caffraria in the Years 1777, 1778 and 1779, The State Library, Pretoria, Microfiche Reprint Series No.2, 1789, p. 60 op.cit.

10 Franken, J. L. M. ed.: Duminy Diaries (P.Pienaar: 1793), The Van Riebeeck Society, Cape Town, 1938, p. 284 and 292-294 as well as p. 315-317

11 See Vedder,H.(translation): 2.Teil: Namaland gegen Hereroland: Kapitel 1: Aufmarsch und Kampf: 1800 - 1840, p. 209-210

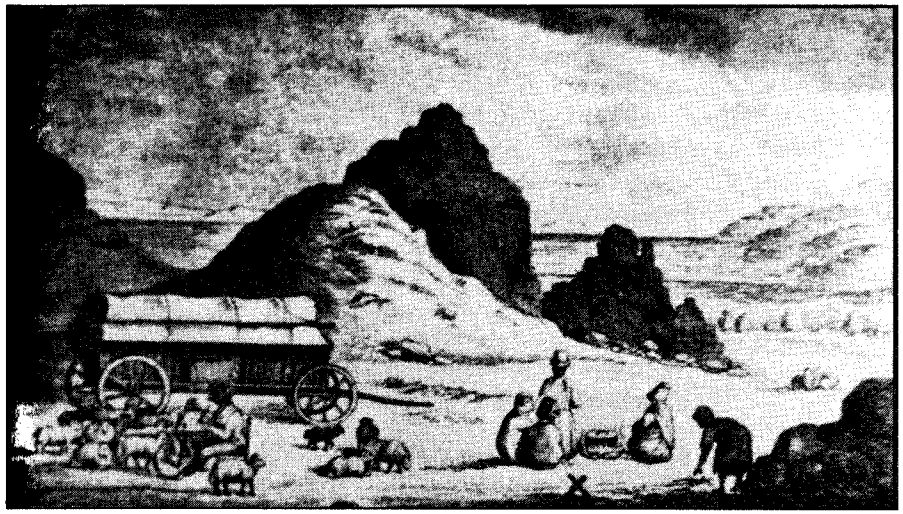


Fig. 1: Knudsen travelling: 1842 Windhoek State Archives

"When the ox-wagon made its appearance in South West Africa, the old footpath were no longer of any use, it was not only that they were too narrow, but they often went over lofty mountain ranges and so compelled the wagon driver to make a new road somewhere else. The next wagon generally followed the spoors of the previous one, for wagon spoors remain visible in Africa for a long time. There is every justification for doing this, for if the first wagon reached its destination the one that follows it has a very good prospect of reaching it too. It was thus that the first roads came into existence and these were the roads to Warmbad and from Warmbad to the north, and the road to Sendlings Drift over the Orange River and from there along Schmelen's roads, which Alexander took, also to the Kuiseb River and Walvis Bay. Schmelen laid down, too, the first part of the road to the sea at Lüderitzbucht."

With the increasing activities of European missionaries in Namibia and with more travellers entering "Great Namaland" north of the Orange River, the first permanent ox-wagon roads were established. However, it has to be said that these so-called "roads" did not deserve this term, because until far into the 20th century they were nothing more than slightly improved natural rough African terrain. The Bushmen, however, respected Johann Heinrich Schmelen's ox-wagon as a special kind of animal when they encountered the missionary travelled in a northwards direction via Büll-spoort to the Kuiseb River. When one of the wheels of the wagon broke, the vehicle was duly abandoned in the desert, and Schmelen decided to replace the ox-wagon

with the more reliable method of riding the ox. The Bushmen, in any case, did not attempt to touch the wagon tracks but jumped over them in large steps.[12]

It also has to be mentioned that nothing constructive is known to-date about the establishment of roads in the Warmbad region in the early 1800s, although Schmelen was in Warmbad once in September/October 1812. In spite of this, it is generally accepted that the first road builder so far on record in the history of Namibia was Johann Heinrich Schmelen, who came to Namibia on the invitation of the "Kaptein" (Captain) of the Orlams (Booi People) in Bethanien in 1814. The decisive motive for any road building activity was not to have a road link to the Cape Colony but rather to open a road to the coast to Angra Pequena in order to achieve contact with occasional ships there. Especially the trade with weapons and ammunition was important for the Orlams of Bethanien. This first "Bay Road" to Angra Peqûena was initiated during Schmelen's stay at Bethanien from 1814 to 1822. The missionary James Kitchingman visited Schmelen in 1820. His diary from 29 May 1820 reads as follows:[13]

"Brother Schmelen's people had been employed for some time in mending the road in hopes of in some future period obtaining some necessary articles from there" (from Angra Pequena).

It is also on record in the journals of the London Missionary Society that the "Kaptein" and his "Raad" (Council), during the late 1810s, were involved in road construction activities, especially to the Bay of Angra Pequena.[14] It is not yet too clear how far these activities of the Orlam group in Bethanien were influenced by the efforts of Heinrich Schmelen. One fact is certain, and that is that both Schmelen and the Orlams of Bethanien were interested in such road links, albeit they acted from different motives.

12 Ibid.

13 Letters and Journals of Missionaries of the London Missionary Society, Cape Archives, Cape Town. Many explanations have been given for the name "Orlam" in the literature on Namibia. One version is that it is derived from the Malay expression "orange lama", a man of long life, meaning an old, experienced servant. "Orlam" must be accentuated on the second syllable. Another popular version comes from the Afrikaans language where "oorlam", a word of unknown origin, means "cunning" or "sly". The Orlams were also known by the collective name "Afrikaners" by the Europeans of the Cape Colony during the 18th century. Thus both names are not original African concepts.

14 Journals of the London Mission Society: Schmelen, 1819, Cape Archives, Cape Town, South Africa, p. 7

By order of the "Royal Geographic Society" in London, Sir James Edward Alexander undertook an expedition during 1836/37 from Cape Town to Walvis Bay via Warmbad, Bethanien and back via Glenelg Bath, which is modern-day Rehoboth. He took the usual route to the Orange River and crossed it in November 1836 at Karahas Ford near Ramans Drift. On 27 November 1836, Alexander reached Warmbad. From there he undertook an excursion to the Afrikaner's Kraal at Blydeverwacht. In January 1837, Alexander left Warmbad to undertake an excursion to "Robber Henrick's Place" (or "Räuber Heinrich's Platz" on Richter's Map of 1845), situated east of the Great Karas Mountains at a tributary of the Gaiab River (Kainab River). He left his wagons at Kanus and reached the fountains of Kama Kams near Henrick's place. Recent investigations (March 1988) have revealed that "Robber Henrick's Place", which could be synonymous with Ridsdale's Klipfontein, in all probability is situated on the farm Narudas 268. The old stone ruins at the southern entrance to the Narudas Gorge are most probably of pre-German origin and fit into Alexander's and Ridsdale's descriptions of the main settlement of the //Hawoben in the 1830s and 1840s.[15]

From there he returned to Kanus on 28 January 1837 in order to proceed to Bethanien. Alexander passed the deserted missionary station in March 1837. Jan and Hendrik Booi from the Bethanien-Orlams assisted and guided him on his further travels to the north. From Bethanien he travelled through the Konkiep and Haseweb valleys to the Naukluft Mountains, which he entered through the "Bull's Mouth Pass". From there he set a course via Abbabis to the Kuiseb River. Alexander arrived at Walvis Bay on 19 April 1837.[16]

From Walvis Bay he travelled in an eastward direction to Ni-ais and Glenelg Bath, modern-day Rehoboth. From Rehoboth Alexander took a route to the Great Fish River and travelled further in a south-western direction back to Bethanien. From there he travelled via Huns and Haris to the Sendlings Drift at the Orange River. Alexander's route through the countries of the "Great Namaquas, the Boschman's and the Damara's of the Hills" which led to the first usable route map in the history of Namibia, can be described with modern place names in [] where such have been established as follows:

15 Dierks, Klaus: //Khauxa!nas - The Great Namibian Settlement, Unpublished, 1991, p. 54-55.

16 Alexander, James Edward: Expedition of Discovery into the Interior of Africa, 2 vols., London, 1838, p. 206-215 and map

Karahas or Korhan Ford [near Ramans Drift]-Nabis or Nisbett's Bath [Warmbad]-(with excursions from there to Elliot Hill and Twanos Hills [Goanus or Kinderzitt 132])-Naros [Naros 76]-Africaner's Kraal [Blydeverwacht 72]-Nisbett's Bath-Dubbeeknabies [Dabegabis 122]-Kanus [Kanus 94]-Aribanies [Bismarckaue 23?]-Keikab River [Gaiab River]-Kama Kams (also called Kamopkams by Alexander) [Groen Rivier 265]-"Robber Henrick's Place" [Narudas 268]-Kanus-Chubeechees [Howobees 51]-Oup or Fish River (Sonuwap Hill [Schlangkopf 124])-Habunap [Feldschuhhorn 81 and 88]- Bethany-Nanees [Chamis 49]-Uchakarieb River [north of Helmeringhausen]-Keiis [Grootfontein 91]-Kopumnaas or "Bull's Mouth Pass" [Büllspoort 72]-Ababies [Abbabis 3]-Kuisip River [Kuiseb River]-Aban/huas [Rooibank]-Walvisch Bay-Hou/tous [Hudaob at the Kuiseb River]-Humaris River-Keree Kama [south-west of Gamsberg]-Naraes [Narais 245]-Ni-ais (Jan Jonker's village at Kei Kurup River [Haris River])-Glenelg Bath [Rehoboth]-Kuis [Kuis 5]-Kaikum River [Packriem River]-Nubapis-Chup River [north-west of Gibeon]-Kei-su River [Kaitsub River]-Kutip [Kuteb 65]-Kunakams [Kumakams 68]-Bethany-Hudap [Hudab 160]-Hoons [Huns 106]-Heris [Witzpütz 31]-Kunarusip Ford [Sendlings Drift]

Many of the ox-wagon tracks, entering Namibia from the Cape Colony, made use of suitable drifts and river crossings along the Orange River. At the western section of the Orange River, during its course through the Namib Desert, two crossings existed: Daberas Drift in the west and the somewhat eastward situated Sendlings Drift, approximately on the same longitude as the modern-day Rosh Pinah.

From these drifts two wagon roads developed. The one went in a north-eastern direction via Haris and Huns to Bethanien and from there through the Konkiep Valley further to the north. The other went in a northern direction to Aus. From there it went through the Neisip Poort into the Konkiep Valley where it joined the Bethanien road and ran further north into the Haseweb valley to Nomtsas at the upper Fish River, where the road branched into different directions. The more important branch took a direction towards the Auas Mountains and the other branch went via Büllspoort, through the Naukluft Mountains and further through the Namib Desert to Walvis Bay.[17]

At the upstream section of the Orange River some river crossings existed, such as Vioolsdrift, and further east the crossings of Goodhouse and Ramans Drift, both previously mentioned, and //Houms Drift as well as Pella Drift, which was used by

17 Wellington, J. H.: South West Africa and its Human Issues, Oxford University Press, Oxford, 1967, p. 116-117

the Orlams at the beginning of the 19th century and the Baster people in 1868 to cross into Namibia. The main transport direction of the roads coming from these Orange River crossings was directed to the hot water springs of Warmbad or Nisbett's Bath, as it was named by the Wesleyan missionaries. From Warmbad one road followed a natural direction to the gap between the Klein and the Great Karas Mountains and another one to the north-south running Fish River Valley. From there it was not too difficult to reach the area of Rehoboth and to travel further north to Damaraland. A third road ran in a north-eastern direction from Warmbad into the valleys of the Auob and Nossob rivers. This road opened an access to the settlement of Elephant's Fountain, the Wesleyan missionaries' name for Gobabis.[18] From there a road branched off to Tunabis, the modern-day Rietfontein, and to Ghanzi in Ngamiland, which later became part of Botswana.

North of the main water edge of the Auas Mountains there are very few natural road building obstacles which could have influenced the alignment of roads north of modern-day Windhoek, except for the northern parts of the Kalahari, where the roads in many cases have been forced to follow the courses of omurambas (wide sand rivers). A reference to a road to the coast, from Bethanien to Walvis Bay, can be found in Windhoek's State Archives.[19] Franz Heinrich Kleinschmidt, founder of the town of Rehoboth, lived there between 1845 and 1864. His diary from 13 September 1858 reads as follows:[20]

"On 13 September I travelled to the Booi's people at Büllspoort. The Jan's compound is situated between huge rocks and is surrounded by a chain of high mountains. From here a road is winding through the so-called "Büllspoort" to a plain looking in the direction of Bethanien, which has been touched and created by the late Schmelen when he made his journey to Walvis Bay."

Schmelen undertook the journey from Bethanien to Walvis Bay during the year 1825.

Heinrich Vedder reported that roads are only worthwhile at places where established human settlements already exist. Cultural progress can be measured exactly by the number, length and quality of usable roads. Roads were needed by the early missio-

18 Tindall, B. A. ed.: The Journal of Joseph Tindall: Missionary in South West Africa, 1839-1855, The Van Riebeeck Society, Cape Town, 1954

19 Annual Reports of the London Missionary Society, 1826.

20 Quellen zur Geschichte Südwestafrikas, State Archives Windhoek, Volume 20: Kleinschmidt, (translation): 13 September 1858, p. 75

naries in order to bring in by ox-wagon what the still undeveloped country could not supply. Also the Orlams, who had known roads and wagon traffic from the Cape Colony, where they originated from, started to build and use roads as the first traders had done. These began arriving once the till then unknown country was made more accessible.[21]

The "Charte des Rheinischen Missionsgebietes in Süd-Afrika" (Richter's Map of 1845)[22] gives an indication of all existing ox-wagon roads at the beginning of the 1840s in the Great Namaqualand and Kamacha-Daman, the southern and central parts of Namibia. This was before Jonker Afrikaner started to build the "Bay Road" from Windhoek to Walvis Bay and before the roads from Elberfeld (Windhoek) to Schmelen's Hope (Okahandja) and to Otjikango came into existence. Place names are spelt as indicated on Richter's Map with modern names in [] brackets where such have been established:

1. *Aris (Klein Namaqualand in the Cape Colony)-Sendlings Drift-/Haris-[Witzpütz 31]-//Huns [Huns 106]-Kai!goab [Geigoab 95]-Bethanien-≠Ausis-!Osis [Osis 73]-≠Am!hub [Amhub 78]-!Nomas [!Nomas on Hahn-Map,1879]-!Gui≠haus-Bulls Pforte [Büllspoort 172]*
2. *Steinkopf (Klein Namaqualand in the Cape Colony)- Vioolsdrift-Warmbad (or Nisbett's Bath)- (south of) Gulbrandsdalen-Bethanien*
3. *Bethanien-Zebris [Tsebris 48] (following a course west of the Oub [Fish River]) (see last section of Alexander's route to Bethanien)*
4. *Bulls Pforte-Kham [Kam River]-Zebris-/Kai≠Gurub [Haris 367]- Elberfeld [Windhoek]*
5. *Bulls Pforte-≠Gou≠hoas [Kanaus 335/336]-/Kai≠Gurub-Elberfeld*
6. *Zebris-[Rooibank]-[Walvis Bay] (following a course of the Kuiseb River, parallel to modern-day district road 1982)*
7. *Bulls Pforte-Chuntob [Tsondab] River-[Abbabis 3]- Kuisib River-[Walvis Bay]*

21 See Vedder, H.: Gewaltherrschaft von Windhoek aus: Wegebau, p. 251-254 op. cit.

22 Richter's Map: Cover Page: Hahn, C.H.: Tagebücher 1837-1860: Part 2, Windhoek Archives Source Publications Series, 1984

2.3 The Era of Jonker Afrikaner circa 1840 - circa 1860

After the "Kaptein of Bethanien" and Heinrich Schmelen the next documented road builder in Namibia's roads history was Jonker Afrikaner. Heinrich Vedder reported as follows:[23]

> *"Jonker at Windhoek was likewise amongst the road makers. When he was expecting the missionaries, Hahn and Kleinschmidt, in 1842, he made a road through the Auas Mountains. Even if it fell far short of the perfection of a European highroad, it was a great help to travellers."*

It is interesting to note that Vedder omitted to mention that the Wesleyan missionary, Joseph Tindall, visited Windhoek before the two German missionaries. Tindall reported on 15 June 1842:[24]

> *"Jonker is a most active and interesting little man. ... . He has made a good road, with great labour, over an exceeding high mountain, which we were two hours and a half in ascending and descending."*

Kleinschmidt wrote on 6 October 1842:[25]

> *"We enjoyed to our delight the results of the praiseworthy activities of Jonker Afrikaner who constructed over these inaccessible mountains a well built road. During the construction period the road builders consumed two oxen and seven sheep. The "Kaptein" from Bethanien did the same on several sections of the road to this place."*

These have been the first "road construction expenses" on record in the history of transportation in Namibia. The above mentioned roads, adequate for the rugged ox-wagon, have been built to a surprisingly high standard with primitive tools and very labour-intensive means. During 1843 Jonker Afrikaner continued to build the "Bay Road" from Windhoek in a western direction. The Nama and Damara communities who lived in the vicinity of the "Bay Road" were appointed by Jonker in order

23 See Vedder, H. (translation): Gewaltherrschaft von Windhoek aus: Wegebau, p. 251-252

24 Wesleyan Missionary Notices: Vol.2: 1843: Extract of a letter from Mr. Joseph Tindall to the Rev. Barnabas Shaw, dated Nisbett Bath, August 1842, Cory Library, Grahamstown

25 Moritz, E./ Kleinschmidt (1842) (translation): Die ältesten Reiseberichte über Deutsch-Südwestafrika: Mitteilungen aus den deutschen Schutzgebieten, volumes 28 (1915) and 29 (1916), p. 2569

to help complete this major task. The road was finished during 1844. Carl Hugo Hahn used this road to travel from Windhoek to Walvis Bay. On 19 February 1844 he wrote the following about this Namibian major arterial road:[26]

> *"Jonker built a road in a part of the country which was so far inaccessible. I must admit that even in the Colony (Cape) I have never seen such "a marvellous piece of road construction". It is incredible to imagine how it was possible to complete such a job with minimum or even without tools. Huge rocky outcrops have been removed or crushed. Trees and shrubs have been cleared. This road is 25 to 30 feet wide and creates the major link to Walvis Bay."*

Jonker's "Bay Road" was leading from Windhoek in a western direction via Heusis and Abochaibis to the southern bank of the Swakop River without crossing this river. From there the road was aligned in a south-western direction via Tsaoḃis, Onanis and Texasgeis (Great Tinkas) and Texas≠kharis (Little Tinkas) to the Kuiseb River. From there it went parallel to the Kuiseb to Rooibank and Walvis Bay.

Heinrich Vedder who, as in many identical cases neglected to supply his sources, mentioned that Jonker planned a road from Windhoek to the Waterberg in Hereroland. This plan was shelved by the outbreak of the war between the Herero and the Nama in the middle of the last century. It is doubtful, however, whether Jonker ever planned to build a road to the Namibian north. No primary historical evidence to support this claim could be traced. On the contrary, it was most probably not in the interest of Jonker to open a road into Hereroland but rather to keep traffic away from it. The first section of an arterial road to the north, to Okahandja and to Otjikango, west of Okahandja, was built by Hahn and Kleinschmidt and improved by Friedrich Wilhelm Kolbe in 1849.

This was the beginning of the development of a road infrastructure in Namibia during the 19th century. In 1845, the till then known parts of Namibia were more or less accessible by the rough ox-wagon. It was possible to reach Bethanien from Sendlings Drift in the west or Ramans Drift (Kompagniefurt) in the east at the Orange River. From there it was possible to travel on a road that was not too bad, without danger to wheels and life, to Windhoek via Rehoboth. From Windhoek a connection existed via the "Bay Road" to Walvis Bay and via Okahandja to Otjikango, the subsequent Gross-Barmen in southern Hereroland.

26 Hahn, Carl Hugo: Tagebücher 1837-1860 (translation): Part 1, Windhoek Archives Source Publication Series No.1, 1984, p. 144; p. 231 and p. 251-253

However, for the inhabitants of Otjikango it was quite difficult and exhausting to gain access to the harbour of Walvis Bay on the Atlantic coast. In 1845, the missionary conference at Otjikango decided to instruct the young missionary from Walvis Bay, Heinrich Scheppmann, to build a connection to the Windhoek-Walvis Bay road. A serious shooting accident prevented Scheppmann from completing this road.[27] Carl Hugo Hahn wrote on 27 September 1847 that it was his colleague, Johannes Rath, who opened a road from Otjikango via Otjimbingwe in the Swakop Valley to Walvis Bay.[28] Rath began his works in 1846 and determined during the alignment studies the later important site of Otjimbingwe, and completed the road in 1850. Rath's "Bay Road" joined Jonker Afrikaner's "Bay Road" somewhere between Tsaobis and the present-day farm Anschluss. The new "Bay Road" shortened the journey from Otjikango to Walvis Bay from four weeks to twelve days. In the middle of the last century the two "Bay Roads" made Namibia somewhat more independent from time wasting and expensive imports from South Africa. Before the completion of the two "Bay Roads", the journey from the Cape to Windhoek had taken eleven months. The completion of the "Bay Road" revealed a basic Namibian transportation principle, namely that it was in the interest of the country to have a short east-west connection to the Atlantic coast rather than the long and expensive transport link to South Africa.

This is confirmed by an "instruction to missionaries" given at the Rhenish Mission Society in Barmen/Germany on 14 August 1844. This instruction mentions three missionary stations which it was the Society's intention to establish in central Namibia, namely Rehoboth (Annis), Okahandja (Schmelen's Hope or Schmelen's Verwachting) and a landing station at the Walvis Bay:[29]

> *"Which could be of importance for all our northern stations, because most probably ships would like to land there in order to trade with local products which, not to mention many other advantages, could save us a lot in transport costs in the future due to the fact that the land journey per ox-wagon from Cape Town would take 9 to 10 months against a sea transport of approximately two months only".*

27 Ibid.

28 Hahn, Carl Hugo: Tagebücher 1837-1860: Part 2, Windhoek Archives Source Publications Series No.2, 1984, p. 368

29 Moritz, Walter mentions in: 'Aus alten Tagen in Südwest: Scheppmannsdorf/ Rooibank und älteste Druckerei in Südwestafrika/ Namibia' on page 4 this instruction (translation): 'Instruction für unsere Missionsbrüder in Süd-Afrika', Barmen, 1844, private copy

It was, however, James Chapman who during April 1861 recorded that, at his house in Otjimbingwe, Charles John Andersson mentioned that a road through the territory of the Swartboois at Rehoboth were to be built to take cattle to the Cape Colony.[30]

Amongst the first travellers on record on the "Bay Road" from Walvis Bay to Otjimbingwe were the two explorers John Baines and James Chapman in 1861, although Charles John Andersson and Francis Galton used this road already in 1851, and Chapman travelled on it from Lake Ngami to Walvis Bay during 1855/56.[31] Baines did not elaborate on the condition of the roads he travelled but he must always have reached his destination. Baines and Chapman were also amongst the first travellers on record who crossed Namibia from west to east into Botswana, after the very first crossing made by Andersson in 1853.[32]

Further road building activities were continued in the south during this period. These and many other activities prove that it is a myth that only "Europeans" have initiated roads in Namibia. Benjamin Ridsdale reported in December 1846 the following about road construction by the "Veldschoendragers" in the vicinity of Warmbad:[33]

"In several parts of the circuit, also, at great expense of labour, new roads have been made, and old ones shortened and improved. We have exhorted them in prophetic language: "Prepare ye the way of the Lord, make straight in the desert a highway for our God!" and they have done so: parties of road-makers have been formed; no remuneration has been given; but now "the crooked places are made straight, and the rough places plain". One of these "rough places", so rough as to shake waggon and traveller nearly in pieces, was made "plain" by one of our native teachers and all his scholars, who persevered in their voluntary task, casting all the loose stones aside, till a good, broad, and perfectly clear road was thrown open. .. . By these improvements, the circuit is much diminished in its extent; and we are enabled to reach our most distant outposts with a considerable saving of time, and with much more comfort than formerly."

30 Chapman, James: Travels in the Interior of South Africa: Hunting and Trading Journeys: From Natal to Walvis Bay & Visits to Lake Ngami & Victoria Falls, 1849-1861, 2 volumes, p. 223 and 225, London, 1868

31 Andersson, Charles John: Lake Ngami, London, 1856

32 Baines, Thomas: Explorations in South-West Africa, London, Longman, Green & Roberts, 1864: Map on page 34

33 Wesleyan Missionary Notices: Vol.5: 1847: Extract of a letter from the Reverend Benjamin Ridsdale, dated Nisbett Bath, 12 December 1846, Cory Library, Grahamstown

On the 3 April 1847 Ridsdale wrote further:[34]

"This morning we arrived at Schans Vlakte [Schanzen 281], a village of the Velschoen Draagers. .. . For a considerable distance before reaching the village our attention was arrested by the amount of labour the people had bestowed in road-making. On former occasions I had visited this tribe on horseback; but as they had for some time past expected that I should visit them with the wagon,. .. ., they had with great labour, and no implements more powerful than their hands, torn up enormous stones and made a clear open road for a wagon, of many miles in length. From the wild and rugged nature of this part, there can never be what an Englishman would call a good road: still, this is one that can be travelled without danger, and it reflects great credit on its inexperienced makers."

The destination of the noteworthy road construction activities of the Veldschoendragers was the fortified town of //Khauxa!nas (Schans Vlakte), which in itself must have been a very remarkable settlement of the Nama people. This unique place was all the more remarkable as it must have been one of the best guarded secrets of the people who lived there nearly two hundred years ago. Besides Ridsdale's and A.J.Bailie's mentions of //Khauxa!nas there are no other historical sources known to the author which take note of such a settlement. The investigations for this publication lead to the conclusion that Ridsdale's Schans Vlakte has to be situated on the farms Schanzen 281 and Gugunas 301 east of the Karas Mountains. This assumption was subsequently verified by aerial photographs and in situ investigations which clearly showed a town on a mountain above a river, which matches Ridsdale's description closely.

Benjamin Ridsdale wrote the following about Schans Vlakte:

".. In front of the village is a low mountain, which is surrounded at the top by a wall, the entire length of which must be eight or ten hundred yards, low in places difficult to access, and five or six feet high in those parts that are most easily available. This wall, which consists of a double row of loose flat stones piled one above another, was thrown round the mountain by the Afrikaners (Orlam Afrikaners from Nama descent) at the beginning of the century. After shooting of the Dutch Boer, Pinnar, to whom old Afrikaner and his clan were at that time subject, and by whom they were oppressed beyond all endurance, Afrikaner and his people fled to this place. Here they resolved upon making a stand against the commandoes sent in pursuit of them by the Colonial Government (Cape Colony). Within this

34 Ridsdale, B: Scenes and Adventures in Great Namaqualand, London, 1883, p. 72-73; p. 165; p. 264 and p. 274-280. Another Wesleyan missionary, A.J.Bailie, referred also to Schans Vlakte.

entrenchment, at the top of the mountain, they built their houses, had kraals for their calves, and in fact everything necessary to a Namaqua village, and considered themselves able to defy all their enemies. They seemed scarcely able to conceive of a valour that would proceed in the face of their bullets, scale their fort, bound over its walls, drive them over the fearful precipice on the opposite side, and plunge them into the abyss of black waters beneath. The opportunity of defending themselves in their impregnable fortification, however, never occurred, as the commando does of Boers from the Colony pursued them no farther than Nisbett Bath (Warmbad). This entrenchment remains unimpaired to this day, and is at least a proof that the Afrikaners possessed an energy of character much greater than that possessed by the Namaqua tribes generally. I felt much interest in viewing this relict. ... I next inspected the new stone chapel in course of erection. The walls, in nearly their entire length, are raised to the height of six feet, and are two feet thick, and when the building is completed, it will hold about three hundred hearers."

Ridsdale's observations highlight a chapter in the history of the Orlam Afrikaners - their initial collaboration with and subsequent resistance to European settlers in the northern frontier zone of the Cape Colony during the latter years of the 18th century. This resistance culminated in the shooting of Pieter Pienaar in March 1796, the same man who sailed to Walvis Bay in 1793 and explored the lower Swakop River valley, and the subsequent retreat of the Orlam Afrikaners into the inaccessible Karas Mountains in southern Namibia where they set up //Khauxa!nas as their hidden refuge against further colonisation. This fortified Nama/Orlams town must have been erected shortly before or just after 1800 and represents the oldest, so far known sophisticated building structures in Namibia. New research to find the capital village of the Veldschoendragers disclosed that //Khauxa!nas could not be identical with "Robber Henrick's Place", which Alexander tried to reach in January 1837.

Alexander was, however, not able to visit the capital of the Veldschoendragers and was only allowed to proceed as far as Kama Kams, some miles away from "Robber Henrick's Place". It has been revealed recently (March 1988) that this place could possibly be situated on the modern day farm Narudas 268 near Groen Rivier 265 which is the literal translation of the Nama name Kamkam. "Robber Henrick's Place" could be identical with Ridsdale's Klipfontein, the main settlement of the Veldschoendragers between 1844 and 1846. It is unfortunate that Ridsdale's narrative of his journeys was not supported by a map, as this would have enabled us to obtain primary historical evidence that Alexander's "Robber Henrick's Place" or Ridsdale's Klipfontein are to be found in the remains of a ruined town on a hill at the southern entrance to the Narudas Gorge. The building structures of these stone ruins are clearly of pre-colonial origin with European influenced structural elements but are most

probably of a later period than the ruins of //Khauxa!nas. These historical events have been confirmed by the author's surveys of the present farms Schanzen 281, Back River 302 and Gugunas 301 (//Khauxa!nas-Schans Vlakte) as well as of Narudas 268 (Klipfontein - "Robber Henrick's Place"), respectively. What was found in the case of //Khauxa!nas exactly matches Ridsdale's description of the settlement above the Back River. There is always water in the river, even in times of drought. A ring wall virtually intact and over one kilometer long was found here with the ruins of houses and foundations of what was probably a council chamber for the Nama leaders, as well as kraals. There is also a well constructed pathway to the hill-top fortress, which is one of the first human made roads in the history of Namibia. The mountain top with its ruins, above the almost vertical rock face which drops to the Back River, provides an impressive sight.

The availability of water at all times must have made this place an ideal settlement and retreat for different Namibian groups in the early times of history. It can thus be accepted that //Khauxa!nas on the present-day farms, Schanzen and Gugunas (Gugunas is derived from the Nama word //Khauxa!nas which means in Afrikaans "Schans Vlakte" (plain of the bulwark) and was first mentioned on Theophilus Hahn's map, 1879) is the forgotten town of the Orlam Afrikaners, and later the Veldschoendragers, who occupied the settlement after the Orlams had left the Karas Mountains in their northward migration to the central parts of Namibia. The Nama had every good reason to keep //Khauxa!nas a relative secret, especially from Europeans, and this is surely the reason why this place cannot be found in any primary historical source except in those of Ridsdale and Bailie.

The fortified town of //Khauxa!nas most probably played its last role as a retreat for the Nama leader Jakob Marengo during the resistance war of the Nama against the German colonial power from 1903 to 1909. The area is so inaccessible and was evidently so poorly known to the German Administration of the time, that, as far it has been possible to establish, they left behind no historical reference to the settlement. After having served the interests of the Nama people for the last time as Jakob Marengo's refuge, it sank into oblivion until it was rediscovered during the investigations for the early Namibian roads system.[35]

35 Dierks, Klaus: //Khauxa!nas - Schans Vlakte: Oldest Urban Settlement in Namibia? : A Symbol for Independence, In Formation No.1, Windhoek, 1987. The hypothesis regarding the discovery of the Nama town //Khauxa!nas is supported by further historical sources: See: Mears, W.G.A.: Wesleyan Missionaries in GreatNamaqualand, 1820-1867, Cape Town, 1968, p. 20-23 and A.J. Bailie: Eerw.J.Bailie Dagboek:1845-1850: Kaapse N. G. Kerkargief: P 50 1/1.

Further road building activities in the Namibian south have been reported by Franz Heinrich Vollmer and Samuel Hahn. Vollmer reported for the 2 May 1848 that[36]

"yesterday the Nama-Chief Willem Swartbooi went with his men to build a decent road for wagons between Tsebris and Rehoboth".

On 13 September 1850, Samuel Hahn mentioned the following in a letter, written at "Grootbroekkros Mountain", about a trip to Berseba:[37]

"The new road through the mountains (Brukkaros) has been built by my "Kaptein" and is for these people a masterpiece in this country." The journey from Berseba through the Brukkaros Mountain has taken seven days.

In the reports of the "Rheinische Missionsgesellschaft" for 1852 the following was written:[38]

"To their surprise they saw the road which was built by the people of Bethanien and Gulbrandsdalen (Berseba) to connect these two places for missionary purposes. It is astonishing to see how much effort was invested to connect these two stations with an adequate road. It is a piece of work of which a European need not to be ashamed of. When one considers how people had not only thrown away all movable stones, be they big or small, on the four-day mountainous road, but also excavated and removed even huge rocks, one of them 15 feet long, without adequate tools and equipment, then one cannot justly agree any more that the Namas .. are stupid and lazy".

Heinrich Vedder also mentioned the activities of Samuel Hahn, who repaired the first ox-wagon tracks in the rainy season of 1849 by filling potholes with improved gravel material after the first "Bay Road", which Schmelen had built, had been washed away. These are the first road maintenance activities on record in Namibia's transportation history. Samuel Hahn also built the first ox-wagon road from Bethanien to Gulbrandsdalen, east of Bethanien, as well as to Berseba. This road was a very difficult one

36 Quellen zur Geschichte Südwestafrikas, State Archives Windhoek, Volume 5 (translation): Vollmer: 2 May 1848, p. 6

37 See 23: Moritz E./ Samuel Hahn: Reisen von Berseba nach dem Kaplande (translation), 1852, p. 246 footnote

38 Archives of the Rhenish Mission Society, Windhoek, 1852, Berichte (translation): p. 332-334. The Archives of the 'RMS' are actually at Wuppertal, Germany and some are at 'ELC', Windhoek.

because one section was so steep that no wagon could pass it. All goods had to be off-loaded and then transported on human or animal back to the top.

The missionary Carl Hugo Hahn provided interesting transport statistic on the ox-wagon road between Berseba and the Orange River. He wrote on 4/5 September 1852 that the distance between Berseba and the Orange River can be estimated with 78 hours, where three hours of ox-wagon travelling time are equivalent to two hours of good walking. He also mentioned the first traffic count in the history of Namibia's roads. On his trip from Berseba to the Orange River he met only one "bushman" (San) and a small travel group of three persons:[39]

From	*Berseba to /Aub*	*6 hours*
	/Aub to Gulbrandsdalen	*6 hours*
	Gulbrandsdalen to Spitzbergen (?)	*6 hours*
	Spitzbergen to Löwenfluss	*9 hours*
	Löwenfluss to !Kab (Gaab)	*9 hours*
	!Kab to Khanibes	*10 hours*
	Khanibes to !Gaibes	*10 hours*
	!Gaibes to Uhabis	*12 hours*
	Uhabis to Orange River (Vioolsdrift)	*6 hours*

Pollock and Swanzie[40] established that the speed of an ox-wagon depends on the season, the physical properties of the terrain or the used track, the mass of the payload and the condition of the draught-oxen. According to this source two shifts of three hours per day were common practice, and the average draught-distance could be determined with 19 to 24 km per day, but during the cooler winter months it was possible to go for three shifts per day with an average distance of 32 km per day. However, it should be added that the speed of ox-wagon journeys also depended on the skills and the quality of the drivers, and it seems that the above claimed speeds are on the high side.

In the north of Namibia, Francis Galton and Charles John Andersson reached the Etosha Pan on 1 June 1851 and proceeded further than the 18th degree of latitude in

39 Hahn, Carl Hugo: Tagebücher 1837-1860: Part 3, Windhoek, Archives Publication Series No.3, 1985, p. 610-611 and 648-651

40 Pollock, N.C. and Swanzie, A.: A Historical Geography of South Africa, Longmans, London, 1963

Owamboland during their expedition to Nangolo's residence in Ondonga (modern-day Ondangwa), as was reported by Carl Hugo Hahn on 18 August 1851 after the two adventurers had returned to Otjikango. They followed a route from Otjikango to a point west of the Omatako Mountains and further to the Omuverume Mountains (Waterberg). They travelled east of the Waterberg to Okamabuti, near modern-day Grootfontein and turned then to the north-west to the Otjikoto Lake, near modern-day Tsumeb. From there they followed the established route to Owamboland via the fountains of Otjando and Namutoni.[41]

2.4 The Pre-German Era circa 1860 - 1884

At the middle of the 19th century the southern and central parts of Namibia had a well developed ox-wagon roads system at their disposal. This concentration of roads in the southern two-thirds of the country reflects the available historic source material, but not necessarily the physical reality. It is most likely that the Namibian north, especially Owamboland, also had a well developed system of paths and perhaps even tracks. This can be assumed in view of the density of the population there, the long-standing social, economic and political links across the present-day Angolan border as well as the nature of political organisation of the various communities like Ondonga, Uukwanyama, Uukwambi etc. Even though there may not be any known recorded account of the situation there, the possibility of a precolonial roads network in the north of Namibia has to be mentioned..[42]

Between 1850 and 1862 the wagon traffic increased considerably, especially in the central parts of Namibia. The mine traffic from the interior to Walvis Bay also grew in this time. The South Africa based "Walfisch Bay Mining Company" began developing the Matchless Mine just west of Windhoek in the Khomas Hochland during 1856. The key to the economic success of this mine was the satisfactory solution to the transport problem. Charles John Andersson became the mine manager in 1857. After some futile tests with pack oxen transporting the copper ore to the coast, he came to the conclusion that it was better to improve the "Bay Road" to Walvis Bay and use the conventional ox-wagon. The, by Andersson, improved "Bay

41 Hahn, Carl Hugo: Tagebücher 1837-1860: Part 4, Windhoek Archives Source Publications Series No.4, 1985, p. 957-1081 and map on p. 977 (Karte zur Übersicht der Reise von H. Hahn und Rath im Südwestlichen Afrika, Mai-September 1857: A. Petermann) as well as p. 1196 and p. 1225-1228

42 Williams, Frieda-Nela: Precolonial Communities of Southwestern Africa - A History of Owambo Kingdoms 1600-1920, Windhoek, 1991

Road" lead from the Matchless Mine to Remhoogte (Ganams 316 or Abochaibis 315), then via a route along the Kaarn River (Kaan River) to Davetsaub (29) and to Otjimbingwe. From there it went via Tsaobis (90), Onanis (121) and Tinkas to Walvis Bay. Andersson mentioned the difficulties in road making in the rough terrain between the Namib Desert and the Namibian interior in a letter to Wollaston of 4 March 1857:[43]

"I am now more than ever impressed with the importance of this route. Indeed without this being practicable our transport will fare badly. Those two terrible stages, Tinkas and the Narip plain, made sad havoc of the oxen. ... I have explored the country between Tsaobis and Tinkas flat, entering the latter at the same point at where the road leads off to Onanis. ... A road is practicable in that direction but more I cannot say at present. Whether a wagon can pass out from Tinkas flat into the Swakop remains still to me to ascertain. If the Onanis route is to be retained, I doubt not but that a considerable improvement may be made, though at a greater amount of labour .. .

From Tsaobis to Otjimbingwe little or no improvement can be made. The line is not bad, and since the road has been cleared of bushes, wagons can now travel pretty comfortable. The sand you cannot avoid. From Otjimbingwe to the entrance of the Kaarn River you have little or no chance of improving the road. ... From the entrance of the Kaarn to Baboon Kloof (on Kaan 309 or Dagbreek 365) the country on both sides of the river is inaccessible for wagons. From Baboon Kloof to near the spot, where the river branches a road is practicable .. ."

Andersson managed to find a new route to avoid six steep hills and he continued to say:

"About three weeks ago I left Jones at the Hoogte with a strong party of Damaras with orders to begin the new road and, if I mistake not, he will now be more than one-third through his appointed task, and a splendid piece of road it will be when completed-, certainly the finest that ever was made in this country."

Andersson's claim must surely be a little bit exaggerated, because the Nama communities were, for their time, experienced and skilled road-builders. The most famous roads were probably those that Jonker Afrikaner had built from Windhoek to Walvis Bay and across the Auas Mountains in the early 1840s. But roads built by Namas between Bethanien and Berseba as well as in the Warmbad region and even in the

43 Andersson, Charles John: Papers, Vol.1: The Matchless Copper Mine in 1857: Correspondence, Windhoek Archives Source Publications Series No.7, 1987, p. 10; p. 18-20 and p. 82

Great Karas Mountains won high acclaim by the missionaries, as has been previously shown in this publication.

Andersson also pursued the direct transport of the Matchless Mine ore via Walvis Bay to England instead of using the route via Cape Town. With an estimated annual shipment of 300 ton of ore, a saving of nearly 1.700 pound sterling per year could be achieved (direct route: 2.945 pounds against 4.549 pounds via Cape Town) which again proves the theorem that it would be beneficial for Namibia to use direct east-west transport links and avoid those via South Africa.

The closure of the Matchless Mine for economic reasons in 1859 and the outbreak of the rinderpest in 1861/62 decreased, however, the traffic numbers.[44] The returning empty vehicles accepted loads from Walvis Bay to the interior, mainly to Otjimbingwe. Apart from ammunition, the ever increasing trade involved ivory, cattle and ostrich feathers. The Namaland got its supplies from Angra Pequena, the subsequent Lüderitzbucht. Already in 1835 it was mentioned that dried meat and skins were exported from Angra Pequena.[45] In 1856 even Alexander Bay served as a harbour to transport goods into the interior of Namibia's south.[46] It is interesting to read statistics compiled by Hugo Hahn over the ox-wagon traffic between Walvis Bay and Windhoek in the year 1853, which took 103 driving hours:

From	*Walvis Bay (Rooibank) to Husab*	*16*	*hours*
	Husab to Jonkersfort (?)	*5*	*hours*
	Jonkersfort to Tinkas	*10*	*hours*
	Tinkas to Onanis	*8.5*	*hours*
	Onanis to Tsaobis	*13.5*	*hours*
	Tsaobis to Otjimbingwe	*8.5*	*hours*
	Otjimbingwe to Omantjiva (Lievenberg ?)	*14.5*	*hours*
	Omantjiva to Buxtonfontein (Klein Barmen)	*4*	*hours*
	Buxtonfontein to Gross Barmen (Otjikango)	*4*	*hours*
	Gross Barmen to Windhoek (Concordiaville)	*19.5*	*hours*

44 Wallis, J. P. R.: Fortune my Foe: The Story of Charles John Andersson, African Explorer 1827-1867, Jonathan Cape, London, 1936, p. 182-185

45 Esterhuise, J. H.: South West Africa 1880-1894: The Establishment of German Authority in South West Africa, Cape Town, 1968, p. 11-12

46 Vedder, Heinrich: Teil 3: Unter der Gewaltherrschaft von Okahandja aus: Kapitel 3: Kulturfortschritte und Kulturhindernisse: Post und Transport, p. 338 op. cit.

In comparison to Hahn's statistics, statistics compiled by Chapman for 1861 for the section Otjimbingwe to Gross Barmen can be quoted. Hahn's statistics revealed 22,5 hours travelling time against Chapman's 24 hours:

From	*Otjimbengwe to Platklip*	*2*	*hours*
	Platklip to second Platklip	*5*	*hours*
	Platklip to Otjimonjeba (Westfalenhof ?)	*9*	*hours*
	Otjimonjeba to Grey's Park (Sney River ?)	*2*	*hours*
	Grey's Park to Little Barmen	*3*	*hours*
	Little Barmen to Great Barmen	*3*	*hours*

On 26 February 1857 Carl Hugo Hahn reported on the improvement of the road between Otjikango, the modern-day Gross-Barmen, and Buxtonfontein, the subsequent Klein-Barmen:

"For two and a half days I have worked with 10 people improving the road between here (Otjikango) and Buxtonfontein, a distance of three travelling hours on the road to Otjimbingwe. In earlier times this road went through the Tsoaxaub (Swakop) and crossed it several times with the consequence that it was during the dry season difficult to cross and during the rainy season not passable at all and even dangerous. The new road, however, doesn't touch the river anymore but traverses the mountains on a more straight alignment which is permanently and easier passable. The Herero are working well with sufficient food and under adequate supervision." (sic)

From 20 May to 11 September 1857 Carl Hugo Hahn travelled together with Johannes Rath to Owamboland. On some sections of this exploring trip they were accompanied by the hunter, trader and adventurer, Frederick Joseph Green. They travelled from Otjikango (Neu Barmen) to the Omatako Mountains, from where they followed the course of the Omuramba Omatako to Otjituo. They reached Auuns on the 30 June 1857 and then followed the course of the Omuramba Owambo to the eastern edge of the Etosha Pan. From there the party more or less followed the line of the modern-day trunk road 1/11 to Ondonga (Nangolo's residence). Nangolo's men attacked Hahn's expedition on 30/31 July 1857 and forced them to retreat to Hereroland. Hahn travelled again to Owamboland in 1866 and was instrumental in bringing Finnish missionaries to Owamboland. During a search journey to find the source of the Kunene River, Charles John Andersson "discovered" the Okavango River on 18 March 1859.[47]

47 Andersson, Charles John: The Okavango River - A Narrative of Travel, Exploration and Adventure, London, 1861

Fig. 2: Bethanien - Berseba - Road 1876 Rhenish Mission Society Windhoek

The increase of ox-wagon traffic was a direct consequence of the rising trade in many parts of Namibia, and it changed the pattern of life for many Namibians. This resulted in an increasing request for more ox-wagons and carts. With the completion of the new Bay Road between Windhoek and Walvis Bay, Windhoek and Otjimbingwe developed as new important trade centres with new trade routes to Damara and Namaland, and even to Lake Ngami in modern-day Botswana, which was to become an important trading point before the lake dried out at the turn of the century. One of the more important traders was Andersson, who established a business in Otjimbingwe at the end of the 1850s. In Angra Pequena the De Pass, Spence & Co company established a post in order to trade with Namaland. During 1869, Axel Wilhelm Eriksson and Anders Ohlsson established a business in Omaruru in order to trade with the northern areas of Damaraland and with the trading post at Lake Ngami in Botswana. Eriksson kept up to sixty ox-wagons on the roads from Walvis Bay to Damaraland, Owamboland and the Lake Ngami area.[48]

In a letter to Hahn of 19 February 1866 Green reported reaching the long-sought Kunene River from the south. Green also reported that it was his intention to follow

48 Möller, P.-A.: Resa i Afrika, genom Angola, Ovampo och Damaraland, Stockholm, 1899, translated to: Journey in Africa, through Angola, Ovampoland and Damaraland, Cape Town, 1974, p. 15-19, p. 61

Fig. 3: Grootfontein (S) - Koyfas - Road Rhenish Mission Society Windhoek

the river towards its mouth, but that he found that there was no practicable road westward, at least for wagons, because the country was so mountainous. It can therefore be concluded that by the mid 1860s Namibia was known and accessible to the ox-wagon from the Orange to the Kunene and Okavango rivers.

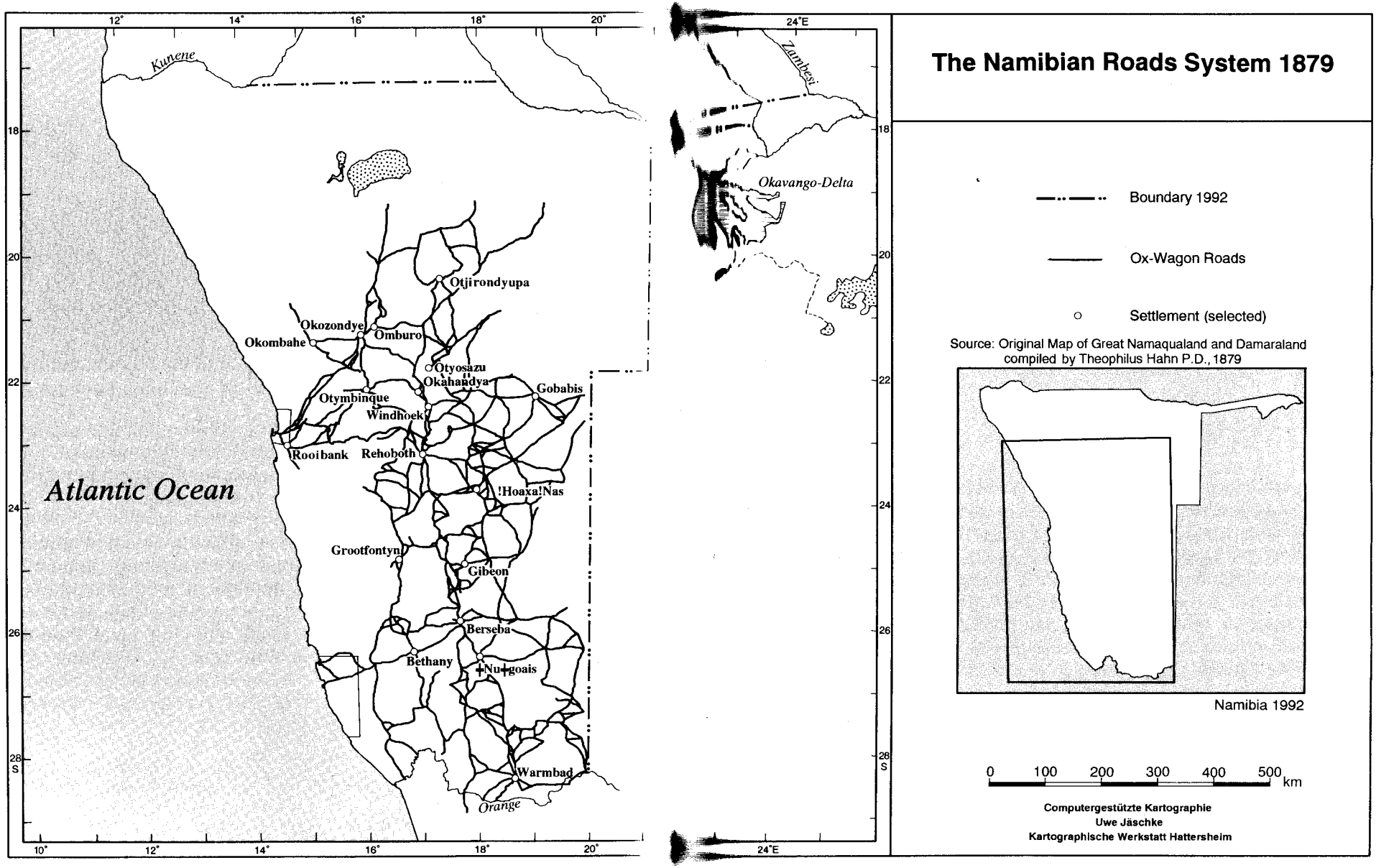
In 1879 William Coates Palgrave reported that there were five wholesale and retail stores in the area and about a hundred wagons and other vehicles engaged in trading and hunting pursuits.[49] Palgrave further noted that Otjimbingwe had a population of about 20.000 people at this time which would seem to be completely unrealistic.[50] Maybe he meant 2.000 people, which seems to be a more likely figure. Theophilus Hahn, who also was a trader, mentioned that "there are about 3.000 regular ostrich hunters in this country" and 30 to 40 traders.[51] The 3.000 ostrich hunters, mentioned by Th. Hahn, are most probably also exaggerated and should rather read 300. Serton[52]

49 BBNA (Cape) 1879, Palgrave to Secretary, 1 July 1877

50 CA G 50-77, Palgrave: Report 12: Report of W.C. Palgrave, Esq., on his mission to Damaraland in 1876

51 See last footnote, Hahn to Magistrate, 21 October 1872, Ann.III.

52 Serton, P. ed.: The Narrative and Journal of Gerald Mc Kiernan in South West Africa 1874-1879, Cape Town, 1954, p. 23


12°
14°
16°
18°
20°
24°E
Kunene
Zambesi
Okavango-Delta
Atlantic Ocean
Otjirondyupa
Okozondye
Omburo
Okombahe
Otyosazu
Okahandya
Gobabis
Otymbinque
Windhoek
Rooibank
Rehoboth
!Hoaxa!Nas
Grootfontyn
Gibeon
Berseba
Bethany
Nu+goais
Warmbad
Orange
18
20
22
24
26
28
S
The Namibian Roads System 1879
Boundary 1992
Ox-Wagon Roads
Settlement (selected)
Source: Original Map of Great Namaqualand and Damaraland compiled by Theophilus Hahn P.D., 1879
Namibia 1992
0 100 200 300 400 500 km
Computergestützte Kartographie
Uwe Jäschke
Kartographische Werkstatt Hattersheim

gave the following description regarding the conditions of Namibian roads in the 1870s:

> *"Transport for traders and missionaries followed definite routes, determined by the waterholes. Through repeated use well-defined tracks had developed, clearly visible in the landscape, so that as a rule the traveller need be in no doubt about the right direction. Our author (Gerald Mc Kiernan: In South West Africa: 1874-1879) even talks of "roads", but there was, of course, no question of a hard surface. The very ease with which a new track could be opened might, however, become a source of embarrassment; at a point of divergence it was not always clear whether this meant a choice between two independent roads, or merely between two parallel tracks on the same route. On the whole, however, people seem to have been well informed about such particulars, and they went forward and back along these routes fully confident of getting to their destination. "Losing the road" was a difficulty mainly occurring during night-treks."*

The "Original Map of Great Namaqualand and Damaraland - compiled from his own observations and surveys by Theophilus Hahn P.D., 1879"[53], gives a survey of the existing ox-wagon roads at the end of the pre-colonial epoch in the transport history of Namibia, shortly before the Germans arrived. The major routes of this map are listed in Appendix Table 1 at the end of this publication. From this table it can be concluded that the pre-colonial Namibian roads network was well established, especially in the southern and central parts of the country. Adequate ox-wagon roads were in existence as far north as the Ugab River and as far as to Outjo with a track leading to the central parts of Owamboland, to the Waterberg and the area around Grootfontein. The southern and central Namibian roads system of this time was mainly orientated towards the Orange drifts at the border to the Cape Colony with some very prominent roads to the Atlantic coast, the two "Bay Roads" to Angra Pequena (South Bay Road) and to Walvis Bay (North Bay Road), respectively. These two important east-west transport links are among the most outstanding examples of road construction during the pre-German era of the Namibian history of roads.

The great war between Nama and Herero in the years 1880 to 1890 ended a period of relative peace and progress. This peaceful period was most probably related to the tremendous expansion of trade and consequently establishment of the ox-wagon roads system at this time. It were the European traders who had been the main beneficiaries of this peaceful period. The traders, for instance, were able to supply

53 Hahn, Carl Hugo: Tagebücher 1837-1860: Part 5, Windhoek Archives Source Publications Series No.5, Ann.: Th. Hahn's Map, 1879

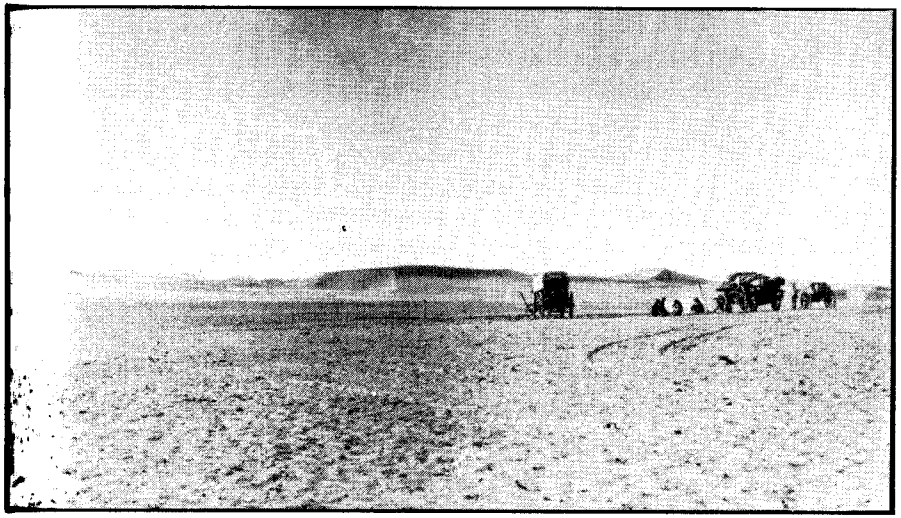


Fig. 4: "The Abomination of Desolation"
South Bay Road to Angra Pequena 1896 Cape State Archives

Herero-speaking chiefs with guns and ammunition. Due to the increased influx of European capital and the expansion of trade more roads came into being. But it has to be observed that subsequently these roads increasingly served the economic interests of the European communities and, since the beginning of the German period in Namibia, the strategic interests of the colonial power. The last war between Herero and Nama in the 1880s ended all road building activities before the German administration began a new chapter in the history of roads in Namibia.

As has been shown, the first road building activities on record in the Namibian history are those of early nomadic communities in the western parts of Namibia which can be dated back as far as approximately 1250 A.D., and also of the Namas and Orlams of the south, as well as of Schmelen, Afrikaner and the German missionaries of the "Rhenish Mission". It is significant to note that these first Namibian road building efforts were not so much pursued to improve north-south road links between Namaland and the South African Cape Colony but rather east-west links between the Atlantic coast and the Namibian interior. These first road construction activities aimed at reducing Namibia's dependence on South Africa, and furthermore to create beneficial short east-west transport links to the open sea and to avoid the long,

dangerous road to South Africa through the barren, rugged and waterless areas in the Namibian Great Namaqualand and the northern parts of the Cape Colony. Towards the end of the 19th century an extended and integrated roads system existed between the eastern parts of present-day Namibia and Botswana.[54]

Many links of the well developed network of the ox-wagon roads of the pre-colonial time disappeared after the arrival of the German colonial power in Namibia. They were, furthermore, never re-established by the South African mandatory power. This fact is sufficient evidence that east-west transport links were not in the interest of the South Africans, a fact which will later be proved in this publication. It has, however, also to be noted that roads running in a north-south direction to the Cape Colony in South Africa were a prominent transportation feature in the pre-German time, even if no very distinct north-south road construction activities can be reported due to a lack of historic data.

However, it is even more significant that it were not only Europeans but many Namibian indigenes who initiated and built roads in Namibia during the 19th century. The tendency of indigenes to build roads on their own was continued even until far into the German colonial epoch. For instance, during 1906 it was reported that Damaras built more than 100 miles of new roads between Ais [Ais/ Otjihorongo (Okomahana) on "Kriegskarte" of 1904] and Sesfontein.[55] The many examples of road building initiatives in the 19th century could most probably only be exercised in a free, non-colonial environment. The example of the Ais-Sesfontein road can be explained by the fact that the area between Sorris Sorris at the Ugab River and Sesfontein was by 1906 not under firm German control. To the writer's knowledge, it is the last example of any road construction undertaken by Namibians before the colonial structure destroyed the will of the people to pursue any such further activities. Their ability to continue would have been reduced and then eliminated by colonial control and by the fact that many of the old Namibian roads and trade flows associated with them would have been inimical to the new colonial objectives of the German and much later the South African periods.

54 Wilmsen, Edwin N.: Exchange, Interchange and Settlement in North-Western Botswana: Past and Present Perspectives, Proceedings of the Symposium: Settlement in Botswana, Gaborone, 1982, p. 98-100

55 Letter from George Elers to Arthur Davis, 12.12.1906, ZBU, 6 XIII B 5 Vol.1, p. 65-69

3. The History of Namibian Roads in the German Times

3.1 The Initial Era of German Occupation 1884 - 1904

The beginning of the era of the German occupation in Namibia, in 1884, did not bring any new technological improvements to the roads system. The ox-wagon still determined the design parameters for any road building activities, but from now on new road building developments in Namibia were initiated by the requirements of the German forces. Initially, this development seems to have been limited in its scope. It has, however, to be borne in mind that this was before the advent of the pneumatic tyre, and the standards were in accordance with the minimum requirements of the rugged ox-wagon. The roads system in this time mirrors the beginning of the political and economic control of Namibia by the new colonial administration. In the first twenty years this administration was not able to really achieve its objective, namely to create a German settler's colony.

A typical report about travelling by ox-wagon during this period can be found in a book by the Swedish traveller, Peter August Möller, who travelled through southern Angola and northern Namibia in 1895/96. Möller was an observant and accurate reporter and his book contains a wealth of first-hand information about travelling in Angola, Owambo and Damaraland, and his description gives a valuable impression of travelling in Namibia in the epoch of the ox-wagon:[56]

"So that the reader has an idea right from the beginning of this country's way of travelling, a few words are necessary about the wagons, their teams of oxen and personnel. The floor of the wagon, about three and a half metres long and one and a half metres broad, consists of thick, broad planks which rest directly without any springs on two wheel axles of steel; the back wheels which are the biggest, have a diameter of about one and a half metres. Over the wagon is spanned a roof of canvas which also forms the walls; furthest in front stands the "front box (voorkis)" on which the driver has his place and in which the cooking pots, coffee, sugar and provisions are stored; in the back of the wagon stands the "back box (agterkis)", which generally contains ammunition and such things; on the floor between the chests is stowed all the heavy load, which can reach a weight of close to 2.000 kg. If there is space, a wooden frame with a network of raw thongs is generally suspended above this, on which a bed is made with skins and blankets when you wish to sleep in the wagon. On both sides of it are hooks on which the guns are

56 Möller, P.: Resa i Afrika, genom Angola, Ovampo och Damaraland, Stockholm, 1899, translation, Cape Town, 1974, p. 15-19

layed; you can actually arrange the interior of the wagon with some comfort and snugness. On each outer side runs a framework of wooden ribs, the so- called buck-wagon (a large, solidly built "bokwa" with strong side-beams to which the rails are attached, meant for heavy loads), on which are tied game that has been shot during the journey, water barrels, buckets etc, and there are also a box of tools to repair the wagon, a jack to lift it when it has become stuck, a spade and axe; at the back the wagon is provided with a braking arrangement. A thick shaft extends from the front axle of the wagon, at the end of which is attached a line of raw thongs up to 30 metres long, often substituted by an iron chain; to these are tied the yokes of the oxen, one behind the other. Most of the wagons are built in the Cape or Transvaal (South Africa) and cost about 1.800 (Swedish) crowns each.

The number of oxen for each wagon varies between fourteen and twenty; if the wagon is loaded, the full team of twenty must be used. At the inspanning the yoke is laid over the neck of the ox; it is prevented from sliding backwards by two wooden pieces fitted into it (yoke-pin or Afrikaans: jukskei), which are connected underneath the neck of the animal by a thong; the oxen are tied to each other in pairs, with thongs between the horns above the foreheads. The pair of oxen closest to the wagon is called the "agter"-oxen; they must be especially good and experienced because the steering of the wagon depends on their obedience and sagacity. Thus they must keep a watchful eye and avoid tree- stumps, rocks etc in the road which could stop or overturn the wagon; when the driver shouts the name of the one or the other; it must immediately push inwards with all its might, the other ox of the pair must then yield, so that the wagon attains the desired direction. Apart from the agter-oxen there is another pair of special importance, that is, the first pair or "voor"-oxen; these must know to keep to the road, to avoid obstacles and, like the agter-oxen, to yield to the side when called. All the oxen have names; .. A well-trained ox must pay attention to its name and pull hard in the yoke when it is called. When they are well fed, these animals are imposing with their very long, often gracefully curved horns.

Unless the fore-oxen find the way by themselves, the first pair of oxen is generally led by a boy, a "leader (voorleier)", who walks in front of the span and whose responsibility it is to see that the road or the wagon-track is not lost, or, where there is no road, to select one himself; then comes the headman of the wagon, the "driver" himself. He drives the wagon and is responsible for it and all it contains. It is an important matter for the traveller to obtain a good driver and it is often difficult to find one. .. The driver has to know his oxen well and understand the art of handling the heavy whip, which consists of a long, strong stick, about four metres long, at the end of which is fastened the five metres long lash of giraffe hide. The whip, or "sjambok" as it is called, is always handled with both hands and when well handled is a terrible instrument - every lash sounds like a shot and strikes with unfailing accuracy the required place on the animal; sometimes the lashes

come from above down onto the back, neck or ears, sometimes they strike from below the belly and legs. When necessary the driver runs now on the one, now on the other side of the span, and as fast as he shouts the names of the oxen, as fast the lashes rain forwards and backwards with such force that the hairs fly from the animals. In the intervals when all goes well the driver sits calmly on the front box with pipe in mouth, only occasionally shouting the name of an ox together with some coarse invective or other. The driver is assisted by one or two boys who help him to whip the oxen when necessary; further there is always a boy behind the wagon who handles the brake when going downhill and who looks after the oxen when they are grazing.

Without doubt the first journey with such a wagon makes a most peculiar impression on the traveller and for my part I shall never forget it. It was, as I said, early in the morning and so dark that you hardly see the objects around you. Suddenly the whip cracks. "Vat! Vat!" shout the drivers and boys in chorus, and slowly the heavily laden wagons start moving. But they move forwards for only a few minutes, the wheels sink down to the naves in the soft sandy bed of the Bera River[57] and then we sit firmly fast. Now starts an infernal noise, the sjambok rains down lashes with unbelievable speed over the poor oxen, Boers and natives shout all they can: "Loop! Loop! Alle beeste - Varenberg! Taffelberg! Zeeland du schelm!" The oxen pull and strain in the yokes, bellowing with pain and rage, throw themselves furiously onto their knees, rush up and threaten their tormentors with their horns, get entangled in the harness, and when, in spite of all this they cannot budge the wagon and the sjambok is still tearing off the hair of their backs, all of them all at once, as if by agreement, rush of the road, turn about towards the wagon and stop it with horns lowered, ready to attack the driver. They are now allowed to breathe for a while .. . In this way we travelled through the "veld". The country rises slowly to the interior; the ground consists of sand and stone, there are no trees or grass, only here or there grows a little sedum - as far as the eye can see the desert extends completely naked and barren. Every third hour the oxen are outspanned to rest and, if grass is found, graze. .. The oxen are called back to the wagon by the driver cracking his whip in the direction towards which the animals had gone in search for grazing; when they return they arrange themselves in a row to the left of the trek-rope with their heads turned towards it, and without too much resistance allow the head-thongs to be fixed round the horns and the inspanning proceeds - and then one carries on once again.

Actual roads are found only along the main routes close to the larger centres of population; otherwise one has to travel across the veld as best one can. Smaller

57 The Bera River is a river east of the Angolan town of Mossamedes. Möller made his journey through southern Angola and northern Namibia from the Atlantic coast and the description of the ox-wagon trip from this town into the interior is identical to appropriate journeys in Namibia.

trees and bushes are crushed under the big wheels; if one gets stuck against a large tree-stump or rock the jack is taken out and the wagon is lifted sufficiently to go over the obstacle. In this way one travels across ground where the stranger could not imagine it possible to drive a wagon, much less a heavily laden one. Sometimes the road runs upwards or downwards across steep boulder-strewn parts and in between one is stuck for hours in some sandy river-bed or other loose ground. If the road is hard and good again, one may travel up to four and half kilometres per hour."

This was to be the mode of travel in Namibia until the threshold of the First World War and even in the twenties and thirties. But it must be also recorded that, with the arrival of the German settlers, a change in the general transport pattern took place. The new settlers arrived mainly at the harbours on the Namibian coast, e.g. Walvis Bay and Angra Pequena. They had to traverse the harsh Namib Desert to reach the Namibian interior. The consequence was that a new colonial transport pattern developed which even more intensified the east-west orientated transport direction at the cost of north-south links.

In January 1894 a German map, the "Langhans' Deutscher Kolonial Atlas, Nr.15: Südwestafrikanisches Schutzgebiet", 1:2.000.000 was published, and the ox-wagon road network of the initial epoch of the German occupation is listed in Appendix Table 2 at the end of this publication.

A comparison between Hahn's map of 1879 and Langhans' map of 1894 establishes the fact that no great differences in the ox-wagon roads networks existed between these two periods in the areas south of the Swakop River. The only exception is a remarkable increase of new east-west links. From the Swakop River, in a northerly direction to Damaraland, to Owamboland, the Okavango and the Kaokoveld, a tremendous extension of roads had taken place in the initial period of the German colonisation. This can be attributed to the increasing trade with Namibia's north during this period, again dictated by the interests of European traders who now were entitled to the protection of the German power. This added to the hitherto mainly economic character of roads, that of a military strategy employed in order to achieve the colonial objective of the German Empire: to create a settler's colony.

The Namib Desert was a considerable obstacle to any ox-wagon traffic, and it led to numerous trials to replace the wagon traffic by more desert adapted transport means. In spite of some unsuccessful trial crossings of the Namib Desert by a steam engine, the ox-wagon traffic started to develop even further, with ever rising intensity and

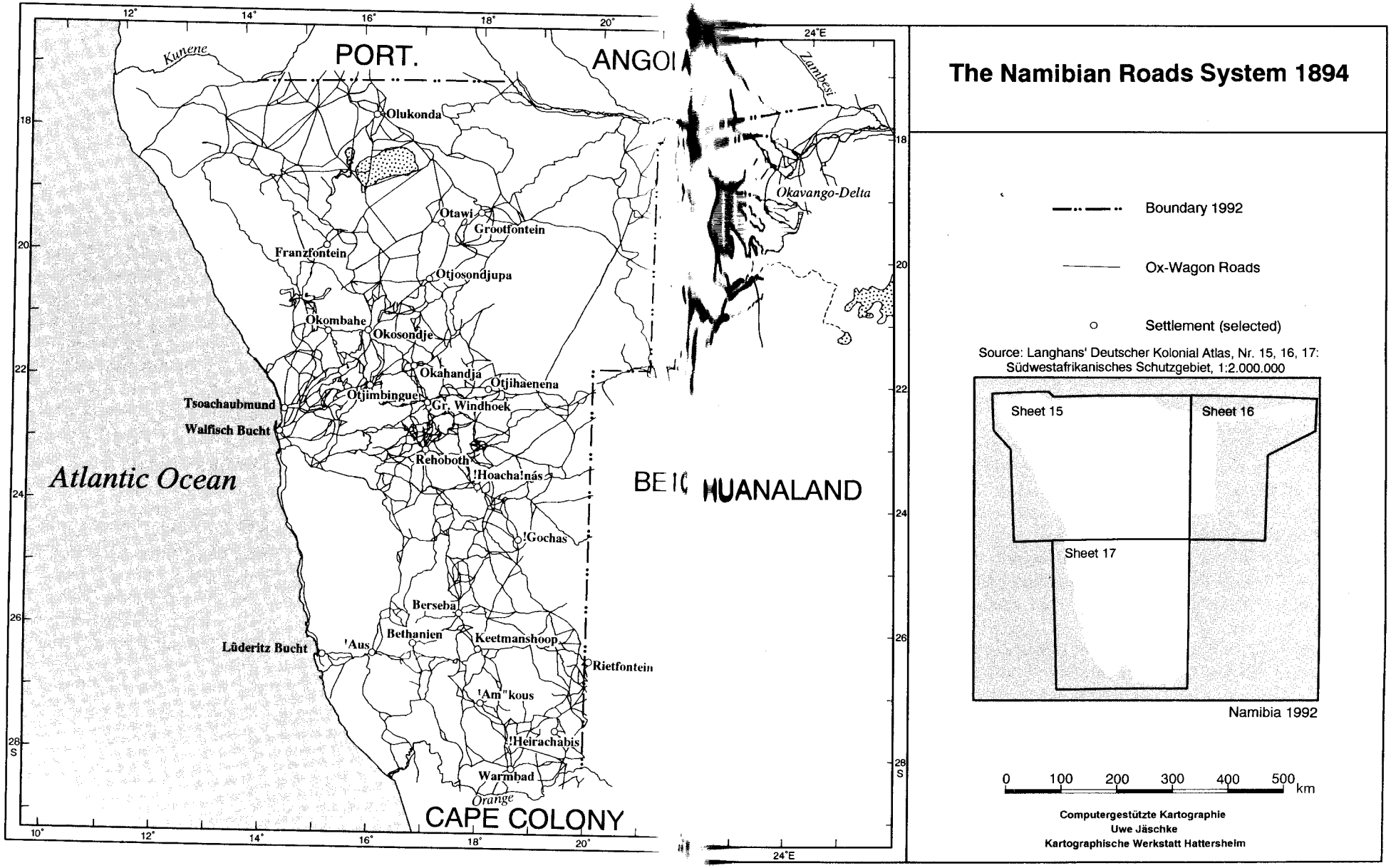
travelling distances during the beginning of the 1890s.[58] The traffic increased as a direct result of the resistance war between Germans and Namibians in 1893, when more military forces arrived, and indirectly as a result of the increasing trade with European goods.[59] But this first resistance war of Namibians against the colonial power not only initiated but also interrupted road transport. During August 1893, Hendrik Witbooi, the leader of the Nama troops fighting the Germans, successfully interrupted the vital German supply line, the Bay Road between Windhoek and Swakopmund, while surprisingly attacking Schmerenbeck's freight train at the places Dieptal and Horibes in the Swakop valley. The train consisted of 20 wagons with essential reinforcements for the garrison in Windhoek. Twelve years later, on 29 October 1905, during the Great National Resistance War (1904-1909), another important German line of communications witnessed Hendrik Witbooi's last fateful struggle when this great Namibian was killed in action while sacking a German freight wagon at the farm Fahlgras [Vaalgras, Koichas] on the road from Koes to Berseba in the Namibian south.[60] Organised construction activities during the initial phase of the German occupation was, however, the responsibility of the German "Schutztruppe" (protection force). This pattern remained unchanged until 1912 when the civil district councils were made responsible for construction and maintenance of Namibian roads.

In 1894 the German artist, Troost, tried to replace the tedious ox-wagon traffic on the "Bay Road" from Swakopmund into the interior by the implementation of a steam traction engine, but it did not succeed to operate under the harsh conditions of the Namib Desert, and the attempt was duly abandoned. Originally, Troost intended to inaugurate a freight service out of Swakopmund with the above mentioned steam traction engine hauling several wagons. The engine was imported from Germany and arrived complete with a mechanic, who was also to serve as the driver. Due to a lack of landing facilities at Swakopmund at this time both were landed at Walvis Bay. The mechanic took one look at the desert and went home. The engine rested some time in Walvis Bay until Troost succeeded in finding a mining prospector who was willing to try his luck at getting the machine to Swakopmund. Three months later he delivered the engine to Troost at Swakopmund. It had practically been pushed the entire distance because it had the tendency to dig itself into the deep sand every time an effort was

58 Loopuyt, M.: The Arteries of S.W.A., South West Africa Yearbook, 1961, p. 47 op. cit.

59 Dove, Karl: Deutsch-Südwestafrika: Ergebnisse einer wissenschaftlichen Reise im Südlichen Damaralande, Petermanns Mitteilungen, Berlin, 1896, p. 68 op. cit.

60 Drechsler, Horst: Südwestafrika unter deutscher Kolonialherrschaft, Berlin, 1984, p. 75-76 and p. 187


The Namibian Roads System 1894
Boundary 1992
Ox-Wagon Roads
Settlement (selected)
Source: Langhans' Deutscher Kolonial Atlas, Nr. 15, 16, 17: Südwestafrikanisches Schutzgebiet, 1:2.000.000
Sheet 15
Sheet 16
Sheet 17
Namibia 1992
0 100 200 300 400 500 km
Computergestützte Kartographie
Uwe Jäschke
Kartographische Werkstatt Hattersheim
PORT.
ANGOL
BE C HUANALAND
CAPE COLONY
Atlantic Ocean
Kunene
Zambesi
Okavango-Delta
Orange
Olukonda
Otawi
Grootfontein
Franzfontein
Otjosondjupa
Okombahe
Okosondje
Okahandja
Otjihaenena
Otjimbingue
Gr. Windhoek
Tsoachaubmund
Walfisch Bucht
Rehoboth
!Hoacha!nás
!Gochas
Berseba
Bethanien
Keetmanshoop
Lüderitz Bucht
'Aus
Rietfontein
'Am"kous
!Heirachabis
Warmbad
12° 14° 16° 18° 20° 24°E
18 20 22 24 26 28 S

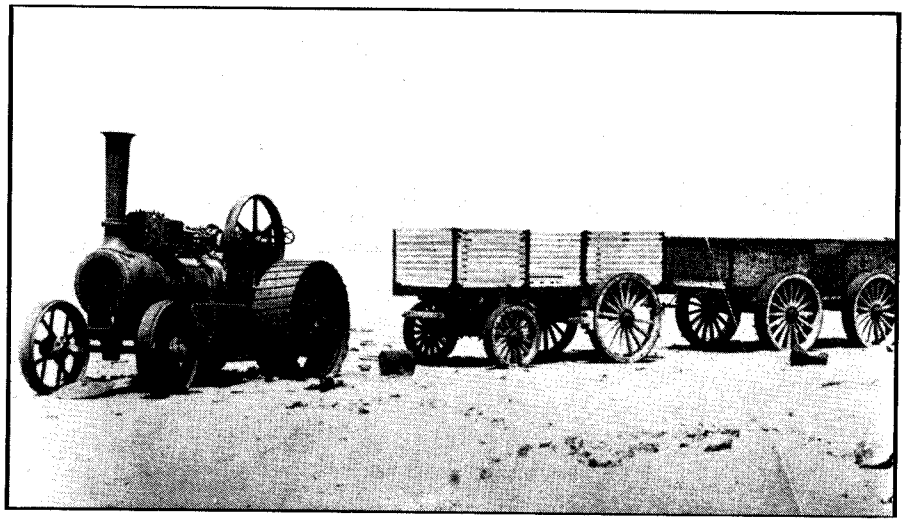


Fig. 5: "The Martin Luther": Troost 1895 Windhoek State Archives

made to move it under its own power. Service was started and the traction engine did surprisingly well once the coastal sand belt was traversed, but the desert was the stronger, and it finally blew a tube which could not be replaced. Later the people of Namibia called this "monument" the "Martin Luther" - hier stehe ich, ich kann nicht anders - (here I stand and I cannot do otherwise), and this was the first "White Elephant" in Namibia's history of roads.[61]

From 1 July 1896 to 1 May 1897 the following traffic numbers were counted on the "Bay Road" at Otjimbingwe: 1.924 wagons, 50 carts and 45.552 oxen as well as 534 horses. The travelling time for the 382 km long journey between Windhoek and Swakopmund was two to three weeks, and the transport rate for 50 kg mass was 30 Mark. One wagon could handle payloads of 2.000 to 2.500 kg, and it took 24 oxen to drag it along what was referred to as a road. During the financial year 1896/97 22.542 Mark were spent on construction and maintenance of ox-wagon roads. This amount was spent on two road projects, namely the road from Avis, east of Windhoek

61 Moir, Sydney M. and Crittenden, H.T.: Namib Narrow-Gauge, Janus Publishing, Benoryn, Republic of South Africa, 1982, p. 6-7

costing 5.000 Mark and the road Keetmanshoop-Lüderitzbucht through the Neiams Mountains costing 17.542 Mark. Further road improvements were continued on the "Bay Road" between Tsaobis and Salem, on the road between Gross-Barmen and Otjiseva as well as on the road between Okahandja and Otjizasu.[62]

In spite of all these activities, the rinderpest, which during July 1897 descended upon the draft oxen and decimating their number unmercifully, for a long time stopped all road traffic with ox-wagons. The supply line literally collapsed and barely let enough supplies through to keep the German power alive, and made it imperative to find alternative transport solutions. Consequently, building activities moved swiftly from road improvements to railway construction. This alternative was not very popular and against the better judgement of the colonial administration, for the German treasury was in no position to stand the required outlay. Another alternative considered was a railway line to be worked with mules, but the rinderpest did not respect any kind of four-footed traction, and this plan had to be discarded. The railway construction became the main priority for the next few years as the modern transport mode, but road building still continued, mainly to create important feeder connections to the expanding German colonial railway system. For instance, the "Bay Roads" were still important transport links until the completion of the first Namibian railway line, the "Staatsbahn" (state railway) between Swakopmund and Windhoek on 19 June 1902.[63]

In the State Archives in Windhoek a detailed study with the number 165 exists regarding the two "Bay Roads" from the Atlantic coast to Windhoek via Otjimbingwe and via Fahlgras, respectively. This road report was compiled by the "Premier-Lieutenant" Franke, "Bezirkshauptmann for Otjimbingwe" (regional commissioner) on 16 February 1898.

An official circular letter of 20 June 1898 from the German Imperial Governor, von Lindequist, to all the "Bezirkshauptmannschaften" accentuated, however, the importance of continuing with the improvement of roads. He emphasised the fact that it is not appropriate to do a great deal of of blasting and heavy earth haulage in road construction but rather to concentrate on debushing, widening and straightening of

62 'Jahresbericht über die Entwicklung der deutschen Schutzgebiete im Jahre 1896/97', Ernst Siegfried Mittler & Sohn, Berlin, 1898

63 Dierks, Klaus: Schmalspureisenbahnen erschliessen Afrika's letzte Wildnis, Vom Schutzgebiet bis Namibia 1884-1984, Windhoek, 1985, p. 350 and Dierks, Klaus: Namibia's Railway System - Future Link to Africa, Harare, 1989, p. 8

existing roads. Von Lindequist especially mentioned the roads from Okahandja to Omaruru and from Omaruru to Outjo. Another letter from the Commissioner for Finance of the German Administration in Windhoek of 25 June 1898 mentioned the funding of roads by road-levies and bottle-store license fees from 30 December 1895 and January 1896, respectively. This was the beginning of organised financing of road projects in Namibia.[64]

Rehbock proposed a decisive improvement of transport links in 1898 in order to create a better economic basis for the "Schutzgebiet" (protectorate) and to reduce the extremely high freight costs which amounted to 1,20 to 1,50 Mark per ton-kilometre against only 0,02 Mark on the German Railways and even 0,01 Mark on the US Railways. The only way to change the unfavourable transport scene was to make a start with the building of narrow gauge railway lines and to improve the existing ox-wagon roads. During the end of the 19th century, Namibia's roads still remained in their original state, and very few improvements had been made at this stage, with the exception of some isolated distinct arterial roads from centres like Windhoek, Gibeon and Keetmanshoop to the Atlantic coast. The friction value on these roads, which existed to a large extent in name only, was very high, and consequently one ox was not able to pull more than a 100 to 150 kg payload. The average covered transport length amounted to only 20 km per day. The daily effectivity of one ox could be determined to 2 to 3 ton-kilometres and in the case of unladen return trips to 1,2 to 2 ton-kilometres. Due to the ineffective ox-wagon transport it was seriously considered to make use of load animals, like camels, for instance. Trials with camels in Namaland made by the firm Seidel and Mühle brought quite satisfactory results. An increase of effectivity in ox-wagon transport could only be expected with systematic improvements of the roads system. But under the economic realities of the final years of the 19th century, Rehbock did not see his way open to recommend the general improvement of the whole road network in existence but rather to concentrate on the improvement of isolated spots and to increase the construction tempo of narrow gauge railway lines.[65]

A first Path Ordinance came into effect on 1 October 1898. This Roads Ordinance mentioned two classes of roads, i.e. public and private roads. The ordinance mainly

64 State Archives Windhoek: Official letters and circulars

65 Rehbock, Th.: Deutsch-Südwest-Afrika - Seine wirtschaftliche Erschliessung - unter besonderer Berücksichtigung der Nutzbarmachung des Wassers, Berlin, 1898, p. 28 and p. 208

dealt with outspan services like water and grazing. Each "Bezirkshauptmannschaft" had to proclaim all public roads and a proclamation list of all proclaimed, public roads to date had to be made known on January 1st of each consecutive year. No mention was made, however, of whose responsibility it would be to construct and maintain these Namibian roads.

In 1899 a feasibility study was carried out by the "Bezirkshauptmannschaft Windhoek" to improve the road from Windhoek in a southern direction through the Auas Mountains. Three alternatives were investigated, i.e. the construction of a new road for 2.100 m for an estimated price of 102.758,12 Mark, an alternative new road for a distance of 1.680 m for an estimated price of 29.737,37 Mark and the improvement of the existing track for an estimated price of 13.580,40 Mark. The German Governor, Leutwein, decided to accept alternative design No. 2 in a letter No. 8339 dated 13 December 1899, and praised the good work done by the Surveyor General but also stated that the design standard for this section of road appeared to be too high. In an official letter to all the "Bezirkshauptmannschaften" Leutwein warned against too high design standards in road construction, as it should be appropriate to African and not to European conditions. Leutwein mentioned that for these exorbitant road costs a full railway line could have been built. The construction of the Auas Mountain road was entrusted to the colonial "Schutztruppe" and to the police force in order to save funds. The works started in June 1899, and the final inspection took place in the presence of the German Imperial Governor, Leutwein, on 4 December 1899.[66]

3.2 The Consolidation of the German Era 1902 - 1915

The period from 1902 to the First World War was used to consolidate the roads system in order to achieve the colonial political and economic objectives. In May 1902 the survey office of the German Imperial Government in Windhoek issued a list of all road lengths in Namibia. 116 different roads were identified and surveyed. In this comprehensive study all surveys from military, official and private sources were summarised. The starting point for the surveys for the different parts was Swakopmund. The first section of these surveys dealt with the central, then the northern and finally the southern parts of Namibia.[67]

66 State Archives Windhoek: Official letters and circulars

67 'Deutsches Schutzgebiet: Südwest-Afrika: Zusammenstellung von gemessenen Wegelängen: Bearbeitet im Bureau der Landesvermessung des Kaiserlichen Gouvernements in Windhoek im Mai 1902'

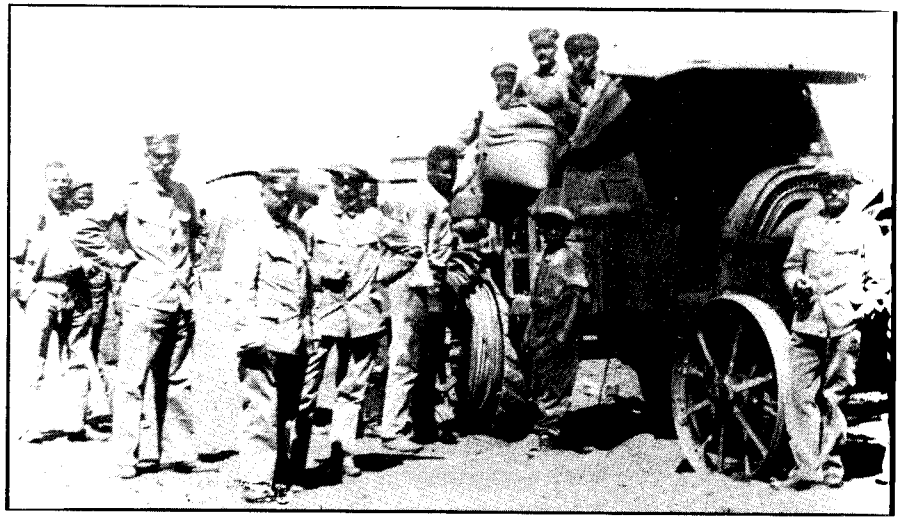


Fig. 6: "First motor car in Namibia: Troost "Lastwagen" 1904
Windhoek State Archives

The total distance of all roads surveyed at that time in Namibia revealed a distance of 18.826,03 km. Most of the road surveys were done quite accurately with the aid of the compass-distance-measuring method or the "tracheameter" method. Other distances, especially in remote areas, were established by means of horse-riding hours where one horse-riding-hour was determined as an average of 8 km. The accurate surveys were partly calculated to the second and third digits after the decimal point in kilometres. In case of different or contradictory measurements the arithmetical mean was accepted or, in case of doubt, the most reliable value. Even remote, difficult roads like the road from Outjo via Okahakahana and Oniipa in Owamboland and via Namakunde in Angola to the Kunene River with a distance of 487,79 km or the road from Outjo to Sesfontein via Kamanjab with a distance of 351,00 km were surveyed. In a letter from the "Kaiserliches Zollamt Swakopmund" (Imperial Customs's Office) with reference J 1381, dated 27 September 1909, it is stated that even the distance between Swakopmund and Lüderitzbucht along the Atlantic coast with a total distance of 486,00 km was measured. The majority of these surveys served as a basis for road proclamations according to the Path Ordinance from 15 May 1898 and later according to the more modern, updated new Road Ordinance No. 13 from 14 June 1912.

An official circular No. 5756 dated 12 August 1902, signed on behalf of the Imperial German Governor by Major von Estorff, gave instruction to all district offices to make a start on the erection of road signs on a systematic basis.

During the Great National Resistance War against the German Occupational Forces in 1904, the first two petrol-powered trucks made their appearances in Namibia. It was Lieutenant Karl Schmidt who saw the two trucks on 17 August 1904 in Okasise on the road between Okahandja and Wilhelmstal.[68] In the same year the colonial administration in Windhoek issued a circular No. 13503, dated 25 November 1904, that all districts have to submit road reports including the estimated expenditures for road construction and maintenance.

The "Kaiserliche Distriktskommando Gobabis" announced by report No. 23, dated 9 February 1905, that no systematic road works had till then been undertaken except for the clearance of roads from obstacles like trees and shrubs in order to establish a minimum drainage of rain water from the road surface and to establish water points for the travelling public.

More activities were reported by the district office Windhoek in a letter No. J 3381, dated 22 February 1905. A total roads expenditure of 52.000 Mark for the financial year 1905 was estimated. Provision was made for a roads construction unit consisting of 25 men and for a roads supervisor as well as for building material. The following works were proposed:

1. The improvement and repair of the Auas Mountain road which had fallen into disrepair due to the increased war traffic and two rainy seasons.
2. Repair and improvement of the two roads Windhoek - Seeis and Windhoek - Hohewarte - Hatsamas. Another priority which was identified was the main road to Haris.
3. Furthermore, it was established that a road from Okahandja via Otjizongati to the Waterberg was to have an important priority.

Also the "Bezirkshauptmannschaft Grootfontein" established road building priorities in a letter K 381, dated 4 February 1905. This letter was signed by "Bezirksamtmann von Örtzen.

The district commissioner did not so much put his efforts into the improvement of existing and the construction of new roads but more into the establishment of water

68 Dierks, Klaus: Pfade, Pads und Autobahnen: Vom Schutzgebiet bis Namibia 1884-1984, Windhoek, 1985, p. 28

points because it was still the ox which served as traction mode, and not the mechanically driven motor car. He also mentioned that systematic road building in Namibia was not appropriate to the real requirements and the economic realities of the country. Each traffic mode were, as far as possible, to bear its own costs. Road improvements were in the mean time to concentrate on debushing, the removal of larger stones and the by-pass of pans which are filled with water in the rainy season. Major road fills and excavations as well as the surfacing of roads could not be justified as yet. Von Örtzen recommended the following road improvement projects:

			Mark
1.	Road:	Grootfontein - Namutoni	
		50 contract labourers for 4 months:	
		6.000 working days at 1,20 Mark food expenses	
		per working day	7.200,-
		Salary for 50 labourers at 10,00 Mark per month	2.000,-
		Material, tools, explosives etc.	2.000,-
		Unforeseen expenses	1.000,-
2.	Road:	Grootfontein - Otavi - Neidaus	
		On the same basis as above:	
		2 months and 20 labourers	3.840,-
3.	Road:	Grootfontein - Otjakewita - Waterberg	
		On the same basis as above:	
		2 months and 20 labourers	3.840,-
4.	Road:	Grootfontein - Otjituo - Karakuwisa - Okavango	
		20 contract labourers for 5 months: 3.000 working	
		days at 1,20 Mark food expenses per working day	3.600,-
		Salary for 20 labourers at 10,00 Mark per month	1.000,-
		Materials, tools, explosives etc.	1.500,-
		Salary for European foreman at 200,00 Mark per month	1.000,-
		Food for foreman at 2,00 Mark per day	300,-
		Costs for 5 'Abessinian boys' at 100,00 Mark	500,-
		Replacement of equipment lost in the Herero-War	
		e.g. diamond drills	220,-
		Unforeseen expenses	1.200,-
		Total for the four road projects in Grootfontein:	29.000,-

The "Bezirksamtmann" Gelshorn from Gibeon reported in a letter No. 76 of 24 July 1905, as follows:

Expenditure for one road building unit per day:

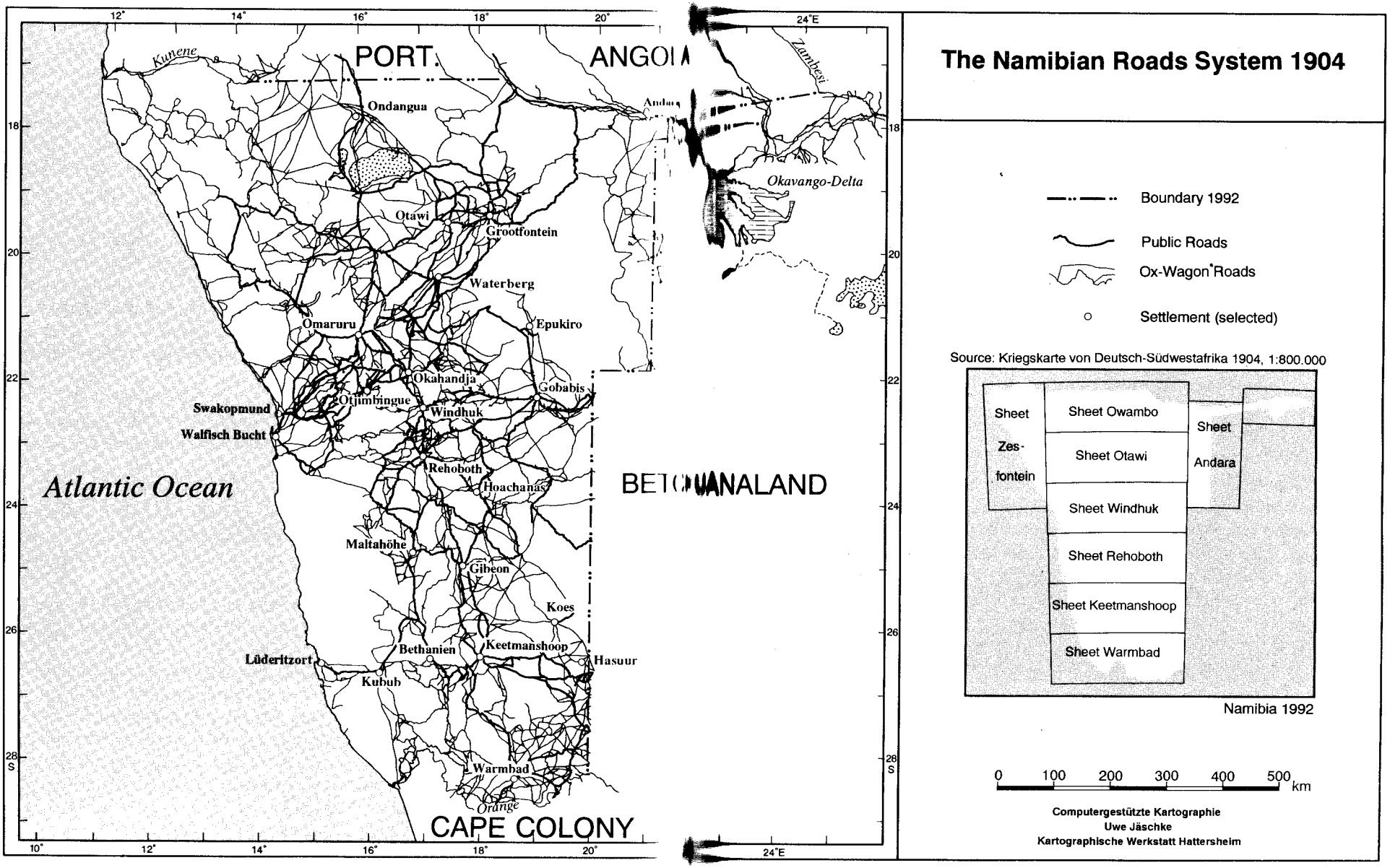
For oxen and wagon per day	20,--	Mark
For 8 'natives' including food expenses per day	16,--	Mark
For 1 'white' supervisor per day	12,--	Mark
Depreciation of tools per day	2,--	Mark

The improvement of roads like the removal of stones and the construction of small fills amounted to 250 Mark per kilometre, for unit costs of 50 Mark and a production tempo of 200 m per day for a road width of between 8 and 10 m. It was, however, mentioned that road construction had been executed for 90 Mark per kilometre, as for instance on the road from Geitsabis to the main road Haribes - Packriem (4.000 Mark for 45 km). The costs for the road Breckhorn to Daweb were estimated at 2.350 Mark for a distance of 20 km.

Karibib reported in a letter No. 1526, dated 18 September 1905, that the originally envisaged priority number one in the district, the road Karibib to Outjo, had become meaningless due to the progress of the construction of the "Otavi Railway Line". Other priorities in the district were identified as the roads Karibib-Friedrichsfelde-Johann Albrechtshöhe and Karibib-Otjimbingwe. For these two projects an amount of 1.400 Mark was estimated. It was also proposed to carry out the work with "Herero-Prisoners-of-War" (sic!).

In a letter No. 291 from the "Kaiserliche Bezirkshauptmannschaft Outjo" signed by "Hauptmann von Wangenheim" and dated 6 May 1905, the following was reported:

Roads in the district of Outjo were non-existent, and paths were created by the tracks of ox-wagons only. The only straight road sections existed between Palafontein and Outjo as well as between Aimab and Okakewa, but *"the oxen did not like to travel on these straight roads because they developed quickly signs of exhaustion"*. It was again stressed that modern road construction methods could not be economically justified. For the time being, road construction had to be restricted to the removal of larger rock boulders and the by-passing of difficult sections as well as the establishment of water points.


The Namibian Roads System 1904
Boundary 1992
Public Roads
Ox-Wagon Roads
Settlement (selected)
Source: Kriegskarte von Deutsch-Südwestafrika 1904, 1:800.000
Sheet Zes-fontein
Sheet Owambo
Sheet Otawi
Sheet Windhuk
Sheet Rehoboth
Sheet Keetmanshoop
Sheet Warmbad
Sheet Andara
Namibia 1992
0 100 200 300 400 500 km
Computergestützte Kartographie
Uwe Jäschke
Kartographische Werkstatt Hattersheim
PORT.
ANGOLA
BECHUANALAND
CAPE COLONY
Atlantic Ocean
Kunene
Zambesi
Okavango-Delta
Ondangua
Otawi
Grootfontein
Waterberg
Omaruru
Epukiro
Okahandja
Otjimbingue
Gobabis
Swakopmund
Windhuk
Walfisch Bucht
Rehoboth
Hoachanas
Maltahöhe
Gibeon
Koes
Bethanien
Keetmanshoop
Hasuur
Lüderitzort
Kubub
Warmbad
Orange
12° 14° 16° 18° 20° 24°E
18 20 22 24 26 28 S

The Namibian roads system for the year 1904 is well represented in the German war map, the "Kriegskarte von Deutsch-Südwestafrika" of July 1904, edited by P. Sprigade and M. Moisel and published by Dietrich Reimer (Ernst Vohsen) in Berlin. Appendix Table 3 at the end of this publication gives a list of the ox-wagon roads of this time which more or less is equivalent to the ox-wagon roads system on Map 3. This roads network can be roughly compared with that of the Langhans' Map of 1894 with some additional extensions to the north-western parts of the Kaokoveld, the eastern parts of modern-day Bushmenland and the Eastern Caprivi Strip. Appendix Table 3 endeavours to show the approximate equivalent roads or parts of roads of the present-day Namibian roads system. The comparison between 1894 and 1904 shows clearly that the colonial roads network expanded with the increasing significance of German-Southwestafrica as a settler's colony where roads served the economic and strategic interests of the German settlers. It also has to be observed that at this stage most of the roads had already been proclaimed in a legal sense in terms of the Path Ordinance of 1 October 1898.

Since 1907 much effort was put into the installation of road signs in the whole "Schutzgebiet" (protectorate). In many official letters in the State Archives in Windhoek, it is reported that by 1912 the farm-areas of Namibia were well provided with direction road signs.

As far as the drainage of roads and the construction of road culverts and road bridges over larger rivers were concerned, nothing constructive for the period of the German colonial occupation can be reported. The only culverts constructed during this time were the culverts on the road through the Auas Mountains which were built in excellent natural stone bound masonry in 1899. The "Kaiserliche Bezirksamt Windhoek" reported in a letter No. 6292, dated 12 July 1906, that till then no experience had been gained in the crossing of rivers and streams with aid of simple drifts. An official note in the above letter stated that *"due to high longitudinal slopes, rivers could only be bridged permanently with the aid of brick layed culverts and bridges"*.

Bridge construction in Namibia during the period before the First World War concentrated upon the many railway lines built during this time. These railway bridges were pre-fabricated steel bridges, imported from Germany and assembled "in-situ". The piers of these bridges were substantially built of cut stone. These railway steel bridges consisted generally of the deckplate girder type and were designed to carry an axle load of 6.500 kg. On the basis of these railway bridges, the "Staatssekretär des Reichs-Kolonialamtes" (state secretary of the Imperial Colonial Office) suggested in a letter No. B. II. 902/13/15443, dated 18 April 1913, that the principle of pre-fabricated steel bridges were to be used also on roads. It was proposed

to use steel bridges with various spans between 10 m and 50 m and with a width between the kerbs of 3,50 m and a free trafficable height of 4,00 m. The design live load for this bridge type was fixed with a uniformly distributed load of 400 kg/m^2 as well as a standard design vehicle of 8.000 kg mass with a vertical wheel distance of 1,30 m and a 3,00 m wheel base on the most unfavourable position on the bridge deck. The following prices were quoted on 3 May 1913 ex "Beuchelt & CO, Grünberg in Schlesien": 31 Mark per 100 kg for spans between 10 and 20 m as well as 28,50 Mark for spans between 25 and 50 m.[69]

The German, Paul Grätz, needed 630 days to cover a journey from Dar-es-Salaam to Swakopmund during 1907/08 with a "Special Mercedes car". 1909 the first passenger motor-car, a "Daimler-Benz", was imported for the Governor of German South West Africa.[70]

From 1909/10 onwards it was possible to negotiate most of the unimproved roads in the central and, especially, in the southern parts of Namibia. The rocky or gravelly nature of the subgrade of such roads made them, with limitations, suitable for motorised traffic. This was possible deep into the Namib desert and to the edge of the Kalahari where the obstacle of the sand dunes hampered any such traffic. But even at the beginning of Namibia's motorised age most of the roads were unconstructed paths which had only been cleared from larger rocks and boulders. Main obstacles, not only for motor-cars but also for ox-wagons, were river drifts and the muddy regions in the north during the rainy seasons.[71] Getting stuck at river crossings and in the mud of the north were common sights until the 1960s when the systematic building of more modern roads began.

On 14 June 1912 the first Roads Ordinance for Public Roads was published by the German Colonial Administration replacing an earlier Path Ordinance from the 18 May 1898, which had been mainly an "Outspan Ordinance". This new Roads Ordinance made provision for four classes of roads, i.e. district roads as arterial roads, connection roads as feeder roads to the district roads, town roads and private roads. The proclamation of all public roads like district and connection roads had to be

69 All above mentioned letters can be found in the State Archives Windhoek in Volumes 1694 and 1695: 'Wegebauten und Überbrückung von Flußläufen und Straßenbrücken' (A II 42) sowie 'Wegebauten und Aufstellung von Wegweisern' (A II 43). See also Dierks, Klaus: Pfade, Pads und Autobahnen, p. 357

70 Ibid, p. 30

71 Estorff, Ludwig von: Wanderungen und Kämpfe in Südwestafrika und Ostafrika und Südafrika, Windhoek, p. 155

effected by the "Bezirksamtmann" after having dealt with by the specific District Council.

A list of all proclaimed roads had to be published in the Official Gazette on the 1 April of each consecutive year.

Maintenance and construction of all public roads, except town roads, were the responsibility of the District Councils. The road width had to be determined by the District Councils but were normally established to 10 metres in the case of district roads. The maintenance included road signs and distance markers. Paragraph 5 of this Ordinance was of specific interest, because it had been laid down that individual persons benefiting from the establishment of public roads with public funds had to participate in the costs directly or indirectly by means of labour mobilisation. The Roads Ordinance came into effect on 1 October 1912.

Shortly before the outbreak of the First World War modern road construction techniques were under consideration by the German Administration. Even the bituminous treatment of roads was proposed in a letter from the "Continentale Öl-Besprengungs und Strassenteerungs Gesellschaft Berlin", dated 9 October 1913, to the Imperial Government in Windhoek. Another innovative proposal to improve the roads in Namibia was made by the firm "Brenner & Co., Berlin-Wilmersdorf, Eisenbahn und Tiefbaugesellschaft" in a letter dated 17 December 1913. The proposal was to use pre-fabricated wagon-tracks made from steel to establish a "strip-road type" or a "spoorbaan type road" which was suggested as "Namibia-Adapted-Technology" nearly seventy years after this first proposal in 1913.

At the end of the year 1914 the following district roads were proclaimed in terms of the Roads Ordinance 1912 and advertised in the Official Gazette for German South West Africa:

1. *Aus - Neisip - Kosos - Chamchawib*
2. *Chamchawib - Bethanien - Brackwasser - Remmhöhe - Zaracheibis*
3. *Bethanien - Eichelmannshöhe - Kuibis*
4. *Kalkfontein (later Karasburg) - Warmbad*
5. *Station Gibeon - Gibeon - Tsubgaus - Ganaams - Voigtsgrund - Breckhorn Maltahöhe*
6. *Kub - Kuis - Tsamnarib Ost - Remmhöhe - Friedabrunn - Geitsabis - Rosenhof - Freistadt - Gibeon - Gründorn*

7. *Mariental Ost - Noib - Karaam - Aukam - Amadab - Persip - Koes*
8. *Dirichas - Narobmund - Nomtsas - Namseb - Hochwasserweg - Maltahöhe - Karichab - Breckhorn*
9. *Maltahöhe - Hochwasserweg - Christiana - Grootfontein - Kleinfontein - Amhub - Osis*
10. *Aris - Rehoboth - Kub*
11. *Gurumanas - Choaberib - Kobus - Klein Aub - Gamis - Maltahöhe*
12. *Garib - Dudoabib- Klein Nauas - Beenbreek - Anias - Derm - Lidfontein*
13. *Windhoek - Seeis - Witvley*
14. *Okatumba Süd - Ekuja - Epukiro*
15. *Kapp's Farm - Hohewarte - Hatsamas - Dordabis - Kowas - Achenib - Springbockvley*
16. *Windhoek - Aris*
17. *Windhoek - Teufelsbach - Okahandja*
18. *Windhoek - Haris - Gurumanas*
19. *Omitara - Otjiwarumendu - Okasewa - Witvley - Kalkpfanne - Gobabis*
20. *Old and new Otjizasu Roads*
21. *Otjizasu - Otjikuara - Okatjeru - Gobabis*
22. *Waterberg Road via Omusema*
23. *Okahandja - Waldau - Okasise - Karibib*
24. *Waldau - Omaruru*
25. *Okahandja - Gross Barmen - Otjimbingwe*
26. *Karibib - Etiro - Giftkuppen - Osambimbambe - Omaruru*
27. *Karibib - Johann Albrechtshöhe - Wilhelmsthal - Fahlwater - Okamohoro - Gross Barmen*
28. *Karibib - Okongawa - Otjimbingwe*
29. *Karibib - Usakos - Goabeb - Daweb - Okombahe*
30. *Waterberg - Okanamangonde - Otjiwarongo - Otjitasu - Omatjenne - Okakewa - Outjo*

31. *Waterberg - Okombiriso - Okahandja*
32. *Omaruru - Kalkfeld - Otjiwarongo - Okaputa - Otavi*
33. *Omaruru - Schieferhof - Okahandja*
34. *Omaruru - Omburu : both roads north and south of Omaruru River*
35. *Outjo - Palafontein - Naribis - Omatjenne - Otjiwarongo*
36. *Swakopmund - Husab - Gawieb - Salem*
37. *Swakopmund - Trekkopje - Ebony - Usakos*
38. *Swakopmund - Cape Cross*
39. *Ururas - Gungochoab - Klein Ubib - Ganab - Goagas*
40. *Grootfontein - Gemsboklaagte - Nosib - Tsumeb*
41. *Grootfontein - Uitkomst - Rietfontein - Okumanti - Otjenga - Otavi*

In addition to this system of arterial roads hundreds of connection roads were proclaimed in 1914. (See Appendix Table 3). This roads network was still established mainly for the ox-wagon, because at the threshold of the First World War only five motor vehicles existed in Namibia. While the ox-wagon still determined the road life during the German colonial era, the advent of the South African troops in 1915 resulted in an increasing deployment of motor driven vehicles in Namibia. The invading South African Army was already remarkably well motorised in comparison with the small German "Schutztruppe". Consequently, it has to be noted that the motorising age started with the beginning of the South African epoch in Namibia. It may also be noted that the transport system of the German era clearly served the interests of its colonial builders rather than those of the indigenes of Namibia. What therefore evolved, was not a road network geared to territorial integration, but a transport structure with an emphasis upon east-west traffic links at the expense of the north-south road connections to the Union of South Africa, linking administrative and military centres, points of resource extraction, mainly mines, and settler farming centres to the ports of Swakopmund and Lüderitzbucht. These ports were crucial nodes in this transport network, which consisted mainly of railway lines and to a lesser extent of an effective roads system, the nodes through which all colonial exports to and imports from Germany passed until the defeat of the German occupational forces through the invading South African Army.

4. The History of Roads in the South African Era

4.1 Phase One from 1915 to 1937

The ultimate colonial transport objectives have remained the same under the South African control from 1915 up to 1990 on the Independence of the Republic of Namibia, despite the provisions of the League of Nations Mandate and the subsequent requirements of the United Nations Trusteeship Committee and the Council for Namibia. The only change in the German pattern proved to be even more disadvantageous for Namibia, because the transport orientation shifted from a more east-west to a South African orientated north-south direction.

After the First World War the League of Nations entrusted the Mandate over Namibia to the Union of South Africa on 17 December 1920. The German Roads Ordinance of 1912 was duly replaced by a South African one in 1923. This "Roads and Outspans Proclamation No. 30 of 1923" was signed by "His Honour Gijsbert Reitz Hofmeyr, a companion of the most distinguished order of Saint Michael and Saint George, Administrator of South West Africa" on 15 October 1923. This Ordinance assigned the following meanings to the different road classes:

" 'public road' shall mean:

(a) any road designated and established as such under the Ordinance of the Imperial Governor of German South West Africa dated 14 June 1912;

(b) any main, district or farm road proclaimed under the powers conferred by this Proclamation: Provided that nothing in this Proclamation contained shall apply to any road within the area of a Municipality or Village Management Board."

This Ordinance also dealt with the question of compensating private landowners for the usage of road construction and maintenance materials which could be removed from private ground without payment as long as these materials were used for the construction and maintenance of proclaimed roads. This was a new principle because in the German Roads Ordinance from 1912 no such provision had been made. This principle has been retained in all Namibian Road Ordinances until the present day.

In the reports to the League of Nations[72] no mention is made of roads until the year 1925, when an amount of R 766,44 was provided for under the Public Works Vote.[73]

72 Report by the Mandatory Power to the League of Nations: 1927

A new Roads Ordinance 15/1927 made provision for the establishment of Roads Boards in each Magisterial District of Namibia. Members of the Board were elected by registered owners of landed property in the district, that is to say, only white persons had any voting rights. Each Board was entrusted with the construction and maintenance of public roads within its Magisterial District, except in areas under the control of urban local authorities, which were vested with similar powers in their respective areas. The Boards had the power to impose a road tax on all landed property in their areas. This tax was based upon the extend of the land.

The tax was levied at the discretion of the Board and usually ranged from R 0,05 to R 0,10 per hectare. This rate was not sufficient to pay for all the road construction and maintenance requirements, and the Legislative Assembly of the - all white - Administration for South West Africa, therefore imposed a wheel tax of R 0,75 per wheel per annum upon all vehicles in Namibia. This revenue must in accordance with the law be applied to roads in the district in which the tax was collected. The areas outside the so-called white districts of Namibia were thus not included in this road tax system.

In addition to this, the Administration granted a subsidy not exceeding R 3,00 for every R 1,00 spent by the Roads Boards on main roads. The Administration's subsidy during the financial year 1926/27 amounted to just over R 24.000. In the report of the mandatory power to the League of Nations for the year 1927 it was further stated that: *"The Boards have done splendid work and, as a result of the improvement of the roads, motor transport is everywhere replacing animal transport and the opening up and the development of the country is being enormously expedited."* Above report continued to state that *"nobody should expect that South West Africa's roads system would be the best in the world because the character of the country would be against the construction of first class roads. Responsible for this would be an abundance of mica schist and sand and the scarcity of good road building materials. In Owamboland, for instance, not a single stone could be encountered, except in the vicinity of the Kunene River. The building of a modern highway from the north to the south of the territory would cost hundred thousands of pound sterling, which the administration never could afford to spend".*

It is therefore apparent that the Roads Boards, under the chairmanship of the local magistrate, were responsible for the collection of taxes and the repair and maintenance

73 One British Pound is taken as two South African Rand, as has been the official Pound/ Rand relationship when the Rand was firstly introduced in 1961.

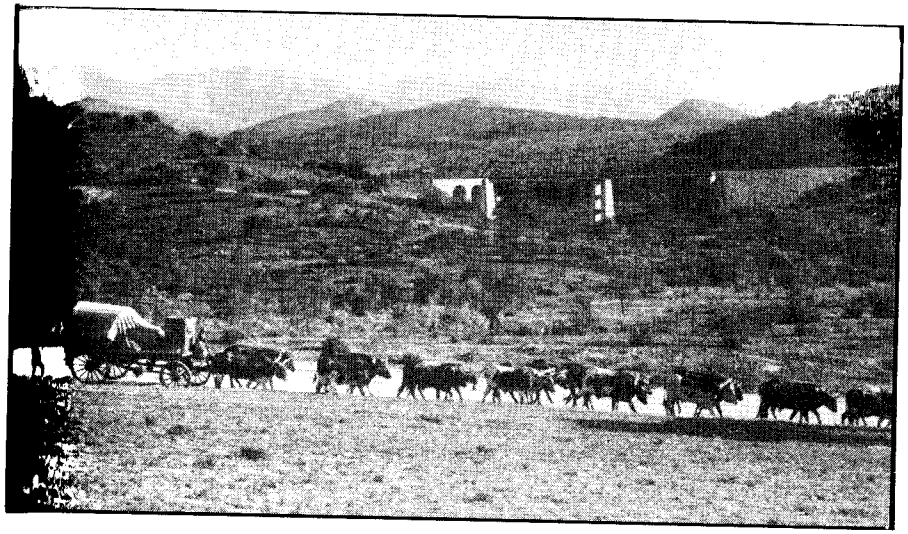


Fig. 7: Avis Road to Kapp's Farm: 1922/23 Windhoek State Archives

of roads within their respective districts from revenue collected by them. In 1930, an amount of approx. R 25 was made available to each magistrate to enable the worst causeways over rivers and streams to be repaired. In cases of serious wash-aways on major roads additional funds were granted to the Roads Boards to effect urgent repairs of river drifts damaged by excessive floods.

Apparently, arrangements also existed between the chairmen of the Roads Boards and certain "white" farmers whereby the roads across their farms were kept in order by granting nominal remuneration by the Board.

The first Road Motor Transport Service of the South African Railways and Harbours was also established during this period and was instituted between Mariental and Stampriet and Mariental and Aranos on 1 February 1927. The heavy transport vehicles used put an extra stress on the maintenance of public roads. They also contributed to the further expansion of the Namibian roads system, giving an indication of where new roads were required relative to the economic growth, but solely in the interest of the white population group. The next "R.M.T." services were instituted between Mariental and Maltahöhe on 1 April 1928, Mariental and Lidfontein on 13 December

1928, followed by the Windhoek to Dordabis service on the 1 May 1930, and Omitara to Otjinene as well as Omitara to Okozondana services on 8 December 1930.[74]

The first tractor drawn grader was purchased during the financial year 1932/33 by the Works Branch of the Administration for the maintenance of Namibian roads. In 1932 two maintenance units were brought into being with the help of two second-hand lorries, a 5 ton "Federal" and a 2 ton "Reo" in the Windhoek district. The first light motor grader, a Galion, was purchased in 1936. Relief work for needy persons during the drought and depression of 1930/33 was provided by the South West Administration, and during 1932 to 1933 some 250 to 300 "white" relief workers were employed on roads.[75]

At this stage the maintenance and repair of roads were the responsibility of the Works Branch of the South West Africa Administration. The exact distances of main and district roads in existence at this stage are not recorded. The above position prevailed in Namibia up to about 1937, and this marks the end of the first phase.[76]

4.2 Phase Two from 1937 to 1945

Not much of a development has taken place in Namibia in the years 1930 to 1934 due to the world economic depression and a severe drought which was, however, broken by an extraordinary good rainy season - the best so far recorded in the history of Namibia - in 1934. It was not until 1937 that it was reported:[77]

"An important change in roads policy was effected during the year. The Roads and Outspans Ordinance, No. 7 of 1937, abolished all Roads Boards, created a Roads Fund, and placed the construction and maintenance of all public roads upon the Administration. The Department of Works is now responsible for the construction of all public roads in the Territory. Major equipment to the value of R 82.000,00 was purchased during the year, and with the aid of this machinery considerable improvement was effected in the condition of roads. The equipment handed over

74 Submission to the International Court at the Hague: The Development of Roads and Bridges in the Territory of South West Africa covering the Period 1920 - 1965, Windhoek, 1965, p. 7

75 Report by the Mandatory Power to the League of Nations: 1932

76 Submission to the International Court at the Hague: The Development of Roads and Bridges in the Territory of South West Africa covering the Period 1920 - 1965, Windhoek, 1965, p. 8

77 Report of the Mandatory Power to the League of Nations: 1937

by the Roads Boards was practically nil. An organisation was started on bridge construction and it is hoped that funds in the future will permit a steady progress in the construction of low level bridges and other drainage crossings. A low level bridge was completed over the Omatako Omuramba on the main road to the north."[78]

Section 6(e), Chapter II of Ordinance No. 7 of 1937, provided that the Administrator of South West Africa shall institute a Central Roads Board, whose functions powers and duties were laid down by Government Notice No. 8 of 1938, and whose duties should be:[79]

"It shall be the function and duty of the Board to advise the Administrator on all such matters relating to the carrying out of the provisions of the Ordinance and the furtherance of the objects thereof, as may be referred to it by the Chairman thereof, and on all such matters as may be specially referred to it by the Administrator."

Until the year 1937 no specific vote existed for road building and it was not until Ordinance 7 of 1937 was passed that specific amounts were voted for specific works. The amounts accruing to and expended from the Roads Fund from 1937/38 to 1945/46 showed a steady increase from approx. R 125.000 to approx. R 250.000. Discrepancies between accrued and expended amounts have been made up from the Territorial Development and Reserve Fund. In fact, more has been spent on roads than the amount of taxes that has been especially levied for road construction and maintenance. Nevertheless, the expenditure during the 1937/45 phase remained fairly constant, showing a small increase in 1945 and indicating a more or less dormant period with very little expansion and mainly concentrating on the maintenance of roads. It was not until 1945, after the end of the Second World War, that a more extensive program could be carried out.

In 1937 road building activities were the responsibility of the Works Branch of the Administration using its own personnel. In 1937 only a "Field Assistant-in-charge" existed, a post which was changed to a Superintendent of Roads in September 1945. During 1938 the Roads Section of the Works Branch moved to new premises on the

78 Dierks, Klaus: Pfade, Pads und Autobahnen: Vom Schutzgebiet bis Namibia 1884-1984, Windhoek, 1985, p. 32

79 Submission to the International Court at the Hague: The Development of Roads and Bridges in the Territory of South West Africa covering the Period 1920 - 1965, Windhoek, 1965, p. 10

same location where the present Department of Transport has been established. The workshops of the Irrigation Section of the Works Branch were taken over for the repairs of vehicles and road building machinery, and the necessary mechanics were appointed during this year.[80]

Apart from the above mentioned Superintendent of Roads and his staff of four permanent officials in Windhoek, all the field personnel, i.e. plant operators and labourers, were employed on a temporary basis. During 1945 the posts of Inspector of Roads and three Assistant-Inspectors were also created while the first Civil Engineer, an Assistant-Engineer, undertook the design of bridges and the drawing up of plans. All these posts were filled by transfers from or in response to press advertisements in South Africa.

Until 1945 very few bridges and other structures were built. It proved expedient to concentrate on the provision of concrete slabs and low-level bridges over rivers that were the longest flowing during the rainy seasons, and in most cases low-level bridges sufficed. The structures built up to 1945 were:[81]

High Level Bridges	2
Low Level Bridges	9
Road over Rail Bridges	2
Concrete Slabs	10

Numerous culverts were, however, also constructed during this period between 1937 and 1945.

In 1937/38 the first two Caterpillar II motor graders were purchased as well as a motor driven 3 wheel roller. An additional Caterpillar II grader was purchased in 1939. By 1940, four heavy motor graders, one crawler tractor, one 5/8 cub.yds. truck mounted loader, several tractors towing 3 ton drawn graders and a number of trucks were in operation.

By the end of 1945, the following machines were on hand and this reflects the start of rapidly expanding road constructing and maintenance activities since 1945:[82]

80 Ibid, p. 11

81 Dierks, Klaus: Pfade, Pads und Autobahnen: Vom Schutzgebiet bis Namibia 1884 - 1984 Windhoek, 1985, p. 32

82 Submission to the International Court at the Hague: The Development of Roads and Bridges in the Territory of South West Africa covering the Period 1920 - 1965, Windhoek, 1965, p. 11

Light trucks	12
Flat trucks	26
Tip trucks	33
130 gallons water trailers	33
600 gallons water trailers	4
Trailers	19
Drawn graders	14
Motor graders	6
Wheel tractors	19
Crawler tractors	1
Sheep foot rollers	3
Centrifugal pumps	4
Concrete mixers	3
5/8 cub.yds. truck mounted loaders	1
Diesel rollers	3
4 cub.yds. scrapers	1

The "Report of the Roads Construction Commission 1950", paragraph 143, reads as follows:[83]

"Only after the Second World War have serious attempts been made to organise a Roads Department so that roads can be planned, improved and built more efficiently, and that a more regular system of maintenance can be introduced."

The war period was not a very active period in the development of Namibia's roads system. In this phase the following Road Transport Services of the South African Railways and Harbours have been instituted:

Konkiep - Helmeringhausen	*12.09.1938*
Keetmanshoop - Koes	*12.10.1938*
Keetmanshoop - Aroab	*21.10.1938*
Grootfontein - Odibo (Owamboland)	*29.09.1941*

On 1 May 1939 a service, available on request only, was instituted from Tsumeb to Oshikango on the Angolan border. This was the first service to Owamboland and by 1941 this became a regular service (Grootfontein-Odibo). The introduction of this permanent bus service required the relocation and improvement of the road between

83 Ibid.

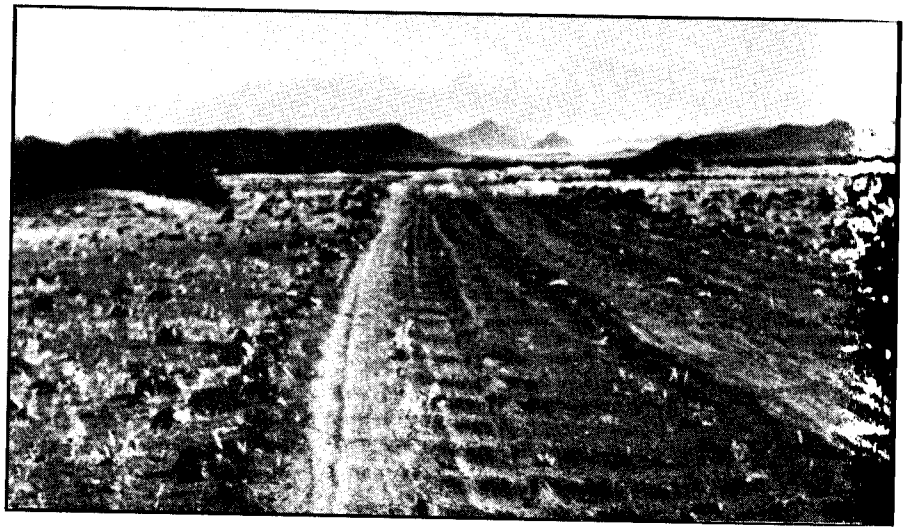


Fig. 8: Road Keetmanshoop - Aroab, later Main Road 27: circa 1940
Windhoek State Archives

Tsumeb and Ondangwa via Namutoni in Etosha over a distance of 180 miles. These works were undertaken during 1940.

In 1945 the Roads organisation of the Administration's Works Branch consisted of the following construction and maintenance units:

2 Bridge Construction Units
4 Road Construction Units
13 Grader Maintenance Units
16 General Maintenance Units
1 Grid Gate Unit

4.3 Phase Three from 1945 to 1952

After the Second World War the South African "Public Service Commission" for the first time made available professional and technical personnel to the Works Branch of the Administration for South West Africa. This enabled detailed surveys, location and design of bridges, and marked the beginning of programmed road building activities in Namibia.

This time also heralds the beginning of a boom period with expansion in the karakul, mining and building as well as fishing industries. At this time blocks of state-owned "Crown Land" were being cut up into farms and were being allocated to mainly white ex-soldiers of the South African Army. These newly developed areas were situated mainly in the Khomas Hochland and in the Omatako as well as in the Namib regions. The Khomas Hochland, being a particularly rugged and mountainous area, was formerly served only by the most primitive rocky tracks. From 1946 one of the six road construction units was allocated to provide a road through the Khomas Hochland which also linked Windhoek directly with Swakopmund on the Atlantic coast. This construction of main road 52 involved heavy mountain-pass work.[84]

Farms were also allocated in the district of Gobabis which falls within the Kalahari region with heavy, deep sand where road construction provides its own peculiar problems. Another geologically harsh area was the north-western region of Namibia, the "Kaross Block", which was also divided up into farms which in due course extended southwards to the Ugab River. In these days the small district town of Welwitschia, subsequently renamed to the former Khorixas, district capital of Damaraland, was established. By the end of the 1940s these areas had been sufficiently well served by roads and a network of South African Railway Road Motor Transport Services.

It is of interest to quote from the Report for 1946 of the Government of the Union of South Africa to the Council of the League of Nations concerning the roads administration of Namibia:[85]

"Some years ago the Administration decided to establish road depots at Keetmanshoop, Mariental, Otjiwarongo and Grootfontein in addition to the main or central

84 One of the most difficult passes on main road 52 was named after the first roads engineer in Namibia: Mr G. Bosua, a civil engineer from South Africa.

85 Report by the Mandatory Power to the League of Nations: 1946

depot and workshops at Windhoek. When these are all completed, equipped and brought into operation, the work will be much facilitated, since it will be possible to undertake maintenance and repair jobs as well as overhauls at those centres without dispatching the road machines to Windhoek for this purpose."

In May 1946 the first two roads engineers were appointed in the Roads Section of the Works Branch of the Administration (Günther Weder (civil) and Markus Lotery man (mechanical)). In all, the technical staff of the Roads Section consisted of three engineers, all stationed in Windhoek, while the districts were controlled by two road inspectors and three assistant road inspectors of the Works Branch of the Administration who were stationed at Grootfontein, Otjiwarongo, Windhoek, Mariental and Keetmanshoop. The field staff consisted of:

3 Bridge Construction Units
6 Road Construction Units
1 Grid Gate Unit
25 Grader Units and a few light maintenance units.

These units consisted of "147 white and 796 non-white" employees. During the financial year 1946/47 an amount of R 150.000 was appropriated from the Territorial Development and Reserve Fund to the Roads Fund and the estimated expenditure under the latter was R 320.000. In addition to road construction and maintenance 340 miles of the Botswana border were cleared during 1947 to facilitate patrols, to control the spread of foot and mouth disease and combat grass and bush fires. No expenditure figures in this regard are on record, however. The most important road construction job in 1946 was the building of the first section of a main road into the Khomas Hochland, and a length of 68 miles had been completed. In the same year, grader units maintained 11.961 miles of graded roads.

In spite of an amount of R 615.000 spent out of the Roads Fund in 1950, there were still so many shortcomings in the roads system of Namibia that the Executive Committee appointed a commission to look into this matter. The report of the "Roads Construction Commission 1950" recommended inter alia:[86]

"Your Commission considers it essential that the Roads Department should be distinct from the Works Department, and that this separately established depart

86 Submission to the International Court at the Hague: The Development of Roads and Bridges in the Territory of South West Africa covering the Period 1920 - 1965, Windhoek, 1965, p. 20

ment should have its own qualified departmental head .. . The Commission has studied the existing legislation thoroughly, and has examined witnesses on the subject. It concludes that the legislation itself is, with a few exceptions, satisfactory .. . The law about outspans, which says that outspans should be one hundredth of the farm, is antiquated, and has fallen into desuetude. Trek animals stop in their tracks to rest where the setting sun finds them .. ."

Subsequent legislation, outspans were done away with and the road reserve width was fixed at 60 metres. The Commission also went into the question of bridge construction and drainage of roads, as can be seen from the following remarks:

"Provision should, therefore, be made for abnormal conditions only after careful consideration. This policy is justified as it seems to be impossible, with the funds available, to make adequate provision for effective drainage along an entire route, for both ordinary and extraordinary conditions."

On the subject on surfaced roads the Commission recommended as follows:

"Although tarred roads are more expensive than gravelled roads, the Commission feels that tarred roads would be a boon to the country, and would advance the attempts of real road-building already being made. Elsewhere we mention that a sound start has been made with 500 miles of road, and we now recommend strongly that these 500 miles should be tarred immediately."

It was not possible, however, to make a start with this work until 1956.

The Commission also recommended the establishment of a soils laboratory for the testing of soils, gravel and stone types for the purpose of road construction. On gravel roads they recommended one motor grader for every hundred miles on main roads. The Commission's Report was accepted with certain amendments by the Executive Committee of the Legislative Assembly of South West Africa by Minute No. 619 of 20 December 1950. The design and construction of bridges during the period 1946-1951 were on the increase and the following structures were erected during this period:

High Level Bridges	*10*
Low Level Bridges	*4*
Concrete Slabs	*12*

In 1946 the total mileage of all proclaimed roads was 21.000 miles. These proclaimed roads have been classified into main roads, main district roads and farm roads. The first two classes were maintained directly by the Roads Organisation while grants

were given to the magistrates of each district for the maintenance of farm roads. In 1949 the mileages with a total of 21.189 miles of proclaimed roads were as follows:

Main Roads	*3.229*	*(5.195 km)*
Main District Roads	*3.879*	*(6.241 km)*
District Roads	*14.081*	*(22.656 km)*

At the end of 1952 approximately 60 major structures, mainly bridges over the larger rivers of the country, existed and are listed in Appendix Table 4 at the end of this study.[87]

Such was the state of the roads organisation before a separate Roads Department was established on 1 June 1951. On 9 January 1952 the first "Chief Roads Engineer" (M. Loopuyt) assumed his duty at the newly created Roads Department and began a new chapter in the history of roads in Namibia.

The establishment of the Roads Department as a separate branch of the SWA Administration marked an important turning point in the development of Namibia and formed the framework for what was to become the former Administration's and later Central Authority's of Namibia biggest single division, in terms of the overall budget. As its prime task, it had to plan, construct and maintain a roads system which in 1952 barely was existent, to serve a country of 824.269 km^2 with a total population of only approx. 450.000 in 1953 (Current estimated population (1992): 1.420.000, last census in 1981 resulted in 1.055.396 and included Walvis Bay).

To add to the difficulties, large areas of Namibia are desert or semi-desert with their own peculiar ground formations and many other natural obstacles which are unique only to this country and which have a marked influence on the planning and building of roads. To top it all, the Department of Transport was, and still is, faced with an acute shortage of highly skilled labour, technical and professional staff.

That Namibia's unique "salt gravel roads" came into being in the late forties happened almost by chance. Heavy trucks bringing salt blocks from the salt mines north of Swakopmund to Namibia's harbour town, Walvis Bay, used the poor tracks along the Atlantic coast. The sandy desert sections could be crossed only with great difficulties,

87 Quite a few structures from this official list of road structures have been replaced by modern ones in the meantime. All listed 'Old Roads' have been re-aligned with new structures built on them: See Appendix Table 4

Fig. 9: The first Gallion-Graders in Namibia 1952 Windhoek State Archives

and it was duly decided to repair the tracks with the freely available salt/clay material under supervision of the Roads Branch of the SWA Administration. No materials specification for this unique gravel mixture existed at the time, but the unsaturated rejected low-salt content material from the salt mines and salt pans north of Swakopmund was placed on the road by trial and error, distributed and levelled by hand and then traffic-compacted by the same trucks which caused the damage. In many cases, during their empty return trips, these trucks were used to haul some of the salt-concentrate. The new innovative road building and maintenance method resulted in a road type which was dust-free and looked nearly as a black-top road, long time before the first bitumen-paved roads came into being in Namibia. The first salt gravel roads were authenticated by Siegfried Engels, one of the oldest still living Namibian "Padmakers" (road builders). Engels was one of the last eyewitnesses of a memorable era of road building in Namibia when, for instance, it was normal practice to improve the dangerous crossing of the Omaruru River north of Hentiesbay by paving the riverbed with "sealskins" to get the traffic across.

During the 1950s the newly created "Salt Maintenance Unit SMU 1" began serious construction of a high standard salt-road from Walvis Bay in a northerly direction. In

the early 1960s the "SMU 1" reached a point just north of Cape Cross at 140 km (Mile 87) north of Swakopmund. Simultaneously, the "salt-road-technique" was also used to build the first section of the trunk road 2/2 from Swakopmund in an inland direction towards Usakos, which proved to be a successful experiment as long as the salt-gravel method was applied in the moist mist-belt region of the Atlantic coast. At the end of the 1960s a point 209 km north of Swakopmund (Mile 130) at the Ugab river mouth was reached.

4.4 Phase Four from 1952 to 1965

On the 13 June 1953 a new "Roads Ordinance and Road Traffic Signs Ordinance" was promulgated. This Ordinance made provision for four classes of roads: trunk, main, district and public roads. Trunk roads are arterial roads forming part of the roads system connecting Namibia as a whole with neighbouring countries. Main roads are important roads connecting important centres within Namibia. District roads are feeder roads carrying a reasonable amount of traffic which largely serve the - mainly white - farming area and provide access to the arterial and main roads system of the country. Public roads are proclaimed roads but their construction and maintenance are not generally undertaken at the expense of the government.

The Central Roads Board was duly abolished and the new ordinance introduced a system of separate Roads Boards in each magisterial district consisting of the magistrate as chairman and four other members from the particular district and who were appointed by the South African Administrator. These Roads Boards *"shall assist and advise the Administrator on all matters relating to public roads within its district, obtain and transmit all information he may require in connection with the Administration of this Ordinance or the regulations thereunder and generally carry out all such functions as the Administrator may from time to time assign to it".*[88]

Under the provision of Ordinance 17 of 1953 1.877 miles of trunk roads, 4.571 miles of main roads, 8.958 miles of district roads as well as 15.270 miles of public roads (now farm roads) were proclaimed between 1953 and 1955.

In April and May 1956 the Public Service Commission of the Union of South Africa carried out a further inspection resulting in a new permanent personnel establishment

88 Submission to the International Court at the Hague: The Development of Roads and Bridges in the Territory of South West Africa covering the Period 1920 - 1965, Windhoek, 1965, p. 35 Ordinance 17 of 1953

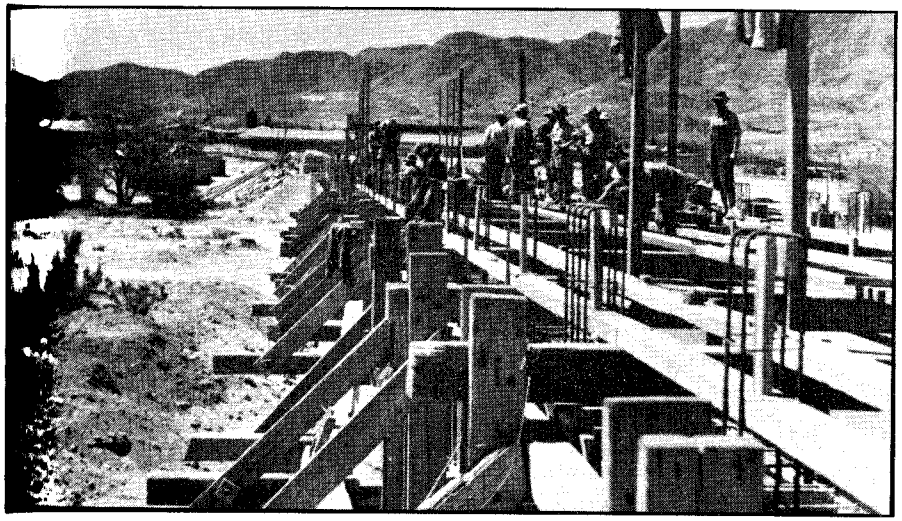


Fig. 10: Brigde No.58: Khan Rivier - Usakos 1952 Windhoek State Archives

of the Roads Department: The personnel of the Department was increased from the former total of 58 to the following 137 posts:

Engineers	*12*
Road Inspectors	*12*
Technicians	*31*
Administrative and Clerical	*82*

During 1956/57 a large, modern mechanical workshop was established while the laboratory was considerably expanded. At the same time the South African "Native Affairs Department" asked for assistance to build the road from Operet to Ondangwa while the construction of a road to Rundu in Okavango was also under consideration.[89]

The regional engineer's structure consisting of three regions Keetmanshoop, Windhoek and Otjiwarongo was still retained but the former eight road inspectorates were increased to twelve. The revenue accruing to the Roads Fund increased between 1952

89 Ibid, p. 36

and 1956 from R 194.422 to R 529.214, while expenditure in the same period increased nearly threefold from R 877.260 to R 2.131.928. At the same time the number of vehicles in Namibia increased from 13.870 to 20.512 vehicles.

At the end of 1956 the following units were in operation:[90]

Construction Units	*8*
Bridge Construction Units	*4*
Grader Maintenance Units	*90*
Ordinary Maintenance Units	*41*
Sandspoor Units	*4*
Gravelling Units	*8*
Pipe Units	*8*
Grid Gate Units	*8*
Firepath Units	*2*

At the end of 1956 the following proclaimed road mileages with a total of 34.354 miles existed:

Trunk Roads	*1.902*	*(3.060 km)*
Main Roads	*5.084*	*(8.180 km)*
District Roads	*9.833*	*(15.821 km)*
Farm Roads	*17.535*	*(28.213 km)*

Still not satisfied with the progress in the provision and maintenance of Namibian roads, the Administrator-in-Executive Committee resolved on 19 June 1956 that a commission be appointed to investigate and report on the above matters. The "Cloete Commission" recommended the purchase of standardised road building machines and vehicles which had proved themselves under working conditions in Namibia and South Africa and for which spare parts and accessories were readily available, and that these plant as far as possible were to be kept in the districts to which they had been allocated. It was further recommended that the construction of the new mechanical workshops at Windhoek, for which R 152.000 had already been allocated, be expedited. In regard to staff, the commission recommended a system of training by which all - white only - operators would receive a more thorough training in road building operations. It also recommended that new specialised road construction units be established, and that a start be made with the provision of surfaced roads. These

90 Annual Report: Roads Department of the Administration for South West Africa: 1956/57

to be built surfaced black top roads had to be given out under private contract, the funds for which had to be raised by means of loans.[91]

During the period 1952 to 1955 the following work was done for the South African Department of Bantu Affairs:

Aerodrome Rundu	*R*	*82,00*
Grootfontein - Rundu Road	*R*	*4.000,00*
Namutoni - Ondangwa Road	*R*	*117.000,00*
Herero Area of Aminuis	*R*	*65,00*
Aerodrome Okakarara	*R*	*1.088,00*

The construction of the first modern gravel road into Owamboland to Ondangwa enabled the start of a more reliable transport link between the "white sector" and this till then neglected part of Namibia. According to an Executive Committee Resolution, dated 13 May 1958, the road from Oshivelo at the southern border of Owamboland to Ondangwa was to be maintained on a 50/50 basis by the Roads Department and the South African "Department of Bantu Affairs". On 22 September 1959 the Executive Committee agreed in resolution No. 952 that a to be created Owambo Unit was to build and maintain this road. The road was proclaimed as trunk road 1/11 from Oshivelo to Oshikango at the Angolan border. In the same year a start was made to build a new direct road from Grootfontein to Rundu in the Okavango traversing virgin forest landscape and deep sand. On 1 October 1964 this road was proclaimed as trunk road 8/2 resp. 8/3.

By Executive Committee Resolution No. 1003 of 7 September 1961 it was decided to proclaim and build the following roads as district roads to generally improve the road infrastructure in Owamboland:[92]

- *Ondangwa - Okatana dam (later Oshakati) - Oshikuku - Ombalantu*
- *Ombalantu - Kalongo - Ongenga - Oshikango.*
- *Oshikuku - Elim - Ongandjera - Okualuthi - Onkolonkathi.*
- *Ongandjera - Ombalantu.*
- *Ombalantu - Okualuthi - Kotjekua - Opuwa (Kaokoland).*
- *Oshikango - Enana - Epasha.*

91 Submission to the International Court at the Hague: The Development of Roads and Bridges in the Territory of South West Africa covering the Period 1920 - 1965, Windhoek, 1965, p. 40

92 Ibid, p. 64

Most of the above 440 miles were, however, not proclaimed before 1978 and they were not built before independence.

Towards the end of 1953 the testing of materials for gravel roads, and two years later for surfaced roads started at the Central Laboratory. During this period between 1953 and 1956 the following major drainage structures were built:

High Level Bridges	*16*
Low Level Bridges	*2*
Concrete Slabs	*11*

For the first time use has been made of a newly developed simple, standardised bridge type with a 28 feet span.

By Executive Committee Minute No. 256 of 22 February 1956 it was approved that two construction units be equipped, including the conversion of the existing first unit, to start the construction of the first surfaced roads in Namibia. The building of a double lane surfaced road from Windhoek firstly to Brakwater, secondly to Aris and thirdly to Kapp's Farm was to be set as a target. Additional it was resolved by Executive Committee Minute No. 1156 of 17 October 1957 that one, already built trunk road in the north, i.e. the Otavi-Tsumeb road (trunk road 1/9) and another, an entirely new one in the south, from Keetmanshoop in a northern direction for approximately thirty miles (trunk road 1/3), be given out under contract for surfacing. For the first time the use was made of the services of private consulting engineers for the planning, design and supervision of the execution of the above mentioned contract works. Two South African consulting engineer firms were duly entrusted with the above mentioned services for the Otavi- Tsumeb, the Keetmanshoop-Wasser and the Windhoek-Aris trunk roads.

A proposed long term policy to surface 2.000 miles of trunk roads was accepted in principle by the Executive Committee by Resolution No. 670 on 16 July 1958. It was suggested to provide the whole Namibian trunk road system with a 20 feet wide bitumen surface, and the cost in those days for 2.000 miles were estimated at R 60 million.

By the end of the 1959/60 financial year there were a total of 60,7 miles of completed surfaced roads, made up as follows:[93]

93 Ibid, p. 50

Trunk Road 1/4 Mariental - Rehoboth	*4,5*	*(7,2 km)*
Trunk Road 1/5 Rehoboth - Windhoek	*11,4*	*(18,3 km)*
Trunk Road 1/6 Windhoek - Okahandja	*28,1*	*(45,2 km)*
Trunk Road 1/9 Otavi - Tsumeb	*15,7*	*(25,3 km)*
Trunk Road 6/1 Windhoek - Kapp's Farm	*1,0*	*(1,6 km)*

During the financial year 1960/61 56,5 miles of bitumen surfaces were laid so that by 31 March 1961 117,2 miles of surfaced roads were in existence in Namibia. Until the 31 March 1965 this figure had risen to a total of 477,6 miles of surfaced roads.

The acceptance of many of the recommendations regarding road construction set out in the Report of the Odendaal Commission resulted in a considerable speeding up of the tempo of surfaced roads construction, again mainly dictated by white interests.[94] Also the tempo of the regravelling of existing gravel roads increased considerably. From the financial year 1957/58 to 1964/65 the mileages of gravel road construction increased from 188 miles to 682 miles.

During 1965 the following road construction contracts were in preparation by private Consulting Engineers to be let at the end of 1965:

- *Trunk Roads 2/1, 2/2 and Main Road 36: Trekkopje - Swakopmund - Walvis Bay - Rooikop* *(2 contracts)*
- *Trunk Roads 1/1 and 1/2 : Keetmanshoop - Narubis - Grünau* *(2 contracts)*
- *Trunk Road 1/10 and Main Road 98 : Tsumeb - Geluk - Operet - Namutoni* *(2 contracts)*
- *Trunk Road 1/10 and Main Road 92 : Okatana (Oshakati) - Ondangwa - Operet* *(2 contracts)*

The construction of the Swakop River Bridge at Swakopmund, one of the largest pre-stressed concrete bridges in the southern hemisphere was, however, only completed in June 1969.

Due to the continued expansion of the Roads Department at this time, new accommodation had to be built all over Namibia. A start was made with the erection of a new roads depot at Karasburg during 1951/52, followed by Usakos in 1956/57. In 1957/58 a start was also made on a new office complex for the head office and the

94 Odendaal Report: 'Report of the Commission of Inquiry into South West African Affairs', Pretoria, 1964

central workshop and stores in Windhoek. In 1959/60 depots were erected at the following places:

Bethanien, Maltahöhe, Outjo and Okahandja, followed by Grootfontein, Tsumeb, Otjiwarongo, Mariental and Gobabis in 1964/65.

Following a new inspection by the "Public Service Commission" of South Africa in 1959 and the Organisation and Methods Section of the Administration for South West Africa during 1963 it was decided to expand the organisation of the Roads Department further. This expansion resulted in a new personnel establishment of 258 civil servants, including 44 engineers, at the head office in Windhoek. The increase in personnel resulted also in the necessity of constructing further new office buildings in Windhoek and new Regional Engineer's offices at Keetmanshoop, Otjiwarongo and Grootfontein.

During 1962 a new Roads Ordinance No. 28 dated 5 July 1962 was created. The Ordinance 28 of 1962 was developed for the amendment and consolidation of all existing territorial laws and ordinances as well as amendments on roads and for the arrangement of related matters. At the end of the financial year 1964/65 the total mileage of proclaimed roads was 37.112 miles of which 20.651 miles were trunk, main and district roads to be regularly maintained by the Roads Department. In the same year the Road Motor Service of the South African Railways and Harbours had also increased to 5.484 route miles. The following bridges were constructed between 1957 and 1 March 1965:

High Level Bridges 98	*bringing them to a total of*	*126*
Low Level Bridges 8	#	*23*
Road over Rail Bridges 7	#	*9*
Concrete Slabs 6	#	*39*

The period from 1957 to 1965 showed a distinct increase in the number of high-level bridges built due to the roads paving program which started during this year. The twenty year period from 1945/46 to 1964/65 also showed an increase in the expenditure of maintenance machinery with an expenditure of R 36.876 in the former and R 961.064 in the latter with a peak expenditure during 1959/60 of R 1.241.392. The rate of vehicle growth in Namibia between 1953 and 1964 continued to rise with an average increase of 10% annually to 35.700 vehicles at the end of 1964.

Finally the following number of road construction and maintenance units for the year 1965 are shown:

Maintenance Grader Units *112*
Light Maintenance Units *17*
Sandspoor Units *8*
Re-Gravelling Units *12*
Pipe Units *13*
Gravel Construction Units *8*
Bitumen Construction Units *2*
Bridge Construction Units *8*
Roving Betterment Units *24*
Bitumen Repeal Unit *1*
Salt Road Maintenance Unit *1*
Grid Gate Units *12*
Bitumen Maintenance Units *12*

Except for the grader maintenance and bitumen maintenance units which increased considerably over the next twenty years this number of units stayed more or less constant between 1965 and 1986. All units mentioned above were mainly used in the "white" areas in 1965. A comparison between these units and the number of units used in Owamboland in 1965 is especially interesting:

Maintenance Grader Units *5*
Light Maintenance Unit *1*
Re-Gravelling Unit *1*
Maintenance Gravelling Units *2*
Roving Betterment Unit *1*

In the following years this relationship did not change much in favour of neglected areas. The roads system at the time (1965) was still not geared to territorial integration between all regions of Namibia and to neighbouring countries in the east and north. But the basis for a modern roads infrastructure in Namibia was laid in 1965, and the modern age in the development of a roads system - at least for the requirements of the "white" population group, whose interests were still synonymous with those of the ruling power - had arrived.

4.5 Phase Five from 1965 to 1987

The period from 1965 to date can be characterised by the consolidation and uplifting of Namibia's roads network to one of the finest in Africa. However, one of its striking features is the different status in quantity and quality of its roads system between the so-called modern areas in the southern and central parts and the densely populated and more traditional parts in the north. This phase was highlighted by the surfacing of a large portion of all arterial roads (most of the trunk roads and some main roads, but very few district roads), the creation of high-standard, all-weather gravel roads and many more high-water structures. In 1952, Namibia had just over 10.000 km of trunk and main roads. There were no surfaced roads and very few suitable bridges. Since that time a remarkable development has taken place. The length of proclaimed trunk, main and district roads, the three roads classifications for which the state is responsible as far as construction and maintenance are concerned, has risen between 1952 and 1986 from a little more than 10.000 km to 41.572 km. This development is pictured in the figures and tables below.

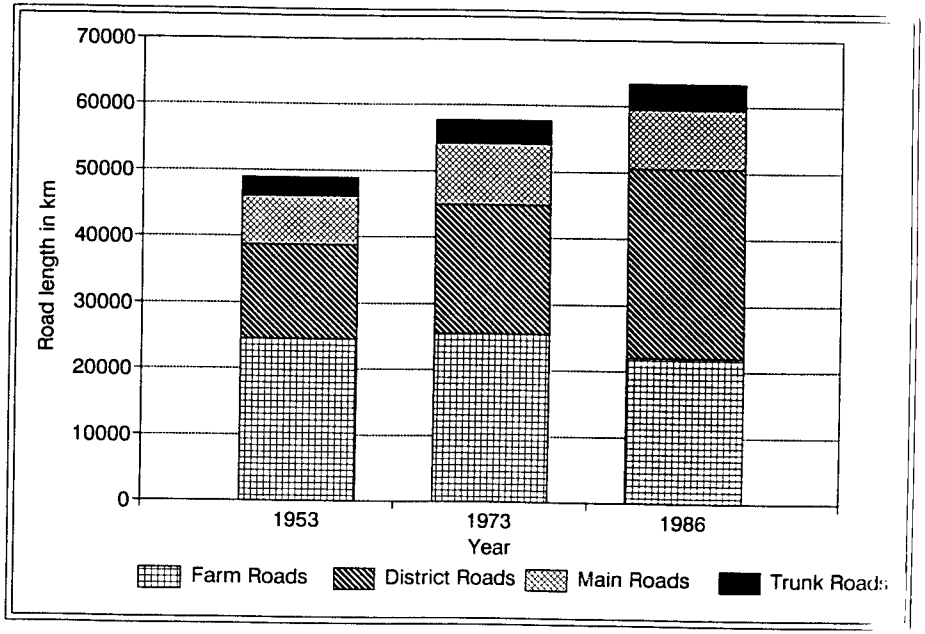


Fig. 11: Namibia: Road Network by Road Categories (see Appendix Table 5)

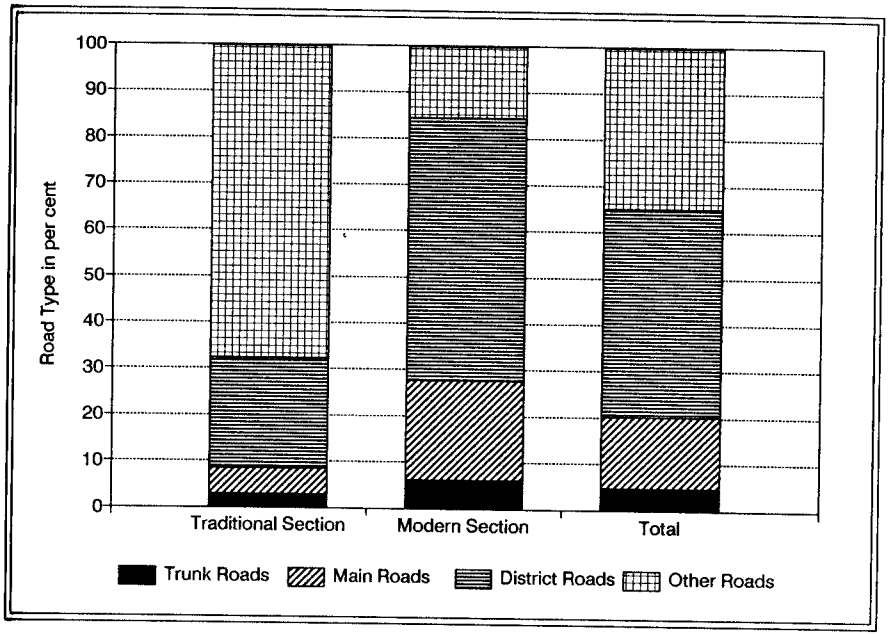


Fig. 12: Namibia: The Distribution of various Road Types 1979 (km) (see Appendix Table 6)

Today Namibia is served by 41.572 km of trunk, main and district roads, which as far as construction and maintenance are concerned are the sole responsibility of the Department of Transport.[95] A further 22.058 km of farm roads are proclaimed in terms of Ordinance 17 of 1972, as amended (Roads Ordinance of Namibia), but are not the responsibility of the Department of Transport. To sum up, a total of 63.630 km are proclaimed trunk, main, district and farm roads, of which 4.402 km are surfaced roads (14,5 km to freeway standard). It has, however, to be stated that these 4.402 km surfaced roads and a further approx. 185 km roads which are presently under construction at surfacing standards are carrying approximately 70% of the total

95 This statistic is valid for the 30 September 1986 as derived from the relevant databank in the Central Computer System of the Department of Transport. 185 km of surfaced roads were 1986 under construction: main road 65 Outjo - Khorixas: approx. 132 km and the first section of trunk road 8/4: Rundu-Bagani: 57 km. The road lengths include roads in the South-Africa occupied enclave of Walvis Bay with a total length of main roads of 86,2 km and surfaced main roads of 46,55 km.

Districts	Proclaimed Roads Total(km)	Tar(km)	Network Density (km/km^2)	Km Road/ 1000 Of Populat.	Km Road Per Vehicle
Bethanien	1.056	65	0,06	320	1,61
Bushmenland	677	0	0,04	233	-
Damaraland	1.822	22	0,04	63	2,05
Gobabis	3.321	108	0,08	128	0,74
Grootfontein	2.031	356	0,08	79	0,44
Hereroland East	1.500	0	0,03	67	6,74
Hereroland West	920	0	0,06	50	1,29
Kaokoland	1.661	0	0,03	85	2,92
Karasburg	2.264	342	0,06	204	1,20
Karibib	909	175	0,07	87	0,65
Kavango	1.043	137	0,02	8	5,03
Keetmanshoop	2.277	239	0,06	110	0,47
Lüderitz	668	125	0,01	40	0,16
Maltahöhe	1.524	33	0,06	272	1,68
Mariental	3.585	332	0,08	148	0,83
Namaland	2.075	173	0,10	137	-
Okahandja	1.641	193	0,09	104	0,44
Omaruru	684	86	0,08	107	0,61
Caprivi	780	122	0,07	17	0,76
Otjiwarongo	1.614	342	0,08	85	0,39
Outjo/Kamanjab	1.711	274	0,04	164	0,86
Owamboland	1.927	435	0,04	4	0,30
Rehoboth	1.015	171	0,07	31	0,55
Swakopmund	1.001	73	0,02	55	0,16
Tsumeb	1.149	203	0,07	50	0,27
Walvis Bay	86	47	0.08	5	0,01
Windhoek	2.629	349	0,08	20	0,05
TOTAL	41.572	4.402	0,05	34	0,35

Source: Developed by author. Old dispensation of regions as before 1992. For instance: Caprivi now becomes Liambezi Region.

Tab. 1: Namibia: The Road System on a District Basis 1986

traffic generated in Namibia (approx. 2.000.000 vehicle - km/day on surfaced roads and 800.000 vehicle-km/day on earth and gravel roads).[96]

The next table gives the roads classification according to their different pavement types:

Description		Distance (Km)
Surfaced Roads	Total	4.402,01
	Trunk Roads	3.291,36
	Main Roads	1.057,97
	District Roads	52,68
Gravel Roads	Total	23.505
	Trunk Roads	749
	Main Roads	7.692
	District Roads	15.064
Earth Roads	Total	13.019
	Trunk Roads	-
	Main Roads	115
	District Roads	12.904
Gypsum/Salt Roads	Total	228
	Trunk Roads	-
	Main Roads	71
	District Roads	157
Sandspoor Roads	Total	418
	Trunk Roads	-
	Main Roads	-
	District Roads	418
Total		41.572 Km

Source: Departmental statistics for the period between March 1986 and September 1986 and include Walvis Bay

Tab. 2: Namibia: Roads according to their Pavement Types

96 Guesstimate of all existing traffic counts as stored on databank in the Central Computer System of the Department of Transport.

Notwithstanding this extensive roads system, there is still a great deal to be done, i.e. rural feeder roads for the development of agriculture and agro-based industries, especially in Owamboland, in Okavango and the Caprivi, have to be built. A sizeable number of human settlements in these areas have no access to any classified road. There are also serious deficiencies in external links with independent African countries to the north and especially to the east.

In the modern sector of Namibia the road network seems to be more than adequate. The Annual Average Daily Traffic (AADT) volumes are, except in some areas of high industrial, commuter and weekend/holiday traffic, surprisingly low. There are very few roads carrying more than 500 vpd.[97] Many high standard roads are quite under-utilised ensuring slow wear and tear with resulting relatively low maintenance costs.

As far as vehicles are concerned the occupation of the road network is, as indicated above, very low and varies between 15% on arterial roads and 1% on secondary roads. It has to be accepted that a rural two-lane-surfaced road can, dependent on local conditions, carry between 9.000 and 14.000 vehicle units per day in both directions. During a traffic count together with a road freight survey during August 1984, the highest traffic loadings have been encountered on the three trunk roads around Windhoek.[98]

Traffic loadings on these three trunk roads changed from 1.200 to 1.800 vehicle units per day in both directions. All other roads in Namibia, except main road 92 between Ondangwa and Oshakati in Owamboland, where a traffic count of 1.600 vehicle units per day has been established, revealed less than 1.000 vehicle units per day. On 1 April 1986 the total number of vehicles in Namibia was established at 120.170 vehicles, which includes 9.255 government, army and police vehicles.[99]

97 German Development Institute: Sektorstudie: Materielle Infrastruktur, Berlin, 1979

98 Trunk roads 1/5 Windhoek-Rehoboth, 1/6 Windhoek-Okahandja and 6/1 Windhoek-Windhoek International Airport

99 Department of Transport: 'Resultate van 'n Vragvervoeropname wat gedurende Augustus 1984 in Suidwes Afrika uitgevoer is', Van Wyk and Louw, Pretoria, 27 November 1984. This report, together with the 'Welgemoed Verslag' of 1981 formed the basis for the 'Verslag van die Advieskomitee vir Vervoerdienste in Suidwes-Afrika/ Namibia' of 28 February 1986. Above 'Vragvervoeropname' is replenished by a further study by Van Wyk and Louw, Pretoria: which is prepared on instruction of the Department of Transport: Road Quality System for SWA/Namibia: Investigation into Technical Aspects: Final Report on the Status Quo, September 1986.

District	Light Veh. <3t and cycles	Heavy Veh. 3t->16t	Other Types Trailers etc	Total
Aranos	634	70	152	856
Bethanien	520	18	68	606
Gobabis	3.193	413	556	4.162
Grootfontein	2.219	228	539	2.986
Karasburg	1.287	126	328	1.741
Karibib	543	41	54	638
Katima Mulilo	842	38	92	972
Keetmanshoop	3.892	175	426	4.493
Khorixas	714	46	61	821
Lüderitz	807	71	88	966
Maltahöhe	675	66	97	838
Mariental	2.444	105	608	3.157
Okahandja	2.849	233	380	3.462
Okakarara	581	62	16	659
Omaruru	861	46	125	1.032
Opuwa	475	34	17	526
Oranjemund	2.470	221	436	3.127
Oshakati	5.284	147	478	5.909
Otavi	940	133	232	1.305
Otjinene	181	20	5	206
Otjiwarongo	2.872	219	730	3.821
Outjo	1.320	114	418	1.852
Rehoboth	1.573	53	87	1.713
Rundu	103	68	21	192
Swakopmund	4.894	295	779	5.968
Tsumeb	3.249	200	563	4.012
Usakos	535	26	104	665
Walvis Bay	5.040	1.440	720	7.200
Windhoek	39.733	2.102	5.213	47.048
Government	3.414	2.699	3.142	9.255
Total	94.126	9.509	16.535	120.170

Source:
Van Wyk&Louw: Road Quality System for SWA/Namibia, 1986

Nota:
In Table 7 the class 'light vehicles <3t' include motor cycles, 'heavy vehicles 3 - > 16t' include in total 1.780 very heavy vehicles with more than 16 t mass, governmental bodies own 1.634 vehicles. 'Other types' include trailers, caravans etc.

Tab. 3: Vehicle Numbers in Namibia according to their Types

Fig. 13: Trunk Road 1/11 Owamboland: circa 1965 Windhoek State Archives

A matter to be taken into consideration in regard to the utilisation of roads is the design life span of a road. Road foundation layers are designed in accordance with the expected number of axles, at a standard axle load, which will use the road during its expected design life span. According to estimates made by the Department of Transport, there is no reason to believe that the existing road network will weaken considerably under the proviso that sufficient resources for maintenance works will be made available by the Namibian Government and heavy traffic will not increase dramatically in the future.[100]

In the former homelands the basic infrastructure still consists (except some isolated arterial roads like the trunk roads Oshivelo - Ondangwa - Oshikango, Grootfontein - Rundu - Bagani- Katima Mulilo - Ngoma and the main roads Ondangwa - Oshakati - Ruacana, Kamanjab - Opuwa and Rundu - Nkurenkuru) of mainly secondary roads (district roads) and "other roads". In the modern sector of Namibia the extensive

100 'Verslag van die Advieskomitee vir Vervoerdienste in Suidwes Afrika/Namibia', Windhoek, 28 February 1986, p. 56

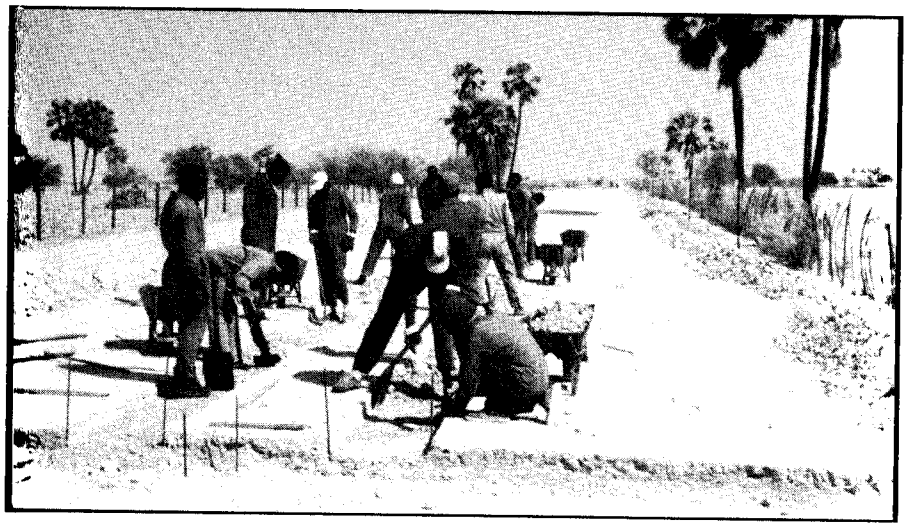


Fig. 14: Labour-based, appropriate road technology in Owamboland after independence 1990 Dierks

network of well maintained district roads provides useful extensions to the major road network which is further supported by an extensive system of farm roads.

Given the level of the roads system, especially in the modern sector, major expansion and improvement will not so much be of a priority except in the above mentioned examples. However, one of the challenges for the independent Republic of Namibia is the construction of low-cost roads with Namibia-Adapted-Techniques, especially rural feeder roads, in the hitherto underdeveloped homelands. The "white" population group did not only gain from better access to better roads but "modern-sector-contractors" also gained from the hitherto highly sophisticated equipment-orientated construction methods employed. These did not contribute a great deal to create more permanent employment possibilities. These capital- and machine-intensive construction techniques also suppressed the application of labour-intensive road maintenance.

In the meantime most of the trunk roads and some of the main roads are surfaced roads. All the layerwork data of these surfaced roads are stored in an extensive databank, the "Pavement Management System", in the Central Computer System of the Department of Transport. Generally these surfaced roads consist of a light blacktop application on natural gravel bases and subbases. Most of the unsurfaced

Fig. 15: Spoorbaan experiment in Ovamboland 1991

Dierks

main roads are engineered gravel roads, and most of the district roads improved earth roads.

The above tables indicate that Windhoek and Walvis Bay districts have the shortest road length per vehicle unit, implying heavier traffic volumes in these centres with dense population concentrations. Namaland has the longest road length per unit area, Bethanien the longest and Owamboland the smallest road length per unit of population, implying that the area with the highest population numbers in Namibia has the greatest backlog in roads.

Not only was the construction of new and the maintenance of existing roads the main task in the recent past, but also the safeguarding and improvements of Namibia's roads system asset, namely:

- widening of existing surfaced roads;
- strengthening and resealing of existing surfaced roads and bitumen surfaces;
- improvement and alterations of road alignment of existing roads;
- strengthening and widening of inadequate bridges and culverts;
- safety measures, namely guard rails, road marking/adequate road signs etc.

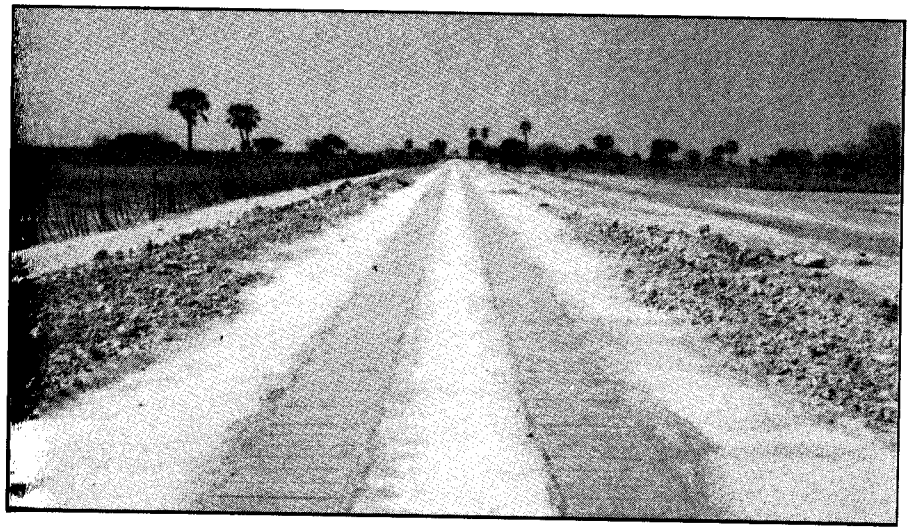


Fig. 16: Spoorbaan experiment in Ovamboland 1991

Dierks

The pace of progress cannot be overlooked - it has not been achieved easily or cheaply. The problems and difficulties which the Roads Department in its first 28 years and subsequently the Department of Transport since 1978[101] encountered were sometimes demoralising, often unique and always onerous. Namibia is a land of many faces: from inhospitable desert and hard rocky outcrops to rugged mountains and undulating plains. Each of these presented different problems to the road builder - some areas are barren and waterless, while others offer - and this is one of the biggest structural problems - no conventional road building materials. Substitutes had to be found, new techniques had to be devised and applied, and many innovations had to be developed. Due to its experience in unused and widely diversified conditions, the Department of Transport of the Ministry of Works,Transport and Communication of the Republic of Namibia is today recognised as a world authority on certain aspects of African road construction.[102]

As mentioned above, Namibia has more kilometres of road per head of population than any other country in Africa, including the Republic of South Africa. But,

101 The centralised Department of Transport came into being by Proclamation A.G. No. 14 of 13 March 1978

102 See: 'The Path to Progress', Group Editors, 1973

Fig. 17: Spoorbaan experiment in Ovamboland 1991

Dierks

nevertheless, much remains to be done - existing roads have to be maintained and this is a steadily increasing heavy financial and technical burden. The present state of unequal development of the roads infrastructure means, however, that assessing accessibility of the "common man in street" to means of road transport suggests poorer access, especially in the Namibian north, than in many other independent African countries. At the end of the evolution of Namibia's roads system it has to be concluded that the bridging of this imbalance will be one of the great challenges of independent Namibia in the 1990s and thereafter.

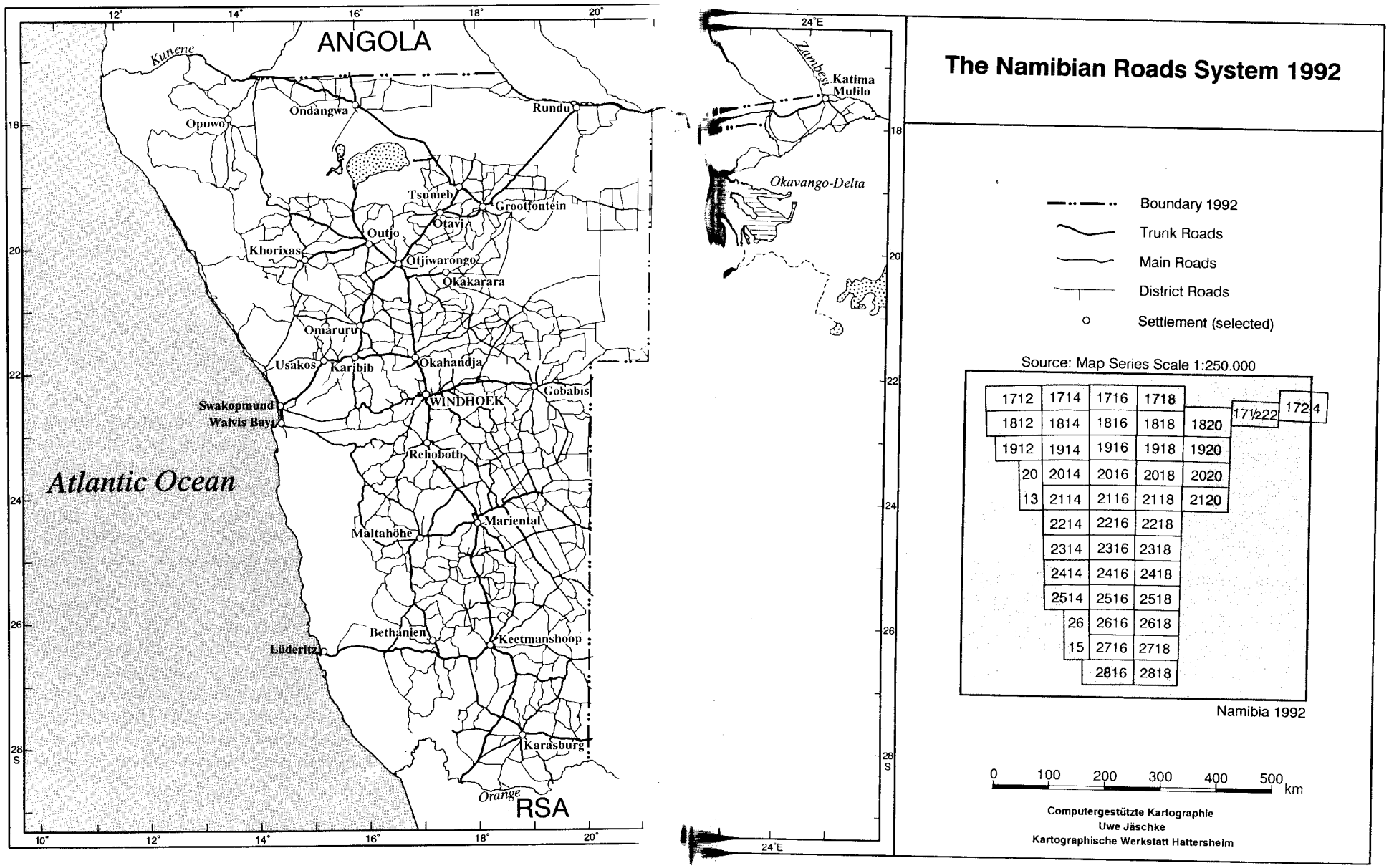
5. Conclusion to the History of Roads in Namibia

The foregoing study dealt with the history of roads in Namibia. Due to the fact that this topic was never investigated in a systematic way so far, it is not surprising that some new findings have been established. For instance, it was a sensational discovery that archaeological evidence has determined that Namibian indigenes built the first pathway around 1250 A.D. The evaluation of transport networks in the 19th and early 20th century revealed that it was established early that short east-west road connections are much more in the infrastructural interest of Namibia than north-south connections directed towards South Africa. The research regarding the early ox-wagon roads resulted in some important findings of identities of places, which were no longer known or had been forgotten. For instance, these research efforts led to the discovery of the oldest Namibian urban settlement, //Khauxa!nas - Schans Vlakte, east of the Great Karas Mountains, which was built by one of the Nama communities at the turn of the 18th century. This historical find resulted in the identification of the first systematic building structures in an engineering sense in the history of the country.[103]

The investigations for the old ox wagon roads of the last two hundred years or so, also revealed the fact that Alexander's "Robber Henrick's Place" or Ridsdale's Klipfontein are to be found in the ancient stone ruins on the farm Narudas at the eastern edge of the Great Karas Mountains, and that they represent the forgotten main settlement of the //Hawoben during the 1830s and 1840s.[104] The identity of another Nama settlement, Kai Gurub, which was also lost, has been established. Another important finding showed that it were Namibian indigenes and not only Europeans who initiated and built the first roads in the country. It has also been proved that the will of Namibian indigenes to initiate such roads was destroyed with the coming of the colonial powers. Their will to continue road building was reduced and then eliminated by the growing colonial control and the fact that many of the old Namibian transport routes and trade flows associated with them were inimical to the new colonial objectives of firstly the Germans and later the South Africans. The historical investigations led to the conclusion that, as from the middle of the 19th century, roads increasingly served the economic and strategic interests of the white trader/missionary alliance and henceforth created the basis for the subsequent colonial status of Namibia.

103 Dierks, Klaus: //Khauxa!nas - Schans Vlakte: Oldest Urban Settlement in Namibia?: A Symbol for Independence, In Formation No. 1, Windhoek, 1987.

104 Dierks, Klaus: //Khauxa!nas - The Great Namibian Settlement, Windhoek, 1991


ANGOLA
Kunene
Ondangwa
Rundu
Opuwo
Tsumeb
Grootfontein
Otavi
Outjo
Khorixas
Otjiwarongo
Okakarara
Omaruru
Usakos
Karibib
Okahandja
WINDHOEK
Gobabis
Swakopmund
Walvis Bay
Rehoboth
Atlantic Ocean
Mariental
Maltahöhe
Bethanien
Keetmanshoop
Lüderitz
Karasburg
Orange
RSA
Zambezi
Katima Mulilo
Okavango-Delta
The Namibian Roads System 1992
Boundary 1992
Trunk Roads
Main Roads
District Roads
Settlement (selected)
Source: Map Series Scale 1:250.000
1712 1714 1716 1718
1812 1814 1816 1818 1820
1912 1914 1916 1918 1920
20 2014 2016 2018 2020
13 2114 2116 2118 2120
2214 2216 2218
2314 2316 2318
2414 2416 2418
2514 2516 2518
26 2616 2618
15 2716 2718
2816 2818
17½22
1724
Namibia 1992
0 100 200 300 400 500 km
Computergestützte Kartographie
Uwe Jäschke
Kartographische Werkstatt Hattersheim

In conclusion to this investigation it has to be stated that the Namibian roads history began as early as the 13th century when Namibian nomadic communities built the first pathway in the central Namib Desert. This history was continued with the entering of European adventurers and Orlam groups into Namibia at the end of the 18th and the beginning of the 19th century. Fairly rapidly, a process of fundamental change took place under the Nama-speaking indigenes of Namibia's south. The change occurred parallel with the advent of the first established, still very rough ox-wagon roads, which were initiated by the Orlams and the first European missionaries but built by the indigenous population. With the arrival of more European missionaries, traders, hunters and adventurers more roads came into existence. As early as in the 1860s, almost one quarter of a century before the official annexation of Namibia by the German Empire, the major functions of control over this country were switched to the European traders and missionaries, facilitated by an ever increasing network of adequate ox-wagon roads.[105]

For the Namibian indigenes the colonial era did not begin with the year 1884. Namibian history teaches us that through forms of social organisation, imposed by invading Orlams on the original Nama inhabitants, the political, economic and social controls slipped from these people's hands. When the power of the Orlams and their Nama associates were broken by a European trader/missionary alliance, this marked the final stages of political and economic independence for the inhabitants of Namibia. It also marked the end of any road building initiatives by Namibian indigenes when the colonial structures destroyed the will of the Namibian people to pursue such activities further.

With the beginning of the German epoch this process of dispossessing the indigenous inhabitants of Namibia of their human and political rights as well as of their access to the economic resources of the country worsened. The road developments in this era were clearly geared to serve the interests of the colonial power only. Beneficial developments were the establishment of more east-west road links towards the harbours on the Atlantic coast in order to make Namibia more independent of neighbouring South Africa. Also beneficial were many systematic surveys and proclamations as well as efforts to plan Namibia's roads system during this time. The actual construction of roads was limited in scope and still dictated by the parameters of the rugged ox-wagon.

105 Lau, B.: The Emergence of Kommando Politics in Namaland, Southern Namibia, 1800-1870: Thesis submitted to the Faculty of Arts, University of Cape Town, for the Degree of Master of Arts, 1982, p. 364-370 op. cit.

For very obvious reasons, the South African colonial power ignored any road developments in Namibia before 1915, or any such developments, which did take place were at least completely disregarded by them.[106]

In fact, when South Africa had taken over from Germany, the colonial situation remained the same with the aggravating addition that the concentration on north-south roads to connect Namibia solely with South Africa hurt the interests of the Namibian inhabitants even further. This is also true regarding the development of a network of modern roads purely for the political, economic and social interests of the mandatory power and of the white population group in Namibia. This situation of domination, even as far as the development of the Namibian roads system is concerned, came only to an end on 21 March 1990.

The history of Namibian roads clearly proves that up to the date of independence day, roads were built by colonial powers of different origin to serve their interests and motives. Even one of the first road builders in Namibia, the Orlams, were only partly of European descent, but even they were invaders and acted, as their successors have done, purely in their own interests and not in that of the Namibians. It has also to be understood that all written history to date has mainly been supplied by colonising and evangelising Europeans and not by Namibians themselves. The history of Namibian roads has been established from documentations which were produced from the perspective of a European position of interest and not from that of a history as experienced by the suffering Namibian indigenes. This is also valid for the history of roads in Namibia which to date has never been written for the sole purpose of serving the interests of the people. Aime Cesaire summarises this pre-colonial situation, "before the Whites came":[107]

> *"But I am speaking about societies which have been disposed of, about cultures trampled underfoot, undermined institutions, confiscated land, about murdered religions, destroyed art and about exceptional potentialities which have been wasted. Facts like statistics, mileages of railways, roads and canals are flung into my teeth. But I am speaking about the thousands of sacrificed humans for the sake of constructing the railway line from the Congo to the ocean. ... I am speaking about the millions of people who have been deprived of their gods, their soil, their customs, their life, life itself, their dances and their wisdom. I am speaking about*

106 Submission to the International Court at the Hague: The Development of Roads and Bridges in the Territory of South West Africa covering the Period 1920-1965, Windhoek, 1965, p. 1 and 4-7

107 Hinz, Patemann, Meier: Weiss auf Schwarz - Kolonialismus, Apartheid und Afrikanischer Widerstand, Bevor die Weissen kamen, Elefanten Press Verlag, Berlin, 1986, p. 12

the millions of people who have been skillfully geared to fear and trembling, to paying obeisance, to desperation and submissiveness. .. . But I am also speaking about natural economic structures, about harmonic, viable and appropriate structures for the indigenes which have been willfully destroyed, about chronic malnutrition, about agricultural developments which solely served the interests of the monopolies, about the exhaustion of resources and the despoiling of raw materials."

After independence at long last has been achieved the future development of roads ought to be pursued in the sole interest of the inhabitants of Namibia. Namibian roads will no longer be planned and built mainly to satisfy the economic and strategic interests of a colonial power, but to improve the life circumstances of those people who have been here before the first Europeans arrived.

A.D.	Anno Domini
BRMG	Berichte der Rheinischen Missionsgesellschaft
CA	Cape Archives Depot
CPA	Cape Provincial Administration
DR	District Road
ECA	Economic Commission for Africa
ELC	Evangelical Lutheran Church in Namibia (South)
EX.CO.	Executive Committee of SWA Administration
FR	Farm Road
IDC	Independent Development Country
LMS	London Missionary Society
MR	Main Road
OAU	Organisation for African Unity
Quellen	Quellen zur Geschichte Südwestafrikas
R	(South African Currency) Rand which is still used in Namibia
RMS	Rhenish Mission Society
RMT	Road Motor Transport Service
RSA	Republic of South Africa
SAR&H	South African Railways and Harbours
SATS	South African Transport Services
SWA	South West Africa
SWAPO	South West Africa Peoples Organisation
TR	Trunk Road
UNIN	UNO Institute for Namibia (Lusaka)
UNO	United Nations Organisation
WMN	Wesleyan Missionary Notices
ZBU	Files of the Central Bureau of the 'Kaiserliche Gouvernement' in German South West Africa

Zusammenfassung (Summary)

Im Rahmen seiner Doktorarbeit über "die Entwicklung eines Straßensystems für ein unabhängiges Namibia" hat sich Klaus Dierks auch mit der Geschichte der Straßen im südwestlichen Afrika beschäftigt. Damit ist die Entwicklung des Straßennetzes im heutigen Namibia erstmals systematisch aufgearbeitet worden. Als Nebenergebnis seines Quellenstudiums im Staatsarchiv von Windhoek und seiner Feldarbeit zur Verifizierung der alten Ochsenwagen-Routen im Gelände konnte Klaus Dierks nachstehende Erkenntnisse gewinnen:

Die Lage einiger nur noch dem Namen nach bekannter Orte und Plätze konnte ermittelt werden. So zum Beispiel von Schans Vlakte [//Khauxa!nas] ostwärts der Karasberge, der ältesten städtischen Siedlung im Lande, die durch einen Nama Stamm am Ende des 18. Jhds. errichtet worden war. Hier findet man Spuren der ersten ingenieurmäßig errichteten Häuser. "Robber Henrick's Place" oder Ridsdale's "Klipfontein" ist identisch mit den alten Steinruinen auf der Farm Narudas an der Ostecke der Großen Karasberge. Hier lag in den 30er und 40er Jahren des letzten Jhds die Hauptsiedlung der //Hawoben. Das vergessene Kai Gurub südwestlich von Windhoek (Haris-Claratal) konnte ebenfalls wieder gefunden werden.

Das Straßennetz, das für das 19. und frühe 20. Jhd. nachgewiesen ist, deckt auf, daß kurze Ost-West Straßenverbindungen schon damals von größerem infrastrukturellen Interesse der Bevölkerung waren als die auf Südafrika ausgerichteten, langen Nord-Süd-Verbindungen. Außerdem konnte festgestellt werden, daß nicht nur Europäer, sondern auch Eingeborene die ersten Straßen des Landes planten und bauten. Im Zuge der Kolonisation wurde der Wille der Eingeborenen zum Straßenbau durch die Kolonialmächte zerstört, da die alten Handelswege und die mit ihnen verbundenen Warenströme schädlich für die kolonialen Ziele der Deutschen und später der Südafrikaner waren. Die weiteren Untersuchungen zeigen, daß von der Mitte des 19. Jhds. an die Straßen immer mehr den wirtschaftlichen und strategischen Interessen der weißen Händler und Missionare dienten, die dadurch die Grundlagen für den späteren kolonialen Status Namibias schufen.

Die vorkoloniale Phase 1250 - 1884

Über den Wege- und Straßenbau in den frühen Tagen Namibias ist wenig bekannt. Die Menschen der Frühzeit benutzten Wildwechsel, um von einem Wasserloch zum anderen zu gelangen. Mit dem Übergang von der Einzelviehhaltung zur Herdenhaltung im 13. Jhd. entwickelten sich erste Formen des Handels. Für diese Zeit belegen

archäologische Funde ein angelegtes Fußweg-System zwischen Siedlungen und Wasserlöchern im Bereich der Hungorob-Schlucht im Brandberg-Massiv. Dieses Wegesystem ist ein Indiz für weitere Wegebaumaßnahmen in dieser Zeit.

Um 1750 beginnt die Zeit der schriftlichen Berichterstattung von Europäern in Namibia. Die verschiedenen Nama-Gemeinschaften lebten zu dieser Zeit in kleinen, gut organisierten Gruppen. Ihre Kultur wird nicht nur durch den wachsenden europäischen Einfluß, sondern auch durch das Eindringen der europäisch geprägten, südafrikanischen Orlam (Nama) in den Süden des Landes gestört. Mit ihnen kamen die ersten Jäger, Händler und Missionare. Beide Gruppen, Orlam und Weiße, kamen aus der Kap-Provinz über den Oranje, denn der Weg von der Küste in das jagd- und weidewirtschaftlich nutzbare Landesinnere war durch die unwegsame, wasserlose Namib versperrt. 1761/62 stellte Carel Frederik Brink die erste Karte von Groß-Namaqualand zusammen, in der die Routen verschiedener Entdecker aufgeführt waren.

In dieser Periode tritt zum ersten Mal der Ochsenwagen als Transportmittel der nächsten 130 Jahre in Erscheinung. Ein Straßenbau im Sinne von Straßenkonstruktion fand nicht statt, die Wege waren lediglich Wagenspuren von Ort zu Ort, auf denen die gröbsten Hindernisse beseitigt waren. Der erste dokumentierte Straßenbau wurde von Johann Heinrich Schmelen zwischen 1814 und 1820 zusammen mit den Bethaniern Orlam durchgeführt, die eine Handelsverbindung nach Angra Pequena brauchten. 1845 stellte Richter die Verkehrssituation im südlichen und zentralen Teil des Landes auf seiner Karte des Rheinischen Missionsgebietes dar.

Der nächste Straßenbauer in Namibia war, wie Heinrich Vedder berichtete, Jonker Afrikaner. Er ließ 1842 die erste Straße durch die Auasberge bauen. Die Kosten dafür betrugen 2 Ochsen und 7 Schafe, nämlich die Verpflegung für die Arbeiter. 1843/44 ließ er den "Bay Weg", eine Verbindungsstraße von Windhoek nach Walfish Bay, errichten, um Waffen und Munition von der Küste in das Innere des Landes zu transportieren. 1850 bauten Missionare eine Parallelstraße von der Küste über Otjimbingwe nach Otjikango. Weitere Wegemaßnahmen wurden im Süden durchgeführt, um die Einfuhr begehrter Handelsgüter aus Südafrika zu ermöglichen.

Von 1850 an wuchs das Straßennetz des Landes, allerdings nur für den Süden und die Mitte dokumentiert, immer weiter an. Für den Norden muß man eine ähnliche Entwicklung annehmen, da dort die volkreichen Owambo-Gemeinschaften lebten, deren sozio-ökonomische Verbindungen weit über die heutige namibisch-angolanische Grenze reichten. Ende der 50er Jahre stieg der Wagenverkehr in der Landesmitte durch den Erztransport von der Matchless-Mine nach Walfish Bay stark an. Durch den Erztransport zur Küste, der um 40% billiger als über Kapstadt war, war der Minenverwalter Andersson gezwungen, den Bay Weg weiter auszubauen und die

Streckenführung zu verbessern. Die Mine wurde schon zu Beginn der 60er Jahre aus wirtschaftlichen Gründen wieder geschlossen, und die Rinderpest 1861/62 brachte den Wagenverkehr erst einmal zum Erliegen.

Ab der Mitte der 60er Jahre steigt die Zahl der Missionare, Jäger, Händler und Forscher erneut an. Handelsgüter sind landeinwärts Waffen und Munition, zur Küste Elfenbein, Vieh und Straußenfedern. Die Erkundung des Landes erstreckt sich vom Oranje im Süden bis zum Kunene im Norden und dem Ngami-See im Osten. Dabei wurden zahlreiche Handels- und Jagdposten gegründet. 1879 verfügte das Land über ein weitverzweigtes Ochsenwagennetz, das abhängig von den Weide- und Wasserstellen, fast flächendeckend war, wie die Karte von Hahn zeigt. Zwei Hauptrichtungen lassen sich feststellen, die langen Nord-Süd-Verbindungen nach Südafrika und die kurzen West-Ost-Wege zu den einzigen natürlichen Häfen an dieser Küste, Walfish Bay und Angra Pequena.

Die deutsche Periode 1884 - 1914/15

Waren bisher die Straßen noch von den Eingeborenen gebaut, wenn auch von den Händlern und Missionaren beeinflußt, so wurde der Wille der Eingeborenen zum Straßenbau durch die deutsche Kolonialmacht zum Erliegen gebracht. Allerdings wurden kaum neue Wege entwickelt und das Transportmedium war weiterhin der Ochsenwagen. Ein Vergleich zwischen Hahns Karte (1879) und der Karte von Langhans 1894 zeigt keine wesentlichen Veränderungen im Straßennetz. Neben dem Anwachsen des West-Ost-Verkehrs - die Versorgung der Kolonie fand über die Häfen Lüderitzbucht und Walfish Bay/Swakopmund statt - ist unter dem Schutz der Deutschen ein verstärkter Handel mit dem Norden zu verzeichnen.

1898 wird die erste Straßenordnung, mit den Klassen "Öffentliche Straßen" und "Privatstraßen", in Kraft gesetzt. Sie regelt den Status der überörtlichen Straßen, sowie Wasser- und Weiderechte. Jede Bezirkshauptmannschaft hatte zum 1. Januar eines jeden Jahres die öffentlichen Straßen bekanntzugeben.

1899 begann die Schutztruppe auch mit den ersten Wegebaumaßnahmen. Die Verbesserung der Straße durch die Auasberge nach Süden führte bei der Landeshauptmannschaft jedoch zu der Erkenntnis, daß beim Straßenbau afrikanische und nicht europäische Standards in Bezug auf Kosten und Ausführung angelegt werden sollten.

Die Rinderpest 1897, die fast jeden Straßentransport verhinderte, sowie die äußerst hohen Transportkosten waren die Ursache für den Bau der ersten Schmalspurbahn zwischen Swakopmund-Karibib-Windhoek. Mit ihrer Fertigstellung 1902 kam der Ochsenwagenfernverkehr auf dieser Strecke zum Erliegen.

1902 beginnt die geordnete Straßenverwaltung durch die Deutschen. Die öffentlichen Fernstraßen werden bestimmt, ihre Weglängen gemessen und ein Wegweisersystem errichtet. In der "Zusammenstellung der gemessenen Wegelängen" werden 116 Straßen mit zusammen 18.826 km ausgewiesen. Neue Straßen werden geplant und gebaut. Das Straßennetz erhält eine innere Verdichtung, um das Land als Siedlerkolonie für Deutsche zu erschließen. Die wachsende Vernetzung wird in der deutschen Kriegskarte von 1904 dargestellt.

1912 wurde die Straßenordnung von 1898 erneuert. Sie enthielt 4 Straßenklassen, die "Distriktsstraßen" als Hauptstraßen, die "Verbindungsstraßen" als Nebenstraßen, "Kommunale Straßen" und "Privatstraßen". Haupt- und Verbindungsstraßen wurden jeweils zum 1. April im Amtsblatt veröffentlicht. Verantwortlich für den Bau und Erhalt der überörtlichen Straßen, sowie für die Wegweiser und Kilometersteine, waren die Distrikte. Kurz vor dem Ersten Weltkrieg begann die deutsche Verwaltung mit Überlegungen, moderne Straßenbaumethoden einzuführen. Bis zu diesem Zeitpunkt waren die Straßen noch immer für den Ochsenwagenverkehr ausgelegt, da man dem Auto keine Chance einräumte.

Die südafrikanische Mandatszeit (1915 - 1990)

Durch den Einsatz des Automobils wurde der Krieg in Deutsch-Südwestafrika von den südafrikanischen Truppen gewonnen. An den allgemeinen Bedingungen im Verkehrswesen änderte sich wenig, lediglich der Ost-West-Verkehr zur Küste wurde durch einen sehr starken Süd-Nord-Überlandverkehr in die und aus der Union von Südafrika ersetzt.

Mit der Übertragung von Südwestafrika als C-Mandat an die Südafrikanische Union durch den Völkerbund begann eine neue Ära. Die deutsche Straßenordnung von 1912 wurde 1923 durch eine südafrikanische ersetzt, jedoch wurden die Distriktsstraßen aus der deutschen Periode übernommen. Neu war, daß der Farmer eine Steuer zur Unterhaltung der Straße entrichten, sowie Baumaterial von seinem Grund kostenlos zur Unterhaltung der Straße beisteuern mußte. 1927 wurden in jedem Verwaltungsbezirk "Road Boards", deren Mitglieder aus Farmern des entsprechenden Bezirkes gewählt wurden, eingerichtet. Diese waren für den Unterhalt der Distriktsstraßen verantwortlich. Straßenbrücken und Drainageeinrichtungen waren nicht vorhanden, so daß die laufenden Trockenflüsse in der Regenzeit oft zu tagelangen Wartezeiten vor den Durchfahrten führten. Im gleichen Jahr wurden die ersten LKW zum Gütertransport durch die Südafrikanische Eisenbahn eingesetzt.

Mit der neuen Straßen-Ordnung 7/37 wurde der Straßenbau der Administration, dem "Department of Works", unterstellt. Gleichzeitig wurde ein zentraler "Road Board" mit 36 Straßenbaueinheiten eingerichtet und mit Fahrzeugen und Maschinen ausgestattet. Während der wirtschaftlichen Depression und während des 2. Weltkrieges wurden allerdings nur wenige Straßen, dafür aber die ersten 23 Brücken durch die Verwaltung errichtet.

Durch die weitere Verteilung von Kronland an Veteranen des 2. Weltkrieges und den Aufschwung der landwirtschaftlichen Produktion wurde das Straßennetz auch in die bisher wenig genutzten, ökologisch gefährdeten Randgebiete ausgedehnt. Dies waren die gebirgigen Bereiche des Khomas Hochlandes mit primitiven, steinigen Fahrspuren, der Kalahari-Bereich im Distrikt Gobabis mit seinen tiefgründigen, schweren Sanden und der nordwestliche Bereich um Welwitschia, heute Khorixas. Ende der 40er Jahre waren diese Gebiete an das Straßennetz angebunden und durch den "S.A. Railway Road Motor Transport Service" versorgt.

Trotz der Ausstattung der Straßenbauabteilung im Department of Works mit einer zentralen Baueinheit und 35 mobilen Baueinheiten unter der Aufsicht von 3 Ingenieuren und 5 Straßeninspektoren wurden weiterhin relativ wenig neue Straßen und Brücken fertiggestellt.

1953 wurde erneut eine veränderte Straßen- und Beschilderungsverordnung veröffentlicht. In dieser Verordnung wurde die bis heute geltende Straßenklassifizierung mit "Trunk-, Main-, District- und Farm Roads" festgelegt. "Trunk Roads" sind die übernationalen Hauptverbindungen Namibias mit den Nachbarstaaten, "Main Roads" verbinden die nationalen Zentren innerhalb des Landes, "District Roads" sind Zubringerstraßen zu den "Trunk" und "Main Roads". Diese Straßen werden ausschließlich vom Staat gebaut und unterhalten. Die Farmstraßen sind dagegen Straßen zur allgemeinen Benutzung, werden aber vom Eigentümer gepflegt. Verantwortlich für die Durchführung der Unterhaltungsmaßnahmen waren die "Road Boards" der Distriktsverwaltungen, die weisungsgebunden dem südafrikanischen Administrator unterstanden. Zwischen 1953 und 1956 wurden ca. 55275 km Straßen aller Klassifikationen proklamiert. Der Personalbestand der Straßenbaueinheiten wurde von 57 auf 137 Ingenieure und Techniker erhöht, die Zahl der Baueinheiten stieg von 36 auf 173.

1956 begann man auch mit dem Bau der ersten Asphaltstraßen. Bis 1960 waren 98 km, hauptsächlich um Windhoek, fertiggestellt. 1961 waren es 190 km und 1965 schon 770 km. Die Zahl der Brückenbauwerke stieg von 119 im Jahr 1957 auf 197 im Jahr 1965.

Zwar hatte man in dieser Periode mit dem Bau von Straßen in den Kommunalen Gebieten begonnen, jedoch lag der Schwerpunkt des Straßenbaus und der Straßenpflege weiterhin im "weißen" Farmgebiet.

Die letzte Periode des Straßenbaus ist durch die Konsolidierung und die Ausweitung des Straßennetzes gekennzeichnet, das als eines der besten in ganz Afrika gilt. Der Unterschied zwischen dem dünnbesiedelten "weißen Erste-Welt-Bereich" in der Mitte des Landes und den dichtbesiedelten, mehr traditionellen Randbereichen, hauptsächlich im Norden, blieb bestehen.

Bis zum Jahr 1990 wurden 41800 km Straßen mit 496 Entwässerungsbauwerken errichtet und unterhalten, davon waren über 4506 km Asphaltstraßen. In den Kommunalen Gebieten wurden, abgesehen von einigen aus militärischen Gründen angelegten asphaltierten "Trunk Roads", ausschließlich nur Straßen 2. Ordnung gebaut.

Die Zukunft

Die koloniale Zeit des "Alten Südwestafrikas" ging mit der Unabhängigwerdung der Republik Namibia am 21. März 1990 zu Ende. Straßen haben in der Entwicklung und der Konsolidierung dieses Kolonialstatus stets eine grundlegende Rolle gespielt. Es ist eine der Hauptaufgaben des Ministeriums für Öffentliche Arbeiten, Verkehr und Fernmeldewesen der unabhängigen Regierung von Namibia, diesen Status zu überwinden. Es ist aber auch Aufgabe der Regierung, die vorhandene, wenn auch unausgeglichene Straßeninfrastruktur zu erhalten. Weiterhin ist es eine der Prioritäten, die mageren vorhandenen finanziellen Reserven durch den Einsatz von "Namibia-Angepaßten-Niedrigkosten-Straßenbau- und Straßenunterhaltungssystemen" optimal zu gebrauchen, mit einer starken Betonung auf arbeitsintensive Baumethoden.

Der Schwerpunkt der Straßenbauaktivitäten wird sich von den bisher bevorzugten Gebieten im Süden und in der Landesmitte in den vorher vernachlässigten Norden verlagern. Weitere Prioritäten sind der schnelle Ausbau der "Trans-Kalahari-Straße" von Gobabis nach Ghanzi und Gaborones in Botswana sowie der "Trans-Caprivi-Straße" von Rundu (Takwasa) nach Katima Mulilo mit einer neuen Zambezibrücke nach Zambia und Zubringerstraßen nach Ngoma und Mohembo an der Namibia/Botswanagrenze. Auch die Straßen in den Süden Angolas werden beschleunigt ausgebaut werden. Wichtig ist weiterhin die Fertigstellung der Straße von Keetmanshoop nach Lüderitzbucht, dem einzigen Hafen, der im Augenblick de facto zur Republik Namibia gehört.

So wie die Straßen in der Entwicklung des kolonialen Namibia eine wichtige und nur allzu oft den Interessen des namibischen Volkes entgegenlaufende Rolle gespielt haben, so werden Straßen in der Zukunft die Voraussetzung sein, die Lebensqualität der Menschen zu verbessern und den Schlüssel für die Entwicklung Namibias zu bilden.

Zusammenfassend kann festgestellt werden, daß die Geschichte der Straßen im 13. Jhd. mit dem Bau eines Fußweges durch nomadische Eingeborene in der zentralen Namib beginnt. Fortgesetzt wird sie mit dem Eindringen von europäischen Abenteurern und Orlam-Gemeinschaften an der Wende zum 19. Jahrhundert. Ziemlich schnell fand eine tiefgreifende Veränderung des kulturellen Umfeldes der Nama-sprechenden Eingeborenen im Süden statt. Diese Veränderung verlief parallel mit der Errichtung der ersten, noch sehr ungebahnten Ochsenwagen-Routen, die von den Orlam und den ersten Missionaren geplant und von den Eingeborenen selbst gebaut wurden. Die Zahl der Straßen wuchs mit der Ankunft weiterer europäischer Missionare, Händler, Jäger und Abenteurer. Um 1860, ein Vierteljahrhundert vor der offiziellen Annexion des Landes durch das Deutsche Reich, war das Land unter der Kontrolle weißer Missionare und Händler, die für ein ständiges Anwachsen gleichwertiger Ochsenwagen-Routen sorgten. Für die Eingeborenen begann schon jetzt die Kolonialzeit. Durch die Veränderung der Gesellschaftsordnung, hervorgerufen durch das Eindringen der mit Feuerwaffen ausgestatteten Orlam in das Nama-Gebiet, verloren die Nama die politische, wirtschaftliche und soziale Kontrolle über ihren Raum. Als die Macht der Orlam und ihrer Nama-Verbündeten durch den zunehmenden Einfluß der europäischen Händler und Missionare gebrochen wurde, markierte dies das Endstadium der politischen und wirtschaftlichen Unabhängigkeit des Landes. Gleichzeitig hörte jeder Straßenbau durch Eingeborene auf.

Mit Beginn der deutschen Epoche wurde die Entmündigung der Eingeborenen verstärkt. Die Entwicklung von Straßen in dieser Zeit diente ausschließlich nur den Interessen der Kolonialmacht. Eine positive Entwicklung war die Einrichtung von Ost-West-Verbindungen zu den Häfen an der Küste, die das Land von Südafrika unabhängig machten. Ebenso gut waren die gründliche und systematische Erforschung des Landes und die planerischen Bemühungen zur Entwicklung eines Straßensystems. Die tatsächliche Errichtung von Straßen war beschränkt und durch das Verkehrsmittel Ochsenwagen bestimmt.

Die südafrikanische Kolonialmacht ignorierte aus sehr ersichtlichen Gründen jede Straßenentwicklung vor 1915 und ignorierte auch bereits erstellte Pläne. Durch die Machtübernahme der Südafrikaner änderte sich die koloniale Situation an sich nicht. Durch die verstärkte Anbindung an Südafrika mit Nord-Süd-Straßen wurden die

Interessen der Einwohner weiterhin vernachlässigt. Die Entwicklung eines modernen Straßennetzes diente nur den politischen, wirtschaftlichen, militärischen und sozialen Interessen der Kolonialmacht und der weißen Bevölkerung.

Die Geschichte der Straßen in Namibia zeigt, daß Straßen von den verschiedenen Kolonialmächten zur Förderung ihrer eigenen Interessen gebaut wurden. Die Gruppe der ersten Straßenbauer, die Orlam, waren nur teilweise europäischer Herkunft, aber sie waren auch nur Eroberer und handelten für ihre eigenen Interessen. Genauso muß man feststellen, daß die geschriebene Geschichte hauptsächlich von den kolonisierenden und evangelisierenden Europäern erstellt wurde und nicht von den Einheimischen. Die Geschichte der Straßen Namibias kann daher nur aus Dokumenten erstellt werden, die die europäische Sicht darstellen, da das Handeln und die Intentionen der natürlichen Bevölkerung bis heute nicht aufgearbeitet worden sind.

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1688.	T.111.b.1 bis T.111.b.2	Ausländisches Wegerecht:- Wegerecht der Südafrikanischen Union, Erhebungen von Wegegebühren in Togo 1908	
1689.	T.111.c.2 bis T.111.e.19	Öffentliche Wege:- Specialia, Erklärungen und Erschliessungen öffentlicher Wege (alte Akten), und in den Bezirken: Grootfontein, Outjo, Omaruru, Swakopmund, Karibib, Okahandja, Gobabis, Windhoek, Rehoboth, Gibeon, Maltahöhe, Keetmanshoop, Warmbad, Bethanien, Lüderitzbucht	1898 - 1914

1690.	T.111.e.2	Privatwege:- Specialia	1898 - 1910
1691.	T.111.f.2	Freihaltung von Frachtwegen:- Specialia	1891 - 1908
1692.	T.111.g.1 bis T.111.g.2	Weideplätze an öffentlichen Wegen:- Generalia, Specialia	1909 - 1914
1693.	T.111.n.2	Beschwerden in Wegesachen:- Specialia	1898 - 1914
1694.	T.111.o.1 bis T.111.o.3	Wegebauten und Aufstellung von Wegweisern:- Generalia, Specialia, Überbrückung von Flussläufen, Strassenbrücken	1898 - 1914
1695.	T.111.p.1 bis T.111.p.16	Wegebauten und Aufstellung von Wegweisern:- In den Bezirken: Grootfontein, Outjo, Omaruru, Swakopmund, Karibib, Okahandja, Gobabis, Windhoek, Rehoboth, Gibeon, Maltahöhe, Keetmanshoop, Warmbad, Bethanien, Lüderitzbucht	1898 - 1915
1696.	T.111.r.1 bis T.111.r.2	Strassenbauten in Ortschaften:- Generalia, Generalia, Strassenbau in Windhoek, Strassenbau in Swakopmund, Strassenbau in Lüderitzbucht	1902 - 1915
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Appendix Table 1:

Namibia's Roads System for 1879

1	[Aris Drift] - /Obib [Obib Mountains] - Gobaxab - /Garu!ab - /Aus [Aus]
2	!Gadaos Drift (or Sendlings Drift) - Gobaxab - /Haris [Witzpütz 31] - //Huns [Huns 106] - ≠Ha//Kais - Gei!goab [Geigoab 95] - !Hudaob [Hudab 160] - Guibe!gaos [Brackwasser 151] - Bethany (!Gadaos Drift near Sendlings Drift or Bethanien Drift must not be mixed up with the Gudaos Drift near Ramans Drift further to the east)
3	≠Khanibes [Kanebis 5] - !Ais!ais [Ais Ais] - ≠Ha//Khais
4	[Vioolsdrift] - Uhabis - !Gaibes [Gaibes 1] - ≠Khanibes - //Hoamus [Holoog 106] - So//noab [Schlangkopf 124] - Arugoams (Fish River) - Berseba
5	[Ramans Drift] - Warmbad - Daimus - /Haris - /Khan/us [Kanus 94] - !Nuoxabeb [Noachabeb 97] - !Aun!as [Dassiefontein 87] - //Hurab - /Howabes [Howobees 51] - ≠Nu≠goaes [Keetmanshoop] - Arugoams - Berseba
6	!Gaibes - !Haib [Haib 134 (Bondelswarts)] - Warmbad - !Naros [Naros 76] - //Hai/aes [Blydeverwacht 72] - !Gaobis [Jerusalem 73] - //Hai/aes - Heiraxabis [Heiragabis 60] - Gei!ab River [Gaiab] - !Nabis [Nabes 31]
7	Daimus - !Amas [Amas 46] - !Nabis (Gaiab River) - //Khais [Sandbrunn 292] - Khoros [Vellicke 76] - Geitsaub (Geitsaub River) - Gei!aub [Gross Aub 44] - /Koes [Koes] - Goab [Twee Rivier 481]
8	/Khoes - Hai/gas [Haichas 190] - Tses - Berseba
9	≠Nu≠goaes - Gei!aub - /Kiriis [Kiriis Ost 233]
10	//Kais - /Kiriis - ≠Gaibis [Gaibis 226] - /Koes
11	≠Nu≠goaes - Hai/gas - Daberas [Daberas 17] - Goamus [70] - /Gui//ganabis [Farm Marienthal 86] - //Anis [Lidfontein 136] - !Hoacha!nas [Hoachanas 120]
12	Berseba - Bethany - Guibes [Kuibis 100] - /Aus - !Gadaos - Elisabeth Bay
13	!Gadaos [Grasplatz] - Angra Pequena [Lüderitzbucht]
14	/Aus - Tiras [33] - ≠Khuias [Kunjas 14] - !Khosis [Kosos 11] - !Osis [Osis 73] - ≠Am!hub [Amhub 78] - Grootfontyn [Grootfontein 91] - !Namseb [Namseb 24]
15	Bethany - Xamis [Chamis 49] - ≠Khuias further see 14 to Grootfontyn
16	Berseba - !Gai//naixas [Gainachas (north of Brukkaros Mountain)] - !Ga/aus [Achterfontein 59] - Tsub!gaos [Zubgaus 29] - Gei/aus [Friedabrunn 20]
17	Tsub!gaos - Gibeon - Goamus - /Haruxas [Haruchas 156]
18	/Haruxas - !Goxas [Gochas] - !Hoaxa!nas

19 !Namseb - !Nomtsas [Nomtsas 26] - //Gobam!nas [Büllspoort 172]

20 !Namseb - /Kharixab [Karichab 39] - Garis [Klein Garis 23] - Gei/aus [Gamigab] - nabis

21 Gei/aus - //Haubes≠gab (on //Haribes) [Haribes 18] - //Kauxas [Kauchas 1] Tsumis [147] - !Awasab [Awasab 333] - Rehoboth

22 //Kauxas - /Oas [Oas 443] - !Hoaxa!nas - Wesley Vale [Leonardville] - Khou demxab [north-west of Uichanas 361] - Gobabis

23 !Nomtsas - Dirixas [Dirichas 28] - Auroeis [Arurueis 475, south of modern-day Schlip] - Tsumis - see 21 to Rehoboth

24 !Nomtsas - /Aub [Klein Aub 350] - Rehoboth

25 //Gobam!nas - /Nautsawisis [Nauchas 14] - !Areb [Areb 176] - /Gubitsaos [Gubitsaus 318] - Tsebris [48] - /Haris [Haris 367] - //Hoes [Heusis 329] - Windhoek

26 //Gobam!nas - Tsouxab River [Tsondab River] - (Abbabis - Rooibank - Walvis Bay was existing before 1879, but not indicated on Hahn's map except the road !Hudaob - ≠Nu!hoas - Rooibank)

27 /Aub - /Gubitsaos - Tsebris - //Guruma!nas [Gurumanas 308] - /Us [Us 35] - Naubes [Chaibis 29] - //Nausgamab - //Ganab - /Ongarusis - /Ubeb - Rooibank - Walewich Bay [Walvis Bay]

28 !Hoaxa!nas - Ou≠gas [Bitterwasser 116] - Rehoboth

29 !Hoaxa!nas - //Kutsi//khus [Kuzikus 37] - !A//ais [Aais 30 junction of White and Black Nossob] - Gobabis

30 Rehoboth - Tsam [Tsams 75] - ≠Kho/nus [Beenbreek 76] - //Kutsi//khus - further see 29 to Gobabis

31 Rehoboth - Oamites [53] - Aris [29] - Windhoek

32 ≠Kho/nus - /Axen/ib [Achenib 247] - ≠Khowas [Kowas 233] - !Uri≠gab [Witvley]

33 Rehoboth - ≠Hatsamas [Hatsamas 92] - ≠Khowas

34 Rehoboth - !Nauas [Nauaspoort 203] - ≠Ga≠guis [Kranzneus 268] - !Kho!anus [Koanus 121] - Seeis - Orumbo [198: White Nossob]

35 Windhoek - //Hoes - /Hai/gas [Vaalgras 14] - Tsaraxeibis [Abochaibis 315] Otymbinque - Tsaobis [90] - ≠O!nanis [Onanis 121] - //Husab Outspan - Walewich Bay (Jonker Afrikaner's Bay Road: several routes through Namib to Walvis Bay directly and via Rooibank)

36 ≠O/nanis - //Ganab - /Ubeb - Rooibank - Walewich Bay

37 Walewich Bay - Palgrave's Mine - Ou Khas [Aukos 68] - !Usa!khos [Usakos] !Ameib [Ameib 60] - Etiro [50] - Okozondye [Omaruru]

38 Windhoek - Seeis - Orumbo - !Uri≠gab - Gobabis - /Oas [Oas 284] - (Ngamiland)

39 Orumbo - //Gamtanas Waterkop [Otjiaha 130] - Gobabis

40 Seeis - Okatumba [193, 195] - Onjati [146] - Otyosazu [Otjisazu 53] - Okatumba [Waldfriede 50] - Otyokuoko [Otjikuoko 83]

41 Orumbo - Otyiarua [Okajura 144] (/Garimu!as) - Otyombindi [Otjombindi 234]

42 Windhoek - Okapuka [50, 51] - Otyizeva [Otjiseva 45] - Ozona [Osona 65] - Okahandya [Okahandja]

43 Okahandya - Otyikango [Gross Barmen 7] - Kamugeu - Otymbinque

44 Otymbinque - Otyontamboume - Omapyu [75] - Okozondye

45 Etiro - /Karibib [Karibib]

46 Omapyu - Ozombinya [Otjombuindya 33] - Okahandya

47 !Ameib - Okombahe - Ani≠gab [Anichab at Ugab River, south of Sorris Sorris]

48 Okozondye - Epako [38] - Otyombonde [Otjimbonde 85] - Otyikango [Otjikango 49, 50] - Ombakaha [58] - Outyo [Outjo] (from Ombakaha a road to Ovamboland was leading)

49 Okahandya - Otyiamongombe [Otjiamongombe 44] - Okandyose [Okandjose 169] - Oiisema [Ousema 202 at Omuramba Omatako] - Otyirondyupa (Waterberg)

50 Okozondye - Omburo [50, 51] - Omatopa (near Omatako Mountains) - Oiisema

51 Oiisema - Ozire [Osire 216, 217] - Ombori Ombonga (Omuramba Omatako, road is following omuramba in modern-day Hereroland West to Ozumbo yakauha, Okavarona and to !Kobis [near Auuns West 288]

52 Otyirondyupa - //Heintas [Naidaus 78] - ≠Nudaus (Ombai on German 'Kriegskarte 1904') - Otave [Otavi] - Otyikango (following further to Ovamboland with connection roads from Otyirondyupa to Otave via Otyozongombe [Otjosongombe 327] - Otyieveta [Otjahewita 291] - Otyiere and another connection road from Ozumbo yakauha to Otyikango {north-west of modern-day Grootfontein on road to Otjikoto})

Source: Theophilus Hahn's Map (1879) and personal research

Note to Appendix Table 1:

Original names from Hahn's map are used, with corrections were obvious mistakes occurred, as for instance in the spelling of Nama or Otjiherero names, with modern-day place names in [] brackets where they could be established.

Appendix Table 2:

Namibia's Roads System for 1894

1 //Aris (Harrys) Drift - /Obib - Gobachab - /Garu!ab - /Aus

2 !Gudaos Drift (or Zendlings resp. Bethanien Drift) - /Haris - //Huns - ≠Ha//kais - !Hudaob - Guibe!gaos - Bethanien

3 ≠Kanibes - /Ai/ais - ≠Ha//kais - see further 2 to Bethanien

4 Vielstrift [Vioolsdrift] - Uhabis - !Gaibes - ≠Kanibes - //Hoamus [Holoog 106] - So//noab - Arugoams - Berseba (/Autsawisis)

5a //Harachas [Ramans Drift] - Warmbad - Daimus - /Haris - !Noachabeb - /Howoba (Guigatsis) - Keetmanshoop (≠Nu≠gaes, Zwartmodder) - Berseba

5b Warmbad - Dakeib - !Amas - Ariebanis - ≠Naraob - Kha!aseb - Kamakam - Wasserstelle am Kainab River (near Robber Hendrick's Place on Alexander's map 1838) (Groenrivier 265)

6 !Gaibes - !Haib - Warmbad - !Naros - !Gaobis (Farm Stolzenfels) - Blydeverwacht - Heirachabis - Gei!ab River - /Nabis

7 Daimus - !Amas - /Nabis - //Khais - Koras - ≠Geitsaub - Gei!aub (Grootfontein) - !Koes (Kleinfontein) - Goab (Auob Geib, Grosser Auob)

8a /Koes - /Hai/gas (Fahlgras) - Tses - Berseba

8b /Koes - Persip [161] - !Amadab [Amadab 159] - Gochas

9 Keetmanshoop - Gei!aub - Klipfontein - !Kiriis

10 //Kais - Rietfontein (≠Has, Pellaer Bastaards) - !Kiriis - ≠Gaibis - /Koes

11 Keetmanshoop - ≠Hoab (Blau River) - Daberas - Goamus - /Gui/ganabis - //Ans [Lidfontein 136] - !Hoacha!nas

12 Berseba - Bethanien - Guibis - !Aus - Tsirub - Elisabeth Bucht

13 Tsirub - Lüderitz Bucht (Angra Pequena)

14 /Aus - Tiras - ≠Kuias - !Kosis - !Osis - ≠Am!hub - Gei/aus (Grootfontein) ≠Namseb

15 Bethanien - Zuurberg [46] - Chamis - ≠Kuias - further see 14 to ≠Namseb

16 Berseba - !Gai//naichas - !Ga/aus - Tsub!gaos - Gei/aus

17 Tsub!gaos - Gibeon - Goamus - /Haruchas

18 /Haruchas - !Gochas - !Hoacha!nas

19 !Namseb - !Nomtsas - //Gobam!nas (Bulls Poort)

20 !Namseb - /Karichab - /Garis - Gei/aus - /Gui//ganabis

21a Gei/aus - //Haubes≠gab - //Kauchas - Tsumis - !Awasab - Rehoboth

21b /Garis - !Gei/koub [Packriem River] - //Kub [Kub 4] - /Oas

22 //Kauchas - /Oas - !Hoacha!nas - //Naosanabis (Wesleyvale) - ≠Kaodamchab - Makam [273, 410] - Gobabis

23 !Nomtsas - Dirichas - Schlip - Tsumis - further see 21 to Rehoboth

24 !Nomtsas - /Aub - Neuras [330] - Rehoboth

25 //Gobam!nas - /Noutsawisis - !Areb - /Gubitsaos - Tsebris - /Haris - Windhoek

26 //Gobam!nas - Ababis [Abbabis 3] - /Hudaob (Kuiseb River) - Hope Mine - /Nu!hoas (Zwartbank) - Nanibechab (Deutsch-Ururas) - Scheppmannsdorf - Roodebank [Rooibank] - Walfisch Bucht

27 /Aub - /Gubitsaos - Tsebris - //Guruma!nas - ≠Eisgaubib [Eisgaubib 31] - Chaibis - //Nausgomab - //Ganab - Gross /Ubeb - Scheppmannsdorf - Walfisch Bucht

28 !Hoacha!nas - Ou≠gas (Bitterquelle) - Klein /Nauas [73] - Rehoboth

29a !Hoacha!nas - Doornfontein [258] - //Kutsi//kus - !A//ais - Gobabis

29b Klein /Nauas - Dütoabib [Düdoabib 57] - ≠Hatsamas - Tsatsachas [87] - !Ko!anus - Ondekaremba [78]

30 Rehoboth - Tsam - ≠Ko/nus - //Kutsi//kus - further see 29 to Gobabis

31 Rehoboth - Oamites - !Aub [Groot Aub 267] - Aris - Auas Poort - Windhoek

32 ≠Ko/nus - /Achen/ib - ≠Kowas - !Uri≠gab (Witvlei)

33 Rehoboth - Usib [Uisib 298] - ≠Hatsamas - ≠Kowas

34 Rehoboth - !Nauas - Kransneus - !Ko!anus - Seeis - Orumbo - Otjihaenena [298] - !Uri≠gab

35 Windhoek - Aukeigas [Augeigas 34] - /Hei/gas [Heusis] - Dawitsaub [Davetsaub 29] - Otjimbingue - /Kurikaub [Kurikaub 30, 31] - Tsaobis [Wilhelmfeste] - !O!nanis - Techasgeis - Techas/karis - Hotsas - Gross /Ubeb - Scheppmannsdorf - Walfisch Bucht

36a Tsaobis - Salem - //Husab - Roodekop [Rooikop] - Walfisch Bucht

36b //Husab - //Goani/kamtes [Goanikontes] - Tsoachaubmund [Swakopmund] (Deutsche Station)

37a Walfisch Bucht - Nonadas [Nonidas] - Arendis [Arandis] - Palgrave Mine - Ebony Mine - Hoeseb [Stinkbank 62] - Oukas - !Ussa!kos - Karibib - Etiro - Omapju (Warme Quelle) - Okosondje (Omaruru)

37b //Goani/kamtes - //Husab - Tsawisis [16] - /Ubib [Ubib 76] - Körners Minen - Du Toits Minen - Karibib

37c //Husab - Hubieb - Kubas [77] - Otjimbingue

37d Nonadas - Salzpfanne (Col. Reneys Font.) - Kleine and Grosse Spitzkoppe - Okombahe (≠Eisib {Omaruru} River)

37e Nonadas - Gross and Klein !Gui//gams [Lewater 57] (Omaruru River) - Orusewa (east of Omuhuruwaro or Daunas Mountains {Brandberg}, also Ani≠gab at !U≠gab River)

38 Windhoek - Ondekaremba - Seeis - Orumbo - Otjihaenena - !Uri≠gab - Gobabis (Epako, Olifant Fontain) - Makam - Oas - Dabis [Dawis 477] - (Border)

39a Orumbo - //Gamtanas (Waterkop) - ≠Nuudom ≠Nosob (Schwarzfluss) [Schwarzer Nossob] - Gobabis

39b !Uri≠gab - Makuja - Karuwapu - Katjaruo (/Garimu!as)

39c Gobabis - Groote Vlei - Paarde Vlei - Epukiro River or Omuramba Otjombindi - Gams Vlei (Omaheke {Groote Zand})

40a Ondekaremba - Otjituesa [Otjituezu 139] (!Uridom !Nosob {Weiss Fluss}) - Onjati - Otjosasu - Okatumba - Katjapia [263] (Tsoachaub River)

40b Onjati - Katjapia - Otjakuoko - Otjikoara [Otjikuara 151] - Otjimbuku [Otjimbuku 136] - Koatjiri (Omuramba - Uamatako) - Otjosondjupa (Waterberg)

41 Orumbo - Katjaruo (/Garimu!as) - Otjombindi

42a Windhoek - Otjisewa - Osona - Okahandja

42b Windhoek - Okapuka - Otjihawero [Otjihavera 62] - Osona - Okahandja

42c Otjisewa - Otjihorunga - Otumama - Otjikango (Neu Barmen)

43 Okahandja - Otjikango - Otjiruse [8] - Kamujai [Okomitundu 24] - Otjimbingue

44a Otjimbingue - Ombujawakwame [Ombujohakane 94] - Otjakatjongo [3] - Omapju - Okosondje

44b Otjimbingue - Onjosa [Onjossa 14] - Eroroberge [Erora 13, 12] - Okahandja

45 Otjimbingue - Audawib [81] - Okongawa [Okongava 72] - Karibib

46 Omapju - Otjimbinja - Otjiteitei - Okahandja

47 !Usa!kos - !Ameib - Okombahe - Orusewa - Soris Soris [186] - Dawib Umb (Carow's Grab) - Chorichas [Khorixas] - Franzfontein (Ombombo)

48a Okosondje - Epako - Otjihinamaparero [Otjihaenamaparero 90, 91, 92] - Otjipaue [112] - Otjikango - Ombahaka - Outjo (Otjo)

48b Otjikango - Katjosongondi (Palafontein) [158] - Outjo

48c Okosondje - Otjongoro [20] - Okonjeje [Okonjenja, Otjihorongo] - Chorichas

48d Okonjeje - Ondjaona - Oluntati - Outjo

49a Okahandja - Otjijamangombe - Okandjose - Oussema - Ossire - Otjosondjupa

49b Katjapia - Omatako Mountains - Omusema [Omusema Uarei 128] - Otjiteitei - Otjosondjupa

50 Okosondje - Omburo - Etjo [97] - Erindi - Ossire

51 Ossire - Ombajonganga [Ombujonganga 235] - Omborombonga - Osondjo Soka=we - Okatjitua (Otjituo) [Otjituuo]

52a Otjosondjupa - Naidaus (≠Haintas) - ≠Nudaus (Okarui Koupote) - Otawi - Otjosonota - Otjikoto [Tsumeb Townlands] - Otjando - Klein and Gross Amutoni (Onamutoni) [Namutoni]

52b Otjosonota - Klein and Gross Amutoni (direct road to Namutoni)

52c Otjosondjupa - Okumombondo [Okamumbonde 332] - Otjihawita Pass [Otjahevita 291, 304] - Otjiera - Oruse - Otawi - Otjimokojo - Grootfontein (Otjomokojo, Otjawanda tjongue) (Frühere Buren Kolonie)

52d Otjosondjupa - Omambonde [157, 165, 166] - Otjimokojo - Grootfontein

52e Omambonde - Okatjongeama - Grootfontein

52f Okatjongeama - Erindi rongongoro (Omuramba Uamotako)

53 Okatjitua - Otjitua - Karkuber (Katjorun?) - Ganams (Numkaup) (always along Omuramba Omatako to Okavango or Ombuenge {Kubango}) with parallel running road: Okatjitua - Neissas [Neitsas 264] - //Naruchas [Maroelaboom] - Ganams (Numkaup)

54 Okatjitua - Okanambuti (Zwartmodder) - Grootfontein

55 Grootfontein - !Aukos [Aukas 593] - Otjikango - Otjikoto

56 Grootfontein - Okanambuti - Auuns - Amutenji - Tschambombe Vlei [East Ovamboland] - Ombango [Mpungu?] - Mpaschi's [Katuitui? at Okavango River]

57 Ombango - along Okavango River to the east

58 Gross Amutoni - Oohama (Ozohama) [Andoni] - Omandonga - Omulonga - Onjipa [Oniipa] (Bethel) - Ukango [Oshikango] (modern-day border to Angola)

59 Omandonga - Olukonda - Ondangua [Ondangwa] - Nechumbo's Werft - Rehoboth [Ongandjera] (Gangella as named by Portuguese)

60 Nechumbo's Werft - Elim - Orundjeno (Border to Angola)

61 Katjosongondi (Palafontein) - Neidaus

62 Outjo - ≠Nudaus - Otawi

63 Outjo - Otjowasandu [Otjovasandu 183] - Ombika - Okaukwejo [Okaukuejo] Gross Amutoni

64 Okaukwejo - Olukonda

65 Okaukwejo - Okaakana [Okahakana] - Rehoboth

66 Okaakana - Otjiwirungo

67 Outjo - Otjitambi[25] - Omuombonde [Ombonde 616] - Otjiwirungo - Otjikaneo (Kalkpütz?) - Omahama - Otawi [Kaoko Otavi, Oruhito] - Omulonga Kounene (Grosses Wasser, Omunene or Nonrse River) - Zwartboei's Drift

68 Franzfontein - Opatakua - Ombangonda - Oruwaurongwe - Otjiwirungo - Okuwaro (Gowarib) - Ohamuheke (Zesfontein) - Purros [?] - south of Kaltes Kap (Cabo Frio) - Sanatantas [Sanitatas] - Otawi

69 Otawi - Kombombo [Ombombo Ovambo] - Rehoboth

70 Orusewa - Betanis [Bethanis 514] - Tsawisis - Passhöhe [Bergsig 714] - ≠Gin Tsawisis - Urumendis - Kaias - Gunjab [Unjab River] - Hoanib River - Ohamuheke

Source: Langhans' Map (1894) and personal research

Note: The names are tabled as used on this map with their modern-day equivalents in || brackets where they could be established and where they not have been mentioned already on Appendix Table 1. As far as possible the numbering system as established for Hahn's map was followed (Appendix Table 1)

Appendix Table 3:

Namibia's Roads System for 1904

1 Arriesdrift - Obib - Numais (Gowachab) - Weissbrunn (Garuab) - Aus: DR 716

2 Sendlingsdrift - Numais - Uguchab [Kolke 84] - Huns - Hakais - Hudaob - Brackwasser (Guibegaos) - Bethanien: DR 716, DR 463, DR 459, MR 31

3 Kanibes - Aiais - Hakais: MR 97

4 Vioolsdrift - Uhabis - Gaibes - Kanibes - Hoamus (Holoog) - Somoab - Neihoms - Arugoams - Berseba (Autsawisis): TR 1/1, DR 316, DR 324, DR 601, MR 28, DR 3907, DR 531

5a Ramans Drift - Kinderzitt (Goamus) - Warmbad - Daimus - Haris - Kanus [94] - Naochabeb - Howobis (Guigatsis) - Keetmanshoop (Nugais, Zwartmodder) - Arugoams - Berseba: DR 208, MR 21, TR 3/1, TR 1/2, MR 88, DR 609, DR 531

5b Warmbad - Dakeib - Amas - Aribanies - Duurdrift [26] - Kaaseb - Hamakams: MR 21, MR 25, DR 201

6a Gaibes - Haib - Warmbad - Velloor [89] - Gaobis (Jerusalem) - Hamis [Blydeverwacht 72] - Heirachabis [Heiragabis 60] - Hudab [38/39] - Onchas [Oas 29]: DR 213, DR 208, DR 210, DR 211, DR 202, DR 213, DR 209

6b Hamis - Ukamas [Ariamsvley] - Dawignab [Davignab 285/286] - Tobos [Gansvley 287/288] - Onchas: DR 202, DR 269, DR 205, DR 204

6c Dawignab - Tobos - Garabis [Plattbeen 300] - Samahaling [211]

6d Dawignab - Tobos - Kais (Freyer) [Tränental 299]

6e Garabis - Kouchanas [Gugunas 301] - Koros: DR 612, MR 26, DR 611

7a Daimus - Kalkfontein [Karasburg] - Amas - Duurdrift - Stinkdoorn [28] - Onchas - Kais - Koros - Geitsaub - Geiaub (Aub) - Koes (Kleinfontein) - Goab: MR 21, MR 25, MR 26, DR 611, MR 30, DR 511

7b Kais - Aranchab [Aroab ?] - Kiriis: MR 25, DR 614

7c Kais - Gunebis - Klipfontein - Koes

8a Koes - Haigasib (Fahlgras) [Haichas 190] - Tses - Berseba: MR 24, DR 3910, MR 98

8b Koes - Persip [161] - Amadab [159] - Gochas: MR 30, MR 33

9a Keetmanshoop - Stampriet [38] - Geiaub - Klipfontein - Kiriis: MR 27

9b Huns - Aranchab - Rietfontein: DR 578, DR 610, DR 612, MR 27

9c Klipfontein - Hasuur [261/262] - Rietfontein: MR 27

10 Dawignab - Holpan - Rietfontein - Kiriis - Gaibis - Koes: DR 614

11a Keetmanshoop - Blau (Hoas) - Daberas - Goamus - Marienthal (Guiganabis) Nugoais (Zwartmodder) [114] - Anis (Lidfontein) - Hoachanas MR 29, DR 1059, DR 1066

11b Keetmanshoop - Gabis (Gawus) [Khabus 146] - Tses - Asab - Gründorn [63] Kawieis (Gaus) [65, 66] - Marienthal: TR 1/3

11c Berseba - Gainaichas - Deutsche Erde [57] - Gibeon - Marienthal: DR 3904, DR 1075, DR 1079, DR 1089, MR 32, TR 1/3

11d Daberas - Amadab - Haruchas - Gochas - Stamprietfontein - Hoachanas: MR 29, DR 1054, MR 33, TR 15/1

11e Stamprietfontein - Nabus 163] - Aminuis: MR 42, DR 1765, MR 91

11f Gochas - Arahoab [Aranos] - Aminuis: MR 32, DR 1033, MR 61, MR 40, MR 91

11g Arahoab - Akanous [285] - Geiab [Gauchab 288] - British Betschuanaland [Botswana]: MR 39

12 Berseba - Bethanien - Guibis - Aus - Tsirub - Elisabeth Bucht: DR 3901, DR 430, DR 435, TR 4/1, TR 4/2

13 Tsirub - Tschaukaib - Lüderitzort (Angra Pequena): TR 4/2

14a Aus - Tiras - Kunjas - Kosos (Kosis) - Osis - Amhub - Grootfontein (Geiaus) Maltahöhe: MR 35, MR 31

14b Aus - Garub - Numis [89] - Namtob [Namtib 5] - Sinclair Mine [2] - Gobis [Kumbis 55]: MR 35, DR 707, DR 407

15a Bethanien - Zuurberg [46] - Chamis - Kunjas - Maltahöhe: MR 31

15b Chamis - Kumakams [68] - Tsub Garis [Voigtsgrund 24] - Kl. Garis [23]: DR 411, DR 1089, DR 811, DR 1121

16 Berseba - Gainaichas - Kanaus [44] - Tsubgaus - Dickdorn [98] - Haribes [18, 19] DR 3903, DR 1079, DR 1084, DR 1088, DR 1121

17 Tsubgaus - Gibeon - Goamus - Haruchas: DR 1084, MR 32, DR 1059, DR 1061

18a Gochas - Marienthal: MR 32, MR 29

18b Gochas - Haruchas - Aukam (Bitterwasser) [154] - Goamus - Gibeon: MR 32

18c Arahoab - Naosanabis [Wesleyvale] - Hoaseb [27] - Aais [31] - Kaitsaub [Keitzaub 68] - Gobabis: MR 39

19a Maltahöhe - Nomtsas - Gamis [170/171] - Büllsport (Gobamnas): TR 14/2

19b Maltahöhe - Zaris [103] - Hyas [99] - Urikos [4] - Büllsport: MR 36, DR 854

19c Hyas - Sessrim [Sesriem 137]: DR 854, DR 826

20a Maltahöhe - Karichab - Tsub Garis - Geiaus - Dassiefontein [100, 101] - Marienthal: MR 34

20b Karichab - Kl. Garis - Nubapis [Nababis 18] - Gaus (Kauchas) [3] - Oas: MR 38

21 Geiaus - Haubesgab - Gaus - Sendlingsgrab (Heiguoao) [Goabgous 434] - Tsumis - Awasap - Rehoboth (Anis, Glenelg Bath): TR 1/4

22 Gaus - Oas - Hoachanas - Nugoais - Naosanabis - Ums [Gr. Ums 502] - Gaodamchab - Makam - Gobabis: MR 38, MR 45, DR 1239, DR 1770, MR 39, DR 1615, DR 1819, MR 91

23 Nomtsas - Dirichas - Schlip - Garis [Naris 375] - Awasap - Rehoboth: DR 860, DR 1254, DR 1259, TR 1/4

24a Nomtsas - Aub [Ghaap 468] - Heiras (Neuras) - Rehoboth: DR 860, DR 1254, DR 1262, TR 1/4

24b Aub - Kubes (Kobus) [Kobos 321]: DR 1254, DR 1261

25a Büllsport - Nauchas (Noutsawisis) - Areb - Gubitsaos - Gurumanas [300] - Haris - Gr. Windhoek: DR 1206, DR 1274, MR 47, MR 78, MR 49

25b Büllsport - Kanbis [Kambes 498] - Aub [Kl. Aub] - Kubes: DR 1206, DR 1261

25c Nauchas - Areb - Kubes - Rehoboth: MR 47

26a Büllsport - Awabes (Abbabis) - Hudaob - Hopemine - Klipnes (Niguib) - Nuhoas (Zwartbank) - Nanibechab (Deutsch-Ururas) - Scheppmannsdorf (Roodebank) - Walfisch Bucht Niederlassung: TR 14/2, MR 36, DR 1983

26b Awabes - Nauchas - Areb - Hornkrans [Hornkrantz 21] - Gurumanas: MR 47, MR 78, MR 49

27a Hornkrans - Natas [220] - Ondusis - Hopemine: MR 49, MR 36

27b Haris - Vaalgras (Mertens) - Eisgaubib - Chaibis - Nausgomab - Ganab - Gross Ubib - Gungochoab - Scheppmannsdorf - Walfisch Bucht: DR 1982, MR 36

28 Hoachanas - Ougas (Bitterquelle) - Kl. Nauas - Kous [66] - Rehoboth: TR 15/1, DR 1223, MR 46

29a Hoachanas - Konus - Doornfontein - Kutsikus - Aais - Gobabis: TR 15/1, MR 79, MR 48, DR 1790, MR 39

29b Aminuis - Achab - Ums - Kaitsaub - Gobabis: MR 91, MR 40, MR 39

29c Aais - Kaukurus [79] - Gr. Witvley (Urigab): DR 1837, DR 1790, DR 1785, DR 1793

29d Kl. Nauas - Dütoabib - Hatsamas - Tsatsachas - Koanus - Hohewarte [76] - Voigtland [77] - Ondekaremba: TR 15/1, TR 6/1

30 Rehoboth - Wortel [54] - Hatsamas: DR 1228, DR 1249

31a Rehoboth - Oamites - Aub - Aris - Gr. Windhoek: TR 1/5

31b Rehoboth - Niais [Nineis 246] - Haris: DR 1237, MR 49

32a Konus - Doornfontein - Achenib - Kowas - Otjinjamaua - Gr. Witvlei: MR 48, MR 51, DR 1444, DR 1792, DR 1793

32b Doornfontein - Springbokvley [92] - Naosanabis: MR 48, MR 41

33 Rehoboth - Usib - Dütoabib - Hatsamas - Kowas - Kaukurus - Gobabis: DR 1238, TR 15/1, DR 1482, MR 51, DR 1444, DR 1792, DR 1793, DR 1805

34 Rehoboth - Nauas - Kransneus - Koanus - Alt Seeis [133] - Otjihaenena - Gr. Witvley: TR 1/5, DR 1463, TR 15/1, DR 1472, TR 6/1

35 Windhoek - Aukeigas - Matchless Mine - Gr. Heusis (Haigas) - Tsarachaibis (Abochaibis) - Dawitsaub - Otjimbingue - Kurikob - Wilhelmfeste (Tsaobis) - Onanis - Gr. Tinkas (Techasgeis) - Kl. Tinkas (Techaskaris) - Husab - Zandfontein - Walfisch Bucht: MR 52, DR 1406, DR 1953, MR 77, MR 52, DR 1985, DR 1982, MR 36

36a Tsaobis - Salem - Husab - Walfisch Bucht

36b Husab - Haigamchab - Goanikomtes - Nonidas - Swakopmund: MR 52

37a WalfischBucht - Nonidas - Orandis Pforte - Palgrave Mine - Ebony Mine - Stinkbank (Hoeseb) - Aukas - Usakos - Karibib - Etiro - Omapju (Warme Schwefelquelle) - Omaruru (Okosondje): TR 2/1, TR 2/2, TR 2/3

37b Goanikomtes - Husab - Tsawusis - Ubib - Körners Minen - Ababis [70] - Karibib: DR 1914, DR 1952, MR 77

37c Husab - Sphinx (Hubieb) - Kubas - Ukuib [84] - Otjimbingue

37d Nonidas - Rössing - Salzpfanne - Kleine and Grosse Spitzkoppe - Okombahe: TR 2/2, DR 1918, DR 1930, DR 1931

37e Nonidas - Gross and Klein Guigams (Lewater) - Jalusnik (Taunauk) - Oritschaub (Witpütz) - Aniha (Orusewa) [Ugab River]: TR 2/2, DR 1930, MR 76

37f Swakopmund - Fischbein (Jakkals Pütz) - Kap Cross - Ugab Mund - Huab Mund - Uniab Mund (alte Werft) - Hoanib Mund: MR 44, DR 2301, DR 2302

38a Windhoek - Kabs Farm [65] - Ondekaremba - Seeis - Alt Seeis - Gr. Witvley - Gobabis (Epako, Olifant Fontain) - Makam - Oas - Babibabi [294] - (Border) [Botswana]: TR 6/1, MR 91, DR 1700, DR 1681, MR 55

38b Windhoek - Hoffnung [66] - Neudamm [63] - Okatumba [193, 195] - Otjihaenena - Orumbo - Omitara - Gr. Witvley: TR 6/1, MR 53, DR 1535, DR 1852, TR 6/1

39a Orumbo - Otjiaha (Gamtanas) - Kehoro[339] - Ohlsenhagen [174] - Gobabis - Orlogsplatz (Arikoas) [Agarichas 401] - Siegfeld [403]: DR 1658, MR 57, MR 55

39b Gr. Witvley - Ekuja 162/167] - Karuwapu - Okaiura [144]: TR 6/1, DR 1852, MR 70, MR 53, DR 2166

39c Gobabis - Okatjeru [181] - Epukiro - Sturmfeld (Otjunda) [252] - Otjimbinde: MR 56, DR 1635, DR 1612, MR 70, DR 1621

39d Epukiro - Okandusae - Epata (Omuramba Eiseb) [Hereroland East]

39e Epukiro - Siegfeld - Stampriet [270] - Oas: DR 1635, DR 1830, DR 1851, DR 1692, DR 1681

39f Ohlsenhagen - Otjimuhandi [Otjimukandi 178] - Owingi [Ovingi 246] - Epukiro: MR 57, DR 1638, DR 1641

40a Ondekaremba - Neudamm - Otjituesa - Onjati - Otjosazu - Okatumba - Okatiapia (Katjapia): DR 1510, DR 2102, DR 2170

40b Onjati - Owiumbu [Oviumbu 188] - Otjikuoko - Otjikuara - Otjimbuku - Otupanda [Okapanda 248] - Osire [492] - Waterberg (Okosondjupa): DR 2170, DR 2166, MR 60, MR 57, MR 101, DR 2512

41a Otjihaenena - Okaiura - Otjombindi: DR 1435, DR 2166, MR 99, MR 70, DR 1621

41b Otjihaenena - Ekuja - Otjiarua [221, 222] - Okatgongoro [Okatjongora 236] - Epukiro: DR 1435, MR 53, MR 70, DR 1841, DR 1639, DR 1638, DR 1641

41c Otjihaenena - Onjati: DR 1435, DR 1468, DR 1434, DR 2169

41d Otjihaenena - Otjiaha - Kehoro: DR 1535, MR 70, MR 57

42a Windhoek - Otjisewa - Osona - Okahandja: Old Okahandja Road

42b Windhoek - Brakwater - Okapuko - Otjihawera - Osona - Okahandja: TR 1/6

42c Otjisewa - Osohorongo (Otjihorungo) - Otumuama - Gr. Barmen (Otjikango)

43 Okahandja - Gr. Barmen - Otjiruse - Uitdraai [35] - Otjimbingue: MR 87, DR 1972, DR 1958, DR 1967

44a Otjimbingue - Ondjossa (Onjosa) - Ombujohakane - Otjakatjongo - Omapju - Omaruru: DR 1967, TR 7/2

44b Otjimbingue - Ondjossa - Okasise - Eroro - Okahandja: DR 1967, TR 7/1

45a Otjimbingue - Onsaramewa (Audawib) - Okongawa - Karibib: DR 1953

45b Tinkas - Onanis - Donkeroek [Donkerhuk 91] - Awetamanus (Witwater) [Anschluss 112] - Tsaobis - Karibib: MR 52, MR 77

45c Salem - Diepdal [Dieptal 25] - Horebis [61, 108] - Tsaobis - Onsaramewa

45d Salem - Wilsonfontein [110] - Tsaobis

46a Omapju - Okanatjikuma [25] - Otjiteiti - Okahandja: TR 7/2, DR 2110

46b Omburo - Okanatjikuma - Okasise: DR 2328, MR 62, DR 2121, DR 2108

46c Karibib - Johann Albrechts Höhe [44] - Ombujohakane - Okasise - Otjiteiti: TR 7/1

47a Usakos - Ameib - Okombahe - Ais - Aniha - Soris Soris - Dawib Urub - Chorichas - Franzfontein (Ombombo): TR 2/2, DR 1935, DR 2306, MR 64, MR 76

47b Aniha - Hungorob [Brandberg]

47c Aniha - Soris Soris - Haobes - Bethanis: DR 2612, DR 3254

47d Eisib Mund (Omaruru) [Hentiesbay] - Ausib - Gross and Klein Guigams - Okombahe - Omaruru: MR 76, MR 64

48a Omaruru - Epako - Okowakuatjiwi [88] - Otjipaue - Otjikango - Ombinda Karambi [Ombindi Karambi 155] - Ombahaka - Palafontein (Lampert's Farm) - Outjo (Tsuob): TR 2/4, MR 63

48b Otjipaue - Erundu [136] - Otjiwarongo: TR 2/4

48c Omaruru - Otjongoro - Kakombo [17, 19] - Epopo [4] - Omburo [81, 82] Tsumamas [74] - Geinasib [Gainatseb 67] - Chorichas: MR 64, DR 2344, DR 2351, DR 2743, MR 65

48d Tsumamas - Tsuwandas [Tsuwandes 107] - Outjo: MR 65

48e Geinasib - Franzfontein: DR 2744

48f Epopo - Oluntati - Ombahaka: DR 2351, DR 2752

48g Epopo - Otjikango: DR 2417

48h Otjikango - Otjongoro: DR 2417, DR 2351

49a Okahandja - Otjiamangombe - Okandjose - Oussema - Otutundu [204] - Okosongo Mingo [149] - Omuoweroumue [Omuverume 147] - Waterberg: TR 1/7, DR 2112, DR 2475, MR 57, DR 2476, MR 101, DR 2512

49b Okahandja - Otjosazu - Owiumbu - Otjihangwe [171] - Ekuja: DR 2170, DR 2166, MR 53

49c Otjosazu - Owikokorero [Agagia 186] - Otjimbuka: MR 59, DR 2124, DR 2125, DR 2120

49d Owikokorero - Okatjongeama [170, 171] - Otjiamangombe - Otjimakuru [62] Omburo - Omaruru: DR 2124, DR 2180, DR 2112, TR 1/7, MR 62, DR 2328

50a Omburo - Osondjesse [Ozondjisse 55] - Etjo - Erindi - Otundu: DR 2329, DR 2404

50b Etjo - Osombutu [Ozombutu 24] - Omuoweroumue: MR 62, DR 2483, TR 1/7, MR 101

51 Osire - Ombajonganga - Omamborombonga - Owisume [Ovisume 189] - Otjituo (Tsamsis): MR 57, DR 2476, DR 2454, DR 2446, DR 3801, DR 3822, DR 3306

52a Waterberg - Omuoveroumue - Otjiwarongo - Ekotoweni [208] - Outjo: DR 2512, MR 101, TR 1/7, TR 2/5

52b Otjiwarongo - Okaputa [567, 568] - Otjikoto [573] - Nuidaus (Ombai) - Otawi (Choabib) - Chorab [Khorab 328] - Otjikoto (Gaisis) - Tsumeb Mine: TR 1/8, TR 1/9

52c Tsumeb - Massauas [Massaus 865] - Namutoni (Namub): TR 1/10, MR 84

52d Waterberg - Okamombonde - Otjahewita - Esere (Godaus) [150, 151] - Otjoujikuju (Ghuchab) [Rietfontein 344] - Uitkomst [41] - Grootfontein (Otjiwanda Tjongue, Geiaub): DR 2512, DR 2896, DR 2612, TR 8/1

52e Waterberg - Omambonde - Okamahundju [178] - Grootfontein: DR 2512, DR 2896, DR 2830

52f Omambonde - Okatjongeama - Owisume - Bubus [213] - Grootfontein: DR 3822, DR 2836

53a Otjituo - Kano Vley - Karakuwisa - Numkaub (Ganams) - Blockfontein [Ncaute] - Okawango [Rundu], resp. one track along Omuramba Omatako to Ungura [Okavango River: Ndonga]): TR 8/2, TR 8/3, DR 3400

53b Otjituo - Neitsas [264] - Nuragas [Maroelaboom] - Numkaub: DR 2874, DR 2845, MR 74 and further to the north east

53c Otjituo - Swartwater (Okanambuti) - Gaikos [729] - Aukas - Grootfontein: DR 2874, DR 2845, DR 2844, TR 8/2

54 Otjituo - Bubus - Grootfontein: MR 71

55a Grootfontein - Nosib [655] - Tsumeb: MR 72

55b Grootfontein - Uitkomst - Guchab Mine - Asis Mine [Kombat] - Otawi: TR 8/1

55c Grootfontein - Harasib [317] - Ghaub [47] - Otawi: DR 2859, DR 2860, TR 8/1, DR 2863, DR 3022

55d Chorab - Ghaub - Nosib - Abenab [707]: DR 3022, MR 72, DR 3021

56a Grootfontein - Abenab - Gorooab [294] - Tsintsabis [881] - Tschitschib (Omuramba Omaheke) [Tsitsib] - Kurung Kuru (Okavango River) [Nkurenkuru]: MR 73, DR 3017, DR 3016, DR 3406

56b Grootfontein - Okanambuti - Auuns - Amutenji - Tschitschib: MR 73, DR 2858, DR 2855

57 Kurung Kuru - Jangana [Nyangana] - Andara (Libebe) - Popa: along Okavango River to the swamps in modern-day Botswana: MR 110, DR 3402 (future TR 8/4)

58a Namutoni - Osohama - Andoni - Omusere - Ombuga - Omandongo - Onajena (Nechale's Werft) - Omulonga - Olukonda - Ondangua - Oniipa - Okango [Oshikango] (modern-day border to Angola): MR 84, TR 1/10, TR 1/11

58b Namutoni - Tschambombe Vley - Ombongo - Mpaschi [Katuitui?]

58c Namutoni - Ondera [308] - Kakuse [300] - Tsintsabis: MR 84, DR 3001

59 Olukonda - Omukuju (Negumbo's Werft) [Oshikuku] - Rehoboth [Ongandjera] Ombombo [Ombombo Ovambo]: MR 92, DR 3613, DR 3615

60a Omukuju - Andersson's Grave (north of border to Angola): DR 3611

60b Rehoboth - Great Cataract (Jayme Godias Cataract) [Ruacana Falls]: DR 3614, DR 3616, MR 92

61 Outjo - Naidaus - Okohuna (Goab) [429] - Otawi: MR 63

62a Okohuna - Guinas [454, 455] - Otjikoto: DR 3028, DR 3043

62b Guinas - Choasib - Chudob (Aub) - Namutoni: DR 3025, DR 3003, MR 84

63a Outjo - Otjowasandu (Urub) - Ombika (Bichab) - Okaukuejo - Homob - Achab Arichas (Springbockfontein) - Hoas - Namutoni: MR 68

63b Okaukuejo - Gasib - Nubabes - Rietfontein - Arichas - Okerfontein - Hoas

63c Gasib - Soawis [Soavis 448] - Guinas: DR 3003

63d Ombika - Ekotoweni: DR 2779, DR 2780, DR 2782, DR 2761

63e Otjowasandu - Chorab [180] - Naidaus: DR 2779

64 Okaukuejo - Olukonda: DR 3605

65 Okaukuejo - Okahakana Kandjila (Okahana) - Rehoboth

66 Okahakana - Onaiso - Otjitjikua - Rehoboth

67a Outjo - Nungubaheis [Nungubais 115] - Goraeis [Goreis 122] - Chauas [Cauas 118] - Otjikondo [37] - Nadas [46] - Otjitambi [25] - Okaua (Gauas) [Cauas Okawa 30] - Okamanja [Kamanjab] - Otjomirungo [Kaross 237] - Otjowasandu (Choabendus) [Otjovasandu 644] - Otjokaware [Kowares 276] - Otjitjikua - Otjiwunda [Otjiwunda] - Ombombo - Owiombo - Elands Pütz - Owerou Kamaheke (Eriksson Duto) [Kunene, Angola]: MR 67

67b Goraeis - Namatanga [35] - Otjowasandu: DR 2696, DR 2710

67c Goraeis - Kl. Tutara [55, 56] - Franzfontein: MR 67, MR 66

67d Kl. Tutara - Otjikondo - Chaudamas [33] - Otjowasandu: DR 2666, DR 2694 DR 2710

67e Okaua - Gagarus [289]: DR 2671

68a Franzfontein - Gr. Tsaub [13] - Kl. Omaruru [21, 22] - Otjombakorua - Kamanjab MR 76

68b Gr. Tsaub - Otjitambi - Chaudamas

68c Franzfontein - Nadas

68d Gr. Tsaub - Gaus [Gauss 265] - Okaua: DR 2670

68e Franzfontein - Gr. and Kl. Achas - Kaidas - Bethanis: DR 2625, DR 2620

68f Kaidas - Nugas - Grootberg - Autsaub [Katemba Autsaub 210] - Kamanjab: DR 2620

69a Otjiwunda - Gauko Otawi - Otju - Nawante (Otjikongo, Okonjembo) [Okonjombo] - Sanitatas: MR 100, DR 3705, DR 3707

69b Otjiwunda - Ombombo - Rehoboth

69c Owiombo - Otjiurungu - Gr. and Kl. Ombasu - Zwartbooi Drift (Kunene): DR 3618, DR 3700

69d Gauko Otawi - Gr. and Kl. Ombasu: DR 3705, DR 3618

70 Kamanjab - Otjombakorua - Anabib - Kowarib - Farm Warmbad (Otjimahuruo) [Warmquelle] - Zesfontein (Ohamuheke): MR 67, DR 3710, DR 3706

71 Grootberg - Urieis - Anabib: DR 2620, DR 3706

72 Huab Mund - Gui Tsawisis - Goabis - Cheias [Gaias] - Mudorib - Zesfontein - Puros [Purros] - Otjowaurua (Chorab) [Khorab] - Sanitatas - Nadas - Otjipaue - Otjinawi - Marienfluß - Kunene: DR 3707

73 Bethanis - Gui Tsawisis - Goabis - Kowarib: DR 3245

74 Goabis - Hoarusib Uitdraai - Sarusas - Sanitatas - Nadas - Okotusu - Kunene Mund

75 Nadas - Angra Fria

76 Otjinawi - Urikomtes (Otjiha) - Otjiuanungu - Gaoko Otawi: DR 3707

77 Karakuwisa - Bogara [Bogana] - Tsumkwe - Gautscha - Chara (Aha Mts): MR 74, DR 3303

78 Tsumkwe - Lewisfontein [Modern-day Botswana]: MR 74

79 Ssambala [Singalamwe?] - Linjanti [Linyanti] - Sitane - Sescheke [Sesheke/Zambia]: DR 3502, DR 3511

80 Sitane - Ngoma: TR 8/7

Source: War Map 'Kriegskarte' of 1904 and personal research

Note: The names are tabled as used on this map with their modern-day equivalents in [] brackets where they could be established and where they not have been mentioned already in Appendix Tables 1 or 2. As far as possible the numbering system as established for Hahn's or Langhans' maps has been followed. The approximate modern-day equivalent roads or parts of it with their proclamation numbers are given for each road (1904).

Appendix Table 4:

List of Major Road Structures for 1987

Official Bridge Number	Site or Name of the Structure	Road Number	Year of Completion
1	Bridge: Otjiwarongo River: Otjiwarongo - Otavi:	Old TR 1/8	1935
2	Bridge: Friedabrunn River: Mariental - Maltahöhe:	Old MR 34	1935
3	Bridge: Omuramba Omatako: Evero: Old TR 1/7:	DR 2475	1937
4	Slab: On farm Hüttenhain:	DR 2180	1937
5	Bridge: Fish River: Mariental - Maltahöhe:	DR 1103	1939
6	Slab: On farm Otjihaenena: Seeis - Omitara:	DR 1535	1939
7	Slab: On farm Urupuka: Kalkfeld - Okahandja:	MR 62	1940
8	Bridge: At mile 7: Windhoek - Rehoboth:	Old TR 1/5	1940
9	Low Level Bridge: Fish River: Seeheim - Goageb:	Old TR 4/1	1941
10	Slab: Khan River: Etiro: Karibib - Omaruru:	Old TR 2/3	1943
11	Bridge: Nossob: Leonardville - Aranos:	MR 39	1943
12	Bridge: White Nossob: Witvley:	DR 1793	1944
13	Bridge: Black Nossob: Gobabis:	Old TR 6/1 (DR 1805)	1944
14	Bridge: Konkiep River: Helmeringhausen - Bethanien:	Old MR 31	1944
15	2 Slabs: On Windhoek - Okahandja Road:	Old TR 1/6	1944
16	Slab: Ugab River: Otjiwarongo - Outjo:	Old TR 2/5	1944
17	Bridge: Hutup River: Maltahöhe - Bethanien:	Old MR 31	1945
18	Road over Rail Bridge: Windhoek - Kapp's Farm:	TR 6/1	1945
19	Bridge: Schaf Revier: Windhoek - Dordabis: *Replaced by new bridge with same number in 1975*	TR 15/1	1947
20	Bridge: Olifant Revier: Windhoek - Dordabis:	TR 15/1	1947
21	Culverts : Mile 12,5: Sukses - Otjiwarongo:	Old TR 1/7	1947
22	Slab: Otjitasu River: Otjiwarongo - Outjo:	Old TR 2/5	1947
23	Anti-Erosion Structure: Windhoek - Gobabis:	TR 6/1	1947
24	Bridge: Schaf River: Koas: Windhoek - Dordabis:	TR 15/1	1947
25	Culvert: Mile 5: Sukses - Otjiwarongo:	Old TR 1/7	1947
26	Bridge: Okateitei: Okahandja - Otjiwarongo	Old TR 1/7	1947

Official Bridge Number	Site or Name of the Structure	Road Number	Year of Completion
27	Culvert: Mile 11: Sukses - Otjiwarongo	Old TR 1/7	1948
28	Bridge: Okamita River: Okahandja - Otjosondu:	MR 59	1948
29	Culverts: Windhoek - Brakwater	Old TR 1/6	1949
30	Bridge: Swakop River: Okahandja: *Bridge 30 was strengthened in 1967 and widened in 1986*	TR 1/6	1949
31	Culverts: Windhoek - Seeis:	TR 6/1	1961
32	Slab: Usib River: Rehoboth - Uhlenhorst: *Replaced by low level bridge in 1979*	MR 46	1948
33	Bridge: Oanob River: Rehoboth - Nauchas: *Bridge 33 will be flooded in 1988 due to Oanob Dam*	MR 47	1948
34	Bridge: Omaruru River: Omaruru: *Bridge 34 was strengthened in 1967*	TR 2/3	1949
35	Culvert: Hatsamas: Windhoek - Dordabis:	Old TR 15/1	1947
36	Bridge: Otjivero: Seeis - Omitara: *Structure is occasionally flooded due to Otjivero Dam*	DR 1535	1949
37	Bridge: Erundu River: Kalkfeld - Otjiwarongo:	Old TR 2/3	1954
38	Bridge: Hamburg Riv.: Kalkfeld - Otjiwarongo:	Old TR 2/3	1955
39	Slab: Seeis River: Seeis - Witvley Road:	Old TR 6/1	1951
40	Bridge: Okahandja River: Okahandja - Windhoek:	TR 1/6	1966
41	Bridge: Ham River: Nakop - Karasburg: *Widened in 1967*	TR 3/1	1960
42	Bridge: Fish River: Gibeon:	DR 1089	1955
43	Bridge: Lewer River: Aurus:	DR 1089	1955
44	Slab: Ugab River: Kalkfeld - Outjo:	Old MR 63	1944
45	Bridge: Fish River: Maltahöhe - Kalkrand:	MR 38	1953
46	Bridge: Aubib River (Satco): Karasburg - Grünau: *Widened in 1966*	TR 3/1	1958
47	Bridge: Otjihavera River: Windhoek - Okahandja: *Widened in 1984*	TR 1/6	1959
48	Slab: Khan River: Okahandja - Omaruru:	DR 2110	1949
49	Slab: Nossob River: Leonardville - Zania: *Replaced by high water structure in 1970*	MR 41	1950
50	2 Slabs: Black Nossob: Kamabingane and Apex:	Old MR 54	1950
51	2 Culverts: Seeis - Omitara:	Old TR 6/1	1951

Official Bridge Number	Site or Name of the Structure	Road Number	Year of Completion
52	Slab: Auob River: Stampriet - Lidfontein:	TR 15/1	1951
53	Slab: Schaf River: Rehoboth - Uhlenhorst:	MR 46	1950
54	Slab and Culvert: Omaruru - Karibib:	Old TR 2/3	1951
55	Slab and Culvert: Kalkrand - Mariental:	Old TR 1/4	1951
56	Crossing: Osterode: Stampriet - Aranos:	Old MR 33	1952
57	Slab: Kainab River: Aroab - Karasburg: *Replaced by a high level bridge in 1979*	MR 25	1952
58	Bridge: Khan River: Usakos: *Widened during 1965: Partly damaged by 50 years flood in 1985 and repaired*	TR 2/2	1952
59	Slab: Swakop River: Palmental: Karibib - Anschluss: *Washed away 1963: Rebuilt as low level bridge in 1964*	MR 77	1952
60	Low Level Br.: Voigtsgrund: Mariental - Maltahöhe:	Old MR 34	1952
61	Bridge: Haseweb River: Maltahöhe - Helmeringhausen:	Old MR 36	1953
62	Bridge: Konkiep River: Goageb: Old TR 4/1)	DR 459	1953
63	Bridge: Swartmodder River: Rehoboth - Kalkrand:	TR 1/4	1953
64	Bridge: Teufelsbach River: Windhoek - Okahandja: *Widened in 1986*	TR 1/6	1953
65	Bridge: Orange River: Vioolsdrift:	TR 1/1	1956
66	Bridge: Otjikuara River: Okahandja - Otjosondu:	MR 59	1954
67	Bridge: Oanob River: Rehoboth - Kalkrand:	TR 1/4	1956
68	Culverts: Windhoek - Rehoboth:	TR 1/5	1961
69	2 Causeways: east of Okamita Bridge	MR 59	1954
70	Bridge: Otjitazu River: Otjiwarongo - Kalkfeld: *Widened in 1970*	TR 2/4	1954
71	Bridge: Jakandonga River: Otjiwarongo - Kalkfeld:	Old TR 2/4	1954
72	Culverts: Nakop River: Karasburg - Nakop:	TR 3/1	1957
73	Channel Culvert: Brakwater: Windhoek - Okahandja:	TR 1/6	1955
74	Bridge: Epako River: Omaruru - Kalkfeld: *Widened in 1973*	TR 2/4	1955
75	Bridge: Orange River: Velloorsdrift:	MR 23	not known

Official Bridge Number	Site or Name of the Structure	Road Number	Year of Completion
76	Road over Rail Bridge: Swakopmund - Walvis Bay: *Widened in 1970: Became redundant through realignment of railway line Swakopmund - Walvis Bay in 1980*	TR 2/1	1960
77	Bridge: Löwen River: Keetmanshoop - Grünau: *Widened in 1966*	TR 1/2	1959
78	Bridge: Guruchab River: Keetmanshoop - Grünau: *Widened in 1967 and strengthened 1978 after blasting attempt*	TR 1/2	1957
79	Bridge: Black Nossob River: Witvley - Gobabis:	Old TR 6/1	1956
80	Culverts: Neu Heusis - Augeigas: *Replaced partly between 1976 and 1984*	MR 52	1958
81	Culverts: Warmbakkies River: Keetmanshoop - Grünau:	TR 1/2	1958
82	Culverts: Sukses - Otjiwarongo:	TR 1/7	1960
83	Bridge: Okapuka River: Windhoek - Okahandja: *Widened in 1983*	TR 1/6	1957
84	Culverts: Windhoek - Aris:	TR 1/5	1961
85	Bridge: Hom River: Karasburg - Grünau: *Widened in 1966*	TR 3/1	1958
86	Seawall: Swakopmund - Walvis Bay:	TR 2/1	1959
87	Culverts: Brakwater - Okahandja:	TR 1/6	1961
88	Culverts: Otavi - Tsumeb:	TR 1/9	1958
89	Bridge: Kudom River: Karasburg - Nakop: *Widened in 1967*	TR 3/1	1959
90	Slab: Hom River: Warmbad:	MR 21	1961
91	Culvert: Gamkub River: Karasburg - Nakop:	TR 3/1	1959
92	Culverts: Mariental - Asab:	TR 1/3	1961
93	Bridge: Kubub River: Karasburg - Nakop: *Widened in 1967*	TR 3/1	1961
95	Bridge: Ugab River: Uis - Kamanjab:	MR 76	1961
96	Bridge: Asab 1 River: Mariental - Asab:	TR 1/3	1960
97	Bridge: Huab River: Uis - Kamanjab:	MR 76	1962
98	Bridge: Asab 2 River: Mariental - Asab:	TR 1/3	1960
99	Road over Rail Bridge: Osona: Windhoek - Okahandja: *Replaced by new structure in 1985*	TR 1/6	1960

Official Bridge Number	Site or Name of the Structure	Road Number	Year of Completion
100	Bridge: Schwarze River: Windhoek - Okahandja: *Widened in 1984*	TR 1/6	1960
101	Bridge: Omakunde River: Windhoek - Okahandja: *Widened in 1983*	TR 1/6	1961
102	Bridge: Seeis River: Windhoek - Kapp's Farm:	TR 6/1	1962
103	Culverts: Kapp's Farm - Seeis:	TR 6/1	1961
104	Bridge: Gründorn 1 River: Mariental - Asab:	TR 1/3	1961
105	Culvert: Ch. 39: Windhoek - Seeis:	TR 6/1	1961
106	Bridge: Avis River: Ch. 89: Windhoek - Seeis:	TR 6/1	1962
107	Bridge: Oamites River: Aris - Rehoboth:	TR 1/5	1961
108	Bridge: Otjiwarongo River: Otjiwarongo - Otavi:	TR 1/8	1961
109	Bridge: Weerlig River: Uis - Kamanjab:	MR 76	1962
110	Bridge: Gründorn 2 River: Mariental - Asab:	TR 1/3	1961
111	Bridge: Khorixas River: Uis - Kamanjab:	MR 76	1962
112	Bridge: Kannenberg River: Karasburg - Aroab:	MR 25	1961
113	Bridge: Bellerode River: Windhoek - Kapp's Farm:	TR 6/1	1962
114	Bridge: Hom River: Karasburg - Vioolsdrift: *Replaced by new bridge due to building of Dreihoek Dam: 1977*	MR 22	1962
115	Bridge: Navarre River: Outjo - Khorixas: *Widened in 1983*	MR 65	1962
116	Bridge: Huab Tributary: Uis - Kamanjab:	MR 76	1962
117	Bridge: Kapp's Farm: Ch. 320: Windhoek - Seeis:	TR 6/1	1962
118	Channel Culvert: Okahandja: Windhoek - Okahandja:	TR 1/6	1961
119	Bridge: Aroab River: Karasburg - Aroab:	MR 25	1961
120	Bridge: Kiriis River: Keetmanshoop - Aroab:	MR 27	1962
121	Bridge: Gaseneirob River: Outjo - Khorixas: *Widened in 1983*	MR 65	1962
122	Low Level Bridge: Nossob River: Stampriet - Aranos:	Old MR 42	1963
123	Low Level Bridge: Auob River: Gibeon - Gochas:	MR 32	1962
124	Bridge: Lewer 1 River: Mariental - Maltahöhe:	Old MR 34	1962
125	Bridge: Okaukonjaka River: Otjiwarongo - Otavi:	TR 1/8	1962
126	Bridge: Naute River: Keetmanshoop - Aroab:	MR 27	1962

Official Bridge Number	Site or Name of the Structure	Road Number	Year of Completion
127	Road over Rail Bridge: Bergland: Aris - Rehoboth:	TR 1/5	1961
128	Bridge: Fish River: Keetmanshoop - Berseba:	DR 609	no plans yet
129	Bridge: Voigtsgrund 1 River: Mariental - Maltahöhe: *Widened and one span added in 1978*	MR 34	1963
130	Bridge: Voigtsgrund 2 River: Mariental - Maltahöhe:	Old MR 34	1963
131	Bridge: Donga River: Outjo - Khorixas: *Widened in 1982*	MR 65	1963
132	Slab: Gurumanas River: Windhoek - Gamsberg:	Old MR 49	1963
133	Low Level Bridge: Auob River: Stampriet - Aranos:	Old MR 42	1963
134	Bridge: Lewer 2 River: Mariental - Maltahöhe:	Old MR 34	1963
135	Bridge: Erundu 1 River: Ombindi Karambi: Outjo - Kalkfeld:	MR 63	1965
136	Culverts: Outjo - Khorixas:	MR 65	1963
137	Low Level Bridge: Kuiseb River: Solitaire - Rooikop:	replaced:	See 196
138	Low Level Bridge: Cuvelai: Ch. 1045: Oshakati - Ruacana: *Replaced by high level bridge in 1983*	MR 92	1963
139	Low Level Bridge: Cuvelai: Ch. 827: Oshakati - Ruacana: *Replaced by high level bridge in 1984*	MR 92	1963
140	Low Level Bridge: Cuvelai: Ch. 745: Oshakati - Ruacana: *Replaced by high level bridge in 1984*	MR 92	1963
141	Bridge: Guruchab River: Keetmanshoop - Aroab:	MR 27	1963
142	Bridge: Tsuwandes River: Outjo - Khorixas: *Widened in 1981*	MR 65	1963
143	Low Level Bridge: Cuvelai: Okatana: Oshakati - Ruacana: *Replaced by high level bridge in 1984*	MR 92	1963
144	Bridge: Stampriet River: Keetmanshoop - Aroab:	MR 27	1963
145	Bridge: Ugab River: Glücksburg: Outjo - Kalkfeld: *Bridge 226 was built instead in 1971*	MR 63:	No plans yet
146	Bridge: Omuramba Owambo: Tsumeb - Oshivelo:	TR 1/10	1967
147	Slab: Gareb River: Keetmanshoop - Aroab:	MR 27	1964
148	Bridge: Grunaub River: Keetmanshoop - Aroab:	MR 27	No plans yet
149	Culverts: Ch. 4,35 and Ch. 11,00: Mariental - Kalkrand:	TR 1/4	1962

Official Bridge Number	Site or Name of the Structure	Road Number	Year of Completion
150-154	Bridges: Ch. 64 (Aub River); Ch. 77,75; Ch. 489; Ch. 494 (Dabib River); Ch.793; Ch. 919: Mariental - Kalkrand:	TR 1/4	1962
155-160	Bridges: Ch. 892 (Rooidam River); Ch. 1490 (Nausgubeb River); Ch. 1692 (Tsumis River); Ch. 2103 (Omgubeb River); Ch. 2681 (Awasab River); Ch. 2753 (Swartskaap River):Kalkrand - Rehoboth:	TR 1/4	1963/64
162	Bridges: Ch. 253 (Aub River); Ch. 1408 & Ch. 1412 (Itzawisis 1 & 2): Keetmanshoop - Tses:	TR 1/3	1959
163	Bridge: Klein Windhoek River: Windhoek - Kapp's Farm:	TR 6/1	1961
164-168	Bridges: Ch. 748,70; Ch. 607,40; Ch. 480,6885 (R/R: Auaspoort); Ch. 328,288 (R/R: Kruin); Ch. 54,8231 (R/R: Aris): Windhoek - Rehoboth:	TR 1/5	1960
169	Bridge: Ch. 12: Access Road to Eros Airport: Windhoek:	MR 85	1960
170	Road over Rail Bridge: Otavi - Tsumeb:	TR 1/9	1961
171-181	Bridges: Ch. 236 (Leeu River); Ch. 483 & Ch. 496 (Waldau 1 & 2 Rivers); Ch. 870 (Ekararoe River); Ch. 938 (Ozombanda River); Ch. 1147 (Okaganga Riv.); Ch. 1272 (Onduombapa Riv.); Ch. 1293 (Otjikako River); Ch. 1321 (Otjitundu River); Ch. 1367 Okasise River); Ch. 2018 (Omusema River): Okahandja - Wilhelmstal:	TR 7/1	1963/64
182	Bridge: Farm Okakango: Okahandja - Otjiwarongo:	TR 1/7: See 382	1963
183	Bridge: Okateitei River: Okahandja - Otjiwarongo:	TR 1/7	1965
184	Culvert: Omuramba Outeniqua: Okahandja - Otjiwarongo:	TR 1/7	1963
185	Bridge: Omuramba Omatako: Okahandja - Otjiwarongo:	TR 1/7	1964
186	Bridge: Ehuameno River: Okahandja - Otjiwarongo:	TR 1/7	1963
187	Bridge: Ch. 3349,15: Okahandja - Otjiwarongo:	TR 1/7	1965
188	Bridge: Sukses Omuramba: Okahandja - Otjiwarongo:	TR 1/7	1965
189	Bridge: Black Nossob: Windhoek - Gobabis: *Widened in 1970*	TR 6/1	1964
190	Bridge: Swakop River: Swakopmund - Walvis Bay:	TR 2/1	1969
191	Bridge: Kalknaute River: Windhoek - Rehoboth:	TR 1/5	1963

Official Bridge Number	Site or Name of the Structure	Road Number	Year of Completion
192	Road over Rail Bridge: Otjiwarongo:	TR 1/8	1966
193	Bridge: Maltahöhe River:	MR 34	1964
194-195	Bridges: Dornfeld Rivers 1 & 2: Outjo - Khorixas: *Widened in 1981*	MR 65	1965
196	Bridge: Kuiseb River: Solitaire - Walvis Bay:	MR 36	1965
197-199	Bridges: R/R: Kapp's Farm; Auas Klip River; Bismarck River Windhoek - Seeis:	TR 6/1	1965
200	Could be duplicate bridge number:	TR 6/1	not found
201	Bridge: Okakango River: Okahandja - Otjiwarongo:	TR 1/7	1966
202	Bridge: Seeis River: Seeis - Gobabis:	TR 6/1	1966
203	Bridge: Erundu 2 River: Ombindi Karambi: Outjo - Kalkfeld:	MR 63	1966
204	Road over Rail Bridge: Usakos - Swakopmund:	TR 2/2	1965
205-213	Bridges: Ch. 156 (Wasser River); Ch. 353 (Kaffer River); Ch. 762 + 42; Ch. 861 + 33 (R/R); Ch. 906 + 146 (Tses River); Ch. 1101 (Springbokvlak River); Ch. 1997 (Diep River); Ch. 2007: Asab - Keetmanshoop:	TR 1/3	1965
214-216:	Bridges: Ch. 802 (Albrechts River); Ch. 918 (Joachims River); Ch. 1055 (Okakoara River) Wilhelmstal - Karibib:	TR 7/1	1965
217	Bridge: Arugab River: Karibib - Usakos:	TR 2/3	1966
218	Bridge: Kranzberg River: Karibib - Usakos:	TR 2/3	1966
219	Road over Rail Bridge: Karibib - Usakos:	TR 2/3	1966
220	Bridge: Omatjenne River: Otjiwarongo - Otavi:	TR 1/8	1966
221	Road over Rail Bridge: Osib: Otjiwarongo - Otavi:	TR 1/8	1966
222	Culverts: Kamanjab - Gröss Omaruru:	MR 76	1966/68
223	Bridge: Blydskap River: Kamanjab - Gröss Omaruru:	MR 76	1967
224	Bridge: Mooipoort River: Kamanjab - Gross Omaruru:	MR 76	1968
225	Bridge: Otjikuara River: Elisenore - Hochfeld:	MR 60	1973
226	Bridge: Ugab River: Outjo - Kalkfeld:	MR 63	1971
227	Low Level Bridge: Gaub River: Solitaire - Walvis Bay	MR 36	1966
228	Bridge: Ch. 239: Windhoek - Gamsberg:	MR 49	1966
229	Bridge: Aretaragas River: Windhoek - Gamsberg:	MR 49	1966

Official Bridge Number	Site or Name of the Structure	Road Number	Year of Completion
230-235	Bridges: Ch. 36 (Loskop River); Ch. 546; Ch. 775 (Etiro River); Ch. 867; Ch.947; Ch. 1233: Wilhelmstal - Omaruru:	TR 7/2	1967/68
236	Bridge: Nossob: Leonardville:	MR 41	1970
237	Bridge: Khan River: Wilhelmstal - Omaruru:	TR 7/2	1968
238	Bridge: Ch.1788: Waldhausen: Wilhelmstal - Omaruru:	TR 7/2	1968
239-249	Bridges: Ch. 207 (Skaap River); Ch. 715 (Huns River) Ch. 1177 (Warmbak River); Ch. 2569 (Guigatsis River); Ch. 2730 (Waterval River);Ch. 3159 (Dassie River); Ch. 3384 (Areb River); Ch. 3640 (Goibib River); Ch. 3875 (Noachabeb River); Ch. 5125 (Naob River); Ch. 5261 (R/R: Grünau): Keetmanshoop - Grünau:	TR 1/2	1966/67
250	Road over Rail Bridge: Swakopmund:	TR 2/2	1966
251	Road over Rail Bridge: Kupferberg Road: Windhoek:	MR 49	1970
252	Bridge: Kokasib River: Grootfontein - Rundu: *Widened in 1982*	TR 8/2	1967
253-255	3 Bridges: Friedental: Windhoek - Gamsberg	MR 49	1972
256	Bridge: Konkiep River: Helmeringhausen - Bethanien:	MR 31	1974
257	Bridge: Kainab River: Karasburg - Nakop:	TR 3/1	1967
258	Bridge: Hirabis River: Outjo - Kamanjab:	MR 67	1968
259	Road over Rail Bridge: Otjiwarongo - Outjo:	TR 2/5	1969
260	Bridge: Daweb River: Keetmanshoop - Aroab:	MR 27	1968
261	Strengthening of Swakop and Omaruru Bridges		1967
262-263	2 Bridges: Otjitazu: Otjiwarongo - Outjo:	TR 2/5	1968
264	Bridge: Hoffnungsfeld: Windhoek - Gamsberg:	MR 49	1969
265	Bridge: Lusthof: Outjo - Kamanjab:	MR 67	1968
266	Bridge: Gurumanas River: Windhoek - Gamsberg:	MR 49	1969
267	Bridge: Naos 2 River: Windhoek - Gamsberg:	MR 49	1971
268-269	2 Bridges: Huab River: Outjo - Kamanjab:	MR 67	1968/69
270	Bridge: Outjo River: Otjiwarongo - Outjo:	TR 2/5	1969

Official Bridge Number	Site or Name of the Structure	Road Number	Year of Completion
271	Bridge: Erundu River: Otjiwarongo - Kalkfeld:	TR 2/4	1970
272	Bridge: Yakandonga River: Otjiwarongo - Kalkfeld:	TR 2/4	1970
273	Bridge: Omaruru Townlands 2: Omaruru - Uis:	MR 64	1969
274	Bridge: Ehuiro River: Omaruru - Uis:	MR 64	1969
275	Bridge: White Nossob: TR 6/1 - Omitara:	MR 70	1970
276	Bridge: Black Nossob: Gobabis - Hochfeld:	MR 57	1971
277	Bridge: White Nossob: Seeis - Gobabis:	TR 6/1	1970
278-279	2 Road over Rail Bridges: Ch. 3824; Ch. 5243: Witvley - Gobabis:	TR 6/1	1970
280	Road over Rail Bridge: Hardap - Stampriet:	TR 5/1	1971
281	Bridge: Dabib River: TR 1/3 - Hardap Resort: *Bridge was overtopped during flood in February 1987*	MR 93	1971
282	Bridge: Farm Ostende Ch. 882: Omaruru - Uis:	MR 64	1970
283	Bridge: Farm San Remo Ch. 565: Otjiwarongo - Kalkfeld:	TR 2/4	1970
284	Bridge: Farm Lehmpütz Ch. 1914: Otjiwarongo - Kalkfeld:	TR 2/4	1971
285	Bridge: Donga River: Outjo - Kalkfeld:	MR 63	1972
286	Road over Rail Bridge: Keetmanshoop - Seeheim:	TR 4/1	1972
287	Bridge: Naos 1 River: Windhoek - Gamsberg:	MR 49	1971
288	Bridge: Guigatsis River: TR 1/2 - Tränental:	MR 26	1971
289-292	Bridges: Arebbusch River; Ch. 247; Aretaragas River; Augeigas River: Windhoek - Keres:	MR 52	1971
293	Low Level Bridge: Omuramba Omatako: Osire:	MR 57	1972
294	Bridge: Gamkab River: Ch. 5797 + 10: Grünau - Vioolsdrift:	TR 1/1	1968
295-305	Bridges: Naute River; Gobas River; Eppenau River; Fish River; Tschaunaup River; Naiams 1 River; Naiams 2 River; Kauas River; Koresib River; Guanam River; Guriep River: Keetmanshoop - Goageb:	TR 4/1	1972/74
306	Bridge: Kubub River: Goageb - Bethanien:	MR 31	1972
307	Road over Road Bridge: Keetmanshoop:	TR 1/3	1972
308	Road over Rail Bridge: Keetmanshoop:	MR 88	1973
309	Bridge: Tsondab 2 River: Solitaire - Maltahöhe:	TR 14/2	1973

Official Bridge Number	Site or Name of the Structure	Road Number	Year of Completion
310	Subway Bridge: Hardap Siding: Hardap - Stampriet:	TR 5/1	1970
311	Bridge: Tsondab 1 River: Solitaire - Maltahöhe:	TR 14/2	1972
312-314	Bridges: Kalkfeld River; Lichtenau 1 and 2 Rivers Kalkfeld - Omaruru:	TR 2/4	1971/73
315	Bridge: Ch. 6417: Grünau - Vioolsdrift:	TR 1/1	1968
316	Bridge: Ch. 8561: Grünau - Vioolsdrift:	TR 1/1	1969
317	Bridge: Hutup River: Maltahöhe:	DR 804	1978
318	Bridge: Bedelaardrif River: Kalkrand - Rehoboth:	TR 1/4	1964
319	Bridge: Haigamas River: Windhoek - Rehoboth:	TR 1/5	1961
320	Bridge: Kuduschlucht River: Windhoek - Rehoboth:	TR 1/5	1961
321	Bridge: Aris River: Windhoek - Rehoboth:	TR 1/5	1961
322	Bridge: Swartsand River: Windhoek - Rehoboth:	TR 1/5	1954
323	Road under Rail Bridge: Kruin: Windhoek - Rehoboth:	TR 1/5	1960
324	Culvert: Ch. 1493: Windhoek - Okahandja:	TR 1/6	1960
325	Road over Rail Bridge: Ch. 119: Tsumeb - Oshivelo:	TR 1/10	1968
326	Bridge: Ch. 3440: Tsumeb - Oshivelo:	TR 1/10	1967
327	Road over Road Bridge: Walvis Bay:	TR 2/1	1969
328-335	Bridges: Karibib Grade Separation; Karibib Road over Rail; Affenberg River; Khan River; Ondera River; Ongaka River; Etiro Riv.; Okomumbande Riv.: Karibib - Omaruru:	TR 2/3	1974
336	Road over Rail Bridge: Omaruru - Kalkfeld:	TR 2/4	1973
337	Road over Rail Bridge: Omaruru - Uis:	MR 64	1973
338-343	Bridges: Ch. 104 (Kakombo River); Ch. 693 (Okandjou River); Ch. 1367 (Kohero River); Ch. 1478 (Kohero River); Ch. 1592 (Goede Hoop River);Ch. 1693 (Okombahe River): Omaruru - Uis:	MR 64	1973
344-349	Bridges: Konkiep 1 River; Konkiep 2 River; Samevloei; Helme 1 River; Helme 2 River; Helme 3 River: Maltahöhe - Bethanien:	MR 31	1973/74
350	Road over Rail Bridge: Karasburg:	MR 21	1973
351	Dual Bridge: Arebbusch River: Windhoek:	MR 49	1970
352	Bridge: Fish River: Mariental - Maltahöhe:	MR 34	1975
353	Road over Rail Bridge: Int.Airport Windhoek:	MR 81	1965

Official Bridge Number	Site or Name of the Structure	Road Number	Year of Completion
354-358	Bridges: Ch. 8; 1120 + 75; Ch. 1556 + 50; Ch. 1738 + 50; Ch. 2347: Kamanjab - Ruacana:	MR 67	1970
359-370	Bridges: Ch. 297 + 38; Ch. 672; Ch. 987; Ch. 1117; Ch. 1310; Ch. 1340 + 50; Ch. 1396; Ch.7 + 75; Ch. 488; Ch. 1419; Ch. 1522; Ch. 1776: MR 67 - Sesfontein:	FR 3223	Not built
371-377	Bridges: Ch. 5238 (Cuvelai River); Km 29,7 (Oshikuku River); Km 69,0 (Ombafi River); 76,5 (Ondokoro River); Olushana Crossing; Canal Crossing; Ch.1683: Oshakati - Ruacana: *Structures 372 to 374 widened and strengthened 1968. All structures replaced between 1981 and 1984 by new bridges*	MR 92	1967
378	Bridge: Omuramba River: Otavi - Grootfontein:	TR 8/1	1971
379	Road over Rail Bridge: Otavi - Grootfontein:	TR 8/1	1971
380	2 Bridges: Fish River: Nomtsas: Solitaire - Maltahöhe:	TR 14/2	1977
381	Road over Rail Bridge: Goageb: (Old TR 4/1)	DR 459	1974
382	See 182: Possibly duplicate bridge number:	TR 1/7	1963
383	Bridge: Ugab River: Otjiwarongo - Outjo:	TR 2/5	1969
384-386	Bridges: Ch. 763; Ch. 844 (Kochena River); Km 43,300 (Naus River): TR 1/2 - Tränental:	MR 26	1973
387-394	Bridges: Ch. 1935; Ch. 1945; Km 0,20; Km 4,70; Km 13,44; Km 14,48; Km 15,48; Km 19,44: Omaruru - Uis:	MR 64	1974/75
395	Bridge: White Nossob: Kapp's Farm - Steinhausen:	MR 53	1974
396	Bridge: Blässkranz: Solitaire - Maltahöhe:	TR 14/2	1976
397	Bridge: Black Nossop: Kapp's Farm - Steinhausen:	MR 53	1974
398	Bridge: Kleine River: Omitara - Otjinene:	MR 70	1974
399	Bridge: Black Nossob: Omitara - Otjinene:	MR 70	1974
400	Overpass Bridge: Karibib Western By-pass:	TR 7/1A	not built
401	Bridge: Okombahe: Omaruru - Uis:	MR 64	1974
402-403	2 Bridges: Weissenfels: Windhoek - Gamsberg:	MR 49	1972
404-406	Bridges: Kaoab River; Tsub 1 and 2 Rivers: Voigtsgrund Mariental - Maltahöhe:	MR 34	1979
407	Bridge: Lewer River: Mariental - Maltahöhe:	MR 34	1977

Official Bridge Number	Site or Name of the Structure	Road Number	Year of Completion
408	Bridge: Keitsam River: Mariental - Maltahöhe:	MR 34	1977
409	Interchange Bridge: M.Christo: Windhoek Western Link:	TR 1/6	1976
410	Interchange Bridge: Brakwater: Windhoek Western Link:	TR 1/6	1976
411	Road over Road and Rail Bridge: Arandis:	TR 2/2	1975
412	Bridge: Auob River: Stampriet - Aranos:	MR 61	1976
413	Bridge: Nossob River: Stampriet - Aranos:	MR 61	1976
414	Bridge: Hatsamas River: Voigtland - Dordabis:	TR 15/1	1977
415	Bridge: Kuiseb River: Haris - Walvis Bay:	DR 1982	1977
416	Bridge: Gomab River: Haris - Walvis Bay:	DR 1982	1977
417	Bridge: Kalkofen River: Mariental - Maltahöhe:	MR 34	1980
418	Bridge: Nabaseb River: Solitaire - Maltahöhe:	TR 14/2	1976
419	Bridge: Hom River: Karasburg - Vioolsdrift:	MR 22	1976
420-423	Bridges: Narob River; Chuchab River; Kaichab River; Kabas River: Solitaire - Maltahöhe:	TR 14/2	1976
424	Road over Rail Bridge: Grootfontein Airport:	MR 96	1976
425	Interchange Bridge: Katutura: Windhoek Western Link:	TR 1/6	1979
426	Bridge: Km 8,88: Rehoboth Northern Bypass:	MR 46	1979
427	Bridge: Kalknaute Riv.: Rehoboth Northern Bypass:	MR 46	1979
428	Low Level Bridge: Usib River: Rehoboth - Uhlenhorst:	MR 46	1979
429-430	Rail over Road Bridges: Lafrenz Townsh.: Windhoek:		not built
431-433	Bridges: Kais River; Bak River; Kainab River: Karasburg - Aroab:	MR 25	1978/79
434	Bridge: Naute River: Keetmanshoop - Aroab:	TR 13/1	not built
435	Bridge: Omaruru River: Henties Bay:	MR 44	1980
436	Road over Rail: Okahandja Internal By-pass:	TR 7/1: D2	1980
437-441	Bridges: Ongombeomuriru River; Weiss River; Kietz River; Achtzehner River; Waldau River: Okahandja - Gross Barmen:	MR 87	1978
442	Bridge: Fish River: Tses - Berseba:	MR 98	1979

Official Bridge Number	Site or Name of the Structure	Road Number	Year of Completion
443-448	Interchange Structures: Pietersen St.; Hospital St; Zwarts St.; Bach St; Bridges: Gammams River; Arebbusch River; Interchange Structure: MR 52: Windhoek Western Link	TR 1/6: D1	1981
449-453	5 Bridges: Tses - Berseba:	MR 98	1979
454	Bridge: Hutup River: Maltahöhe - Bethanien:	MR 31	1982
455	Road over Rail Bridge: Arandis Access Road		1980
456	Bridge: Auros River: Kalkrand - Maltahöhe:	MR 38	1983
457	Culvert: Blouputs River: Kalkrand - Maltahöhe:	MR 38	1981
458	Bridge: Packriem River: Kalkrand - Maltahöhe:	MR 38	1982
459	Bridge: Haris River: Haris - Walvis Bay:	DR 1982	1982
460	Bridge: Kaoab River: Kalkrand - Maltahöhe:	MR 38	1981
461	Bridge: Schlip River: Kalkrand - Rietoog:	DR 1254	1988
462	Bridge: Kalf River: Kalkrand - Rietoog:	DR 1254	1987
463-481	Bridges: Km 37,7; Km 40,5; Km 50,7; Km 57,01; Km 61,10; Km 102,20; Km 110,00; Km 115,20; Km 116,90; Km 121,40; Km 124,80; Km 126,00; Km 134,70; Km 138,90; Km 145,00; Km 149,60; Km 153,80; Km 154,60; Km 154,90: Kalkrand - Rietoog:	DR 1254	not built
482	Bridge: Rietoog River: Klein Aub - Nabaseb:	DR 1261	1981
483	Bridge: Kam River: Klein Aub - Nabaseb:	DR 1261	1981
484	Bridge: Holoog River: Seeheim - Grünau:	MR 28	not built
485	Bridge: Okavango River: Bagani: Rundu - Katima Mulilo:	TR 8/4	1977
486	Super Arch Pipes: Kwando River: Rundu - Katima Mulilo:	TR 8/5	1976
487	Bridge: Chobe River: Ngoma: Botswana Border:	TR 8/7	* not known
488	Culvert: Man Se Dam: Rehoboth - Klein Aub:	MR 47	1981
489	Culvert: Farm Nomtsas: Solitaire - Maltahöhe:	TR 14/2	1982
490	Culvert: Klein Packriem River: Kalkrand - Maltahöhe:	MR 38	1982
491	Culvert Battery: Haseweb River: Maltahöhe - Bethanien:	MR 31	1983
492	Culvert Battery: Tses - Berseba:	MR 98	1979

Official Bridge Number	Site or Name of the Structure	Road Number	Year of Completion
493	Culvert: Omuramba Omatako: Rundu - Katima Mulilo:	TR 8/4	1987
494	Culvert: Oas River: Kalkrand - Schlip:	DR 1254	1986
495	Culvert: Ommamas River: Kalkrand - Schlip:	DR 1254	1987
496	Culvert: Nagenoeg River: Kalkrand - Schlip:	DR 1254	not built
497-499	Culverts: Auros East River; Voigts Kub 1; Voigts Kub 2: Kalkrand - Maltahöhe:	MR 38	1983
500	Super Arch Pipes: Neu Heusis: Windhoek - Anschluss:	MR 52	1977
501	Super Arch Pipes: Heusis River: Windhoek - Anschluss: *Washed away in 1984; were replaced by Bridge 1984*	MR 52	1976
502	Bridge: Opuwa River: MR 67 - Opuwa:	MR 100	not built
503	Culvert: Tsuwandes: Km 49,44: Outjo - Khorixas:	MR 65	1983
504	Bridge: Koam River: Haris - Walvis Bay:	DR 1982	no plans yet
505	Road over Rail Bridge: Windhoek Western Link:	TR 1/6: D1	1988
506	Bridge: Arebbusch River: Windhoek Western Link:	TR 1/6: D1	1988
507	Bridge: Charles Marais Ext.: Windhoek Western Link:	TR1/6	not built
508	Bridge: Zambezi River: Katima Mulilo - Sesheke/Zambia:		no plans yet
509	Bridge: Us River: Haris - Walvis Bay:	DR 1982:	no plans yet
510	not allocated		
511	Bridge: Omuverume R.: Okosongomingo - Waterberg:	DR 2512	not built
512	2 Bridges: Konkiep River: Goageb - Aus:	TR 4/1	not built
513	Bridge: Kuibis River: Goageb - Aus:	TR 4/1	not built
514	Bridge: Bree River: Goageb - Aus:	TR 4/1	not built

Source: Master list of all major structures on the Namibian roads system, as kept by the Bridge Engineer of the Department of Transport and personal records of the author of this publication, who was personally involved in the design and construction of a considerable fraction of all Namibian road structures from 1965 to 31 August 1987

Date of Survey: 31 August 1987

Note: If an 'Old' road is indicated the structure is replaced in the meantime by a new one on a new alignment

Ch.: Foot Chainage (1 chainage = 100 feet)

R/R: Road over Rail Bridge resp.Rail over Road Bridge

* The steel truss bridge over the Chobe River on the border between the East Caprivi/Namibia and Botswana was built by the authorities of British Betchuanaland before 1965. All efforts of the author to locate the files in Pretoria or Gaborone have failed so far.

Appendix Table 5:

Namibia: Road Network by Road Categories (km)

Year: Road Type	1953	1973	1986	1953-73	1973-86
Trunk Roads	3.008	3.600	4.040	+592	+440
Main Roads	7.312	9.248	8.936	+1.936	-312
District Roads	14.336	19.627	28.596	+5.291	+8.969
Sub-total	24.656	32.475	41.572	+7.819	+9.097
Farm Roads	24.432	25.408	22.058	+976	-3.350
Grand Total	49.088	57.883	63.630	+8.795	+5.747

Source:

a) Odendaal's Report, Windhoek 1964, Table CXX, p.373
b) South West Africa Survey, Windhoek, 1964
c) UN/ECA: Transport Survey for Namibia, Addis Ababa, 1981, p.20
d) Statistics: Databank File 'SUMRY3':
Department of Transport: Namibia: September 1986. Statistics include Walvis Bay with a total of 86,21 km of main roads according to the roads classification of the Province of the Cape of the Good Hope/South Africa

Appendix Table 6:

Namibia: The Distribution of various Road Types 1979 (km)

	Road Type Name of Area a)	Trunk Roads	Main Roads	District Roads	Other Roads	Total
1.	Kaokoland (1,2)	-	140	125	2.400	2.665
2.	Kavango (1,2)	-	130	460	2.050	2.640
3.	Hereroland (1,2,3)	-	12	740	2.552	3.304
4.	Ovamboland	210	265	460	2.735	3.670
5.	Bushmenland	-	-	195	338	533
6.	Damaraland	25	290	940	1.009	2.264
7.	Caprivi	-	-	105	225	330
8.	Rehoboth	130	54	521	73	778
9.	Namaland b)	155	101	607	339	1.202
10.	Sub-total	520	992	4.153	11.721	17.386
11.	Per cent	2,9	5,7	23,9	67,5	100
12.	Modern Sect. c)	1.839	6.273	16.584	4.526	29.222
13.	Per cent	6,2	21,5	56,8	15,5	100
14.	Grand Total	2.359	7.265	20.737	16.247	46.608
15.	Per cent	4,9	15,5	44,9	34,7	100

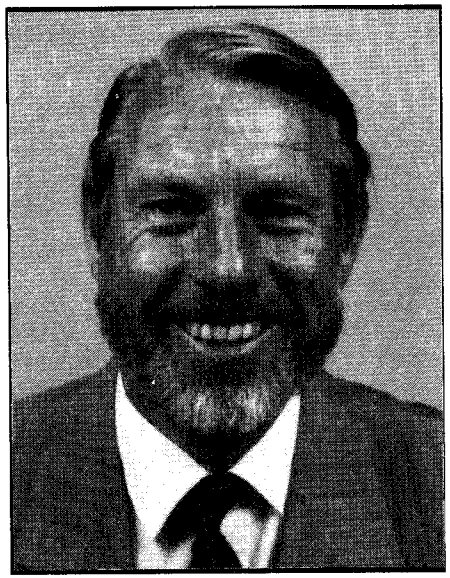
Source:

Economic Commission for Africa: TRANSPORT SURVEY FOR NAMIBIA, Addis Ababa, Nam/79/005, 1981, p.20

Nota:

a) The first three 'homelands' are divided into zones, whose numbers are bracketed.
b) Includes parts of the 'white' districts of Mariental and Bethanien, altogether with their respective road network portions.
c) Consists of 16 'white' districts and Walvis Bay

The Author



Klaus Dierks is a Namibian citizen. He studied civil engineering and history at Berlin Technical University. He has always been interested in history and archaeology and has visited nearly all major archaeological sites in the world. As roads engineer in the Namibian Department of Transport he gained a thorough knowledge of all parts of Namibia, especially its roads network. During research work for his doctoral thesis (Ph.D.) on the development of a roads system for an independent Namibia he discovered the ancient ruined settlement of //Khauxa!nas. He has published several studies on transport issues in Namibia, especially railways and roads, and of the rediscovery of //Khauxa!nas. Due to his commitment to the independence struggle for Namibia and the unique transport problems which were used by South Africa to create a "noose of lifeline" transport situation for Namibia, he was forced by the Interim Government of 1985-1989 to resign after 22 years of service in the Department of Transport. Dierks subsequently established his own consulting engineering firm, Namibia Consult Incorporated, which specialised in developing "Namibia Appropriate Technologies" involving a new approach to civil engineering to serve the interests of the Namibian people in the post-colonial era. With Namibia's independence in March 1990, Dierks was appointed Deputy Minister for Works, Transport and Communication in the first independent Namibian Government. He is Member of the first Namibian Parliament. In 1992 , Dierks obtained a Ph.D,-degree in engineering (Dr.-Ing.) at the Technical University Berlin (Topic: Technical Aspects for Appropriate Low-VolumeRoads in Namibia).

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