BOUNDARY SURVEYS AND DEMARCATION IN THE LATE 19TH AND EARLY 20TH CENTURIES

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Abstract

Much of 19th century colonial boundary making of the was carried out in conferences, by diplomats who were ignorant of the geography of the areas to be delimited. In an attempt to put boundary making on a more rational footing, two British army officers, Hills and Holdich, and a politician, Curzon, made a number of recommendations. As an experienced boundary surveyor, the suggestions of Holdich should have carried the most weight. However, while the ideas of Hills, Curzon and Holdich had much to commend them, with the notable exception of Holdich’s Argentine/Chile boundary in Patagonia, their ideas were rarely followed.

Introduction

The late 19th century saw an unprecedented growth in boundary surveys and demarcations. Britain was busy defining the territorial limits of its colonies (India and Burma) and dependent territories in Asia (Afghanistan and Egypt), the boundaries of its new colonial territories in Africa and the limits on its territories in the Americas (British Guiana, British Honduras and Canada). Some territorial boundaries were never fully defined and are still bones of contention between successor nations (Malaysia and Yemen). That these boundaries were often decided paying no regard to the wishes of the indigenous inhabitants is well known. What is, perhaps, less well known is that in most cases the boundaries of these territories were decided at conferences, often held thousands of miles away from the boundary itself, with little or no say given to the surveyors who would, ultimately need to define the boundary on the ground. As the post-colonial period has seen a consensus amongst the peoples of the former colonial territories to respect the colonial boundaries, the work of the diplomats who delimited the boundaries, and the surveyors who carried out the demarcation has left a permanent legacy in boundary markers on the ground and in the depiction of those boundaries on maps.

The consequence of boundary making by conference was that lines were drawn on a map, which often paid scant regard to the geography of the area to be divided. Ratzel (1897) made the first real attempt to bring some logic, or order, to bear upon the process of boundary making. In Ratzel’s (1897) view, the boundary was an abstraction and that what really existed was the border area. The boundary for Ratzel was like the skin of an organism that defended the organism, but also allowed exchanges to occur. Ratzel also viewed boundaries as a factor influencing state power, and as a measure of state power. A State would grow, or contract at its periphery. Strong states would grow by the absorption of territory from weaker states, or by their wholesale incorporation. Weak states would lose territory, either through the assertion of independence by peripheral territories, or by the loss of territory to neighbouring states. In viewing boundaries in this way, Ratzel was simply reflecting the growth of Prussia and the establishment of the German Empire through the 19th century. Ratzel also drew attention to the need for defensible boundaries, a view that was also held very strongly by the two major British writers on boundaries, Curzon and Holdich. While Ratzel’s attempt to establish general laws relating to boundaries has been shown to be futile because each boundary is unique (see Jones, 1945), nonetheless, his ideas were very influential in the boundary making of the early 20th century.

Types of Boundaries

Curzon’s Romanes Lecture on frontiers, given in Oxford in 1907, provides a very clear overview of British political thinking on the subject of boundaries (Curzon, 1907), while Holdich’s Political Frontiers and Boundary Making of 1916 provides a clear exposition of the views of someone intimately involved in the practice of boundary making and
demarcation over many years. The main ideas contained in both Curzon’s and Holdich’s work had been discussed a little earlier by Hills (1906). Although virtually unknown today, Hills was a key player at the time, a well-known astronomer and a Major in the Geographical Section of the General Staff (GSGS). He was sent on a number of tours of colonial survey departments and seems to have acted as a ‘trouble-shooter’. Of the three writers, Hills (1906) was the most outspoken in his criticism of boundary definition by diplomats ‘whose knowledge of geography may be small and whose knowledge of practical survey is nil’ (emphasis in the original).

Hills, Curzon and Holdich all held the view that boundaries could be described as ‘natural’ or ‘artificial’. By these terms they meant that boundaries were dependent on, or independent of, physical features such as rivers or mountain chains. These views were attacked since all boundaries could be regarded as being artificial. However, What Hills, Curzon and Holdich had in mind was that certain physical features were intrinsically more defensible. As Prescott (1965) noted, Curzon was very careful to distinguish between ‘natural boundaries’ based on physical features and a ‘class of so-called Natural Frontiers…namely those which are claimed by nations as natural on grounds of ambition, or expediency, or more often sentiment. The attempt to realize Frontiers of this type has been responsible for many wars, and some of the most tragical vicissitudes in history’. Nearly one hundred years after Curzon’s lecture, events in the Balkans, the Caucasus and the Middle East show this to be no less true today.

Curzon advanced three ideas which were subsequently used by others, and are restated here because they directly relate to the central focus of this paper. Firstly, Curzon classified artificial boundaries into three types: astronomical, mathematical and referential. Astronomical boundaries followed a parallel of latitude or a meridian of longitude, mathematical boundaries connected two specified points, while referential boundaries were defined relative to points or points, and could include arc or straight lines. Thus, the United States border with Canada is for much of its length an astronomical boundary as it follows the 49th parallel. That between Alaska and Canada is, in part, a meridional boundary. State and province boundaries in the United States and Canada are also largely defined astronomically. Mathematical boundaries are used to define the boundaries between Libya and Chad or Algeria and Niger, or of more relevance here, much of the boundary between Kenya and Tanzania. Referential boundaries includes much of the boundary between Gambia and Senegal, but are much more common in defining maritime boundaries.

Secondly, Curzon mentions the idea that boundaries could be frontiers of separation of contact. The old ‘Iron Curtain’ was very much a boundary of separation, while that between North and South Korea remains one to the present day. Boundaries within the European Union are boundaries of contact, especially those between signatories to the Schengen agreement.

Thirdly, Curzon drew attention to the need to constantly reconsider the suitability of frontiers in the light of changes in military technologies. This was to be a major factor in the thinking of military theorists, but went largely unconsidered by geographers for many years (Prescott, 1965).

While the types of artificial boundaries discussed by Curzon are easy to define on paper, they often posed significant problems when it came to demarcation on the ground. To understand the nature of the problems encountered by a boundary survey party attempting to mark an astronomical boundary, it is first necessary to understand the limitations of the survey techniques of the day. The nature of these problems can best be illustrated by looking at the work of particular survey parties. The simplest artificial boundary to define, is one which follows a line of latitude, such as the 49th parallel between the United States and Canada (Anderson, 1876). It was relatively easy, if time consuming, to determine the latitude of an unknown point. 19th century surveyors could have measured their latitude by reference to the elevation of the sun above the horizon. This did not give a very precise answer, so for more precise surveys, observations to stars were used instead. To carry out star observations for precise determination of latitude, it was also necessary to know the time to a high level of precision. In a time before time signals, this meant that the survey party would need accurate chronometers. Multiple observations of stars, using a zenith instrument, would then be needed to yield a latitude of sufficient accuracy. However, this simply gave the surveyor the position of the unknown point, not the position of the boundary latitude. To work out where the boundary was relative to the determined point, it was then necessary to calculated the distance on the ground of the required latitude from the determined point, based on an accepted ‘figure of the Earth’ (i.e. an accepted size of the Earth at that latitude). This distance could then be measured and check observations of latitude made on the line of the parallel if necessary. This would work reasonably well, so long as there were no significant gravitational anomalies. Once the position of the parallel had been found to the required precision, the point could be marked. The direction, or azimuth, of the parallel could then be determined by more astronomical observations. The whole process took, on average 7 days to complete for each surveyed point.
Unfortunately, to make matters worse, in the 49th parallel observations, there were significant variations in gravity, which meant that observed positions of the parallel did not lie on the same small circle (Anderson, 1876). This led to the boundary being defined as a series of lines joining observed latitudes, rather than a true parallel of latitude.

The boundary between The Gambia and Senegal was defined in part astronomically and in part referentially. The problems encountered by astronomical definition were little different to those encountered by the United States/Canadian survey party. The referentially defined part of the survey created new problems of its own. The agreed definition for the referential part of the boundary between The Gambia and Senegal was to be a line 10 kilometres from the banks of the River Gambia. The survey party was therefore charged with placing ‘at a distance of 10 kilometres from the banks of the River Gambia, cairns or marks at places near villages of any importance, at salient points on the curves of the boundary’ (Reeve, 1896).

The distances from the river banks were measured using a chain and compass capable of being read to 20’. The positions on the river having been previously determined by hydrographic surveyors. Questions arose regarding the necessity of defining on the ground the curves of the arcs that described the boundary. The British opted for a cost-effect solution whereby a limited number of points would be defined and the boundary would then be regarded as following a straight line between adjacent points. Since these chords would be territorially to the advantage of France, the French were happy to agree (Reeve, 1896). A further series of questions arose regarding the nationality of villages on the border. The British were prepared to take into account ‘local sentiment’ in deciding whether the village was in French or British territory. The French, however, insisted on a rigorous adherence to the letter of the agreement (Reeve, 1896). This stated that the village would fall wholly within the territory within which the majority of the area of the village was found to lie. The boundary was then moved 100 metres beyond the outer most yard of the village. No building was then permitted within 100 metres of the boundary (Reeve, 1896). In the 1896 survey season of three months, the Anglo/French carried out some 400 kilometres of traversing, partly independently and partly as joint parties, and 53 pillars or marks were put on the boundary. Given the laborious nature of chain surveying, and the type of country being surveyed, this represents very rapid progress and indicates the high level of professionalism shown by the Royal Engineers involved. It also demonstrates that a referential survey could be carried out more rapidly than the apparently much simpler astronomical survey.

A second type of referential survey was that carried out on the boundary between German and British East Africa. In this case the boundary was defined as a series of straight lines joining known points. Unfortunately, the known points turned out to occupy different positions to those that they were believed to occupy at the time of the Congress of Berlin. Triangulation, controlled by astronomical observation, was used to determine the position of the boundary during this survey. This technique was to become the norm for most future surveys. Smith (1894) gives some idea of how the survey was conducted. In this case, the latitudes of eight stations were determined astronomically and linked in to the triangulation scheme, which was made up of 86 triangles. In addition to the triangulation, a plane table survey was carried out of the topography either side of the boundary. The plane tabling was carried out by Imam Sharif, on secondment from the Survey of India. The inclusion of an Indian surveyor for the plane tabling had been at the suggestion of Holdich, who had advocated Indian survey methods for Africa (see Holdich, 1891). No British trained surveyor could have been used, as plane tabling had not been taught in Britain for the best part of a century (Collier and Inkpen, 2003).

One of the best documented examples of a boundary survey based on a ‘natural’ boundary was that carried out by Holdich on the Argentina/Chile boundary. Holdich wrote an account of the survey in The Countries of the King’s Award (Holdich, 1904), and there is Holdich’s official report (1903). The survey was necessitated by a dispute over the precise position of the boundary between the two countries in Patagonia. The continental divide, or watershed, had been designated as the boundary, and this had been assumed to coincide with the highest range of the Andes. Unfortunately, while the continental watershed did coincide with the highest range for much of the middle and northern parts of the boundary, in Patagonia this was far from being the case.

The task in this case was, therefore, to determine the position of the watershed and to put in place sufficient boundary marks to remove any future arguments over the true position of the boundary. The boundary marks would then need to be described and their positions determined as accurately as possible in the absence of a good geodetic network on either side of the boundary. In this boundary survey the major problems here were not ones that were intrinsic to the surveying, but rather, they were ones of logistics and weather. The positions of the boundary marks only needed to be determined approximately as they lay on a ‘natural’ boundary, and could be reinstated relatively easily if any were lost or destroyed. Should the positions subsequently need to be determined to a higher precision, that could be done by tying them in to a geodetic triangulation scheme (Holdich, 1903).
Holdich’s Disenchantment with what had gone before

Holdich’s reservations about earlier work on boundary definition can be summed up in three points; there were problems of definition on the ground, the boundaries lacked a defensible nature and they ignored economic realities. Curzon had recognized the problems of defining artificial boundaries on the ground. He had alluded to them in the Romanes Lecture (1907) when he talked about the need to clear a 100 yard swath of vegetation and to monument the boundary. Curzon also made the point that the demarcation of such boundaries was extremely costly in time and money. Curzon, however, seemed much less aware of the problems created for the surveyor by the inappropriate selection of a boundary. As an experienced boundary surveyor, what Holdich wanted were well defined and easily surveyed boundaries. From his work in South Asia, Holdich recognized that a line on the ground which did not relate to any kind of physical or cultural reality would not only be difficult to define, it would also be difficult to enforce. Holdich was well aware that the boundary between Russia and Afghanistan and Afghanistan and India were very porous (Holdich, 1916, pp.5-7). To the nomadic tribes people of the time nationality meant nothing, let alone national boundaries. In such circumstances, inappropriate natural boundaries would be of little use, and artificial boundaries would be even worse.

However, like Curzon, he recognized that not all ‘natural’ boundaries made good boundaries. The most obvious ‘natural’ boundary is a river, and rivers are commonly used as boundaries in many parts of the world. However, rivers are also commonly the physical entity that unites people. They have been conduits from trade and are often integral to the economic life of countries. They also serve to join countries. These important roles were recognized in the Congress of Vienna where special status was accorded to major waterways.

Artificial boundaries come in for particular criticism from Holdich, as they had from Hills. As practical men they knew that artificial boundaries posed technical problems for surveyors if they were to be demarcated at the level of precision required by the treaties governing them. As previously noted, the United States/Canadian boundary had been especially problematic, due to the difficulty involved in determining the precise position of the 49th parallel.

In addition to the cost in time and money that it took to carry out the demarcation of an artificial boundary, there was also the problem that, in settled areas, it was likely to cut through overlapping areas of settlement. By the time the boundary surveyors reach the Dakotas, they found Canadians south of the 49th parallel, and Americans to the north of it. Any line drawn through settled areas of Africa was bound to come up against similar problems. The only circumstance under which a straight line boundary was considered acceptable was in an uninhabited desert area, where the desert itself was believed to act as a defensible boundary. Unfortunately, the uninhabited desert areas of the late 19th and early 20th centuries were sometimes later found to contain mineral resources, which made them very contentious.

In addition to wanting boundaries which were easy to define and survey, what Holdich wanted was that boundaries should be ‘strong’. By this he meant one that was as short as possible, well-defined and defensible. For example, in his discussion of the boundary between the Belgian Congo and Rhodesia he differentiates between different parts of the boundary in terms of their strength (Holdich, 1916, p.237).

The dividing line between Belgian territory and Rhodesia is not an ideal boundary, but it is on the whole a natural boundary, definitely fixed, and should lead to no complications. It follows a fine watershed at the head of the southernmost affluent of the Congo till it is carried to the southern end of Lake Bangweolo, and from that lake to Lake Moreo it is defined by a connecting river.

This is a strong frontier so far. A straight line (which is never a strong line) connects Lake Moero with Lake Tanganyika and finishes off the southern borders of the Belgian Congo State.

It is interesting to note that this particular stretch of the Congo/Zambian boundary has still not been settled, 110 years after the boundary was first delimited, due to problems with the definition of the starting point on Lake Tanganyika.
Holdich’s recommendations

Holdich, like Curzon and Hills before him, believed that international boundaries were lines between enemies actual or potential. There are frequent references to this function of international boundaries. However, even before getting on to any discussion of the defensibility, or otherwise, of a boundary, Holdich believed that the first consideration had to be the acquisition of good geographical knowledge of the area to be delimited, normally in the form of properly surveyed maps. In his view, most 19th century boundary making had been bedeviled by the inadequacy of the geographical knowledge of those delimiting boundaries.

To Holdich:

The delimitation of a frontier is the business for the treaty makers who should decide on trustworthy evidence the lines of a frontier delimitation which will be acceptable to both the high contracting parties with all due regard to the local conditions of topography and the will of the people who are thus to have a barrier placed between them.

Holdich (1916, p.179)

It is in the assertion that good geographical knowledge needs to precede any attempt at boundary delimitation that Hills (1906) and Holdich (1916) make their greatest contribution to the literature on boundary making. As anyone who has read the reports of the boundary commissions will know, the reports often contain the first real description of the area being demarcated. It was common for the parties to include scientists, such as botanists and geologist, to collect geographical data whilst the demarcation was in progress. If it is necessary to carry out a boundary delimitation in a previously unexplored area, Holdich is clear, that:

If, indeed, it is compulsory ignorance, if there is no possibility of waiting till maps can be made, and arbitrators are forced into the position of adopting the worst of all possible expedients – the straight line – a provisional or elastic agreement must take the place of a more elastic boundary.

Holdich (1916, 184-85)

It is also clear from the above the kind of boundaries that Holdich thought desirable. Boundaries should, wherever possible, follow natural features. Ideally, they should be watershed boundaries of the kind used in his demarcation between Chile and Argentina. They should be defensible, bearing in mind the military technology in use at the time of demarcation. Like Curzon (1907), he would also like the possibility of revision in the light of changing military technologies. However, both Curzon and Holdich are, at best vague about how this could be achieved. To ensure a more defensible boundary, it would be relatively easy for a strong power to force a boundary revision on a weaker neighbour. However, a strong power would have little need for such an arrangement with a weaker neighbour. Where it would need one would be with a stronger neighbour, a neighbour much less likely to agree to such an arrangement.

Holdich also believed in trying to get the agreement of the people living in the border region to alignment of the boundary. This belief is a recurring theme throughout his work and, no doubt, derives from his experiences on the borders of India and Afghanistan. However, as noted above in the case of the Gambia, this was already common British practice, even if other powers were happy to ignore the wishes of the local population.

In the light of all the problems discussed in his book, and elsewhere, he hoped that things would be different in future:

It may be assumed that no future treaty-maker or boundary-delimiter would care to face the risks of failure by following the methods of a past generation of political blunderers.

Holdich (1916, p.180)

Holdich did not, however, restrict his argument to the physical nature of the boundary and the views of the local population. He also believed that due regard to be paid to economic issues, for example transport. Good transport links would aid the defensible nature of the boundary, but they would also foster the economic development of the border region and possibly trade across the boundary. Encouraging development, and hence settlement, of a border region could rendered it more defensible.

Boundary Making Post World War One
In the post-World War One settlement it would be natural to assume that, where new boundaries involving British interests were to be defined, the ideas of Curzon and Holdich would have played a significant role. By then Curzon had been a major figure in Asquith’s Coalition Cabinet, Lloyd George’s War Cabinet and was to be Foreign Secretary in Lloyd George’s Coalition Cabinet. Holdich had been President of the Royal Geographical Society and had written and spoken on numerous occasions about the form that boundaries should take. However, this was far from being the case. It is not so surprising that their ideas would carry little weight in Eastern Europe, President Wilson’s championing of ‘self-determination’ meant that ‘local sensibilities’ played a significant role through the use of plebiscites (for example, to determine the boundaries between Poland and Germany). In some cases, those on the victorious side simply took what they wanted without regard for ‘natural’ boundaries or the wishes of the population (see MacMillan, 2001 for details). In the cases of territories being acquired by Britain as ‘protectorates’ or mandates, some recognition of the ideas of Curzon and Holdich should have played a role. Even here, however, there is little evidence that much thought was given to ‘natural’ boundaries or to strong boundaries.

To take first the example of the Palestine/Syrian boundary which was subject to demarcation in 1921-22 (Newcombe, 1922). The negotiations between the British and the French over spheres of influence in the Middle East had pre-dated the collapse of the Ottoman Empire. The French had ‘historic’ claim in Lebanon/Syria, which they expected to see recognized in any settlement. The British were keen to provide a buffer between the Suez Canal and any potential aggressor but were also interested in the possibility of controlling and moving oil from the oilfields in southern Persia and Mesopotamia to termini on the Mediterranean coast. They were also interested in the possibility of opening up an air route to India, if possible over British controlled territory. Additional concern were the fulfillment of the promises made in the ‘Balfour Declaration’ and in the Arab Revolt.

The divisions between British and French spheres of influence in Palestine/Syria were largely defined in the Sykes-Picot Agreement of 1916 (see Laqueur, 1969, for the text of the agreement, and Fromkin, 1989, or Stein, 1961, for its implications). However, these were somewhat modified in the light of events with the British sphere being defined as stretching as far north as Tel Dan to allow it to conform to the Biblical description of Israel as stretching from Dan to Beersheva. When the time came to carry out the demarcation of the boundary, the approach that was adopted owed little to the ideas of Curzon or Holdich. The account provided by Newcombe (1922) of the demarcation shows that it rarely conformed with any possible definition of defensible boundaries. The northern boundary (with modern day Lebanon) sometimes followed a watershed, but often followed a thalweg. For example:

The frontier leaves the Mediterranean Sea at the point called Ras el Nakurah and follows the crest of the spur to cairn 1 situated 50 metres North of the Palestinian police post of Ras el Nakurah.
Thence the frontier follows the same crest to cairn 2 at Khirbet Danian.
Thence it follows the same crest to cairn 3 which is an old point of triangulation 400 metres South-West of Labuna Village……

Thence it follows a straight line to cairn 25 situated in the valley, on the East bank of a thalweg 600 metres North-West of the village of El Malkiyeh.
Thence it follows the thalweg in a generally Northern direction to cairn 26 situated where the thalweg is cut by the path from Kades to Aitherun.

Later, part of the boundary with modern day Syria is described as:

Thence it follows a straight line to cairn 44 situated at the junction of the path from Muddahad to Baniyas with the thalweg from Ain Fit to Seid Huda Ibn Yakub.
From this point where the contour 180 metres passes, (this contour must remain entirely in Palestine to permit the construction of a canal,) the frontier follows a succession of straight lines from cairn to cairn …

When the boundary reaches the area of the Sea of Galilee the boundary is describes as follows:

After cairn 60 the frontier follows a line parallel to and 50 metres East of the Eastern branch of the Jordan to the mouth of that branch in Lake Tiberius. From the mouth of the Jordan to the sulphur springs at Messifeh where is placed cairn 61, the frontier follows a line on the shore parallel to and 10 metres from the edge of Lake Tiberius following any alteration of level consequent on the raising of its waters owing to the construction of a dam on the Jordan South of Lake Tiberius.
Although much of this does not conform with Curzon’s or Holdich’s ideas of boundary definition, it becomes even more complex as a consequence of Article V of the Convention of 23rd December 1920, which defined the boundary. Article V allowed for joint Palestinian/Syrian access to a railway station at Semakh and for extra territoriarity of the railway between Semakh Station and a landing stage on Lake Tiberius. In addition, citizens of Lebanon and Syria ‘shall have the same fishing and navigation rights on Lakes Huleh and Tiberius and on the river Jordan between the said lakes as the inhabitants of Palestine’ (Newcombe, 1922). This seems to have been a sensible, pragmatic solution to the definition of a boundary between the overseas territories of two countries that had just fought a war as allies. However, it bears little relationship to the ideas of Curzon and Holdich and, following decolonisation, the boundary has been a source of conflict.

As the boundary between Palestine and Syria was an Anglo-French affair, its failure to meet the requirements of Curzon and Holdich could be explained in terms of the need to satisfy the French. However, the boundary defined between Trans-Jordan (modern day Jordan) and Iraq was a wholly British affair, as was the boundary between Trans-Jordan and Palestine and should therefore have conformed to the requirements of Curzon and Holdich, if their theories of boundary making was having any impact on the process of boundary making. As can be seen in Figure 4, the boundaries of modern day Jordan with Syria, Iraq and Saudi Arabia are defined by a series of straight lines, while that with Palestine (taken to be Israel and the Occupied Territories) is defined by the Jordan River as far as the Dead Sea, where it is a mid line for much of its length. Between the Dead Sea and the Gulf of Aqaba (Gulf of Elat) it follows the thalweg of the wadi Arava (Araba), flowing south into the Gulf of Aqaba. Not all of the boundary between the Dead Sea and the Gulf of Aqaba dates from the Mandate, as there has been an amicable adjustment of the boundary since the Peace Treaty between Jordan and Israel in 1994 (Israeli Ministry of Foreign Affairs, 2004).

The boundary between Trans-Jordan and Iraq was also initially an all British affair, with the British dividing up part of their mandated territory between two client rulers, the brothers Faisal (who was appointed King of Iraq in 1921) and Abdullah (who was made ruler of Trans-Jordan in 1922). The first attempt to define the boundary was in the Trans-Jordanian Nationality Law of 1 June 1928 when it was described as:

A line drawn from the intersection of meridian 39° east and parallel 32° north to the nearest point on the frontier laid down in Article 1 of the Franco-British Convention of 23 December, 1920.

Realising that this was not a very satisfactory arrangement, and that the boundary needed to be agreed between the two countries, in an exchange of letters between the Iraqi Prime Minister, Nuri as-Sa’id, the British Resident in Amman, C.H.F. Cox and King Abdullah the boundary was described as:

The frontier between Iraq and Trans_Jordan starts in the south at the point of junction of the Iraq–Nejd frontier and the Trans-Jordan – Nedj frontier and ends in the north at that point on the Iraq – Syria frontier and Trans-Jordan – Syria frontier, as ultimately delimited, which is the nearest to the summit of the Jebel Tenf. Between these two terminal points the frontier follows where possible prominent physical features, provided that it shall not diverge more than 5 kilometres from a straight line between these two terminal points.

(US Department of State, 1970)

Clearly, in this case, there was an attempt to make the boundary conform to something approximating to a watershed, but not if it deviated by too much from a pre-determined straight line. Since this line was in the middle of a desert and almost devoid of habitation, Curzon and Holdich would have had no objection to a straight-line boundary. They believed that desert boundaries were inherently defensible and were unlikely to provoke conflicts. Unfortunately, the nature of warfare, and hence the defensibility, or otherwise, of boundaries, was to change dramatically over the next few decades, while the boundaries were not changed to accommodate the new realities of warfare. In addition, a number of these straight-line desert boundaries were subsequently found to run through areas of mineral wealth and were, therefore, likely to be contested.

Conclusions

Despite the published advice on boundary making from Holdich, Curzon and Hills, the delimitation of most of the new colonial territories, acquired as a consequence of the First World War, was largely carried out by diplomats, who
continued to work in ignorance of the geography of the areas of Asia or Africa to be delimited. Later writers all cite Holdich as the leading British expert on boundaries in the early 20th century. However, while he was regarded as an experience practitioner of boundary demarcation, his ideas played little role in the practice of boundary delimitation.

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Biography

Peter Collier is a Principal Lecturer in the Department of Geography, University of Portsmouth. Prior to becoming an academic, he worked for nearly seven years at the Directorate of Overseas Surveys in photogrammetry and cartography.

Peter’s main teaching is on the undergraduate and postgraduate programmes in GIS, where he teaches about spatial data acquisition, using ground, air and satellite based systems. He also teaches the history of cartography and historical geography as part of geography programmes.

Peter’s main research areas relate to the history of surveying and mapping, both in their own right, but also the interaction between surveying and mapping, and the development of geography as an academic discipline in the English speaking world. Peter took part in the Exploratory Essay Initiative for Volume 6 of the History of Cartography, and has joined the board of advisors for Volume 6.

He also works on the application of surveying and photogrammetric techniques to mapping and monitoring at a range of spatial scales. Recent work has included the monitoring of stone decay on historic buildings, ice accretion on aerofoil sections and changes in inter-tidal vegetation caused by eutrophication. Peter will be taking part in the monitoring of the drying phase of the Tudor warship, the Mary Rose. As part of the preparations for this study, he is currently undertaking photogrammetric monitoring of timbers from the Swedish ship, Vasa, as they are exposed to changes in relative humidity.

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