

GERMAN CONTRIBUTIONS TO THE CARTOGRAPHY OF SOUTH WEST AND EAST AFRICA FROM MID 19th CENTURY TO WORLD WAR I

Demhardt, I.J.

University of Technology Darmstadt. Department of Geography,
Schnittspahn Str. 9, 64287 Darmstadt. E-mail: demhardt@geographie.tu-darmstadt.de

ABSTRACT

The colonial division rendered the decisive boost to the application of scientific reconnaissance methods on the exploration of the African continent. Within only two generations the hitherto unknown hinterland was covered by a steadily tighter knitted net of geodetic and topographic data woven by pioneering explorers and later more specialised researchers. The paper deals with the German contributions to this process by examining the in approach and cartographic result most different examples of the two protectorates Deutsch-Südwestafrika (Namibia) and Deutsch-Ostafrika (Tanzania). Due to an early advance of route traverse mapping already in the first half of the 19th century the area was fairly sufficiently mapped when Deutsch-Südwestafrika was established. As a consequence cartography hibernated to some degree until the Herero and Nama uprisings 1904 sparked off a full turn around with major efforts aiming at various map series from 1:25 000 to 1:400 000. Although geodetic highly innovative – e.g. the first implementation of Gauss-Krüger co-ordinates in German mapping – the lately tackled task of topographical field work left this most important imperial colony without any completed reliable map series at the outbreak of the war in 1914. Contrary Deutsch-Ostafrika lacked the abundance of criss-cross pre-colonial route traverses to build on. But exactly this short-comings triggered immediate and thorough efforts to survey that difficult terrain with its unhealthy tropical climate, thick bushes, high mountains and often hostile population. By World War I the protectorate not only had a complete topographical map series in 1:300 000 but also a number of well covered regions like the Kilimanjaro massif with the first large scale stereo-photogrammetry of an African mountain area exercised in 1912.

The ‘scramble for Africa’ in the second half of the 19th century coincided with the application of scientific methods of reconnaissance as e.g. route traverses, plane tabling and photogrammetry onto the exploration of the continent. Within only two generations the hitherto completely unknown hinterland of the coastal merchant factories was covered by a steadily tighter net of geodetic and topographic data. It was woven by a fraternity of European explorers and following more specialised researchers who regarded it as their prime task to chart the remaining white dots of the interior. Among these pioneers – adored newspaper heroes of their time – were a lot of German and Austrian travellers of fame (Fig. 1) as to name but a few: HEINRICH BARTH (Central Sahara and Sudan 1850-55), GUSTAV NACHTIGAL (Eastern Sahara 1869-74), HERMANN WISSMANN (Central Africa 1881-87) and LUDWIG VON HÖHNEL (East Africa 1886-89).

Not the least contribution to that fame were state of the art maps constructed and drawn by the Gotha based publishing house ‘Justus Perthes Geographische Anstalt’. Here AUGUST PETERMANN and his journal ‘Petermanns Geographische Mitteilungen’ from the 1850s to the 1870s functioned through its innovative construction and drawing of maps as the hub of overseas ‘explorative cartography’. But these merry years of competing yet cosmopolitan research ended with the colonial division of Africa following the Berlin Congo Conference (1884-85). Thereafter the lead in the emerging German colonial cartography changed over to the semi-official ‘Kolonialkartographisches Institut’ in Berlin under the joint lead of PAUL SPRIGADE and MAX MOISEL [1]. This watershed in African exploration and cartography creating exclusive research areas was defended by RICHARD KIEPERT, another famous contemporary German cartographer: “It was unavoidable that , in the process of dividing the huge land-mass of Africa between seven European powers, the English and the French traveller disappeared from German colonies like the German vanished from the landscapes which had fallen under the sovereignty of England, France, Belgium, Italy, Spain or Portugal” [2].

While one tends to expect that the Germans, being notorious for efficiency, would have applied this habit as well to the cartography of the newly acquired African protectorates the development of geographical research and its reflection in official and private maps of the German colonies were surprisingly not homogeneous. The paper highlights the stunningly different approaches and results by introducing some map examples from the most adversely developing African dependencies Deutsch-Südwestafrika (Namibia) and Deutsch-Ostafrika (Tanzania, Ruanda and Burundi).

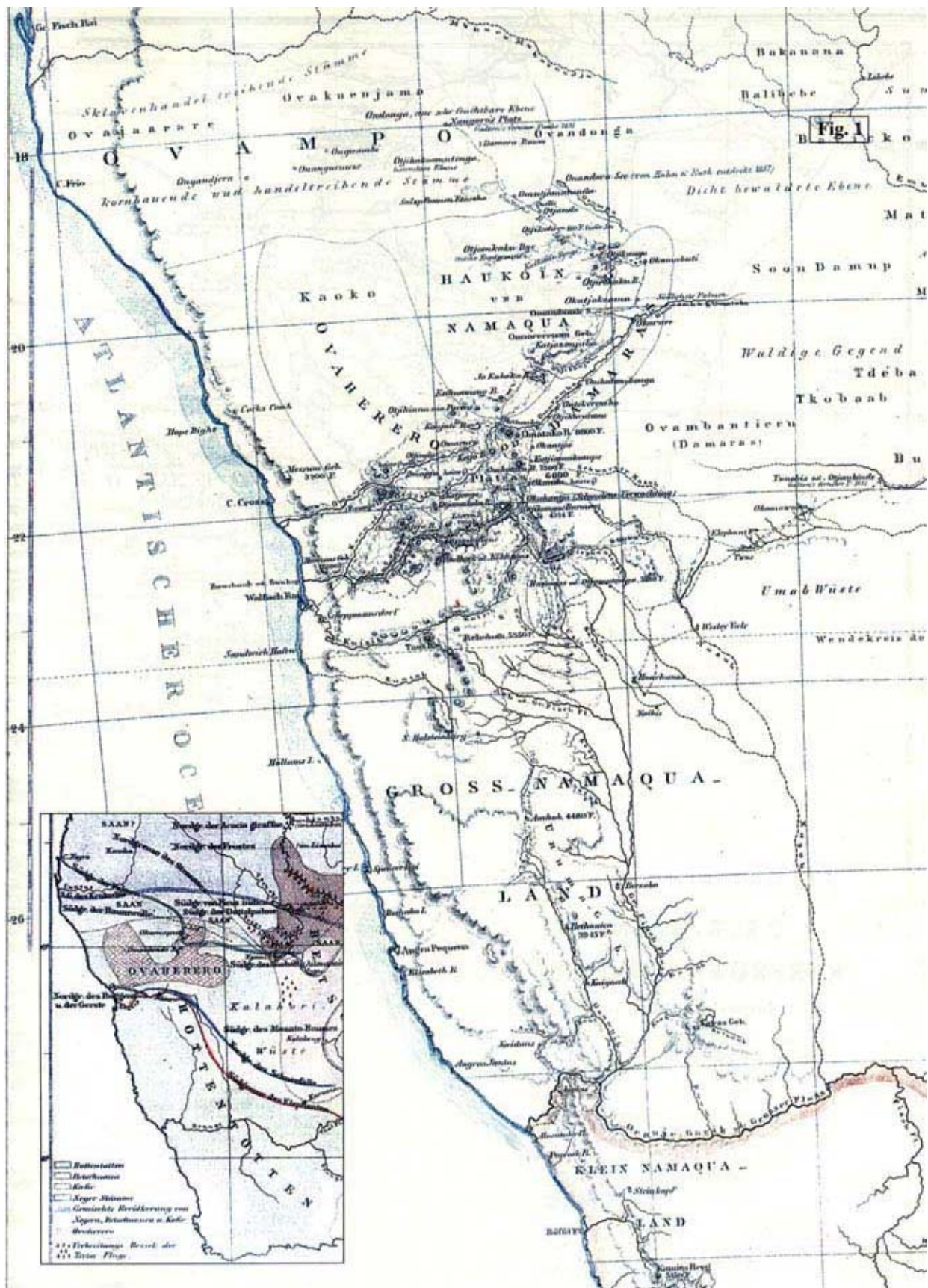


Figure 2. Excerpt of the 'Karte von Süd-Afrika zur Übersicht der neuesten Entdeckungen von Livingstone, Moffat, Galton, Anderson, Bains' and other explorers (1:6,3 million) drawn by AUGUST PETERMANN with an inserted sketch map showing botanical, zoological and ethnographical boundaries within Southern Africa

[SOURCE: Petermanns Geographische Mitteilungen, Vol. 4 (1858), Tafel 7]

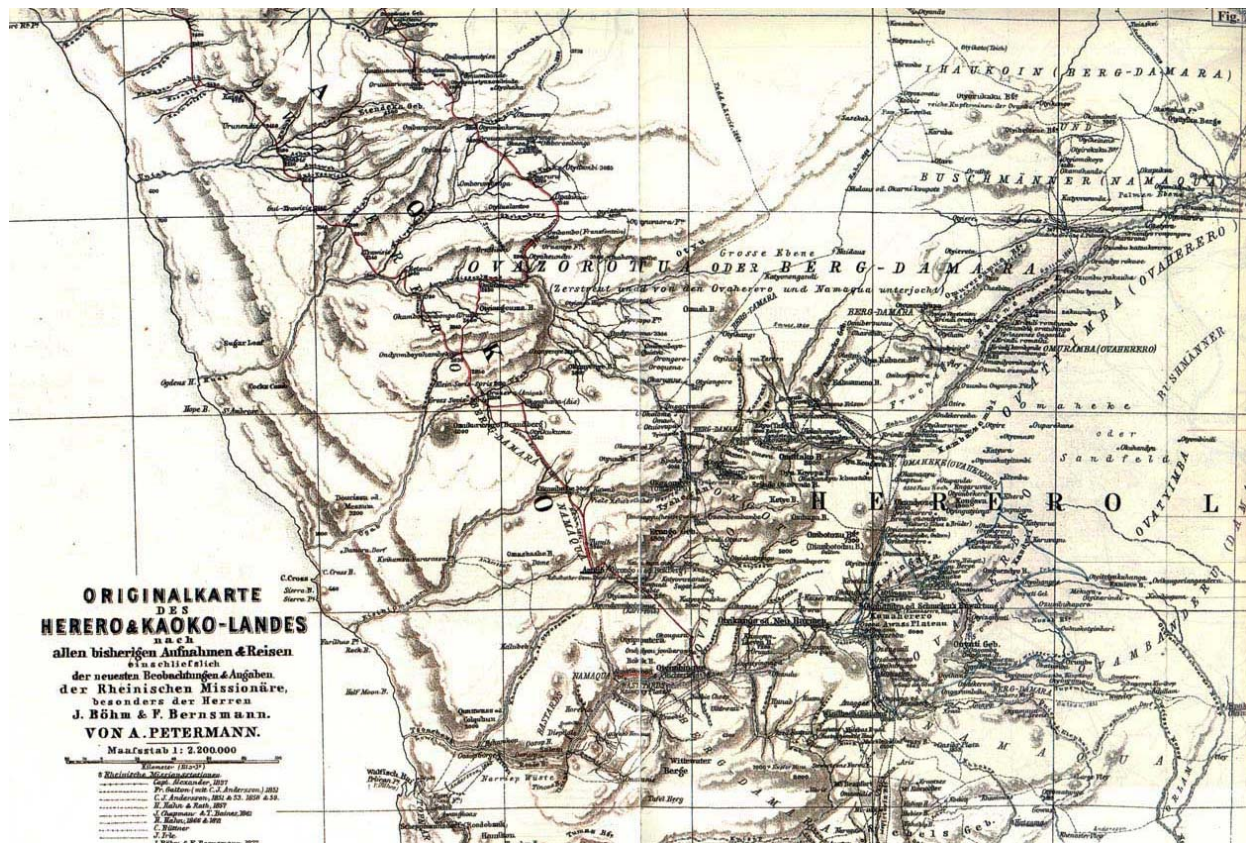


Figure 3. Excerpt of the ‘Originalkarte des Herero & Kaoko-Landes’ (1:2,2 million)
[SOURCE: Petermanns Geographische Mitteilungen, Vol. 24 (1878), Tafel 17]

While pre-colonial cartography enjoyed a wide general knowledge it lacked topographical detail. Since its results satisfied the ordinary needs for spatial orientation of a small trading and farming early colonial community surveying and mapping didn’t receive a boost by the establishment of German colonial rule over Deutsch-Südwestafrika in 1884 [3]. A generation later SPRIGADE and MOISEL excused this by hinting towards the arid character of the protectorate: “*Topographical detail was a secondary matter; it was more important to know the general direction and the number of riding hours to the next waterhole.*” Because the colony’s surface in its general features were already known – and no big lake or mountain still to be discovered attracting adventurous travellers – as a consequence surveying and mapping went to some degree into hibernation until the Herero and Nama uprisings in 1904 exposed Deutsch-Südwestafrika as a stepchild of German colonial cartography and sparked off a full turn around.

The guerrilla warfare out in the bush caught the Schutztruppe (colonial army) and its reinforcements shipped in from Germany by surprise and cartographically unprepared with only a few medium-scaled and yet fairly accurate regional reconnaissance sketch-maps of the battle fields. This lack of topographical knowledge added considerably to the loss of live and equipment in the four years long campaign against the insurgent natives. In this crisis the Imperial Great General Staff in Berlin was forced to act: In the first instance it commissioned the so-called ‘Kriegskarte’ (War Map) 1:800 000 in 8 sheets compiled and drawn in day and night shifts from all material at hand within only seven weeks. Because this quick-shot inevitably proved incorrect and insufficient in many ways in the second instance the General Staff seized for its subsidiary ‘Preussische Landesaufnahme’ (Prussian Land Survey) the control over future cartography of the protectorate from the chronically understaffed and niggardly funded civilian colonial authorities [4].

The ‘Preussische Landesaufnahme’ still in 1904 dispatched a ‘Feldvermessungstrupp’ (Field Survey Corps) initially staffed with seven intelligence officers and their staff consisting of a Trigonometrical as well as a Topographical Section. Within the next decade up to World War I the Trigonometrical Section provided in the central and southern parts of the protectorate numerous triangulation sequences. Additional chains were provided by private surveyors as e.g. by the Otavi railway line from Swakopmund to the copper mines of Tsumeb and the cadastral surveys with each given out farm. Therefore at the outbreak of the Great War all parts important to the colonial economy were covered by a grid of high-quality triangulations and subsequent clusters of cadastral surveys of a lower order in the main farming and mining areas [5]. Although highly innovative – e.g. the first implementation of Gauss-Krüger co-ordinates in German mapping – the contemporary geographer FRITZ JAEGER expressed the concern of the ordinary map user: “*This mathematical skeleton often lacks a topographical content*” [6].

Because the Topographical Section, on the other hand, got off the mark much slower and their first approach to provide the much needed filler for the trigonometric set of data was stubbornly diligent as if working somewhere in the much smaller midlands and plains of northern Germany. Contrary to all other German protectorates in Africa it was decided that not the usual and rapidly to achieve route traverses should form the topographical backbone but rather the much more accurate yet also much more time consuming plane tabling and alidade in the scale 1:50 000. As foreseeable the extent of both the protectorate and the task proved too daunting for the tiny Topographical Section and by 1908 only four sheets (sic!) of the Windhoek area were completed and published [7]. Therefore SPRIGADE and MOISEL critically assessed: “Practice has shown that the completion of such a series with the means available for such purposes in terms of the general financial situation of the protectorate would take centuries. In addition detailed surveys of vast areas with no economic future seem purposeless at present. Under these circumstances surveying methods were modified to fit the local situation and a scale of 1:100 000 was adopted” [8].

The conclusion drawn from this veritable fiasco was to abandon the ill-fated series 1:50 000 for so-called croquis with only sketched land surface in terms of valley and crest lines into which form-lines instead of isohypses were inserted in a monochrome series 1:100 000. Unfortunately even base maps of this scale still proved to be much too detailed for the vast extent of the protectorate and the small staff available. As some sort of déjà-vu by 1913 again only 14 sheets of the surroundings of Windhoek, Okahandja and Karibib out of projected 673 sheets of this series were readily compiled, drawn and published (Fig. 4).

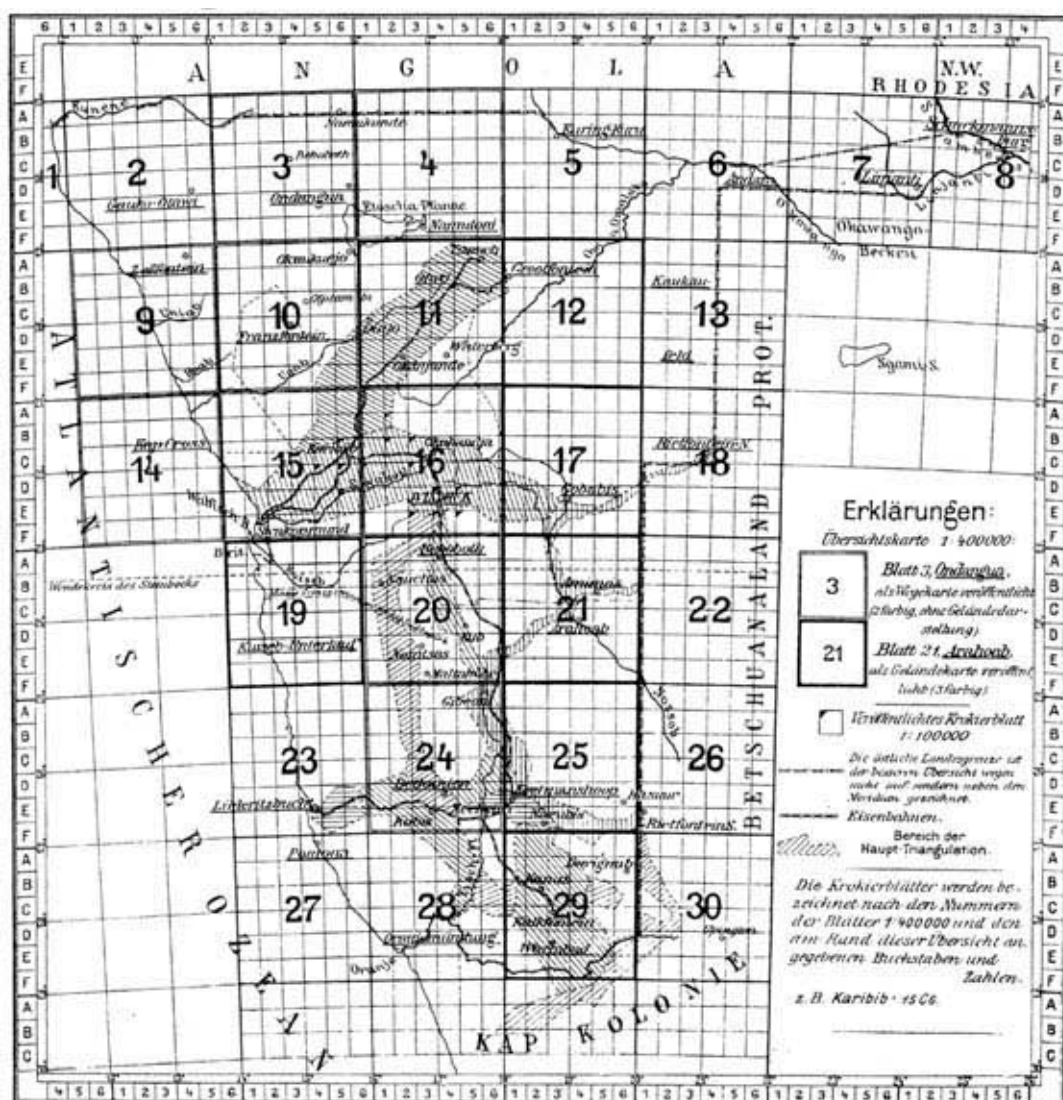


Figure 4. Index sheet indicating the divisions of the official map series 1:400 000 ('Übersichtskarte von Deutsch-Südwestafrika') and 1:100 000 ('Krokierblätter', only a few sheets published around Windhoek and Karibib marked by a black triangle) and an indication to the main triangulation chains

[SOURCE: Hugo Marquardsen (1915): Die Kolonialkartensammlung des Reichs-Kolonialamts, in: Mitteilungen aus den Deutschen Schutzgebieten, Vol. 28 (Enclosure to Issue 2), Tafel III]

However, the prosperous commercial farmland in the highlands, already subdivided in great detail into farms, other small property and concession titles, demanded urgently medium-scaled maps to provide general economic, administrative and cadastral information and, quite simply, to depict the character of the land surface. This gap ought to be filled by a series of 'Farm-Übersichtskarten' (Farm Survey Maps) 1:200 000 ventured at district level throughout by the Imperial Land Survey of the protectorate's administration in Windhoek which the Imperial Great General Staff and its 'Preussische Landesaufnahme' had pushed aside from the general tasks of surveying and mapping. But sadly until 1914 again only two of these aesthetically quite pleasing sheets appeared on parts of the districts Gibeon-Maltahöhe and Windhoek-Karibib (Fig. 5) [9].

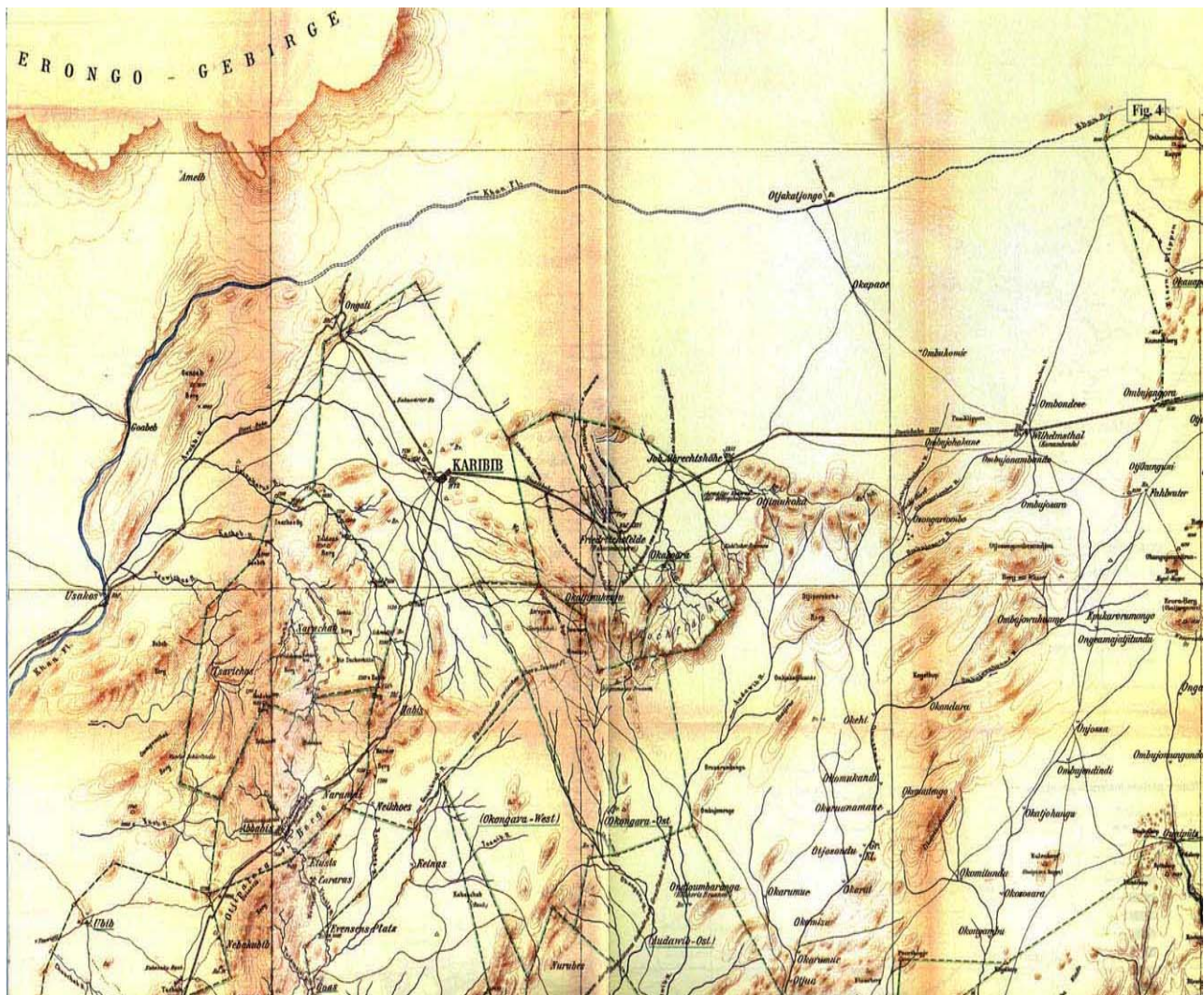


Figure 5. Excerpt of the 'Farm-Übersichtskarte von Teilen der Bezirke Windhuk und Karibib' (1:200 000)
[SOURCE: Mitteilungen aus den Deutschen Schutzgebieten, Vol. 19 (1906), Karte 3]

The final attempt to push through with a complete map series was the decision to assign the 'Feldvermessungstrupp' (Field Survey Corps) with a comprehensive but provisionally thought series 1:400 000 called 'Übersichtskarte' (Survey Map) – later to be replaced by an envisaged but never begun final series 1:200 000 – emphasising the relief with partial hatching and form-lines. It was not without irony that this series aimed at 30 sheets initially was based on a mere enlargement of the hastily compiled 'Kriegskarte' (War Map) 1:800 000 onto which newly available material simply was transferred. Only were subsequent surveys rendered its geodetic base and topographical knowledge obsolete the particular sheet saw a complete revision [10]. Therefore the cartography of this series looked somewhat rough but nevertheless contained everything important for most of the map users: relief indication by elevation lines and sometimes even hatching, traffic informations, rural settlements and all features of colonial economic value as to water, grazing and farm boundaries. However, as the fate with all series since the quick-shot 'Kriegskarte' (War Map) in 1904 this series too got only 16 sheets printed up to the end of 1913 [11] whereby the peripheral sheets of the far north (Fig. 6) exposed most clearly their rough and provisional nature.

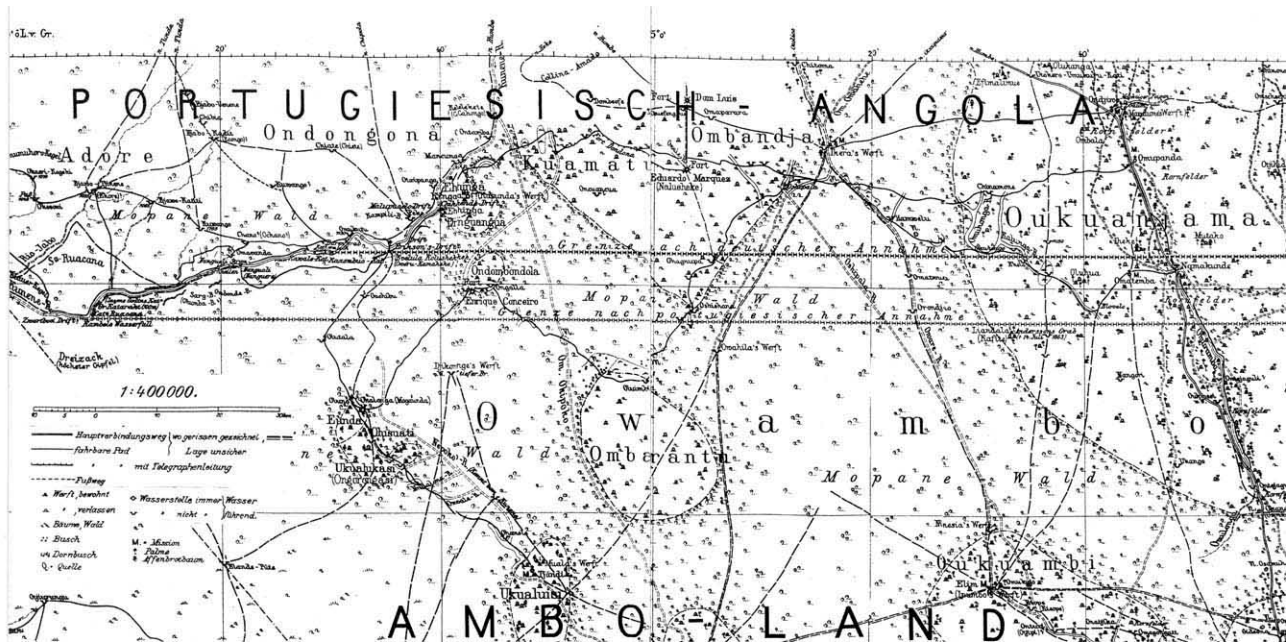


Figure 6. Excerpt of sheet 5 Rehoboth (Amboland) of the official 'Übersichtskarte von Deutsch-Südwestafrika' (1:400 000, provisional edition 1912) showing the disputed German-Portuguese border through the densely populated Ovambo-land [SOURCE: National Archives of Namibia, Map Collection, Map No. 677]

Given all the trouble with the topographic reconnaissance it does not take wonder that thematic cartography was neglected except for uncomplicated small-scale textbook sketch maps. One outstanding exception is the rainfall map by EMIL OTTWEILER of 1907 (Fig. 7). Its surprisingly correct pattern even gains in appreciation knowing that it is based on only about a hundred observation stations with rarely more than ten years of observation [12]. However, due to the belatedly tackled immense task, the sketched misjudgements and inadequacies of the responsible authorities Deutsch-Südwestafrika at the outbreak of the Great War was the only German protectorate with no completed topographical series – except for the notoriously not trustworthy 'Kriegskarte' (War Map) 1:800 000 – but four seemingly eternal works in progress represented by the series 1:50 000, 1:100 000, 1:200 000 and 1:400 000 still far from completion.

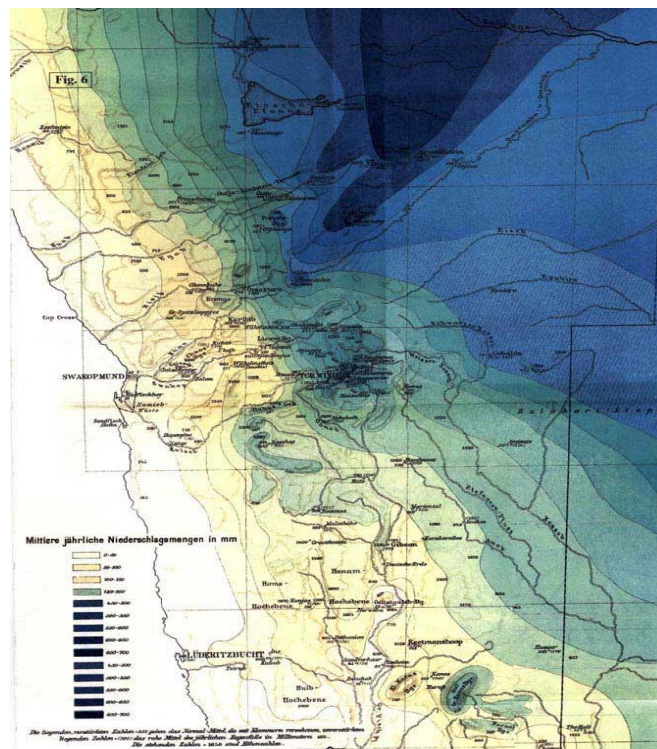


Figure 7. Excerpt of the 'Niederschlagskarte [rainfall map] von Deutsch-Südwestafrika' (1:3 million) by EMIL OTTWEILER. [SOURCE: Mitteilungen aus den Deutschen Schutzgebieten, Vol. 20 (1907), Karte 1]

2. EAST AFRICA

While the search for the course of the river Niger and the attraction of the legendary town of Timbuctu had occupied the minds and deeds of European travellers and cartographers for decades since the end of the 18th century the travels of DAVID LIVINGSTONE and his across Europe immensely popular reports caused a popular shift towards the east of the continent by the mid of the 19th century. This was fanned by the strange news of snow mountains just under the equator and the renewed interest for the ‘caput Nili’ which since the ancients had become a synonym for a search in vain.

To summarise recent geographical discoveries of especially German missionaries – JOHANN LUDWIG KRAPP and JOHANN REBMANN had first seen the snow mountains Kilimanjaro and Kenya in 1848-49 – and to map their reports about the East African hinterland gathered from hearsay of ‘natives and muslim travellers’ AUGUST PETERMANN in 1856 compiled a pioneer map of that interior (Fig. 8). Expressis verbis it was meant to give future travellers a precise representation of how little was known and to indicate the the big white dot still to explore between the coast and the reported yet mysterious giant lake in the heart of the continent [13]. In fact this sketch-map assisted RICHARD BURTON and JOHN SPEKE on their expedition 1857-58 which resulted in split of the one giant into three still big lakes, the knowledge of the general hydrological system and the famous telegram that the ‘Nile is settled’. However, since this paper discusses German contributions to East African cartography it might be added that it took until 1898 before the question was finally settled when RICHARD KANDT discovered the source of the Kagera, the mightiest tributary of lake Victoria, in the Ruvenzori mountains of today Ruanda.

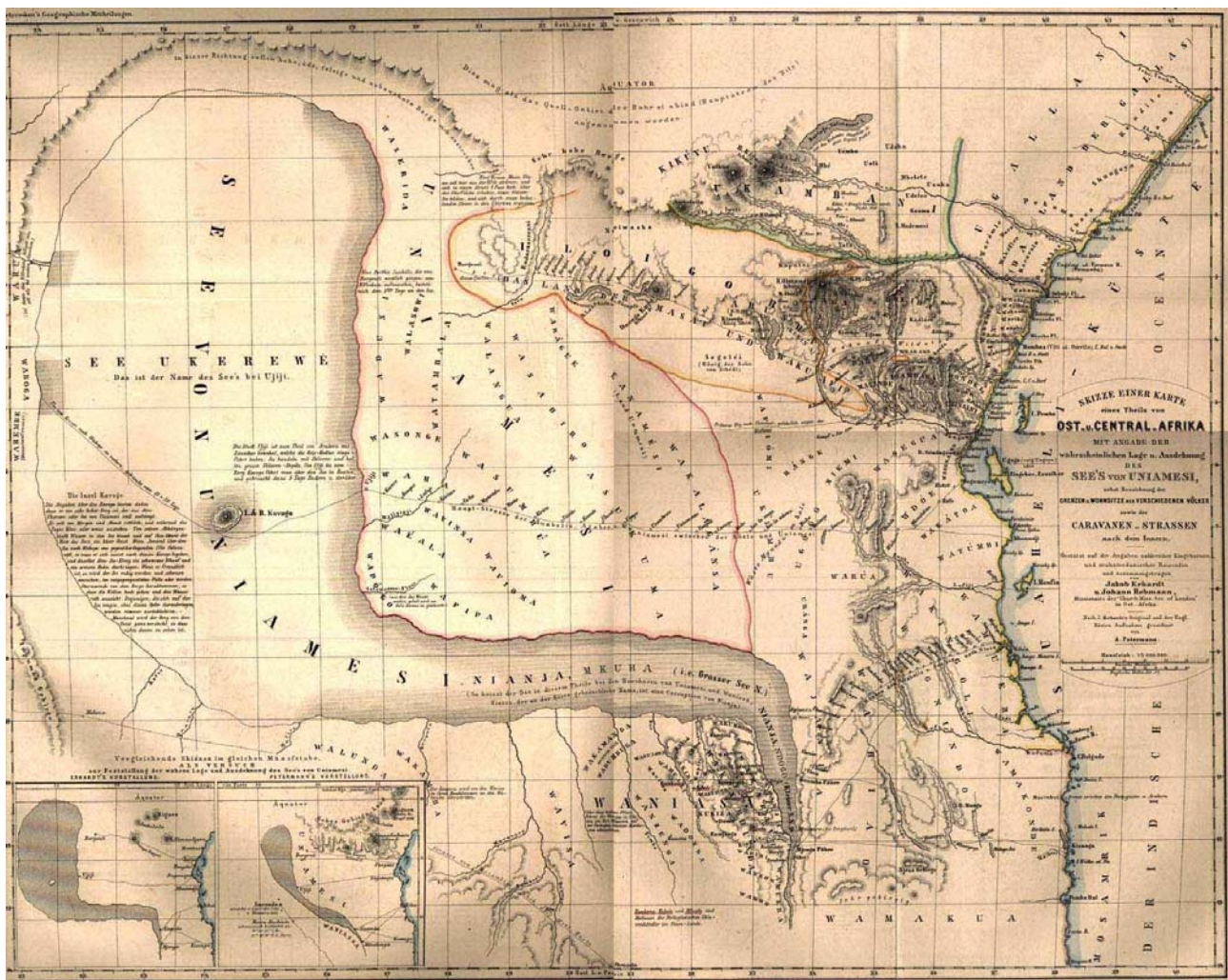


Figure 8. Oro-hydrographical pioneer map of East Africa drawn by AUGUST PETERMANN highlighting the slave routes to the interior and the at this time still mysterious great lake(s)

[SOURCE: Petermanns Geographische Mitteilungen, Vol. 2 (1856), Tafel 1]

The vast and still largely unknown landscapes between the coast and the big lakes attracted serious European interest only after the opening of Suez channel in 1869 and were finally colonial divided between the United Kingdom and Germany in 1885. To achieve at least preliminary cartographic coverage of the protectorate – given the meagre

resources of an colonial administration of only 466 civilian and military officers still in 1912 – it was decided to continue and intensify topographical reconnaissance by means of route traverses and some astronomical observations. The bulk of that task, co-ordinated by an Office of Land Survey established in 1893, was assigned to the few officers of ‘Schutztruppe’ (colonial army) often being the only Europeans on the slowly dispersing inland stations and engaged with field operations to push through the colonial rule. This approach soon resulted in a lot of field books and observations of various parts of the protectorate completed by contributions of farmers, missionaries and researchers.

All survey material was sent to Berlin where the Colonial Office had assigned construction, drawing and printing of its colonial maps to the publishing house Dietrich Reimer whose cartography department was headed by RICHARD KIEPERT. Because of the ever increasing number and quality of the received material the publishing house Dietrich Reimer in 1899 established an semi-official ‘Kolonialkartographisches Institut’ under the joint leadership of PAUL SPRIGADE and MAX MOISEL [14] being responsible for the official cartography of all German protectorates – except for Deutsch-Südwestafrika much more sophisticated but inefficiently covered by ‘Preussische Landesaufnahme’ (Prussian Land Survey).

By 1894 such a number of route traverses, astronomical observations mainly of latitudes and barometrically measured altitudes had piled up in Berlin that the Colonial Office decided to commission a medium-scaled official topographical series ‘Karte von Deutsch-Ostafrika’ 1:300 000 aimed at 36 sheets. Until the end of 1896 already 10 sheets had been published and by 1911 the series – based on about 750 route traverses and only 1 863 astronomic or geodetic observed points – was completed (Fig. 9) with some sheets even in a thoroughly revised second edition [15] and further revisions kept in the drawers after the outbreak of World War I. As off-springs a reduced small-scale series 1:1 million as part of the ‘Großer Deutscher Kolonialatlas’ (Grand German Colonial Atlas) was delivered to subscribers in 1903-12 and also a ‘Übersichtskarte von Deutsch-Ostafrika’ (Survey Map of German East Africa) in 1:2 million with cartographical notes by the heads of ‘Kolonialkartographisches Institut’ [16].

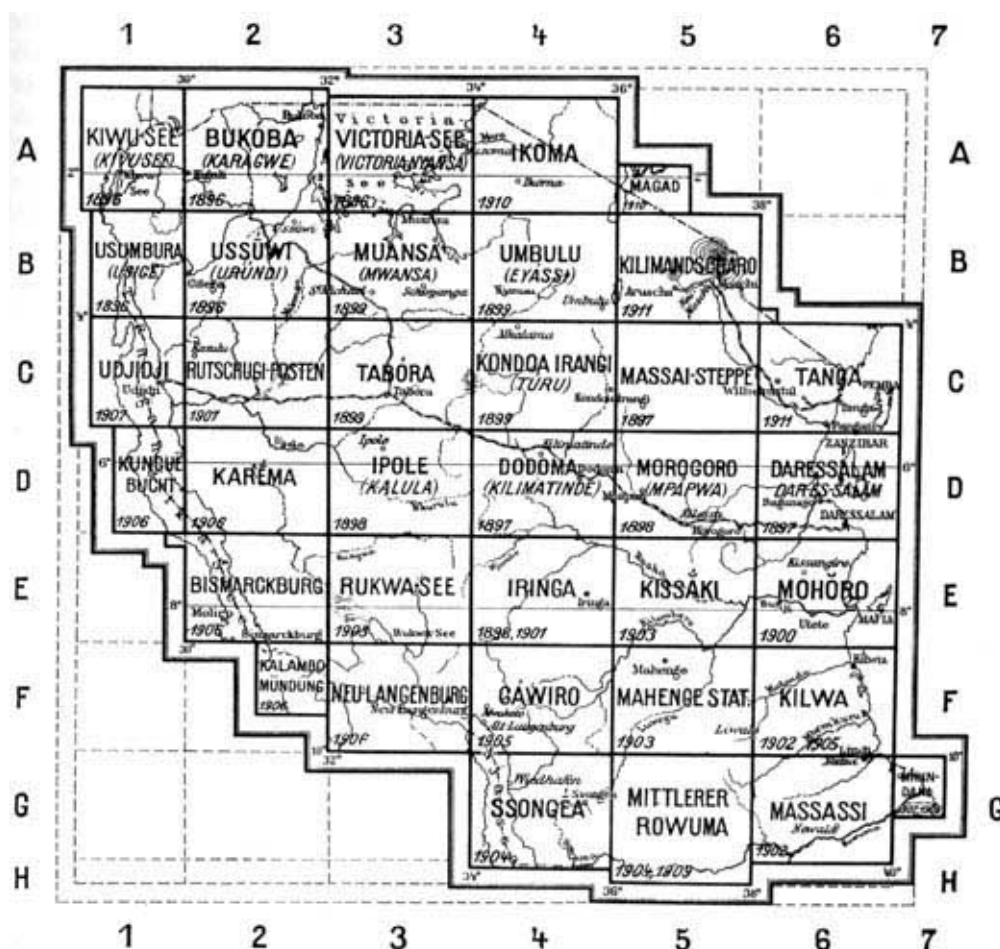


Figure 9. Index sheet indicating the division, sheet names and dates of publication of the official ‘Karte von Deutsch-Ostafrika’ (1:300 000, published 1894-1911, some sheets with revised second edition)

[SOURCE: Hugo Marquardsen (1915): Die Kolonialkartensammlung des Reichs-Kolonialamts, in: Mitteilungen aus den Deutschen Schutzgebieten, Vol. 28 (Enclosure to Issue 2), Tafel I]

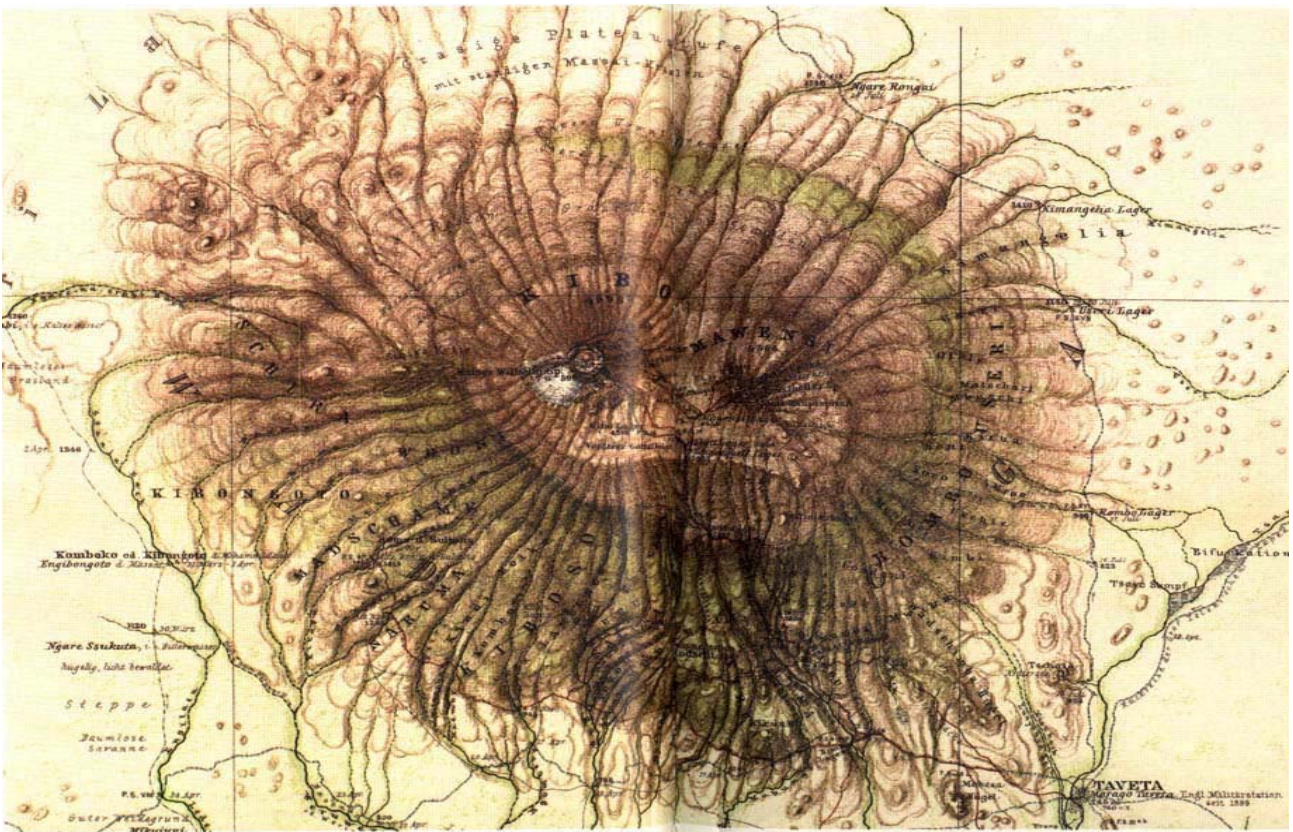


Figure 11. Excerpt of sheet B4 of the official ‘Karte von Deutsch-Ostafrika’ (1:300 000, drawn 1916, not published)
[SOURCE: Wolfgang Pillewizer (1941): Der Anteil der Geographie an der kartographischen Erschließung
Deutsch-Ostafrikas, in: Jahrbuch der Geographie, Enclosure V]

The greatest attraction for researchers since its remarkably late discovery by KRAPF and REBMANN in 1848 was, of course, the Kilimanjaro (5.895 m a.s.l.). This glacier topped highest free standing mountain of the world, rising about 5 000 metres above the surrounding Serengeti steppe, covers an area of almost 4 500 km² luring numerous expeditions of which the one of CARL CLAUS VON DER DECKEN and OTTO KERSTEN in 1862 was the first to result in a small-scaled but already coloured map 1:500 000 [19]. A quarter of a century later the geographer HANS MEYER undertook the first of four visits to the massif and succeeded during the fourth in the altogether fiftieth attempt since the discovery of the vulcanoe to climb the highest peak on the crater rim on October 6th 1889 and baptising it ‘Kaiser-Wilhelm-Spitze’ (since renamed Uhuru or Freedom Peak) [20].

His observations – route traverses, distant bearings by theodolite and compass as well as barometric observations of altitudes – were constructed into the first detailed medium-scaled map of the Kilimanjaro 1:250 000 (Fig. 12) published in 1893. Due to the inevitably meagre basis of reconnaissance it did not take wonder that this map still contained some uncertainties and outright mistakes especially as to the character of the Shira ridge and the glaciers around the crater. But all major relief features like the radial cutting of the valleys, the division in a mountain base and a peaked top appeared quite three dimensional by the use of hatching. However, it also made clear that a further engagement of linear reconnaissance methods would be unable to achieve a large-scaled and precise map of the high mountain areas.

Consequently in following years plane tabling and triangulation by MEYER and JAEGER crawled up especially the southern flanks of the massif [21]. Although this difficult work had not reached higher than about 4 500 m in 1911 the ‘Kolonialkartographisches Institut’ decided not to wait any longer with the publication of sheet B5, the second last of the ‘Karte von Deutsch-Ostafrika’ 1:300 000 (Fig. 13). Drawing too on results of these expeditions it compiled a sheet from all available material for an eight-colour-sheet showing the most refined terrain drawing replacing many hatchings and formlines already by true isolines. This was the ultimate to achieve in mountain cartography relying on route traverses, triangulation and relief hatching before the introduction of modern methods of field reconnaissance.



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Demhardt, I.J.

University of Technology Darmstadt. Department of Geography,
Schnittspahn Str. 9, 64287 Darmstadt. E-mail: demhardt@geographie.tu-darmstadt.de

Biography

Privatdozent Dr. phil. Imre Josef Demhardt M.A.

Born March 28th 1962 in Wiesbaden (Germany). Studied in Frankfurt am Main (Germany) and Stellenbosch (South Africa) Medieval and Modern History (Master of Arts 1987) and Geography (Diploma 1991). Research on colonial boundaries in Africa at the Department of Social and Economic Geography in Frankfurt am Main (PhD 1995). Lecturer for Human Geography at Department of Geography, University of Technology Darmstadt (1996-2001). Habilitation in Human Geography with a thesis on 'Tourism Geography of the Western Cape [South Africa] since the end of Apartheid' (Darmstadt 2003).

Focus in research, lecturing and consultancy on tourism geography of Central Europe and Southern Africa, German colonial history as well as the history of cartography and geography in 19th and 20th centuries. 43 scholarly monographies and articles including 26 on historical aspects of cartography and geography.

Consulting editor of '*Tourism Geographies*' (since 2002) and Column Editor on History of Geography of '*Petermanns Geographische Mitteilungen*' (since 2000).