

The Importance and Methodology of Undertaking a Literature Search for Gemmological Research and Article Publishing

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If I have seen further... it is by standing on the shoulders of giants. Sir Isaac Newton

Introduction

Performing a literature search is a very important—but often neglected—part of doing gemmological research. As indicated by Davis *et al.* (2012), “Any scientist needs to be familiar with the work that has been done in his or her area of research and with what others are doing concurrently. No scientist, however, can read all the books, articles and other printed matter related to a given area...Therefore, we need to be selective and to find the most pertinent literature on a subject as efficiently as possible and to use it effectively.” A literature review should be conducted *before* starting a research project, in order to avoid “reinventing the wheel” and to keep up with the most current methods for pursuing an experiment, as well as to gather data and information critical to a proper understanding of the subject matter. A literature search involves collecting, cataloguing and evaluating information in the literature in order to determine salient works and refine the subject of one’s research (Machi & McEvoy, 2022). Research findings and other scientific information can be published in books, monographs, proceedings, journals, dissertations, patents, standards, governmental bulletins or reports, and a variety of other sources.

In general, it is best to avoid using unpublished references (although in some cases a personal communication or report from a mining company etc. may be necessary to cite). As a general rule, it is also best to avoid referencing online chat groups/blogs or Wikipedia, due to variations on the quality of the information and lack of expert peer review.

Gemmological Literature Search

Gemmology poses special challenges for undertaking a literature search. Unlike other areas of earth sciences and related fields, there are no comprehensive reference tools for gemmological literature. Therefore, gem researchers will benefit from independently making their own literature collections and databases (typically composed of articles and other works in PDF and hardcopy formats). These can be organised and catalogued using reference management tools such as Endnote, Zotero, Mendeley and Papers, which also allow reference lists to be easily formatted according to numerous bibliographic style templates.

Scholarly journals (e.g. Figure 1) constitute a main source of primary literature (i.e. publications authored by the scientist(s) who personally carried out the research). An exhaustive list of 20 gemmological journals and 10 gem laboratory publications—including information on their time span, accessibility, website, etc.—is available by contacting the author. Only some of them offer indexes or table-of-contents listings that can be searched for keywords, authors, etc. These include *The Journal of Gemmology*, *Australian Gemmologist*, *Revue de Gemmologie A.F.G.* and *Gemmologie: Zeitschrift der Deutschen Gemmologischen Gesellschaft*. (Note that researchers should not omit foreign-language journals from their search, due to the availability of online translators such as Google Translate, DeepL, etc.)

It is highly recommended to download the entire available journal back-issue collections, so that the PDFs are readily accessible even without internet access, while travelling, etc. The PDFs for each journal should be saved into a separate folder. For those journals without indexes or contents



Figure 1: Examples of some scholarly gemmological journals in various languages.

listings, keyword searches can then be done for all files in a particular folder by using the “Advanced Search” function of Adobe Acrobat Pro. (Most PDFs are searchable, but those consisting of scanned images will first need to be processed using Adobe Acrobat Pro’s “Recognize Text” function.) Although more time-consuming than using indexes or contents listings, with this technique it is possible to search for specific content in any collection of PDFs within a single folder, whether from a particular journal or from miscellaneous sources that are grouped together according to gem material, locality, etc.

Other sources of gemmological information include the following:

- Gemmological reference books (e.g. Gübelin & Koivula, 1986, 2005, 2008; O’Donoghue, 2006; Dominy, 2024)
- GIA Library search (<https://g30010.eos-intl.net/G30010/OPAC/Index.aspx>)
- GIA’s historical reading lists (<https://www.gia.edu/historical-gemology-reading-lists>) and bibliographies (<https://www.gia.edu/search?q=bibliography>)
- CIBJO Blue Books and guidelines (<https://cibjo.org/industry-standards-resources>)
- Laboratory Manual Harmonisation Committee (LMHC) Gemstone Information Sheets (<https://www.lmhc-gemmology.org/gemstones>)
- Sheahan Diamond Literature Reference Compilation (<https://secure.kaiserresearch.com/a13/Education.asp?ReportID=364130>)
- For gem localities: John Sinkankas’ textbooks (*Gemstones of North America*, *Emerald and Other Beryls*, etc.); mineral

locality compilations (Bernard & Hyršl, 2015; Moore, 2016); and Mindat (<https://www.mindat.org>)

- For spectroscopic data: Mineral Spectroscopy Server (<http://minerals.caltech.edu>), RRUFF database (<https://rruff.info>) and Spec4Gem (www.spec4gem.info); the first two can be searched to provide reference listings for particular minerals.

Useful general search engines include Google Scholar (<https://scholar.google.com>) and Google Books (<https://books.google.com>); see search tips by Trauth and Sillmann (2018). A relatively new tool is R Discovery, which is an artificial intelligence tool for literature searches (<https://discovery.researcher.life>). In addition, keyword searches can be done using CrossRef (<https://search.crossref.org>), and this website can also be used to look up DOIs (digital object identifiers) for specific articles. DOIs should always be included in reference lists when available.

A tremendous amount of literature (mostly older works that are not under copyright) is freely accessible online via the Internet Archive (<https://archive.org>) and the HathiTrust Digital Library (<https://www.hathitrust.org/the-collection>). The Internet Archive contains resources of particular interest to gemmologists, such as a collection of documents from the GIA Library (<https://archive.org/details/gialibrary>) and gem-and-mineral bibliographies by John Sinkankas, Curtis P. Schuh and Joseph O. Gill. Valuable historical information on gem materials can also be found within archives contained in museums, monasteries, research institutions and government offices.

Local public university libraries are valuable assets for performing literature searches, encompassing numerous resources beyond the scope of this review (see, e.g., Mann, 2005). In addition to obtaining assistance from a reference librarian, it may be possible to use an interlibrary loan service to obtain materials held at other academic libraries. In addition, university libraries commonly have public computers that allow access to online academic databases including “online public access catalogues” (OPACs), WorldCat, GeoRef, Geobase, Web of Science, Scopus, ProQuest, EBSCO, Gale, etc. Importantly, these computers may also have full access to an extensive collection online journals, allowing members of the public to freely download selected articles

and books in PDF format to a flash drive. Local community libraries also have digital collections (although usually not academically oriented) and interlibrary loan services. Another way to obtain access to online journal collections is through membership with the Geological Society (London), which allows members to remotely access content from more than 100 earth science journals.

In conclusion, gemmologists have various options for performing literature searches and electronically accessing journals, books, etc., either using their own computer or by visiting local libraries, even without being a student or member of a university.

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