

## **HOW SHALL AFRICA BE MAPPED? FRENCH AND BRITISH RESPONSES TO THE NEEDS OF COLONIAL MAPPING.**

*COLLIER P.*

*University of Portsmouth, PORTSMOUTH, UNITED KINGDOM*

### **INTRODUCTION**

Bartholomew (1890) in his survey of world mapping noted that of the 29.8 million square kilometres of Africa, detail survey covered only 518,000 square kilometres; topographic mapping about 1.14 million square kilometres; detailed route surveys about 5.9 million square kilometres and general maps about 12.4 million square kilometres, leaving 9.8 million square kilometres unexplored and unmapped by Europeans. It was clear to the European colonial powers that if Africa were to be administered and developed economically they would need to map their colonies

Colonial mapping of Africa did not start with the partition of the continent into 'spheres of influence' by European colonial powers at the Berlin Conference in 1884. France had been actively mapping in North Africa since the 1840s, and Britain had carried out some limited mapping in Southern Africa. On the other hand, Portugal, which had been in occupation of coastal strips for centuries, had not made any significant effort to map the territory under its control. The question was, however, how should the colonial powers go about mapping Africa?

### **ADMINISTRATIVE ARRANGEMENTS**

As Jana Moser noted, in German South-West Africa mapping was largely carried out by commercial organisations such as the Deutsche Kolonialgesellschaft für Südwestafrika and the Deutsche Diamantengesellschaft (Moser 2005; 2006). Dietrich Reimer, a commercial publisher, issued complete coverage of German East Africa at 1:300,000. However, both France and Britain saw the responsibility for mapping as a function of the state. How they went about fulfilling that function was, however, very different.

Both France and Britain had well-established national mapping agencies, le Service Géographique de l'Armée and the Ordnance Survey, who carried out all topographic mapping on behalf of the state. In France, le Service Géographique de l'Armée (SGA), as the name implies, was also responsible for military mapping. In Britain, the Ordnance Survey was no longer a military mapping organisation, but it retained a responsibility for military mapping of the United Kingdom as the War Office lacked any significant mapping capacity of its own. The Ordnance Survey was also responsible for printing bulk stocks of overseas mapping produced by the War Office.

A crucial difference between Britain and France lay in how, prior to the division of Africa, the most important colonial territories had been acquired and administered. In the case of France, the important colonial territories in North Africa had been acquired as a result of wars of conquest fought by the French Army. It was therefore logical that the French Army should carry out mapping in support of both the conquest and subsequent administration. In the case of Britain, the most important colony was India, but India had, initially, been governed by the East India Company, which had created separate survey departments in the three Presidencies of Bombay, Madras and Bengal. While these survey departments were responsible for providing military mapping to the Company's army, one of their most important functions was cadastral mapping in support of the Company's tax raising. The Presidency survey departments were merged into the Survey of India (SoI) under a Surveyor General, but an administrative division between trigonometric, topographic and revenue surveys was maintained until the end of 1877.

### **HOW SHALL AFRICA BE MAPPED?**

The differences between administrations were also reflected in difference in ideas concerning who should carry out the survey work. The personnel of le SGA were serving engineer officers or specially trained infantry officers, supported by enlisted men. Some civilians were also employed in specialist functions, such as computation. It seems that in France there was little debate on how the newly acquired colonies in Africa were to be mapped. The precedent had been set in North Africa and the same approach was simply applied to the rest of Africa.

Britain, however, had no real tradition of mapping in Africa. In addition, the British Army had no equivalent of the specially trained survey officers found in the French Army. Surveying was simply a task that a Royal Engineer officer might be expected to pick up as part of his normal duties. Officers were posted to the Ordnance Survey, but it was rarely for more than a few years before being posted back to normal regimental duties, such as planning fortifications or building road and bridges. An officer like Sir

Charles Wilson was unusual in that he spent significant periods of his career in survey related activities. In most cases it would have been no more than a few years. This meant that Royal Engineer officers engaged in survey work often lacked competence in important areas, such as computation. The Ordnance Survey had carried out no significant geodetic work since the mid nineteenth century, so no serving officers had experience of the work. Training seems largely to have consisted of instruction and practice in navigational techniques, using sextants and artificial horizons for sun observations, and detail surveys using compass observations and field sketching. There was no training in the use of the plane table as it was not used by the Ordnance Survey.

The lack of appropriate training within Britain was considered to be such a problem by the Royal Geographical Society (RGS) that it decided to institute its own training course. However, their course was largely organised around the needs of exploration, where what was needed in the new colonies was systematic topographic mapping if the colonies were to be administered efficiently and developed economically.

In the SoI it had been common practice to use locally recruited and trained personnel to carry out much of the work of the Survey. The only areas of work that were reserved for Europeans were trigonometrical and astronomical observations. The SoI had been conducting geodetic work throughout the nineteenth century, which meant that the surveyors were experienced in both the necessary observations and their computation. Unlike the Ordnance Survey and home-based Royal Engineers, the SoI made great use of the plane table, its topographers being rated amongst the best in the world.

Following a debate within the RGS which was dominated by Sir Thomas Holdich, former Superintendent of Border Survey with the Survey of India, training within the RGS was reformed to bring it in line with SoI methods. He was quite clear that 'native labour' had a major role to play in the mapping of Africa 'indeed, I may express my conviction that it is quite hopeless to attempt to deal with the vast project we are considering on any other basis. Native labour must be the mainstay of the whole project'. He even went further by stating that even 'were European labour available, I should certainly prefer the native in native territory' (Holdich, 1891). In addition, the Colonial Office made the decision that the African colonies would follow the Indian model and be mapped by local survey departments funded out of local revenues. Charles Close, on taking over responsibility for training of home-based Royal Engineers, introduced Indian methods, including the use of light-weight theodolites and plane tables, and dropped instruction in the use of the sextant and artificial horizons. Close's reforms ensured that there would be a supply of trained personnel capable of carrying out survey operations in Africa.

#### **ORGANISATION OF MAPPING IN AFRICA**

French approach to mapping south of the Maghreb was through the establishment of a series of outstations of le SGA, in Brazzaville, Tananarive and Dakar, and subsequently joined by another in Yaoundé. The relationship between Paris and the outstations was based on le SGA supplying and paying for all European personnel, with the outstation recruiting, training and paying for all local personnel and, as Sallat (2003) notes, they were established to meet specific military needs. This system was to be maintained after the creation of the Institut Géographique National in 1940 (Sallat, 2003). There is some disagreement in the literature about the precise nature of the relationship between le SGA and the outstations. In le Service Géographique de l'Armée (1938, 121) the outstations are treated as if they were autonomous, but the U.S. Department of the Army (1963, 44) clearly considered the outstations as being the responsibility of the parent organisation. A 'Service Cartographique du Ministère des Colonies' also existed, based in Paris, but it lacked the means and expertise to provide direction to the outstations (Sallat, 2003).

North of the Sahara, le SGA was using photogrammetry for topographic mapping before World War II, making Algeria and Tunisia the first parts of Africa to be map using instrumental aerial photogrammetric methods. Depending on the density of settlement and intensity of land use, areas not mapped at 1:50,000 were originally mapped at 1:100,000 or 1:200,000.

In practice, there was not a great deal of progress in mapping sub-Saharan Africa until after World War II. A start had been made in 1922 on mapping at 1:200,000 in what became Burkino Faso and Niger, and some 1:100,000 mapping in Madagascar (Parry and Perkins, 2000) but, as Hurault indicated, much of the pre-war coverage was in the form of 1:1,000,000 sketch-mapping "drawn up from itinerary survey records obtained from different sources, complemented by miscellaneous, often verbal information" (Hurault, no date). The Ubangui District chosen by Hurault to demonstrate the paucity of pre-war mapping was an area of savannah and riverine forests that would have lent itself to conventional topographic surveys by plane table, had the resources been available. It did not present the same problem to surveyors as the rainforests of Gabon or the Cameroun. Sallat (2003, 1-5) provides a good summary of the mapping accomplished by

1940 and the need for a reform of the system, and on pages 76-77 demonstrates the relatively poor quality of pre-World War II mapping.

In the British colonies the situation was, at least in theory, much clearer. The Ordnance Survey had no responsibility for colonial mapping, and the Army lacked sufficient personnel to be actively involved. Edmund Hills, Head of the Topographic Section, General Staff, "recommended the formation of a Department for African Mapping" (McGrath 1976). For possible reasons discussed by McGrath (1975), Hills' proposal was not accepted. All but the smallest colonies were therefore expected to set up and fund their own survey departments. The senior staff were European, but all the topographic work was to be carried out by locally recruited and trained personnel. However, experience had shown that some already existing local survey departments were not efficient and lacked direction a case in point was the Survey Department in Ceylon, which, although established in 1800, had in 1897 "no reliable map of the Island" (Ridgeway, 1897).

In 1905, the decision was therefore taken to establish the Colonial Survey Committee as a central advisory body overseeing the individual survey departments (Collier, 2006). In practice the Colonial Survey Committee dictated the types and scales of maps that the colonies should produce. Topographical maps were to be produced at 1:62,500, 1:125,000, 1:250,000, 1:500,000 and 1:1,000,000, while cadastral plans were to be produced at 1:2,500, 1:5,000 or 1:10,000. It was noted that "a scale of 1:250000 was regarded as sufficient, as a general rule, for military purposes. A survey of this scale should extend over the whole of the Colony or Protectorate" (Colonial Survey Committee, 1905). Although not stated overtly in the instructions to the survey departments, it was understood that the sheet lines were to conform to those of the International Map of the World at one to one million scale (Collier, 2006). While the local survey departments were responsible for observing the control networks and carrying out detail survey, the compilation and printing of the maps was carried out in the War Office drawing room.

The Gold Coast was the first colony to fully mapped, at 1:125,000, all the maps being published by August 1908 (Colonial Survey Committee, 1909), but little use had been made of 'native' surveyors during this work. The Gold Coast survey was financed largely from the revenues generated from carrying out boundary surveys of mining concessions, and the colony was able to employ a detachment of Royal Engineer surveyors in addition to its own survey department. The detachment was withdrawn once the topographic survey work was completed. Progress was much slower in other colonies which lacked the Gold Coast's mineral resources.

In most of the African colonies the inter-war years were ones of financial hardship, and the budgets of survey departments were severely restricted. Work on topographic mapping was seen as less important than work on cadastral mapping and mapping of mineral concessions, both of which showed short-term financial returns. There was little increase in the total area covered by topographic mapping, and much of the existing coverage was increasingly out-of-date. There were a number of proposals from the colonial survey departments to use air survey methods, but Harold Winterbotham, the outgoing Head of the Geographical Section, General Staff, on a tour of inspection of colonial departments, reject most of the proposals in favour of 1:250,000 and 1:125,000 mapping by ground survey (McGrath, 1976).

## **THE IMPACT OF WORLD WAR II**

World War II interrupted most mapping activities in Africa, except where the mapping was directly related to military activities. However, as a consequence of the war there were significant institutional changes and technical developments that were to have far reaching implications for the post-war mapping of Africa. In France, the reorganisation of the SGA into l'Institut Géographique National (l'IGN) allowed a fresh start to be made on the mapping of France's African colonies. The need for change had been identified even before the outbreak of World War II and Colonel Hurault convened a commission to examine the problems posed by mapping the colonies (Sallat, 2003). This led in 1941 to the transformation of the North African outstation of l'SGA into an 'Annex de l'IGN'. Similar changes took place subsequently in the other outstations. In Britain, it was the creation of an entirely new organisation, the Directorate of Colonial Surveys, under the leadership of Martin Hotine, that accelerated British mapping activities in Africa.

Neither institutional change would have been as significant as it was if it had not been for the major advances in photogrammetry that had taken place during World War II. These advances were not due to major innovations in equipment, but were the consequence of the vast increase in the use of photogrammetry during the war. This expansion had led to a reduction in the cost of photogrammetry through the production of better and more cost-effective cameras, plotting techniques and aircraft. The war had also led to the creation of a large body of trained personnel who could use the available equipment and methods. Radial line methods, first developed by Hotine in the 1920s, were used for the intensification of

ground control, significantly reducing the number ground surveyed points required, and cost of control surveys. Radial line methods were also used for plotting planimetry. There were still some difference between French and British practices, the French relied heavily on astronomically observed control points, whereas the British remained wedded to the use of triangulation methods. In part, this can be explained by the differences in the basic scales adopted. Whereas the British aimed, wherever possible for basic scale mapping at 1:50,000, French mapping varied between 1:50,000 and 1:200,000, depending on the density of population (Hurault, no date).

### **CONCLUSIONS**

Both France and Britain started from a similar base when, at the start of the twentieth century, they initiated mapping programmes in Africa south of the Maghreb. Both countries had some experience of colonial mapping, but due to institutional factors, this was often of little practical value when it came to mapping in Africa. In addition, the ground survey methods that had been developed and used elsewhere could not easily cope with the vast areas that needed mapping. As a result, by the outbreak of World War II progress had been patchy at best.

On the other hand, there was a huge extension in the land area covered by topographic mapping in Africa in the period between the end of World War II and decolonisation. Some colonies had been completely mapped, and others were well on the way towards completion. None of this would have been possible if France and Britain had not reformed the institutional basis of the mapping or implemented the major technical improvements in survey and mapping, particularly the adoption of photogrammetry, made possible by World War II.

### **REFERENCES**

- Collier, P, 2006, The Colonial Survey Committee and the Mapping of Africa, International Symposium on "Old Worlds-New Worlds": The History of Colonial Cartography 1750-1950 Utrecht University, Utrecht, The Netherlands, 20 to 23 August 2006
- Colonial Survey Committee, 1905 Minutes of the Colonial Survey Committee. PRO CO 879/87/8.
- Colonial Survey Committee, 1909, The Surveys of British Africa, Ceylon, The Federated Malay States, Jamaica, Trinidad, British Honduras, Fiji. The Annual Report of the Colonial Survey Committee. London: His Majesty's Stationary Office.
- Department of the Army, 1963, Foreign Maps, Technical Manual TM 5-248, Department of the Army, Washington, D.C.
- Holdich, T.H., 1891, African Boundaries, and the Application of Indian Systems of Geographical Survey to Africa, Proceedings of the Royal Geographical Society 13 596-607.
- Hurault, Louis., no date, Aerial Photography and Map-Making, Paris, Institut du Transport Aérien.
- MacGrath, Gerald, 1975, "From Hills to Hotine", The Cartographic Journal 13 7-21
- MacGrath, Gerald, 1976, The Surveying and Mapping of British East Africa, Cartographica Monograph 18.
- Parry, R.B. and Perkins, C.R. 2000. World Mapping Today 2nd ed. London: Bowker-Saur.
- Ridgeway, J.W., 1897, Papers relating to the Re-organization of the Ceylon Survey Department, Government Printer, Colombo, Ceylon.
- Sallat, Roland, 2003, De l'Empire Colonial aux Agence de L'I.G.N.: 1940-1973: Les Cahiers Historique de L'I.G.N. No.3, Institut Géographique National, Paris.
- Service Géographique de l'Armée, 1938, Le Service Géographique de l'Armée: son histoire, son organization – ses travaux, Imprimerie du Service Géographique de l'Armée, Paris