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## The Colonial Survey Committee and the Mapping of Africa

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### *Abstract*

Following the 'Scramble for Africa', Britain controlled large tracts of territory in a continent, which was almost completely devoid of good quality mapping. This paper will start by looking at the debates in Britain concerning the mapping of Africa in the late 19<sup>th</sup> century, in particular the arguments in favour of the 'Indian System'.

It will then look at the initial division of responsibilities, with boundary surveys being regarded as the responsibility of the imperial power, but all other mapping as the responsibility of a locally established survey department. The Second South African War revealed the deficiencies of this approach, leading to the establishment of the Colonial Survey Committee. This committee advocated a uniform approach to mapping in the colonies, with priorities, in part, being dictated by the needs of the Topographic Section of the General Staff.

The paper will look at the work of the Colonial Survey Committee prior to the First World War. It will discuss the priorities adopted in the context of the prevailing political situation and the distorting effects this had on the mapping programmes of the colonies concerned. Using the example of the Survey Department of Southern Nigeria, it will show how a Director of Surveys who saw his first responsibility as being the needs of the colony could be undermined, and ultimately replaced by someone more in tune with the perceived needs of the imperial power.

### *Introduction*

Following the 'Scramble for Africa', Britain was confronted by the problem of having theoretical control over large tracts of territory in a continent which was almost completely devoid of mapping. If these newly acquired territories were to be controlled effectively, they would need to be mapped. Of course, Britain was not alone in facing the problem of unmapped territory. France had, at least, made a start in North Africa, with mapping in Algeria, but most its territories were completely unmapped, as were those of Belgium, Germany and Italy. Even the old colonies of Spain and Portugal were virtually unmapped (Bartholomew, 1890). Of the 11.5 million square miles of Africa, Bartholomew estimated that detail survey covered only 200,000 square miles, topographic mapping some 440,00 square miles, detailed route surveys about 2.3 million square miles, general mapping about 4.8 million square miles, much of which he judged approximate, and some 3.8 million square miles was unexplored by Europeans.

The question of how Africa was to be mapped had exercised the minds of a number of leading geographers and surveyors during the last decades of the 19<sup>th</sup> century. As early as 1874 Warren discussed the problems that were likely to be encountered in a talk to the Geographical Section of the British Association. The first serious attempt to address both the kinds of surveys to be conducted, and the kind of

personnel needed to conduct those surveys, was that of Holdich (1891). In that paper Holdich recommended the adoption of the “Indian System” for use in Africa. This would involve triangulation by Europeans followed by a ‘graphic system of mapping .....by means of chiefly native labour’ (Holdich, 1891). 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).

Problems with a lack of mapping had also been identified as a result of the need to carry out boundary surveys between the newly acquired British territories, and those of the other colonial powers. As Holdich (1891) noted, previously Britain had rounded “off her territories with great natural barriers of sea and mountain”. All this had now changed, as the British territories in Africa had land boundaries totalling approximately 8,500 miles. British surveyors had been involved in the United States/Canadian boundary surveys, and in some boundary demarcations in the Balkans. The former had mainly required the astronomical determination of the 49<sup>th</sup> parallel (Anderson, 1876), while the latter mainly depended on the correct demarcation of watersheds. In both cases, this involved working in areas that were largely explored and inhabited. In Africa, the boundary demarcation parties often had to carry out surveys in areas that had been largely unexplored by Europeans and were frequently either sparsely inhabited or uninhabited. This meant that the surveyors had to cope with severe logistical problems, as well as with the difficulties of demarcations where the boundary had been delimited in the absence of any real knowledge of what existed on the ground (Collier, 2005).

Holdich returned to the issue of mapping in Africa again at a meeting of the British Association in 1900 (Holdich, 1901), again to stress the need for locally recruited and trained labour to carry out the bulk of the work. However, apart from boundary demarcation surveys and surveys of mineral rights, progress was extremely slow.

In British eyes the need for good quality maps of the recently acquired African territories took on a new urgency in the aftermath of the Second South African War. The Commission set up to report on the major British reverses suffered in the early stages of the war identified the inadequacies in the mapping as a significant contributing factor. Clearly, if Britain were to be involved in another war in Africa, it would need to ensure that proper mapping was available for the Army.

### ***Concerns about the proper running of colonial survey departments***

The establishment of the Colonial Survey Committee came at a time when the British Government was starting to take the whole matter of colonial defence more seriously. The Colonial Defence Committee had been established in 1885, within the Colonial Office, to advise colonial governments on how best to prepare for their own defence. However, the committee lacked senior representation from the Army and Navy and, in consequence, its advice carried little weight (Gordon, 1962). Following the debacles of the Second South African War, it was realised that imperial defence

needed to be put on an altogether more professional footing through the creation of the Committee of Imperial Defence (CID) by the Prime Minister Arthur Balfour. The CID was a Cabinet committee as, as such, carried a lot more political weight when it came to implementing the recommendations of the War Office Reconstruction Committee, the Royal Commission on the South African War and the Royal Commission on Militia and Volunteers. As part of the reorganisation following the establishment of the CID, the Colonial Defence Committee became, in effect, a sub-committee of the CID.

As noted above, one of the issues raised by the Royal Commission on the South African War was the poor quality of the mapping available to the Army at the outbreak of war. To prevent that problem arising again in the future, it was clearly necessary to put colonial mapping on a more systematic basis. Britain, the imperial power, lacked the resources to map the colonies. The Ordnance Survey was fully committed to mapping at home, and the Intelligence Division, War Office, had very few staff other than draftsmen. The solution was clearly that mapping of the colonies should be delegated to the colonies themselves. In fact, by 1900 most British colonial territories survey departments. What better solution could there be to the problem of providing mapping for future wars than to get the colonial survey departments to do the mapping on behalf of the imperial power? However, even where colonial survey departments had been established for some time, there were often concerns regarding their efficiency, and whether they were actually providing the kinds of maps that were required. 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). The map of the island that was then current, had been compiled in the early days of the British occupation by Fraser, and contained errors “so numerous and gross as to make it almost useless” (Ridgeway, 1897). The situation in Ceylon was deemed to be so bad that Holdich was asked to carry out an inspection and to make recommendations regarding the future organisation and work of the Survey Department (Ridgeway, 1897). If a long established colony, with an equally long established survey department had such problems, what could be expected of the new African colonies? To deal with the problem of ensuring that the colonies were properly mapped two approaches could be adopted, inspections carried out by ‘experts’, such as Edmund Hills, but including Holdich and Henry Lyons, and the establishment of an oversight and advisory body to act on behalf of the Colonial Office. In practice, both approaches were adopted, with the inspectors reporting back to the oversight body.

### *The establishment of the Colonial Survey Committee*

A memorandum from H.J. Read of the Colonial Office on ‘devising a comprehensive scheme for the survey of our Colonies and Protectorates in tropical Africa’ recommended :

- I A central Advisory Committee in this country
- II Properly organised Survey Departments in the Colonies and Protectorates themselves

Read (1905) noted that the general question of forming an advisory committee had been discussed Major Hills, Major Close, Major Watherston and the Director General of the Ordnance Survey. The advice was to establish a committee made up of representatives of Ordnance Survey (OS), Topographical Section, General Staff (TSGS) and the Colonial Office. The OS was to be represented as it was prepared to store all records and instruments, to instruct surveyors, to print all maps, except cadastral maps and to advise on technical points. It was recognised, however, that OS training was not quite what was required, what were needed were first class topographers as were found in the United States and India (Read, 1905). TSGS were to be represented, not only on account of the general interest which military authorities had in the preparation of proper maps of the colonial possessions, but also because they would prepare the maps for reproduction by the OS, and would prepare reductions on smaller scales. The involvement of TSGS would also avoid overlaps in responsibilities. In addition, it was recognised that many officers in TSGS had 'personal knowledge of the geography of the Colonies or Protectorates under discussion' (Read, 1905).

The need for properly organised survey departments was in the light of the South African experience where the existing surveys were not based on, or adjusted to the geodetic network. This had led to problems when compiling mapping for military purposes.

Read also advocated the use of Royal Engineer officers as Heads of Survey, and that locally trained native surveyors (on the Indian model) should be used. It was noted that Major Watherston had 'used such people on the Gold Coast Mines Survey' (Read, 1905).

The response to Read's memorandum came in the form of two letters from Lyttelton, the Colonial Secretary, to the War Office and the Board of Agriculture (responsible for the OS). In that letter Lyttelton makes the point that "a proper survey is also of great importance from a military point of view and the question may, therefore, be regarded as being to a certain extent an Imperial one" (Lyttelton, 1905). He then went on to propose the establishment of an advisory committee along the lines suggested by Read. Both the War Office and the Board of Agriculture wrote, agreeing to make the requested representatives available.

Close (1933) provides a slightly different perspective on the formation of the Committee, when he recalls the proposal to form a committee arising out of discussions between himself and Read. There is no mention of any involvement on the part of Hills, Watherston or the DGOS, but this may be due to Close being unaware that Read was also discussing the possibility with others. The discussions between Read and Close had taken place in the context of regular contact between TSGS and the Colonial Office. Under the Headship of Hills, the TSGS had become geographical advisor to both the Foreign Office and the Colonial Office. When Close took over as Head of TSGS in 1905, he continued what he regarded as an 'excellent custom' (Close, 1933).

### ***The Remit and work of the Committee***

The Colonial Survey Committee (CSC) met for the first time on 14 August 1905. Hellard, (DGOS), Close (TSGS) and Read (Colonial Office) were the main members with Sholto Douglas (TSGS) and Bottomley (Colonial Office) acting as secretaries. The minutes of the meeting (Colonial Survey Committee, 1905), record that the first business was to decide on the title of the committee. Although it was originally envisaged that the committee would only deal with survey in Africa, Close felt that the adopted title would permit the future extension of its scope to other British Possessions.

The committee then discussed the qualifications it thought necessary for anyone being considered for appointment in a colonial survey department. As there were at that time no formal British qualifications in surveying (Collier and Inkpen, 2003), the qualifications were, in fact, a list of things potential surveyors should know about, such as cadastral systems, or know how to carry out, such as the determination of longitudes by telegraph. However, the committee was not content just to set the standard for the future employment of surveyors, but also decided to circulate a form to Governors and Commissions of the Colonial and Protectorates to ascertain the qualifications of the surveyors already employed.

Hellard next stated that the OS was prepared to teach surveying to classes of not more than six, subject to the approval of the Board of Agriculture and the Treasury as an increase in teaching staff would be necessary. It was agreed that instruction would only be provided to personnel from survey departments, as other arrangements could be provided for those coming from other departments.

The next item on the agenda related to sources of recruitment of surveyors. Surveyors from Queensland and New Zealand were considered a possibility, as surveyors from both had been employed in the Gold Coast survey. Hellard also offered to lend OS surveyors when required. The possibility of employing a Royal Engineer surveyor in the British Central African Protectorate was considered, but it was felt necessary to ask the opinion of Sir Alfred Sharp, the Governor. To fill the subordinate positions it was felt that the Indian model, of employing and training natives, should be followed. This was, of course, in line with the advice that Holdich had been giving since the early 1890s.

It is clear from these agenda items, that the CSC did not limit its role to general oversight of surveying and mapping in the colonies, but also actively sought to influence both employment policy in the colonies and the training of surveyors. The next agenda items covered the preparation of maps and plans with a prescribed procedure of the map being prepared in the colony, it being sent to the colonial, from when it would go to TSGS for fair drawing or compilation, and from there to OS for printing. In addition, the committee laid down the approved scales for both topographical maps and cadastral plans. Topographical maps were to be produced at 1:62500, 1:125000, 1:250000, 1:500000 and 1:1000000, while cadastral plans were to be produced at 1:2500, 1:5000 or 1:10000. 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 minuted here, the sheet lines were to conform to those of the International Map of the World at one to one million scale.

The next item considered by the committee was the requirement of each Colony or Protectorate for surveying. It was decided that opinions should be obtained from the relevant Governors or Commissioners on:

- i. Areas for cadastral survey.
- ii. Areas for topographical survey, with the scale recommended for each area.
- iii. Existing state of surveys.
- iv. Order in which surveys should be executed.

It was decided that the best way to collect the information would be to send out index maps to be completed to show requirements over the next three to four years. The Colonial Office was also to draw attention to the importance of mapping in a systematic way, block by block, rather than adopting an *ad hoc* approach, or withdrawing surveyors to work on other duties. An annual report on progress was also required from each territory. The issue of inspections was also raised as an agenda item, but deferred to a later meeting (Colonial Survey Committee, 1905).

The main roles of the committee had been agreed by the end of its first meeting. It is clear from the minutes that the CSC would not be content to be simply an oversight body, but that it also intended to take an active role in directing policy and controlling the employment of staff. It is also clear that the military requirement for 1:2500000 mapping was informing its guidelines on mapping scales. In the light of the finding of the Commission report on the Second South African War, that is not surprising. However, when it is also remembered that, at that time, the Director General of the Ordnance Survey was a serving officer in the Royal Engineers, it is clear that the makeup of the committee would have tended to bias in its views in favour of military requirements.

Part of the duties of the CSC was the production of an annual report. The format of the annual report took a few years to settle down. In the first annual report (Colonial Survey Committee, 1906), it started with an Introduction, which included:

- i. Necessity for Explorations and Surveys
- ii. The Colonial Survey Committee
- iii. System and Method
- iv. Uniformity
- v. Topographical Maps and Plans
- vi. Map of Africa. Topographical Section General Staff
- vii. Employment of Natives
- viii. Geographical Attachment of Africa to Europe
- ix. The 30° Meridian Arc
- x. Boundary Commissions

Most of these entries are self-explanatory, but item vi. refers to maps of Africa at 1:1000000 and 1:2500000 that were being prepared at TSGS. Item viii. refers to the determination of longitudes and latitudes of places within Africa. The 30° Meridian Arc was the result of a proposal by Gill, His Majesty's Astronomer in Cape Town, to

observe a meridian arc in Africa, in the same way that Struve had in Russia, and Lambton and Everest had in India.

The bulk of the annual report was made up of reports from the various survey departments or on work being carried out by survey parties working in territories without a survey department. In the first year's annual report there were reports from the Anglo-Egyptian Sudan, the East African Protectorate, The Gambia, Gold Coast, Northern Nigeria, Sierra Leone, South Africa, Southern Nigeria and Uganda. The report notes that 'the Colonial Survey Committee is not concerned with the surveys of the South African Colonies, except in so far as Imperial interests are involved' (Colonial Survey Committee, 1906). Subsequently, the report makes clear what those Imperial interests are 'the provision of maps for the defence of the colonies'.

Subsequent reports start with general reviews of work over the past year in Africa. They then deal with 'regulations affecting survey departments', before going on to give the reports of the individual survey department. The reports are well illustrated with index maps showing progress with topographic and general mapping and have tables 'Showing the Progress made in the Delimitation of British Frontiers in Africa'. The reports of the individual survey department are a mine of useful information on the progress made in mapping British Africa, but they reveal little, or nothing of the work of the CSC. For that, it is necessary to turn to unpublished sources, the minutes and correspondence of the Committee. What these reveal is an organisation prepared to go to great lengths to achieved its aims, mapping in the Imperial interest. The extent of the interference of the CSC in the running of individual survey departments is best illustrated by the example of the Survey Department of Southern Nigeria.

### *The Committee and the Survey Department of Southern Nigeria*

The Survey Department of Southern Nigeria was created in 1906, following the amalgamation of Lagos and Southern Nigeria. Prior to that there had been a Survey and Lands Department operating in Lagos, under a Commissioner of Lands, who was also Colonial Surveyor. Survey work had been limited to cadastral surveys on or around Lagos Island, theodolite traverses to create a control framework, the determination of the longitude and latitude of the observatory in Lagos and a boundary survey with Dahomey. In Southern Nigeria there was a small Survey Department, which had been formed in 1901. Following the creation of a separate Survey Department, the staff comprised a Director, an Assistant Director, five surveyors and a draftsman (Colonial Survey Committee, 1906). This team was responsible for mapping an area of approximately 130,000 square kilometres, largely made up of flat forested or swamp lands. The terrain was almost uniquely difficult to survey using traditional land survey methods. Except in the East, away from the coast, triangulation was difficult, leading to the use of theodolite traversing to establish control frameworks. The dense forests meant that detail survey could not be executed except along the traverse lines, and the coastal swamps were only properly mapped in the second half of the 20<sup>th</sup> century using photogrammetric methods.

Following the creation of the Survey Department, the Director, Ernest Percival Cotton, saw the training of native surveyors as one of his major tasks. As Arden-Close

(1950) noted, this was in continuation of the work he had carried out while Commissioner of Lands in Lagos. Cotton was also concerned to extend the theodolite traverses, with his Department surveying 200 linear miles in 1906-07, together with 3,000 miles of compass traverses. However, what the new Survey Department did not produce in its first year of operation was maps (Colonial Survey Committee, 1906). This was to be the source of conflict with the CSC, culminating in the dismissal of Cotton and his replacement by Guggisberg, a Royal Engineer surveyor, who had previously been the Director of Surveys in the Gold Coast.

The conflict started with the entry for Southern Nigeria in the Second Annual Report (Colonial Survey Committee, 1907) when it was noted that:

A serious defect in the mapping of the area indicated is that the Director of Surveys has taken no steps to effect the delineation of relief or hill-features, whether by barometer determinations or by other recognised methods.

It went on:

Although a Survey Department has existed for about 6 years (this refers to the Lands and Surveys Department in Lagos), and although liberal funds have been allotted for the purpose of mapping this Colony, up to the present time (June 1907), no material fit to form a final map has been received by the Colonial Office. Much time appears to have been spent in the execution of traverses, many of which are of an unnecessary degree of precision; some of the methods adopted appear to show a want of a sense of proportion, and of appreciation of the truism that the Department exists not to make traverses but to make maps. No degree of technical excellence in details compensates for the fact that the main object in view has not so far been attained  
(Colonial Survey Committee, 1907)

It is clear that Cotton's professional competence, rather than his technical skill was being called into question. The response of Cotton came in the form of a letter to the Colonial Secretary forwarded as an enclosure in a letter from the Governor. It is clear from the Governor's letter (dated 15 December 1907) that dealing with Cotton was far from easy. In the letter he notes 'I find, and I understand others find this also, that it is most difficult to get him to place the results of his survey at the disposal of the Government and also to obtain any special information that may from time to time be required' (Egerton, 1907). He further recorded that he had to argue with Cotton, and finally give him definite instructions before Cotton would agree to show made road as they are depicted on Ordnance Survey maps.

Cotton's response is in the form of an item by item rebuttal of the criticisms levelled in the Annual Report (Colonial Survey Committee, 1907). The points dealing with relief depiction and costs are note worthy:

...In point of fact, the hill systems have been delineated (*vide* sheet already forwarded) and the heights of a large number of the chief hills

have been carefully determined barometrically, and are recorded on the plan in feet.

This serious alleged defect is, however, the least important factor in the topography of the area which has been surveyed during this year.

It is a fact that not two per cent. Of country dealt with is even moderately hilly; most of the hills are forest-clad, and, at close quarters, can only be seen occasionally through the thick jungle which frequently surrounds them; hence it will be seen that a survey sufficient to delineate them in proper “relief” would have cost more than could be allowed from our vote – if the prime factor were not to suffer at the expense of the minor ones.

10. A contour survey would certainly have been of value, but we had neither sufficient men nor money to carry out this work in such a manner as to make it of any great practical value.

11. In connection with this matter, it is rather interesting to turn to page 33-34 of the above-mentioned report and consider the map before you, and a mental note of the money spent out, the great praise given to Major Guggisberg who. It is unnecessary to mention, is a Royal Engineer. I have had an opportunity of seeing that map, but I have failed to discover either a contour or a hill thereon, yet no mention is made of “serious defects”. (Cotton, 1907)

The point about cost refers to the Gold Coast Survey having an annual budget £18,750, while that of the Southern Nigeria Survey was £7,593 (Colonial Survey Committee, 1907). He also noted that the first money voted for the ‘specific purpose of mapping this Colony appeared in the Estimates of 1907’ (Cotton, 1907)

Cotton (1907) also notes of there had been an error in attaining an unnecessary degree of precision it ‘is an error in the right direction’. He goes to the extent of quoting an extract from the report by Hills (1903) on survey in Canada to support his case “the maxim that what is worth doing at all is worth doing well, is eminently true of our national survey”. He then goes on to deal with the issue of traverses, arguing that maps cannot be made without first carrying out traverses, again supporting his argument by reference to Hill’s report.

What Cotton cannot have know, is that the War Office had already recommended his removal as Director of Surveys. In a note from the Director of Military Operations (DMI) dated 12 November 1907, the first manuscript map (a 1:125000 version of Sheet 73-E) from the Southern Nigerian Survey Department was criticised by Major-General Ewart. It was noted that the map was compiled from accurate traverses, but that ‘very little attention has been paid to detail off the line of traverse’. The map is similarly criticised for a lack of height information, for the fact that a large portion of the area is still unexplored and that the course of most rivers are unsurveyed. The sheet was compared unfavourably with those being produced of French colonies, such as Senegal, Madagascar and New Caledonia. Cotton is also accused of scattering his surveyors over three sheets, rather than concentrating on one

at a time, leading to inadequately and incompletely surveying a large area. The note end:

It would appear desirable to inform Sir Walter Egerton that, having regard to the length of time during which the Survey Department has been in existence and the amount of money spent on the surveys, the map cannot be considered satisfactory, and that it is doubtful if better results will be produced so long as the Directorship of the Department is held by Mr. Cotton.  
(Director of Military Operations, 1907)

Clearly, as early as November 1907 the military were indicating to the Colonial Office their wish to have Cotton replaced. That would be perfectly reasonable if, in their judgement, he was doing a bad job. The criticism that he lacked a systematic approach may have had some validity, but what of the criticism that the Survey Department was simply not providing an adequate return for the money invested in its work? Cotton was to answer that criticism in his letter of 5 December 1907, when he compared budgets with the Gold Coast, and mentioned that the first specific allocation of money for mapping not taking place until 1907 (Cotton, 1907). The length of establishment of the Survey Department was something of a red herring, as the DMI must have known that the survey Department had only been formed in 1906 and that the two departments merged to form it had had other duties. Indeed Close (1905), had noted that Captain Woodroffe, a Royal Engineer surveyor, had made little progress with the survey of Southern Nigeria for just the reasons Cotton was to advance for his own lack of progress (Cotton, 1908b), the constant diversion of his staff to other work deemed more urgent by officials in the Colony. In addition, Close must have been aware of the particular difficulties encountered by survey parties in Southern Nigeria. In a brief account of boundary survey work in Southern Nigeria he was to make reference to both the difficulties of the terrain and to the problem of illness (Close, 1932).

In January 1908, Cotton was in London and met Close to discuss the problems. Following the meeting Cotton wrote to Close claiming that ‘a grave misunderstanding (probably on my part) has been at the root of the matter’ (Cotton, 1908a). He stated that he had no knowledge of the function of the Colonial Survey Committee in determining how the surveys in Southern Nigeria should be conducted. ‘I was of opinion that it simply represented the War Office point of view, and that any representation which it might make to the Colonial Office regarding the work in question would be conveyed to the Governor in the usual way and, if necessary, to me through the Colonial Secretary’ (Cotton, 1908a). Cotton then covers a number of specific criticisms of the map (Sheet 73-E) discussed above. He then writes ‘no one is more anxious than I to fall in with the views of that body (the CSC), know as I now do that the Colonial Office desire that their views should be carried out as far as possible’ (Cotton, 1908a).

Despite the conversation with Close and the subsequent letter, the CSC was clearly still unhappy with the actions of Cotton. In the Minutes of its next meeting (27 January 1908), it recorded the recommendation that ‘Mr. Cotton should be informed that the Colonial Office did not approve of what he had done, and considered his

explanation in adequate. He should be directed to work to instructions which Major Close would draw up' (Colonial Survey Committee, 1908).

In March 1908 Cotton was sent detailed instructions, drawn up by Close, under cover of a letter from Cox at the Colonial Office. The letter also contained a direct threat that, if Cotton did not do as he was instructed, he would be fired (Cox, 1908). A day later, Cotton, who was still in London on home leave, responded, agreeing to do as he was told (Cotton, 1908c). It is clear that, during his home leave in London, Cotton had come to realise that the Colonial Survey Committee was not merely acting in an advisory capacity to the Colonial Office, but was, in effect, dictating mapping policy in the colonies.

It is clear from the correspondence that Cotton did not perform in the way expected by the CSC or the Colonial Office. In 1909 things came to a head when it was decided to send E.H. Hills on an inspection of the Southern Nigerian Survey Department (Colonial Office, 1909). Hills had been Close's predecessor at TSGS and had subsequently carried out a number of inspections in the East Africa Protectorate, Uganda, Federated Malay States, and Ceylon. He must have seemed the obvious man for the job.

In June, 1909, Hills reported back, writing both a detailed report and a covering letter. The letter is, if anything, more damning. In it Hills writes, 'I have been driven to the conviction that Mr Cotton is quite incompetent as a Director of Surveys (Hills, 1909). He goes on:

For some of the figures and facts in my report I am of necessity indebted to particulars obtained from Mr Cotton. I have, however, found him so inaccurate in his statements that it is dangerous to place much reliance upon information given by him, and, where possible, I have applied independent checks. Should, however, my report be seen by him he will doubtless contend that facts are wrongly stated and my deductions are thereby vitiated. In order to anticipate this objection, I should like to express my confidence that, while I may possibly be in error on some minor points, my main conclusions are incontestable.  
(Hills, 1909)

In the detailed report, in a section entitled *Scope and Cost of Survey*, Hills comments that 'such maps as have been produced show only the roads and tracks with little detail away from them, the work has not yet proved of any appreciable value for military purposes (Hills, 1909). Hills is also critical of the lack of triangulation, claiming that the use of tree or scaffold stations would have enabled triangulation to be used at no very extravagant cost. Cotton, having previously been accused of having not providing value for money, is now being criticised for not adopting even more expensive methods. Cotton is also accused of running an office, which lacked in method. It appears from Hills report that Cotton expected all of his staff to be able to perform all stages of survey, from observation through to the computation and plotting of results. Hills regards this in a very negative light. What he expected to find, was a department run on similar lines to the Ordnance Survey, where each stage was carried out by an individual just trained in that stage of the process. What Hills failed to understand, or did not want to understand, was that, in a small department,

having staff capable of carrying out any stage of the survey process was an asset, not a disadvantage, especially in an environment where staff were frequently ill from tropical diseases. If only one or two members of staff were competent to work as computers, any illness on the part of those staff would have had a serious impact on the Department's ability to function. Hills (1909) also comment unfavourable on the precision of observations, claiming that observations of a lower precision would have been adequate, and allowed for faster progress.

Hills wrote a section specifically on the survey school established by Cotton, in which he criticises the use of a native instructor and a want of method in the instruction. He claimed that the future of the school 'depends entirely upon the European instructor, who joins in July' (Hills, 1909). Finally, Hills (1909) discusses the work of the Intelligence Officer, Captain Beverley, stating that he had just completed a map of the Central and Eastern Province. Of this map he states 'there is no material for arriving at ground forms, but the map shows all important roads and tracks and is universally conceded, both by the military and civil authorities, to be of the greatest value' (Hills, 1909). In other words, maps produced by Cotton, which show only roads and tracks and very little detail away from them, have no appreciable military value, but a similar map produced by Captain Beverley is of the greatest value.

It was decided that the easiest way to deal with Cotton was to hold an enquiry into his qualifications. To this end Holdich and Hinks were appointed. Unfortunately, no terms of reference, sources of evidence or minutes of the enquiry survive. The only reason its existence is known is because Holdich and Hinks made certain recommendations in a memorandum preserved in a War Office file, probably part of the files kept by Close (Holdich and Hinks, 1909). In May 1910 Cotton was replaced, as Director of Surveys, by Major Guggisberg, formerly of the Gold Coast Survey (Colonial Survey Committee, 1910).

### *Conclusions*

It seems, on the evidence of the Colonial Office files cited above, that a Director of Surveys was replaced on the grounds of inefficiency. Although, it also appears that Hills, in particular, went out of his way to load the evidence against Cotton, even at the risk of being accused of double standards. Given that Close was heavily involved in the removal of Cotton, it seems rather strange to read in Close (1950) that Cotton, 'was, perhaps, the first to show that native West African can be trained to become useful surveyors'. In the whole piece there is little hint of all the problems discussed above, merely that under Guggisberg an efficient system was established and valuable results obtained. The question remains, valuable to whom? Was Cotton's 'crime' that he placed the interests of the Colony ahead of the Imperial interest? At a time when TSGS urgently wanted maps for military purposes, Cotton was expending effort on cadastral surveys, on training local surveyors, and conducting surveys of a precision that would be of long-term benefit to the Colony. Clearly Cotton did not realise who was really dictating policy. In part, this may have been due to a 'clash of cultures'. Cotton was an Australian, probably from Queensland. He had probably arrived in Southern Nigeria via the goldfield surveys of the Gold Coast. Unfortunately, there is no record of his career before he became Director of Surveys,

and none of his career afterwards. All that is known, is that he became a Fellow of the Royal Astronomical Society in 1905 and that the recommendation for a Fellowship has a mention of New South Wales and Queensland. Hills (1909) also mentioned that Cotton had purchased in Brisbane a steel tape being used for measurement by the Survey Department. However, one thing is clear, that Cotton, as an Australian surveyor, would have been properly trained and formally assessed before being licensed to practice. At that time no British surveyor would have been similarly qualified (Collier and Inkpen, 2003).

What is clear from the files of the Colonial Survey Committee, is that it was not set up just to act as advisors to the Colonial Office. From time to time, the minutes and correspondence of the Committee make it quite clear that the main role of the Committee is to ensure that colonial survey departments produced maps of value to the military authorities, in the Imperial interest. The replacement of Cotton by Guggisberg will have left all the other Directors of Survey in no doubt who were the real masters.

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