

Editorial

The Invisible Infrastructure of Science: The Starring Role of Librarians and Archivists and a Call for Appreciation

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I recently received a standard ‘template e-mail message,’ sometimes referred to as a ‘canned response’ or ‘standardized message,’ from my University’s Interlibrary Loan office: “We have information about an ILL request that you placed: *Atti della Accademia nazionale dei Lincei*. 24, 850-854, 1915, Title: Autoxidation by light in the terpene series. I and II (English translation), Author: E. Sernagiotto, has been cancelled for the following reason: We have exhausted all possible sources. No library is able to supply this item. Questions and comments regarding interlibrary loan policies and procedures may be directed to us.” (I learned later that none of my University’s Interlibrary Loan (ILL) Department’s partner institutions had a copy of the requested article. I also learned later that, as a result of this particular interaction, my University’s ILL Department is developing a policy to handle such instances. “Continuous improvement” is a wonderful lifelong commitment!)

But at that very moment, I was not happy. That’s an understatement. I was disappointed because my research had been, at least temporarily, thwarted. Indeed, it was more than that, as I shall relate. It took only a moment via Google search to learn that there are two national libraries in Italy, one being the Biblioteca nazionale centrale di Firenze (in English, the National Central Library of Florence). Of course, we all know of Firenze and the role that this very special city has played in the development and display of human culture and achievement. But additionally, Firenze is the home of *Substantia*, *An International Journal of the History of Chemistry*, and of its editorial staff, including its editor, Pierandrea Lo Nostro, a professor at the Università degli Studi di Firenze.

I focused my attention on Firenze. It took only a minute or two on the Biblioteca’s website for me to find the link I had hoped to find: “Contact Us.” It took only seconds to write a short request seeking their help: Could they provide me with a pdf of Sernagiotto’s 1915 publication?

The link to that publication arrived within hours. I had the pdf!

Let me tell you why all of this matters.

Of course, the Biblioteca’s response was a wonderful display of international collegiality and professional courtesy. And I repeat: international courtesy. Think of the degrees of separation between the Biblioteca and me. One marker of separation is distance, 4436 miles from Richmond to Firenze. Others are nationality and language. What duty does a national library in Italy have to a Virginian? Further, the librarian/archivist – scientist relationship is another step in separation beyond the scientist – scientist relationship. I could have, and I almost did call Pierandrea to seek his help. An insider’s assistance can always smooth the way, and he has previously and generously helped me on professional matters. But I had faith in the system, and I went directly to the Biblioteca. Their immediate and productive response displays, in a most splendid fashion, two qualities about the international science community: first, the collegiality that we generally experience within the scientific community; and second, the commitment of librarians and archivists to users around the world.

Librarians and archivists have long been among my greatest heroes. They truly honor human achievement, by collecting and preserving treasures of the past and providing access to scholars around the world. For me to

receive such immediate attention from across the globe is an earmark of professional commitment to the highest level, by the Biblioteca nazionale centrale di Firenze.

It is even more than that. It is actively venerating the very culture and achievements that information scientists collect and provide. And for me, the Biblioteca's performance allowed me to fully know of and cite the research of a rather unknown Italian chemist who toiled more than 100 years ago.

These considerations certainly apply to historians of chemistry. There are simply not enough historians to tell *all* the stories of human accomplishment and of human passion. And when we historians or would-be historians choose to tell a story, we must diligently recover and document each researcher's role in that story. (In my case, it is the history of the conversion of acyclic diterpenes to their cyclic analogues in the late 1800s and early 1900s. You've surely heard the names geranial, linalool, limonene, terpineol, menthol, and pulegone.)

Furthermore, I believe that all chemists are historians. Every introduction to a publication, every review article, every reference cited – all of these are history of chemistry. Of course, many of today's historians of chemistry were once experimentalists in days long past. We all share our common legacies, and we all use the history of our science. We also know how very hard it is to do research. We know the kind of resolve one must have to write our manuscripts, deal with journals, editors, and reviewers, and ultimately correct the galley proofs. It takes a very special commitment and follow-through to be a scientist. And that commitment is collected and saved for posterity by our archived books, journals, and patents. These archives make this history available for both scientists and historians today and far into the future. Without the librarians, archivists, and information technology (IT) staff, today's records and those of the past would otherwise remain untouched and unnoticed, perhaps not even collected, forgotten on the dusty shelves of yesteryear or lost forever.

My collection of pdf reprints obtained via the ILL Department at my University for the past nearly 20 years is an even more impressive emblem of their commitment to my research and that of my colleagues. And I have another resource: my university's science librarian who provides specialized support. She urges me to send her my most complex IT problems.

A reader of an earlier version of this manuscript criticized its content as being anecdotal. But what are all of our experiences in doing research other than anecdotal? Just about the time I needed the article from the 1915 *Atti della Accademia nazionale dei Lincei*, I required a copy of a publication from an 1891 issue of the *Proceedings of the Society of German Natural Scientists and Physicians*. That

is another rather obscure publication. In that instance, I wrote directly to the information desk at the still-in-existence Society of German Natural Scientists and Physicians, in Bad Honnef, Germany. They forwarded my request to an archivist at the Deutsches Museum von Meisterwerken der Naturwissenschaft und Technik in Berlin. Within hours, the requested article arrived!

More anecdotes? I spent the month of March 2025 in Japan on a short-term fellowship sponsored by the Japan Society for the Promotion of Science. I enjoyed two days with Kenichi Fukui's documents at the Fukui Institute for Fundamental Chemistry at Kyoto University (Figure 1-Left). I also spent an afternoon with the papers and autograph books of Tetsuo Nozoe at the Tohoku University Archives in Sendai (Figure 1-Right). Two months later, for four days in early May 2025, I reviewed documents in the R. B. Woodward papers at the Harvard Archives in Cambridge.

And I would be remiss if I did not highlight my many explorations within the archives of the Science History Institute and Patrick Shea, SHI's Chief Curator of Archives and Manuscripts. In all of these visits, the archivists provided personalized assistance so that my research would be as efficient, productive, and as pleasant as possible. Not a moment of my time was wasted. Anecdotes plus more anecdotes and even more anecdotes make a trend. And that trend is, an open-arms welcome from librarians and archivists around the world. I must add: I am particularly grateful and rather awed by the many new "jewels" that rest happily and eagerly in my collection of future research projects.

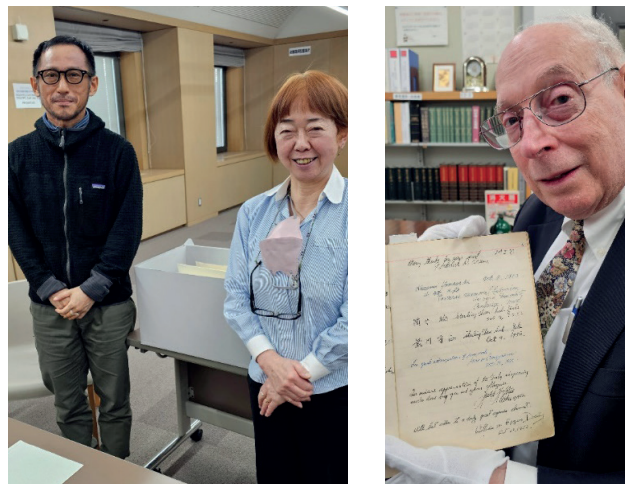


Figure 1. (Left) Information technology professionals Dr. Ayumu Saito and Ms. Noriko Kitagawa at the Fukui Institute for Fundamental Chemistry, Kyoto University, March 18, 2025. Photograph courtesy J. I. Seeman. (Right) Seeman holding one of Tetsuo Nozoe's autograph books, Tohoku University, Sendai, March 11, 2025. Photograph courtesy Yoshiteru Maeno, Kyoto University.

How could librarians and archivists know the importance of each of our requests without substantive connectivity with their clients? I posit that we users of libraries and archives around the world should personally thank these information scientists for their work on our behalf and on behalf of our shared scientific and cultural heritage. We probably never, or never enough, directly share with them why this or that request is important in the history of humankind. We can do that, also.

Let me encourage you to connect with your librarians and archivists and share with them the stories of your research. When I do so, as I always do, I can feel their eyes opening wide. Really wide! For example, at an

archive, I bring special documents to the attention of the archivist and explain their uniqueness and their value. I can sense their own appreciation of the documents they curate as well as the research I do and their role in that research. They are, all too invisibly, collaborators in my research. And they also become members of the audience for my research.

So, you can see why librarians and archivists are among my favorite people. And surely, they are some of your favorite people as well. It is important and rewarding to make the effort to interact with, and especially to thank, these sometimes invisible but always invaluable professionals.