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Seeing the Copperbelt: Science, mining and colonial power in Northern Rhodesia

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ABSTRACT

This article explores the relationship between science and the extension of colonial power through an examination of the rise of the Northern Rhodesian (later, Zambian) Copperbelt in the 1930s. The rise of the Copperbelt rested in part on scientific prospecting operations perhaps unparalleled in size and scope in the world at the time. These operations brought new 'scientific' prospecting techniques to the area which enabled the Northern Rhodesian subsurface to be 'seen' in new ways. The seemingly universal and fixed knowledge scientists produced served both political and commercial aims, animating the 'civilising' project of imperial power and transforming a newly acquired territory into a profitable annex to empire. Two prospecting operations are explored in detail: (1) the first large concession floated as the Rhodesian Congo Border Concession and (2) the first attempt to use geological science to generate a complete geological map of mineral resources on the Copperbelt in the Nkana Concession. Examining the efforts of these two prospecting operations reveals the methodological, theoretical and epistemological challenges of producing a viable mineral investment and practicing science in the periphery. Finally, the disconnects between the logics and goals of science and those of colonial extraction in Africa are explored. Here it is argued that it was the very malleability of the knowledge produced by European scientists, rather than its abstract fixity or placeless universality, that enabled it to become part of wider political and economic flows.

1. Introduction

In 1926 Northern Rhodesia[1] stood on the cusp of what the government described as "one of the greatest mineral developments ever experienced."[2] Within a few years the Nchanga, Nkana, Roan Antelope and Mufulira mines of the Northern Rhodesian Copperbelt would sweep onto the world investment stage in a shower of publicity. Between 1930 and 1964 Northern Rhodesia was transformed from a colonial 'backwater' into a key asset of the British Empire and one of the world's largest exporters of copper (Parpart, 1983). As one journalist noted in the early days of this change:

> "In no other area of the world has there been, during the present century, such a transformation of social values, such a development of commerce and industry and transportation, or such an intensive application of scientific knowledge to so large a region previously so primitive and so little known" (Letcher, 1932, p. 15)

Only a few years previous, the future had looked bleak. In contrast to the success of mining in the Katanga region of Congo just a few dozen miles to the north, the challenges of mining in Northern Rhodesia had earned it a reputation as the graveyard of mines, not their birthplace (Gann, 1969). A sparsely populated land-locked country with few resources and little investment had poor prospects in a policy climate which demanded that the colonies pay their way. It was a dramatic turnaround.

This dramatic rise was no mean feat. It rested in part on a prospecting operation perhaps unparalleled in size and scope in the world at the time. Capital poured into Northern Rhodesia as prospectors walked millions of miles and deployed a range of expensive and cutting-edge technologies to uncover one of "the world's great subterranean storehouses of wealth" (Rhodesian Mining Journal, 1932, p. 457). Bringing new prospecting techniques to the area enabled the Northern Rhodesian subsurface to be 'seen' in new ways. Centrally, these operations revealed copper sulphide ores which had previously been "masked by deceptively poor-looking outcrops" (Wilson, 1992, p. 132). This article examines the complexities of this process of prospecting on the Northern Rhodesian Copperbelt and its role in the extension of colonial power. Two prospecting operations are explored in detail: (1) the first large concession floated as the Rhodesian Congo Border Concession (RCBC) and (2) the first attempt to use geological science to generate a complete geological map of mineral resources on the

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[1] This article uses the term 'Northern Rhodesia' to describe the territory of colonial Zambia before 1964. This is done for reasons of simplicity and clarity as the territory held multiple names and administrative forms prior to amalgamation in 1911 (Gann, 1969, p. 80, f.n.).

[2] National Archives of Zambia, Lusaka (henceforth, NAZ) RC 1375 Mining and geology, General review mines department staff and work 1932, p. 2.

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Copperbelt on the Nkana Concession. Examining the efforts of these two prospecting operations reveals the methodological, theoretical and epistemological challenges of producing a viable mineral investment and practising science in the periphery. The final section then considers the imbrications of knowledge production and economic and political goals in the late colonial period, arguing that disconnects between the logics and goals of science and those of capitalist extraction meant that the linkages between knowledge production and colonial power were problematic and often tenuous. Before all this, the paper begins by exploring debates on the key linkages between science and empire.

2. Seeing colonial natures

The idea that knowledge generation underpins the extension of colonial power has much traction in contemporary geographical research, and for good reason. Science has provided the basis for the expansion of European colonial power from its earliest days with European colonialism "as much a scientific process as an economic and military one" (Sörlin, 2000, p. 51). Much has been written on these processes in the early colonial period (Hodge, 2011). Exploration cartography, in particular, has come to be an emblematic study for exploring the linkages between knowledge production – or 'science' – and the extension of colonial power into new areas and relationships (Butlin, 2009; Craib, 2004; Escolar, 2003). Certain practices of scientists in the colonies flourished as the knowledge produced served both political and commercial aims, animating the civilising project of imperial power and transforming newly acquired territories into profitable annexes to empire (Drayton, 2000). This section discusses how the activities of scientists, and geologists in particular, work to enable the extension of colonial power before reviewing recent critiques of the relationship between colonialism and science that draw on detailed examination of the practices of scientists.

European colonial powers' capacity and mandate to rule was founded upon the apparent universality, solidity and pre-eminence of scientific truths. Scientific appraisals produced a systematic and understandable totality from colonial natures useful to commercial and governmental actors through simplification, abstraction and ordering. James Scott describes the process of simplifying complex realities, such as the colonial natural environment, as rendering 'legible' (1998). Rendering legible classifies and orders the complexity and chaos of the natural environment into a rationalised, standardised and "administratively more convenient format" (Scott, 1998, p. 3). This rendering legible is a central process in the conversion of nature from biophysical environment to an object of human action, of producing nature (Bridge, 2007; Howitt, 2001). Scientific descriptions, charts and formulae offered an appearance of secure understanding upon which to intervene, invest and re-order social and environmental relations, imposing regularity, order and clarity on distant complexity (Livingstone, 2003; Stafford, 1990). These appraisals worked to render natural resources visible, legible and – through the imposition of 'scientific order' – calculable (able to be represented in numerically quantifiable ways which could then be used in calculations), enabling nature to be understood and depicted in ways which encourage and support investment (Demeritt, 2001; Gregory, 2001; Scott, 1998). Through the knowledge produced by European scientists, colonial natures were simplified to produce both natural order and disordered nature (Gregory, 2001; Scott, 1998). Foreign unruly natures might be tamed to the path of development and their resources unlocked. In the colonial setting, as Joseph Hodge argues, "staging science as an expression of western dominance was an important facet of colonial rule, lending legitimacy to the ideologies of improvement and rationality that underpinned the new structures of state power" (2011, p. 12). The activities and knowledges of European scientists actively conjured a space which could be known and thus acted upon confidently, legitimating and supporting the rise of "interventionist colonialism" in the early twentieth-century (Tilley, 2011, p. 11).

Geological science in the colonial period was advantageously placed at the intersection of commercial and governmental interests, particularly in a territory like Northern Rhodesia where mining was at the heart of the ambitions of the colonial state (Stafford, 1990; Zeller, 2000).[3] The exploratory nature of geological science performed multiple political and economic functions in extending claims to space and enabling the development of extractive commercial relations. Geology has long been imbricated with the ideologies of empire, with some of geology's leading lights being among the strongest proponents of the expansion of British Empire in the nineteenth-century (Secord, 1982). Geological maps were key ideological and commercial tools as they "symbolised regularity and improvement: they graphically charted the European conquest of the peripheral wilderness"(Stafford, 1990, p. 73 and 74), enclosing landscapes and extending the dominion of colonial power (Naylor, 2011; Secord, 1982). In symbolically taming the wilderness of the African interior and revealing them 'in truth', scientific maps of the Northern Rhodesian subsurface produced a stable and detailed understanding upon which plans for manipulating the newly visible natures could be made. Geological science appraised nature in ways which held commercial significance. The geological maps drawn up in the nineteenth century not only charted the potential contours of strata and geological formations; they charted the probability of the occurrence of specific potential mineral deposits, deposits which held economic value. As Braun argues, geological knowledge linked nature with distant investment markets as the "geological language of probability speaks in the tongue of an economic and political language of possibility" (2000, p. 25). Through the work of prospectors and geologists, the Northern Rhodesian subsurface was produced as a 'resource' and made amenable to specific forms of analysis and understanding. Difference was produced. Gone was the homogeneity of the flat, gently undulating plateau of the Copperbelt, rendered into sight was its 'inner architecture', its distinct strata, layers, contours, ruptures, continuities, folds, faults, varying mineral properties, and with this, its potential economic value (Braun, 2000; Gregory, 2001). Through the practices of economic geology, elements of nature were able to move into the logics of capital as a commodities which could be priced and exchanged on global markets (Castree, 2003). Linking commercial and territorial expansion, geology, like its sibling geography, was an archetypal imperial science.

While the role of science underpinning the extension of colonial power has been relatively uncontroversial, recent analyses have sought to complicate directly instrumentalist understandings of the relationship between science and empire through careful examination of the practices and networks of science and scientists. One strand of analysis destabilises scientists' claimed ability to establish 'universal' and placeless truths, while a second highlights the often awkward relationship between scientists and their masters in colonial bureaucracies. To begin with this first strand, European science's claim to authority stemmed from producing a placeless 'view from nowhere', understandings which are 'objectively true' everywhere, transcending the location in which they were originally produced (Bourguet et al., 2002; Naylor, 2005; Shapin, 1998). Counter to this, a number of recent studies have highlighted how making science and knowledge travel was a problematic endeavour which relied upon multiple explicitly spatial

[3] This article consciously skirts detailed discussion of the history of geology as a science. For more comprehensive explorations of the science's intriguing history, see Porter (1978), the works of Secord (1982, 1991), Stafford (1989, 1990) and Rudwick's remarkable *Bursting the Limits of Time* (2007).