

REFLECTING ON THE COLONIAL LEGACY OF GEOSCIENCE IN AFRICA

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As this issue of *Elements* clearly demonstrates, carbonatites are unique and fascinating igneous rocks, with incredibly diverse mineralogy, that also represent vital resources of critical metals, such as the rare earth elements and niobium. Although carbonatites are now known worldwide, much of the early work to identify them was done in Africa, particularly around Oldoinyo Lengai (Tanzania) led by the late John Barry Dawson (1932–2013). Barry was a professor at the University of Edinburgh (UK) when one of us (KG) was there during the 1990s doing a PhD on alkaline igneous rocks and carbonatites; his interest and enthusiasm for the subject was infectious. Barry's initial work on Oldoinyo Lengai, and his recognition of it as a carbonatite volcano, was done when he was a geologist for the Geological Survey of Tanganyika, around the time of Tanzanian independence. This was a time when colonial attitudes still strongly governed the way geological work was done in Africa, and the early papers on carbonatites abound with names of former colonies such as Rhodesia, Nyasaland, and South-West Africa.

The Geological Survey of Tanganyika was part of the Directorate of Colonial Geological Surveys, an organisation established in 1947 and based in London (Dixey 1957). This organisation provided geologists, geophysicists, geochemists, and mineral resource experts to geological survey organisations across Africa. Most of the geoscientists were graduates from British universities; reports from the time draw a tacit distinction between the skilled expatriate geologists and the local staff (who were rarely, if ever, mentioned). Part of the directorate's work was to understand mineral resources in what were once British colonies, and Dixey's 1957 review stated that it "paid particular attention to carbonatite complexes and has done much to stimulate interest in these potentially economic deposits."

In 1958, the directorate was renamed the Overseas Geological Surveys, which later became integrated as the Overseas Division of the Institute of Geological Sciences in 1964. The institute eventually evolved into the British Geological Survey (BGS), which continues to deliver international research and partnerships, in which the present authors are heavily involved. A 1977 review of the work of the Overseas Division noted baldly that "in most newly independent countries, there are few experienced indigenous geologists to staff a geological survey" (IGS Overseas Division 1977). Clearly, this situation was in large part a consequence of the colonial approach, which had offered few, if any, opportunities for local geologists to gain training and experience. For the rest of the twentieth century, the response to this continued to be the secondment of expatriate geologists to work in overseas geological surveys. However, this was accompanied by a gradual increase in training and development opportunities for local colleagues.

At the BGS, we have been working for some time to move on from this colonial legacy. We now focus on building and sustaining partnerships with African geological surveys and their geologists, working together to exchange knowledge, expertise, and skills. However, remnants of the colonial approach undoubtedly still remain across the geosciences and more widely. There is still far too much evidence of "parachute science", whereby UK and other scientists from the Global North design and win projects, visit African sites, collect data, and write papers without involving African colleagues beyond the arrangement of logistics (North et al. 2020). International support for geological surveys and other geoscience organisations in Africa is all too often short-term: equipment may be purchased and data gathered, but there is limited support for the management, maintenance, and use of those assets once the international funds are no longer flowing. Changes in international aid budgets and focus, for example due to COVID-19 (Brown 2021), can have a significant impact on geoscience organisations in lower- and middle-income countries. There is a need for sustainable, long-term



FIGURE 1 Geologists from the National Minerals Agency of Sierra Leone and the British Geological Survey on a joint field trip in Sierra Leone. PHOTO CREDIT: BRITISH GEOLOGICAL SURVEY 2018.

international funding, as illustrated by Swedish support for national research systems (Fellsson and Mählck 2017).

We discussed this text with our colleague Prince Cuffey, Director of the Geological Survey within Sierra Leone's National Minerals Agency. He agreed with many of the points made here and emphasised that partnerships need sustainable funding to ensure meaningful progress. He also made an important point: he, like many other leaders in African geoscience institutions, has experience across the different sectors, having previously worked for exploration and mining companies. All too often, those companies were headquartered overseas, not in the country where they were actively working; when they closed their operations, their data and information left the country with them. Prince gave the example of Sierra Leone's carbonatites. As a company geologist, he was involved in geochemical exploration over aeromagnetic anomalies that marked carbonatites, so he knows the dataset exists, but the company left Sierra Leone without ever submitting their data to the Geological Survey. This happens time and again, and it is vital that geoscientists ensure that datasets collected in one country are also delivered to the appropriate institution in that country.

The "decolonisation" of geoscience calls for us all to address the factors over which we have influence, i.e., those that may sustain or create additional inequalities. This is an opportunity for geoscience organisations—including the BGS—to critically reflect on how UK colonial history shaped our discipline, and on subsequent progress. We also need to consider the attitudes and challenges that remain today in our organisations and the way in which we undertake our work in former colonial countries. Many of us have inadvertently made mistakes at times, which we need to recognise, reflect on, and learn from. Developing this deeper understanding of the issue, and openly acknowledging our history, will enable us to confront unequal power relations and inequality in accessing knowledge, data, and resources. It will also improve our organisational practice in equality, diversity, and inclusion, as well as our engagement with external partners in science that itself can support international development. Ultimately, we aspire to sustainable, equitable partnerships with African geoscience organisations, so that together we can continue excellent research—on carbonatites and on many other topics!

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