ABSTRACT

This article discusses the evolution of the cartography of Katanga during the colonial period. As far as cartography is concerned, the colonial period is divided into three periods. The first period, from 1875 up to the First World War, is characterized by the establishment of the state and implies the creation of boundaries, exploratory expeditions, the use of astronomic positioning and a first map of Katanga. The second period is situated between the two world wars. The “Comité Spécial du Katanga” establishes a cartographic institute that starts with a series of maps on a scale of 1 : 200 000. During the third period, until decolonisation in 1960, aerial photography is introduced and the “Institut Géographique du Congo Belge” publishes a series of maps on a scale of 1 : 200 000 which covers the whole area. The published maps of these three periods are shortly discussed.

1. INTRODUCTION: THE STUDY OF HISTORICAL COLONIAL CARTOGRAPHY

A survey of 3 985 books, that were written between 1960 and 1996 and describe the period from 1880 until decolonisation in 1960, shows clearly that there is not enough knowledge about the cartography of Belgian Congo (Vellut, 1997). This article is no more than a result from an exploratory research on the cartography of Katanga, one of the provinces of Belgian Congo. Furthermore, this research cannot be considered as a case study of the cartography of Belgian Congo in general, since the cartographic evolution of this province is not representative for the whole country. The work of the “Comité Spécial du Katanga” (CSK) resulted in a political and economical development fairly different from other regions in the country.

1.1. Cartography, a product of the political-historical context

Maps are a product of a particular historical period, the general political-historical context leaves its marks on the maps. To be able to explain the development of the cartography of Katanga, this context has to be taken into account. Furthermore, there is the establishment of cartographic (geographical) institutes, mostly as a result of governmental initiatives.

1.2. Establishment of a geometrical framework

The creation of maps is strongly connected to and dependent on the establishment of a geometric framework. The geographic coordinates (longitude, latitude and sometimes altitude) of several points on the field have to be known in order to localize points and to orientate objects in relation to these reference points. Without such geometric framework to rely on, it is impossible to create a reliable topographic base map of a region. Because of this crucial importance for the cartographic process, the geodetic and topographic survey methods and missions are considered in this article.

1.3. Topographical basic maps

A topographical basic map tries to cover the whole territory of an area in a systematic way. This article only discusses the development of the topographical basic maps, mostly done by governmental institutions. Cartography created by
private companies also existed in Katanga, mostly for smaller, economically interesting regions, but were not taken into account in this study.

1.4. Spatial and structural demarcation

The considered period runs from colonisation up to decolonisation and is divided into three subperiods based on the political-historical context, the established institutes, the surveys done and the published maps. Particularly the area of the CSK is discussed because this committee enforced the most important cartographic projects. Nevertheless the boundaries of the territory of the CSK changed during the discussed period and the CSK also made maps beyond its territory, making it impossible to define a spatial demarcation of the studied area with a simple boundary line.

2. CARTOGRAPHY AND BOUNDARIES

Several authors (Jentgen, 1952; de Martonne 1935) have extensively described the coming into existence of boundaries. A brief discussion of these studies may not be lacking in this article as demarcation has an important role in the cartographic evolution of a region and vice versa. The relationship between boundaries and cartography is twofold. On the one hand, the boundaries are delimited based on existing maps. On the other hand, the demarcation of boundaries initiates topographical field surveys that serve as geometrical basis for the creation of maps.

2.1. Boundaries: delimitation based on maps

As Jentgen (1952) writes, a new state territory is established when the boundaries are decided on. The existence of a state is intrinsic to the existence of a boundary. The boundaries of a new state are demarcated in three steps: the allocation, the delimitation and the demarcation (Mellor, 1989). Several authors use different wording like respectively existence, fixation and demarcation (Jentgen, 1952). Others have used another division, de Martonne (1935) for example joins allocation and fixation together and divides the fieldwork into the determination of the boundary on the one hand and the placing of boundary stones on the other hand.

In the first phase, the allocation, the boundary comes into existence by general negotiations. This phase establishes the existence of the state territory by means of a vague description of the boundaries. The second phase, the delimitation (fixation), implies the determination of the boundary lines on large-scale maps by means of conventions (Guichonnet & Raffestin, 1974). In the third phase, the demarcation, the boundary is physically determined on the field by means of boundary markers. Theoretically, the demarcation is a purely executive task as the boundary was fixed during the delimitation phase. In practice, modifications are still possible because of ambiguities, especially in colonial areas where knowledge of the field mostly is limited (Mellor, 1989).

For the purpose of allocation and fixation, maps are used. By means of an ‘arrangement’ or ‘protocol’, the first determination of the boundary is done on diplomatic level. The diplomats describe the boundary track based on the exploration maps that mostly were the only maps available of the area (de Martonne, 1935). Imaginary lines, like meridians or parallels, are often used as a boundary, which is not surprising seen the vagueness and numerous contradictions of the exploration maps. One of the consequences of such determination of boundaries is that the cultural and linguistic entities were not taken into account (Corbridge, 1993). The delimitation of Belgian Congo, at the end of the 19th century, also happened as described above.

2.2. Boundaries: the first mapped areas

Due to demarcations, geographical knowledge of boundary regions mostly is much ahead of that of the rest of the country. The paradox situation arises that the boundary areas are better known than the mining areas and the administrative centres, in which only isolated surveys occur (de Martonne, 1935). Demarcation of boundaries usually takes place before the economic exploitation. According to Corbridge (1993) two steps are necessary before trade and production come into the wider network of the colonial world economy. Firstly there is the establishment of territories and boundaries and secondly the establishment of a political order and an administrative hierarchy in the territory.

According to de Martonne (1935), the demarcation of boundaries on the field offers a network of geographic positions (‘canevas d’ensemble’) to the colonial cartography. This network of points with known coordinates is determined by astronomic positioning and triangulation and is used as geometrical basis for the creation of maps. Secondly it offers an extensive geometric description (‘description géométrique’) of the boundary with the localisation of boundary markers.
Thirdly, a topographic survey of the boundary region (‘levé topographique’) is executed, it concerns a strip at both sides of the boundary. In the beginning of colonisation, this strip was a few dozens of kilometres wide which later became an average of three to four kilometres. The scale of these general survey maps varied from 1 : 50 000 in populated areas to 1 : 100 000 in savannah and forests, and to 1 : 200 000 and even 1 : 500 000 in desert areas (de Martonne, 1935). De Martonne (1935) summarizes that the demarcations served as exploration missions, as a source of knowledge for diplomacy of the region and as a manner to search for ways of communication.

3. COLONIAL CARTOGRAPHY IN KATANGA

The considered period of this study of the cartographic evolution in Katanga runs from colonisation until decolonisation. The period starts at the foundation of Congo Free State around 1885 and includes the initial period from 1875 onwards. It concerns a new state, without an existing ‘modern’ cartography, that is ‘developing’ and where, at the same time, cartography is built up. The study period ends with the decolonisation in 1960. Starting from June 30 1960, Belgian Congo becomes the independent Democratic Republic of Congo.

To give an historic overview of the evolution of the cartography of Katanga, the considered period is further divided into sub periods. Several authors have made a division based on specific aspects concerning the evolution of cartography. Table 1 gives an overview of the four sub periods other than the division used in this research. Le Marinel and Dubreucq (1911) distinguish four periods until the publishing date of their work in 1911:

| 1st period | starting from the first discoveries till March 12 1891, period with explorative expeditions and missions |
| 2nd period | Belgian explorations from 1890 until 1893, the occupation and taking possession, the English-Congolese Arrangement of May 12 1894; missions started by Le Marinel, Delcommune and Bia-Francqui |
| 3rd period | foundation of the ‘Compagnie du Katanga’ (1891) and the CSK (1900); mission by Lemaire (1897) |
| 4th period | until the annexation of Congo by Belgium in 1908; administrative autonomy of Katanga |

Table 1: Katanga 1890-1911, subdivision in four periods (Le Marinel and Dubreucq, 1911)

The CSK states in one of its publications (1950) that the foundation of a cartographic service within the CSK is a turning point in the cartographic evolution and not its own foundation. In this same publication we can find a subdivision in two periods (table 2):

| 1st period | 1st phase (1891-1910): most of the cartography origins from the missions and expeditions like the mission Bia-Francqui-Cornet (1891-1919) and the mission Lemaire (1897) |
| 2nd period | 2nd phase (1910-1919): delimitation Katanga-Rhodesia |
| 2nd period | starting from 1919: foundation and work of the ‘Service Géographique et Géologique’ (SGG) |

Table 2: Subdivision based on the foundation of a cartographic service within CSK (Anonymous, 1950)

In his article about the history of the triangulation networks of Belgian Congo, Meex (1997) divides the period from 1900 till 1972 into four phases. This division from the point of view of the triangulation activities is mentioned here because of the importance of a geometric framework for the cartographic evolution. As we see in table 3 Meex uses both World Wars and the decolonization as turning points and does not use exact beginning and ending dates:

| 1st period | 1897-1924: triangulations related to demarcations |
| 2nd period | 1921-1942: insertion of regional networks |
| 3rd period | 1946-1960: unification of the network |
| 4th period | 1961-1972: adjustment of the network |

Table 3: Subdivision based on triangulation activities (Meex, 1997)

Gilliard (1953) makes a rough division (table 4) based on a global look on the cartography of Belgian Congo:

| 1st period | before 1940 mostly the easiest areas, most urgent areas (boundaries) and areas |

Table 4: Rough division based on a global look on the cartography of Belgian Congo (Gilliard, 1953)
interesting for mining industries (mainly areas containing copper in the south of Katanga) are mapped

| 2nd period | after 1940 remarkable events are the foundation of the ‘Institut Géographique du Congo Belge’ (IGCB) and the use of aerial photography for cartographic purpose |

Table 4: Subdivision based on the general cartography of Belgian Congo

For the further discussion of the history of cartography of Katanga, the period from colonisation until decolonisation is divided into three sub periods. Table 5 shows that important turning points and impulses that justify this division are the foundation of several services, the used survey techniques and the historical context. The division between the different periods is fuzzy with no exact dates:

| 1st period | from 1875 until the First World War (1914-1918): explorative expeditions and missions lead to the first map of Katanga at a scale of 1 : 1 000 000 and to the delimitation of Kantanga-Rodesia |
| 2nd period | from the First World War (1914-1918) until the Second World War (1940-1945): most important fact is the foundation of the SGG |
| 3rd period | from the Second World War (1940-1945) until the decolonisation of Belgian Congo (1960) remarkable events are the foundation of the IGCB, the drafting of a ten-year plan and the use of aerial photography for cartography |

Table 5: Subdivision used in this research

3.1. 1875 - WWI : Cartography during the period of the origination of the state

From 1875 onwards, the Belgian King Leopold II had set his sights on a colony in Central Africa (Wesseling, 1999). He created the “Association Internationale Africaine” (1876), the “Comité d’Etudes du Haut-Congo” (1878) and the “Association Internationale du Congo” (1882).

To end the disputes and competition between the different European states about Central Africa, an international conference was held in Berlin. The official programme of the conference was the free trade in the Congo Basin and adjacent regions. The Berlin Act was signed on February 26 1885. During the Berlin Conference, a lot of lobbying had been going on and Central Africa was divided among the European states. The Congo basin was established as the Congo Free State under the sovereignty of King Leopold II in his personal capacity as head of the private “Association Internationale du Congo”. During the same year, Katanga was added to Congo Free State by deceiving the British. During the absence of experts on Africa of the Foreign Office, Leopold II showed a map with the boundaries of Congo Free State to the civil servants present. They thought those boundaries were recognised already and thus made sure that Katanga was part of Congo Free State.

According to the Berlin Act, Congo Free State had to “take Katanga into its possession”, if it wanted to keep its rights on it. Because Leopold II did not have the necessary means at his disposal, he came to an agreement with the private group “Compagnie du Congo pour le Commerce et l’Industrie”. Together they founded the “Compagnie du Katanga”. Because the demarcation of the territories of the “Compagnie du Katanga” and Congo Free State caused some problems, the ‘Comité Special du Katanga’ (CSK) was established in 1908. The CSK vouched for the public administration of Katanga until 1910, afterwards it mainly had an economic task. This was a consequence of the transition of Congo Free State, the private colony of Leopold II, to Belgian Congo in 1908, a Belgian colony (Le Marinel & Dubreucq, 1911).

Exploratory expeditions and surveys, as in other newly exploited countries, resulted in the first cartographic sketches and other information of Europeans (Anonymous, 1950). Especially the hydrography was explored and the presence of mineral materials was mentioned. The first mission with cartographic importance took place in 1897 under the command of Captain Charles Lemaire. Through astronomic positioning, the geographical coordinates of about 100 points were defined. This technique determines the degrees of latitude and longitude based on the position of celestial bodies. The surveys of the boundaries by means of triangulation only started in 1911 with the demarcation of the boundary between Katanga and Rhodesia (Meex, 1997).

The first map of Katanga was drawn in 1903 on a scale of 1 : 1 000 000, but not published before 1904. This was made possible thanks to the geodetic network that Lemaire’s mission had established and additional information from different sources, mostly travel stories from explorers and surveys of (parts of) the rivers (Anonymous, 1950). The map is also called the “carte Droogmans” because it was drawn by H. Droogmans, CSK’s president at that time. Later, other versions followed, corrected on the basis of results of the demarcation committee, the internal boundary of the area, as
determined by the CSK, and information from others, like technicians of the private company Union Minière (Anonymous, 1950).

3.2. WWI - WWII : Establishment of the “Service Géographique et Géologique”

The need for cartography was stated in a report of the CSK about the period 1913-1919, in which the necessity of the establishment of a cartographic service was mentioned. In 1919 the “Service Géographique et Géologique” (SGG) was founded as a part of the CSK. One of the first purposes of the SGG was to create a network that could be the basis for a general topographical map of the province on a scale of 1:200 000 and for a map showing cadastral boundaries (Maury, 1931; Gilliard, 1953).

Triangulation resulted in the creation of a fundamental network, made possible by the assistance of Maury (Robert, 1935; Gilliard, 1953). Triangulation means the creation of a triangular network, of which the coordinates of the vertexes are known. This is done through the measurement of angles, starting from a point with known coordinates and a known base (Maury, 1931). The SGG started the systematic triangulation of the territory of the CSK, which was possible thanks to the almost total absence of tropical rainforest in Katanga, the relatively limited surface of the area (20% of Congo) and the ample means at SGG's disposal (Meex, 1997). Fieldwork started in 1920 and was concentrated in a first phase on the southern boundary (Anonymous, 1950).

The studies of the SGG were systematically done per ‘square degree’ (‘Degré Carré’): an area with in both latitude and longitude sides of one degree. Besides topography, the most important element on the maps, also geology, vegetation, soil, relief and hydrography were examined. Robert (1935) notes that the members of the topographic teams had to have an extensive knowledge of topography as well as geology, soils, botany and zoology.

Meex (1997) sees the period between 1921 and 1942 as the period of establishment of regional networks in Belgian Congo. In Katanga, for example, a network was established before 1942 and covered the eastern half and the southern part of the area. Beyond the territory of the CSK, a range to the west was also surveyed. This is the so-called “Banguela railway” line that connects Katanga with the Angolan coast (Meex, 1997).

The purpose of the surveys was to get an overall picture of Katanga and, by doing so, to learn more about the possibilities of development of the different examined regions (Robert, 1935). Map sheets were drawn up per “square degree” on a scale of 1:200 000. Not only topographical maps but also geological, soil and vegetation maps were created. Those thematic maps provided a general image of the territory. The geological map sheets created a frame for the mining companies and the soil maps were specifically oriented towards agriculture (Robert, 1935; CSK, 1950). Before WWII, 25 ‘square degrees’ had been mapped based on the triangulation network. More in particular, the south of Katanga was covered by maps. This can be explained by the executed triangulation at the boundary with Rhodesia and the presence of important mining regions. In addition to this, 1929 saw the first edition of the Atlas of Katanga, edited by the CSK.

Anderson (1996) observes the introduction of maps with an European style in colonial territories, ‘Mercatorian maps’ as he calls them. The aim of the maps is to make a total classification. The colonizer visualizes the geography of the colony by means of maps. On the maps, a geometrical grid located the territories that had not been explored yet. The gaps in the grid were filled up by surveyors, soldiers and explorers. Maps were useful to the colonial government because the administration of the territory was done on a territorial cartographical base. When we apply this to Katanga, we find that the ‘square degree’-maps do aim at a total classification and meridians and parallels are used as a geometrical grid that is ‘filled up’. The latter is defined by Anderson (1996) as ‘filling in the boxes’.

3.3. WWII - Decolonisation : Rapid development of the cartography

The Second World War caused an important turn in the economy of Congo, connecting it with the world economy. In order to further exploit the natural resources in a better way, the government wanted to expand the existing infrastructure. They also wanted to decrease the vulnerability of the economy, caused by the one-sided tuning to the export of natural resources. For that reason, a ten-year plan was drawn up, which was put into action in 1950. The plan would improve the equipment of the country as well as it would mean a social progress for the inhabitants.

One of the fields of action of the ten-year plan was the improvement of the public services, some of which were part of the country’s economic infrastructure because of their technical character. Money was reserved for aerial cartography and geodesy. Within the scope of the ten-year plan the “Institut Géographique du Congo Belge” (IGCB) was established, by a Royal Decree of December 7 1949 (Van Griecken-Taverniers, 1981).
**Aerial cartography** was already studied and used in Belgium and Belgian Congo before the Second World War, already in 1927 Sabena made some flights during which aerial photographs were taken (Vander Rijt, 1948). But it was only after the Second World War that aerial photography was used for the production of Belgian topographical maps. In 1949 the Ministry of National Defence agreed to the collaboration between the Military Geographical Institute (MGI), the air force and the SGG to design the ‘carte générale du Katanga’. The MGI and the air force executed the flights and the SGG executed the work on the ground. The aerial photographs were taken in series per ‘square degree’ (Vander Rijt, 1948). Aerial photographs are a fast and appropriate way to make an inventory of the natural resources of Congo and to orientate the explorations of the different colonial services.

After the Second World War, triangulations still occurred. The network of Katanga was completed, a connection was measured between the regional network of Katanga in the east and the network of Lower-Congo. A connection with the measurements of the 30th meridian was established as well (Meex, 1997).

**New ‘square degree’**- map sheets were published by the SGG and the sheets that dated from before the Second World War were corrected and improved by means of aerial photography. Nevertheless a total covering of the area of the CSK was never fulfilled (Anonymous, 1958). Another important accomplishment of the IGCB is the ‘Cartes de Territoires’ series on a scale of 1 : 200 000 (Van Grieken-Taverniers, 1981). The maps were created per region but not with a triangular incision, like the Belgian topographical maps, or via meridians and parallels, like the ‘square degrees’ of the SGG. There is a total covering of the domain of Belgian Congo but on many of the map sheets ‘édition provisoire’ (provisional edition) is mentioned. The whole territory of Belgian Congo was not surveyed in the same way, mainly because there was no complete coverage of aerial photographs.

### 4. CONCLUSION

The colonial period can be divided into three periods with regard to the cartography of Katanga. Each period has another historical background which influences the occurrences in the field of cartography and makes them possible. The technical means that were used also evolve and are an extra argument for the division used. A synthesis of the discussed periods is shown in figure 1.

The first period starts with King Leopold II’s first plans to establish a colony in Central Africa in 1875 and lasts until the First World War. In 1875, King Leopold II brought up the idea of acquiring a colony in Central Africa. After the establishment of a few organizations with the aim to explore and to take possession of the colony, Congo Free State was recognised in 1885, during the period of the Conference of Berlin. King Leopold II was the sovereign leader of the new state. In the same year, Katanga was annexed to Congo Free State. During the period before the establishment of Congo Free State, many explorers crossed the area which later would become Katanga. That offered the first bits of information about the Central-African interior. Maps were used during the treaties to determine boundaries. But the allocation and delimitation of boundaries occurred on vague, small-scaled and inaccurate maps and by general descriptions, resulting in an unambiguous definition of the boundary lines.

Within the state the Compagnie du Katanga (1891) was established, which later was called the Comité Spécial du Katanga (CSK). Exploratory missions were still sent and in 1897 the Lemaire mission made astronomic positionings...
that were later used in the first map of Katanga (1903; scale 1 : 1 000 000). The CSK, established in 1900, soon recognised the need for cartography.

A first important step in the design of a triangular network was the demarcation of the boundary between Katanga and Rhodesia, which started in 1911. Then came the First World War, which delayed the cartographic work.

The second period is situated between WWI and WWII. The period of discovery and exploration has finished and the systematic mapping of Katanga begins. The most important fact is the establishment of the “Service Géographique et Géologique” (SGG) of the CSK. The SGG starts with the establishment of a network by means of triangulation. To get an overall picture of the area, geological, soil and vegetation maps were created on a scale of 1 : 200 000, in addition to topographical maps. Nevertheless the covering of Katanga is not complete.

After the Second World War the CSK continued with its activities and started using aerial photography. To improve the economy of Belgian Congo, a ten-year plan is drawn up and as a part of that plan a geographical sevice ‘Institut Géographique du Congo Belge’ (IGCB) is established. The IGCB also used aerial photography and made map sheets of Belgian Congo on a scale of 1 : 200 000, the so-called ‘Cartes de Territoires’, produced per region (‘territoire’). This is the first territory covering base map on such high scale for Katanga and Belgian Congo.

REFERENCES


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