UKSG

The once and future library: the role of the (national) library in supporting research

The global research environment is changing rapidly and with it the role of libraries in facilitating research. Taking the British Library as an example, this article provides a situational analysis of the challenges research libraries face in this context. It outlines a new, or at least modified, role for research libraries, taking the emerging research services strategy of the British Library and its 'Everything Available' change management portfolio as an example. It argues that if libraries want to keep adding value to the research process, they need to shift their thinking from focusing on local collections to contributing to a global knowledge environment – in a persistent and open fashion.

Introduction

'Of course, you always liked books', said a relative when he heard I was taking on a role at the British Library. Now, I have always liked books, but there is a lot more to what we do. Research libraries exist to facilitate the creation of knowledge. They do this by making information accessible and preserving it for future use. Historically, this meant building up collections, or what the public, and my relatives, think of as 'books' (even though it has always been more than that). In this article I will make the case that our focus needs to shift more towards delivering services in a global, open knowledge environment. Though my views are informed by work currently under way at the British Library, many of the issues and principles should apply to research libraries more broadly.

TORSTEN REIMER

Head of Research Services
The British Library

Reflections on the current research library environment

Let us start with a brief analysis of the environment in which research and national libraries operate.

A concern for many libraries is finding a sustainable way to procure content. For many years the cost of journal subscriptions has gone up way beyond inflation.[1,2,3] As a result, libraries have been forced to make difficult decisions, including reducing the budgets for books. This is even harder when faced with the budget cuts that affect many libraries. In the case of the British Library, the grant-in-aid we receive from government will have shrunk by 30% in real terms between 2010 and 2019.

Coupled with this financial constraint, the British Library (and I assume other national libraries) sees lower usage of subscription journal content than university libraries: researchers attend the Library for relatively short, intense study visits, after which they may not use us for months or years. Academic visitors often have access to scholarly literature via their home institutions and some focus on our heritage collections, so access to journals

> 'the grant-in-aid we receive from government will have shrunk by 30% in real terms between 2010 and 2019'

is not always a priority. As a further challenge, due to licensing restrictions, most of our subscription content can only be accessed from our premises.

Lack of remote access also goes to the heart of our collections: legal deposit content. For centuries UK publishers have been required to deposit their print publications to ensure the nation's published output is preserved. In 2013 new regulations came into force extending this requirement to digital material.[4] In addition to this deposit process, we actively archive the websites in the UK web domain through the UK Web Archive.[5] Scholars around the world want to use these collections but we cannot make them available online. In line with the legislation, we have to treat digital content like print legal deposit: you can only access it on our premises, even if it was originally open access (OA) content, and only one person can see a particular item at a time. This legal restriction means we will continue to limit access to legal deposit to our premises only, even though we are aware this does not meet user expectations. Legal deposit libraries have advocated strongly for improved access conditions for the UK Web Archive, as well as broader alignment of the non-print legal deposit regulations to established copyright law. At the time of writing, these recommendations are being considered by the UK Government.

On the positive side, our premises do meet expectations – user surveys show that 97% of readers rate the reading rooms as very good or excellent. Our readers value the environment we provide for solitary study, but we also note more requests for facilities to engage with digital collections at scale. We support the latter through the British Library Labs[6] project but need to transition from project to a sustainable and scalable offer to meet growing user demand.

Looking beyond our collections, research libraries are also affected by changes in the wider research environment. For example, funder interventions like the open access policy for the post-2014 Research Excellence Framework have resulted in a significant increase in OA material.[7,8] The Engineering and Physical Sciences Research Council policy framework has forced UK universities to invest in research data management workflows.[9] Along with the regulatory framework, researchers' workflows change through technology. In a 2014 survey of UK researchers, 69% said their research would no longer be practical without research software.[10] Keeping pace with these developments and the sheer scale of digital content is a challenge for any research library.

> 'we will become a little less relevant to researchers every year because there is so much more available elsewhere'

Digital content at scale poses another and perhaps more fundamental challenge for thinking about our role: globally, online content grows at a rate several times faster than our own collections.[11] This means that, relatively speaking, our collections are shrinking. If we define ourselves only through material we hold directly, we have to face the truth that we will become a little less relevant to researchers every year because there is so much more available elsewhere.

Thankfully, this issue also carries a solution: open access, and open science/research more broadly. As scholarly content is now increasingly available freely online,[12] libraries do not need to subscribe to full open access material to facilitate its use. A world of open access content would also do away with the complex and non-user-friendly architecture for access and authentication. This does, however, pose an essential question for libraries: if our users will no longer need us to access scholarly content, how can we still add value? For university libraries, the current answer seems to be a paradigm shift: in addition to helping staff and students to access content, they now also assist with publishing research (for example through repositories and management of OA payments).[13] For national and state libraries, with our very different relationship to our readers, the answer requires a broader rethinking of services. One of them is the British Library's document supply service,[14] which for decades has served millions of users across the globe. In an environment of big deals, OA and a range of other – not always legal – content sources, document supply is less in demand now. It needs to reinvent where it can add value other than just the provision of content in the 'long tail' and grey literature.

Still, I hear you say, readers rely on us for discovery. However, for many researchers the default response to discovery is Google.[15] Considering the effort multinational tech companies pour into search technology, it is hard to see how this would change substantially in the favour of library catalogues. How long will it be until the likes of Siri and Alexa will be able to respond meaningfully to user requests such as 'Find scholarly articles that correlate social unrest in 17th-century Europe with the Little Ice Age, and make related climate data available on my desktop'?[16]

We may face a future where the library catalogue is increasingly irrelevant, accessed mostly by those who are required to use it for looking for unique items. Increasingly, our users assume that what is not available online does not exist or may not be relevant enough to justify travel. With limited funds available for digitization of heritage and special collections, access is a concern in addition to discovery. Material that is not easily discoverable and accessible online is at risk of becoming invisible, and that particularly affects heritage collections that are at the heart of national libraries. This may bias research towards the small subset of heritage collections, thereby skewing our perspective on the past and the human condition more broadly.

> 'How long will it be until the likes of Siri and Alexa will be able to respond meaningfully to user requests ..?'

If we do not keep innovating and changing, where will these developments leave national libraries in their role as research libraries in a decade or two? Will it leave them, provocatively speaking, as repositories with convenient desk space for local researchers and historians? As a historian myself, I can find some comfort in this, but as a national library we need to be able to offer something valuable to everyone in the UK. In addition, we have a responsibility to make our global collections available to everyone and to work with partners around the world to advance knowledge.

National libraries in a global open environment

As publicly funded organizations, national libraries have an obligation to serve the public. Instead of just assuming we are useful simply because we exist, we have to constantly ask ourselves where we can add value. To answer that question for our research purpose, we need to look at the fundamental attributes of national libraries: persistence, being free of (commercial and political) bias and being tasked to serve everyone who comes through our doors (including the virtual ones).

> 'libraries still have a role facilitating access for those who are not served by other organizations'

I would argue that these attributes enable us to support a global open knowledge infrastructure. After all, it needs to be built in a persistent way that ensures transparency and open access to scholarly information. And, for as long as paywalls exist, libraries still have a role facilitating access for those who are not served by other organizations. To work effectively in the current and future research environment, we need to gradually shift from defining ourselves mostly through our collections to defining ourselves through the ability to help our users to:

- find and access the most suitable information available from our collections and relevant content globally
- easily use this information to create new knowledge and
- share this knowledge in a persistent manner that facilitates reuse.

The British Library's response

National libraries work in different contexts, so there is not necessarily one right answer to the challenges I have outlined above.[17,18,19,20] In the following, I will give my personal perspective on the approach we are taking at the British Library.

In 2016 the British Library set up a strategic change portfolio called 'Everything Available' and a new department, Research Services, to transform our services to researchers and

research organizations. This process is guided by the development of a service strategy for our research purpose, the first in the Library's history and an update of our content strategy.

The emerging service strategy builds on the vision of the British Library offering a world-leading research library service that contributes to a sustainable and open global knowledge environment that benefits all. We aspire to enable seamless discovery and access to the world's knowledge, regardless of format, and to assist users in extracting useful information from content. This requires a shift from a model of local collections to an approach where we enhance our unique material by facilitating access to, and (computational) research on, content globally. One way to achieve this is to assist other organizations in opening up their content for research and helping them to reduce data loss and the cost of managing content. To address these challenges, we are developing shared collection management services, including digital preservation and facilities to make content available online. Where physical collections are concerned, we are already supporting a collaborative approach through the UK Research Reserve, a distributed national research collection managed by a partnership between the higher education sector and the British Library.[21] Similar approaches can be considered in the digital environment.

The emerging research service strategy builds on the 'Living Knowledge' vision of the British Library as 'the most open, creative and innovative institution of its kind in the world'.[22] It has been informed by a situational analysis and will be refined through ongoing user research and horizon scanning. The strategy builds on three objectives for our research purpose defined by Living Knowledge:

- 'Develop our remote access services to become a trusted and indispensable resource for fact finding, research and analysis for researchers everywhere.'
- 'Ensure that the Library's on-site facilities and Reading Room services keep pace with the changing needs of researchers.'
- 'Leverage the Library's collections and expertise to drive innovation in large-scale data analytics, for the wider benefit of UK research.'[23]

Everything Available

The Everything Available portfolio is the delivery arm for implementing the strategy. It is organized around three themes or work streams that take forward the above and other related objectives. The themes relate to activities of researchers and research organizations: 'Find', 'Use' and 'Publish'. As a national library, our definition of 'researcher' goes beyond academics and includes everyone who is undertaking research at any level, be it from a commercial, academic or personal perspective, and regardless of the field of study.

Find

'Find' reflects challenges around discovery: internally, the size and diversity of our own collections pose significant discovery challenges. This is made exponentially worse when you consider that our collections are only a small part of the information sources available globally. Because of the deluge of information, it is no longer sufficient to point researchers at objects but to identify information contained in them and to understand relationships between objects. Finally, because of the way researchers work, we can no longer expect they will always come to us to consult Library catalogues.

'our definition of "researcher" goes beyond academics and includes everyone who is undertaking research'

The Find work stream is looking at our approach to discovery in the context of developments such as text and data mining, machine learning, visualization and user-experience design. It goes beyond content that, like journal articles, is published in a traditional sense and has relatively high visibility. Alongside data discovery, as featured in our recently published Data Strategy,[24] we need to consider how we can increase the visibility of our complex heritage collections.

Under the Find work stream, we are evaluating technologies in the discovery space, working with start-ups, community initiatives and researchers.[25] These ideas will inform our own roadmap, the replacement of our core discovery solutions and potential services for the wider community, for example in OA discovery. We are also considering the future of the library catalogue as a discovery tool, as we feed more information to users through whichever tools and networks they discover content – even if that means that we will eventually mostly 'talk' to machines. I think it is critical that libraries are an active player in discovery: after all, if we do not understand the algorithms that present us with 'the answer', we risk the objectivity of research and our future more broadly.

Use

The 'Use' work stream supports researchers in working with content. We need to be able to serve the most suitable version of an item to our users. In the short term, one of the most important steps will be enabling remote access for licensed content. We are currently in the process of rolling out single sign-on to improve the user experience and to tailor services and content access to specific user groups. The latter will help in negotiations for remote access with vendors of databases, e-journals and other digital material.

An improved architecture for remote access will also benefit users on site. Wherever possible, they should be able to access content on their own devices. This requires changes to authentication and delivery mechanisms and, in some cases, renegotiation of licensing agreements. Some users will be working with our digital collections through their own tools. To facilitate this, the Library is currently investigating setting up a platform for programming interfaces (APIs). Where it is not possible to grant access on user devices, we need to improve our facilities for analysis of audio-visual material and provide computational resources and guidance for analysis of digital content across formats. For legal deposit content, even the most experienced users will need a managed on-site process as the material cannot leave our sites in London and Yorkshire, neither during nor after analysis.

To meet user needs for content delivery we require, from a user perspective, a single workflow that results in seamless delivery of the most suitable version of content. In the case of analogue formats this may include on-demand digitization. For subscription content, the British Library is moving to a model where current e-journals are being provided on a just-in-time basis rather than buying titles 'just-in-case'. On an abstract level (that overly simplifies areas like heritage collections), I would expect a workflow to look something like this – see Figure 1.
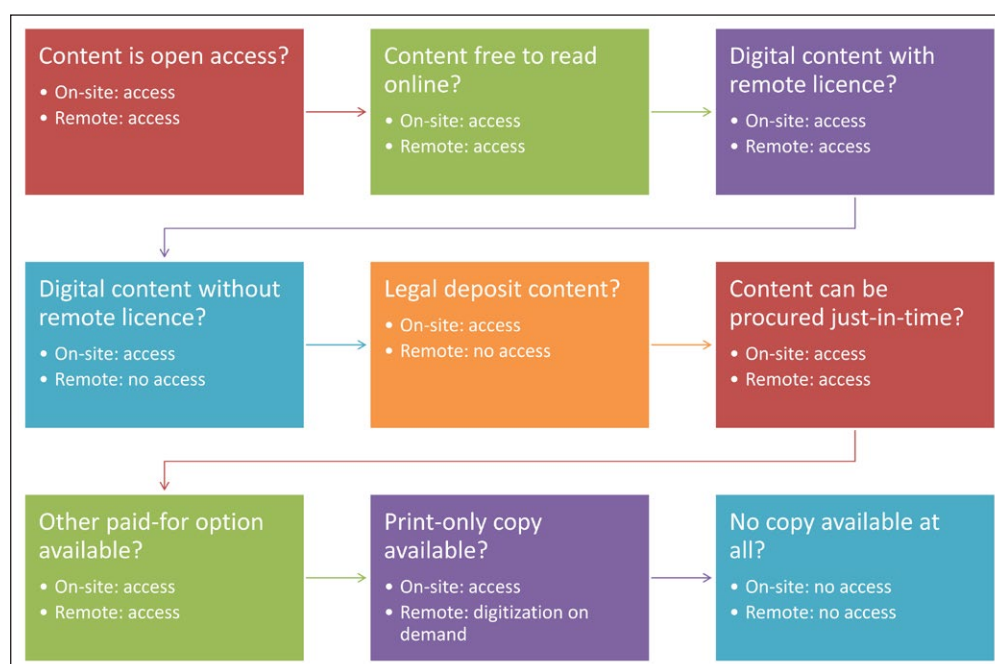

Figure 1. Simplified workflow for providing access to content

Publish

The third work stream, 'Publish', will support our users by helping other organizations to manage their own content. In particular, we want to address three issues: the risk of content being lost, the cost of managing and preserving content, and persistent access.

The British Library has a broad range of skills and experiences that can help others address these issues, ranging from preservation to large-scale collection management, digitization, metadata curation and persistent identifiers. We are developing a set of services that starts with physical collection management and moves, via digitization, to the digital services that are part of Everything Available. These will include a digital preservation offer and support for making content available online. At the heart of this will be a multi-tenancy repository infrastructure that will be the home of British Library services (to include, for example, the national electronic theses service EThOS)[26] as well as content from partner organizations. Researchers across the world would benefit through access to content and improved search and discovery tools including text- and data-mining facilities.

In order to improve our existing infrastructure and develop new services, the British Library is embarking on an ambitious programme to renew its whole digital library infrastructure. Starting with the digital preservation system (over five million items), we will then look to our library management system and other metadata stores (a total of over 80 million records), the discovery solution, specialized systems, e.g. for manuscripts and archival material, and single sign-on and identity management. The plans for Everything Available build on these changes.

'national libraries have an important role to play with regard to infrastructure components that require openness and persistence'

Working in a global environment

Going beyond our internal services, national libraries should support the wider knowledge environment. Research requires global access to knowledge and efficient sharing of information. I believe national libraries have an important role to play with regard to infrastructure components that require openness and persistence. This is why the British Library helped to set up DataCite and is now running the DataCite UK service that provides digital object identifiers (DOIs) to over 90 data centres and research organizations.[27]

The Library actively participates in projects on persistent identifiers and related community discussions, for example around an open registry for organizational identifiers.[28] With many years of experience in making metadata available openly for reuse, the Library has joined the Initiative for Open Citations to promote the availability of structured, open citation data.[29] Such initiatives support a diverse environment through which information services and data can be connected globally. In order for this environment to flourish, we need to nurture innovative ideas coming from communities so that they can transform into sustainable services. As a global brand with a persistent organizational structure, the British Library may well have a role in supporting innovators in establishing new services. Working in partnership is key here. After all, the challenges are such that no single organization can tackle them. Therefore, we are working through established relationships, e.g. with SCONUL, Research Libraries UK and Jisc, and new ones with organizations like the Allan Turing Institute[30] (the national centre for data science hosted in the British Library building in London).

'we need to nurture innovative ideas coming from communities so that they can transform into sustainable services'

Understanding our users, enabling our staff

To ensure that we aim our efforts in the right direction, we have to improve our understanding of our users. User research is particularly important as national libraries serve a diverse audience with different perceptions and expectations, and we do not always understand what these are. We must get better at segmenting our current and potential user base, understanding their needs and developing

tailored marketing and services with a suitable user experience. To drive this transformation, the Library has created two dedicated posts focusing on user-experience design and insight management for the research audience.

Last, but certainly not least, libraries need to invest in our staff if we want to be able to adapt to a constantly evolving environment. In addition to supporting flexible ways of working, we need new skills, from business analysis and modelling to user-experience design and data analytics. One way to tackle this is to enable staff to share their skills with others in the organisation and, in terms of the British Library's responsibility as national library, with colleagues in other research libraries – and in turn learn from them. Because of this we are now looking at work shadowing, staff exchange with other research libraries and expanding placement opportunities.

Conclusion

In 1980 Maurice Line, then Director General British Library Lending Division, argued that 'the acquisition and retention of the nation's publications and the production of the national bibliography, although basic functions, are of less importance and magnitude than national information and document supply, which should be given priority in all countries. The repository function is also increasingly important. These tasks require a different approach and a different kind of national library.'[31] I would argue that in a digital and therefore ultimately global environment, we can only perform an effective national information supply (and perhaps even preservation) service if national libraries think more in terms of global instead of national collections.

The British Library will always safeguard our national heritage, but in an online environment it can be increasingly difficult to define what that is. Who is responsible for data on climate change in Great Britain, collected by Spanish and Chinese researchers, hosted on an US-Irish cloud and cited in an article published by a Dutch publisher on a German server? Thinking globally does not only provide us with the opportunity to keep adding value for our research audience, it can also create benefits through collaboration and sharing of burden.

'we are shifting from a local content to a global information service provider model'

When faced with a rapidly changing environment, you have three choices: do nothing, follow, or aim to lead. I would hope to see libraries aspiring to do the latter. National libraries in particular should take a leadership role – not with a view that we always know best, but with an understanding that our remit allows us to co-ordinate, facilitate and sustain solutions. We need to think about the problems our users face and not assume that, just by virtue of their existence, our collections are always the answer. Along with other sectors, we are shifting from a local content to a global information service provider model. Libraries should aim to actively shape that transition. Even so, I can comfortably say that we will always love books.

Abbreviations and Acronyms
A list of the abbreviations and acronyms used in this and other *Insight*s articles can be accessed here – click on the URL below and then select the 'Abbreviations and Acronyms' link at the top of the page it directs you to: **http://www.uksg.org/publications#aa**

Competing interests
The author has declared no competing interests.

References

1. Panitch J M and Michalak S, The serials crisis. A White Paper for the UNC-Chapel Hill Scholarly Communications Convocation, January 2005: **http://www.unc.edu/scholcomdig/whitepapers/panitch-michalak.html** (accessed 16 April).

2. Shu F, Mongeon P, Haustein S, Siler K, Alperin J P and Larivière V, Is it such a big deal? On the cost of journal use in the digital era, College & Research Libraries, 2017 (preprint): **http://crl.acrl.org/index.php/crl/article/view/16829** (accessed 16 April 2018).

3. Jubb M, Plume A, Oeben S, Brammer L, Johnson R, Bütün C and Pinfield S, Monitoring the transition to open access: December 2017, 2017, London, Universities UK: **http://www.universitiesuk.ac.uk/policy-and-analysis/reports/Pages/monitoring-transition-open-access-2017.aspx**, 40 (accessed 16 April 2018).

4. Legal deposit:
http://www.bl.uk/aboutus/legaldeposit/ (accessed 16 April 2018).

5. UK Web Archive:
https://www.webarchive.org.uk/ukwa/ (accessed 16 April 2018).

6. British Library Labs:
http://labs.bl.uk/ (accessed 23 April 2018).

7. Policy for open access in the post-2014 Research Excellence Framework, July 2015, HEFCE:
http://www.hefce.ac.uk/pubs/year/2014/201407/ (accessed 16 April 2018).

8. Jubb M et al., ref. 3.

9. EPSRC policy framework on research data:
https://www.epsrc.ac.uk/about/standards/researchdata/ (accessed 16 April 2018).

10. Hettrick S, 4 December 2014, It's impossible to conduct research without software, say 7 out of 10 UK researchers, Software Sustainability Institute Blog:
https://www.software.ac.uk/blog/2016-09-12-its-impossible-conduct-research-without-software-say-7-out-10-uk-researchers (accessed 16 April 2018).

11. A prevalent assumption is that digital data will double every two years; see for example: The Exponential Growth of Data, 16 February 2017, insideBIGDATA:
https://insidebigdata.com/2017/02/16/the-exponential-growth-of-data/ (accessed 16 April 2018).

12. Jubb M et al., ref. 3.

13. Together with Anja Oberländer (University of Konstanz, Germany) I am currently editing a special issue of the journal *Publications* on 'Open access and the library':
http://www.mdpi.com/journal/publications/special_issues/open_access_university_library (accessed 30 April 2018).

14. The British Library's document supply service – British Library On Demand:
https://www.bl.uk/on-demand (accessed 16 April 2018).

15. This had been evident for a while; a 2012 report commissioned by the British Library and Jisc showed that while about 40% of doctoral students saw Google/Google Scholar as the main source for discovery, less than 10% listed the institutional library catalogue. See figure 7 from: Researchers of tomorrow. The research behaviour of Generation Y doctoral students, 2012, London, Jisc:
https://www.jisc.ac.uk/reports/researchers-of-tomorrow (accessed 16 April 2018).

16. For a recent discussion on use of voice in library discovery systems see: O'Neill J, 1 February 2018, What Will Scholarly Information Providers Do About Voice User Interfaces (VUI)?, The Scholarly Kitchen:
https://scholarlykitchen.sspnet.org/2018/02/01/will-scholarly-information-providers-voice-user-interfaces-vui/ (accessed 16 April 2018).

17. While writing this article, I consulted with colleagues in other European national libraries. The engagement with research varies across these organizations, but some are taking steps in a direction not too dissimilar to work at the British Library. Refs. 18–20 give a few examples in addition to the following one: The Danish eInfrastructure Cooperation and the Royal Danish Library in Aarhus have established a supercomputer with direct access to digitized cultural heritage data:
https://www.deic.dk/en/cultural_heritage_cluster (accessed 16 April 2018).

18. The National Library of the Netherlands offers services to facilitate digital humanities research on its collections:
https://www.kb.nl/en/organisation/research-expertise/digital-humanities (accessed 16 April 2018).

19. The National Library of Portugal makes data sets available under a CC0 licence:
http://opendata.bnportugal.pt (accessed 16 April 2018).

20. The National and University Library in Zagreb, Croatia, is a partner in a shared service repository:
https://dabar.srce.hr/en/partner-institutions (accessed 16 April 2018).

21. UK Research Reserve (UKRR):
http://www.ukrr.ac.uk/ (accessed 16 April 2018).

22. Living Knowledge: The British Library 2015–2023 project, 10 September 2015:
https://www.bl.uk/projects/living-knowledge-the-british-library-2015-2023 (accessed 16 April 2018).

23. Living Knowledge, ref. 22.

24. Kotarski R, 25 August 2017, Announcing the new British Library Research Data Strategy, Digital scholarship blog:
http://blogs.bl.uk/digital-scholarship/2017/08/announcing-the-new-british-library-research-data-strategy.html (accessed 16 April 2018).

25. An example for this is an investigation into open access discovery that involves the:
https://openaccessbutton.org/, https://www.crossref.org/ DOI infrastructure (accessed 16 April 2018).

26. EThOS:
http://ethos.bl.uk (accessed 16 April 2018).

27. DataCite – The British Library:
https://www.bl.uk/datacite (accessed 16 April 2018).

28. FREYA:
https://www.project-freya.eu/ (accessed 16 April 2018).

29. Wilson N and Reimer T, 29 August 2017, I4OC: The British Library and open data, British Library Science Blog:
http://blogs.bl.uk/science/2017/08/i4oc-the-british-library-and-open-data.html (accessed 16 April 2018).

30. The Alan Turing Institute:
https://www.turing.ac.uk/ (accessed 16 April 2018).

31. Line M B, The role of national libraries: a reassessment, *Libri*, 1980, 30(1), 1–6, 1; DOI:
https://www.degruyter.com/view/j/libr.1980.30.issue-1/libr.1980.30.1.1/libr.1980.30.1.1.xml (accessed 30 April 2018).

Torsten Reimer
Head of Research Services
The British Library, London, UK
E-mail: torsten.reimer@bl.uk

ORCID ID: http://orcid.org/0000-0001-8357-9422