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Careers in Chemical Information and Science Librarianship

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CAREERS IN CHEMICAL INFORMATION AND SCIENCE LIBRARIANSHIP.

Presented to the Younger Chemists Committee at the 208th National Meeting of the American Chemical Society, Washington, D.C., August 22, 1994.

I started out as a laboratory chemist. I spent 5 years as a graduate student at the lab bench and then another 8 years doing lab research in biochemistry. I liked that work and I thought I would spend my entire career in the lab. Yet I haven't gotten my hands wet for 13 years, and I am having a good time working in a library.

There are also some chemistry students who like chemistry but decided that lab work was just not for them. Some of these people have also found rewarding careers in chemical information.

A career in chemical information is not for everyone, but you should at least look at what chemical information specialists do, and think about whether this is an option for you to consider.

Relatively few chemists spend their careers in chemical information, but these chemists do many different types of things. To give you some idea of how many chemical information specialists there are; Of the 150,000 ACS members, only 1400 are in the division of chemical information.

I am going to talk about the different kinds of jobs we do. There is no one single course of training that can prepare you for a career in this field. The necessary training depends on the exact job you are seeking. There are openings for chemists at nearly any level of training and experience.

For example, a Masters degree in library science is required for most academic positions, but this degree is rarely required in industry. I will talk more about this later.

In industry, a Masters or Ph.D. in chemistry is sometimes useful. It may or may NOT enhance your job prospects. It depends on the exact job. Here also, I will have more to say about this later when I talk about my own career.

Now to what chemical information specialists actually do. First I am just going to give you a list of the different things we do, then later I'll describe in detail what each of these things actually is:

We work as, electronic database searchers.

Also as chemistry librarians, and science librarians.

We teach people how to use electronic information sources.

Some of us are computer specialists who build these electronic sources:

We work as indexers and abstractors where we prepare information so that it can be retrieved by the chemists who need it.

Some chemists work in publishing and editing, and sales of publications.

There is also the growing field of computational chemistry, where people use the power of computers to substitute for actual laboratory work.

In all of these fields many people spend their time doing research on new and improved products.

What type of person chooses a career in chemical information? First, ask yourself these questions:

Do you like something other than lab work?

Do you like technical information?

Do you like to read?

Do you enjoy being in a library?

Do you like to work with computers?

Do you like to work with people?

If you answered yes to ANY of these questions, you may find a rewarding career in chemical information.

What are the qualifications for entering chemical information? There is one basic thing you need to have, and that is good communication skills. By good communication skills, I do not mean that you need to be an extrovert, and good at small talk. It does not mean you have to be the "life of the party". I certainly am not.

It does mean that you must be able to listen to people, to talk to people, and sometimes to communicate with people in writing. You have to understand people's needs and explain to them what you can do for them. This kind of talk is not small talk. You are talking to people in an area where you are the expert, where you are trained, and where you know what you are talking about. Anyone can learn this type of communication skill.

Getting back to myself for a while, I really liked being in a lab. Hands on work was my greatest strength and I never even thought about working any place except in a lab. But I always liked to read and I enjoyed being in libraries. In graduate school we had to prepare seminars, which were oral presentations on an area of research we were not working on. Naturally this involved a lot of library work. I found that I liked preparing these seminars as much as I liked doing lab research.

I learned about a career in science librarianship from a colleague in my lab who made that switch. I decided to try it and have liked it ever since. I am happy with the career move I made. In fact, every laboratory chemist I have spoken to who has made that switch is satisfied with what they did.

The most common career in chemical information is being an electronic database searcher. Here we sit at computer terminals and work stations and use the power of computers to find the exact information we need, usually quickly and efficiently. In the past this type of position was called "literature searcher", and those people would toil at printed indexes, like big bound volumes of Chemical Abstracts. That kind of manual searching was slow and fairly easy. Many lab chemists did this kind of searching themselves.

Electronic databases are more powerful ways of getting information. They can do things that manual searching can never do. But, you need some training and experience before you can effectively use these computerized sources. These days, information specialists do most of the searching. There are some lab chemists who do like to learn how to search and do their own searching. And these chemists often need help, advice, and instruction from information specialists.

To give you an idea of what databases can do. Suppose you are interested in a certain molecular structure, like the most important drug used to treat AIDS this drug is called AZT, It is also known as Azidothymidine or Zidovudine. It is one of the few drugs available to treat AIDS. You may want

to know what kind of work has been published on all compounds having a similar molecular structure. You can easily draw this structure on your computer terminal and have the computer locate all compounds that contain the structure you selected. There is no way to do this search the old fashioned way using only printed indexes.

Let me give you another example, of how computerized databases work. Suppose you are interested in a small detail, a detail so small that it may not be mentioned in a printed subject index like the subject index for chemical abstracts. For example, once I had to do a search on waterbased, or water soluble adhesives. Now, if you look in the printed index to Chemical Abstracts you will see a lot of information on adhesives. But whether or not a specific adhesive was water based is not usually mentioned in the printed index. This kind of detail is usually mentioned only in the abstract or the summary of the paper. So I could sit down and try to read thousands of abstracts that have been published or I can have the computer read these abstracts for me. In just a few minutes I had the computer first select all articles on adhesives and then I asked the computer to read each of these abstracts to see which of them mentioned water based or water soluble.

Database searching is more complicated than the old way of searching the literature manually. You need training and experience. But this new electronic method of searching is so much more powerful. You get this training by going to workshops that are given by the producers of these databases.

This gives you some idea of the power of databases. I have been a database searcher for 12 years, and I find database searching interesting and challenging. No two searches are ever the same.

There are several different kinds of database searching. Searchers who work for the SAME chemical company may have different jobs. Some searchers are specialists. For example, patents are very important to chemical companies. To protect their inventions and new products, companies must patent these things. As part of this process, chemical companies must know in detail what kind of similar work has already been patented in this area. They can waste a lot of money working on something which has already been patented. They can also be sued if they market something where somebody else has an active patent. Several companies hire searchers only to search the patent literature.

There are also jobs where you spend all your time searching only the chemical literature.

Some chemical companies are smaller or they simply have a smaller commitment to information services. These companies ask their searchers to be able to search not only chemistry, but also related areas, such as the business side of chemistry. The pharmaceutical companies often hire chemical information specialists. Here you may be asked to search the medical and pharmaceutical literatures as well as the chemical literature. This is a position I had for several years.

Being able to search fields outside of chemistry may sound hard, because as a chemist you usually haven't taken any courses in business or the pharmaceutical sciences. But it is not as difficult as it sounds.

You do not need a degree in business to be able to search the business information sources. You do need to know how to search information sources. If you think about it, being a chemist is not easy.

It's a fairly difficult profession. This means that if you can use chemical information sources, you can learn to use business information sources without much trouble. It's much easier for a chemist to learn something about business, than it is for a business person to learn something about chemistry. If you stop and think about it, can there possibly be anything harder than P-Chem?

For a number of years I was primarily a medical and pharmaceutical librarian. Even though I had only one year of biology in college and I never took any medical course, I had no trouble being a medical librarian.

Again, this is because chemistry is difficult. The concepts in chemistry are usually much harder than the concepts and theories of other fields. When I was primarily a medical librarian, I would often have to read or scan many medical research papers. After reading these papers I sometimes would come across a paper in biochemistry, the field where I have a Ph.D. I would often find it harder to understand these biochemistry papers than most medical papers.

Chemistry is good preparation for nearly anything. You do not have to be a physician or medical student to serve the information needs of physicians. You only have to understand their information needs. You get to this level of understanding by talking to these people. They clarify what they need, and you as the information specialist explain what you can do for them. Here is where you need the communication skills I talked about before. Also when it comes to medicine, just having a good medical dictionary on hand can really help you understand the language of that field.

Now, what are the requirements for being a database searcher specializing in chemistry. There is not one easy answer. In private industry different companies place enormously different values on information. The more enlightened companies have whole information departments doing things that don't even exist in other less enlightened companies. This difference in approach is reflected in who they hire. In some companies, you as an information specialist are part of research group and you are expected to contribute to that group. In these companies, management realizes that you can never have too much training and experience. They look for people with Ph.D.'s. For some positions they seek people who have Ph.D.'s and research experience in a specialty related to the people they will be serving.

In other companies the management doesn't understand information, and doesn't understand how information is such an important part of research. These companies reluctantly hire information people and when they do they treat them as second class citizens.

In most companies the information professionals are part of the library. Many people terribly misunderstand what a library actually is. Some people think that anyone who works in a library ONLY puts books on shelves and tell people to be quiet. Librarians do much more than that. Actually the boundary between information specialists and librarians is slight. They are both true professionals.

Anyway, some people, including the management of some companies have a prejudice towards anything connected with a library. And this prejudice shows in who they hire and how they treat the people they do hire. Most database searching jobs have similar levels of duties and responsibilities. The requirements should be the same. Employers should all be looking for the same type of person but they don't. The enlightened companies, the ones who know the value of information will seek

the most highly trained people they can find. Other companies deliberately seek less trained people because they think it makes no difference. For some database searching jobs, a doctorate is desirable or even necessary, while for the same job in another company they won't touch you with a ten foot stirring rod if you have a doctorate. They won't even interview you. I know because it happened to me, more than once.

This two tiered approach to information that you see in industry sounds chaotic. Actually this chaos has advantages. It means there are job openings at nearly every level. In the companies that don't understand information you may be able to get a low pressure job that you can grow into. Its low pressure because in these companies management doesn't know what to expect, and anything you do is a plus. You can learn the profession and grow at your own pace.

However, if you are well qualified and trained, you will see fewer opportunities than you expect. I showed before that chemical information is a fairly small field. Unlike other branches of chemistry, you do not see many jobs advertised each week. You just have to live with the fact, that you will be considered for only about half the jobs you are qualified for. This can be a little frustrating if you want to work in a specific geographic area. You may have to wait longer than you expect to find a job.

Now on to some of the other careers in chemical information. Many chemists have careers as librarians at colleges and universities. One of the advantages of an academic position is that at many colleges the librarians have faculty rank. This means there is the possibility of tenure, and the salary and fringe benefits are often quite good.

Just as in industry, some academic librarians are specialists. Many colleges have dedicated chemistry libraries. Obviously all you do here is chemistry. You may be asked to do some database searching, and in some libraries you may teach database searching. But your main duty is guiding the faculty and students, and helping them find the sources they need from the library. You are also responsible for selecting books and publications to add to your collection.

Other colleges are not quite as specialized. They may have a Science Library. Here you would be the chemistry expert, but you would also probably be serving other sciences. Sometimes the sciences and engineering are combined in one library. At City College of New York where I work, there is an engineering school and we have a combined Science and Engineering Library. At the other extreme are colleges having only one library, and you are the designated science librarian.

This means that if you are working in a library that is not exclusively a chemistry library, you will probably be serving people whose needs are outside of chemistry. Here you may be a general science librarian even though you have training just in chemistry. This is not as hard as it sounds. I made this point before when I talked about jobs in the chemical industry or the related pharmaceutical industry. Training in chemistry is good practice for being an information specialist or librarian in other fields. Understanding information is more important than having a detailed understanding of other scientific and engineering fields. I have no trouble serving engineers, even though I never took any engineering courses. The engineering information sources are not as difficult to learn and use as are the chemistry sources. Even though you are trained as a chemist you can work as a librarian in other sciences or in engineering.

To become an academic librarian you generally need a masters degree in library science. Sometimes this degree is called library and information science. In most of these programs you can go to school part-time while you still keep a full-time job.

There are jobs that are related to academic positions; jobs where you teach people how to use electronic databases.

I mentioned before that you learn database searching by going to specialized workshops. Instructors who are chemists are needed to teach these workshops. If you like to teach, this may be something for you to consider. The major vendors of online databases are DIALOG Information Services, and Chemical Abstracts. Occasionally they have an opening for an instructor. Both DIALOG and Chemical Abstracts are here in the exhibit area. If you think you may be interested you may want to talk to the people in those booths.

These database producers have help desks where you can phone in for advice and help. Often the help desk workers are the same people who do database instruction.

Another field that employs chemists is publishing. There are many different kinds of jobs in publishing.

A large publisher like Chemical Abstracts employs many chemists. Each year Chemical Abstracts prints more than 600 thousand abstracts of research articles and patents. Each one of these articles has to be analyzed in detail. The important points of these articles have to be correctly indexed, the compounds being studied have to be correctly identified, and any new compounds have to be accurately described. Often the original paper has no abstract and one has to be written. Only chemists can do this work. A Chemist may spend up to one hour analyzing one research paper.

Book publishers also hire chemists. Chemists often work with authors helping them rewrite manuscripts. People who know chemistry are needed to sell and market chemistry books. Chemists also work as acquisition editors where they seek out authors of books that need to be written. There are also free-lance positions in publishing and editing. Every book has an index. These indexes must be compiled by someone who can thoroughly understand the book. Only a chemist can index a chemistry book. I worked for a while doing free-lance indexing for a large technical publisher.

A growing field in chemical information is computational chemistry. A simplified definition of computational chemistry is using computers to substitute for laboratory work. Lab work can be expensive. For example in the pharmaceutical industry, it costs a few hundred million dollars to develop every new drug. One of the reasons drug development costs so much is that for every successful drug hundreds or thousands of compounds must be synthesized and tested. This means time and money. The pharmaceutical industry has been using computers to predict properties of compounds that they have not made.

Also, over the years most drug companies have synthesized and kept thousands of compounds. For example, a company may have synthesized and collected hundreds of compounds that they were testing for a blood pressure medication. They keep track of these compounds in large databases. Sometimes the research direction of a pharmaceutical company changes, and instead of being interested in blood pressure medications they may now be interested in anti-ulcer medications.

They can screen these compounds using computational chemistry. To some degree of accuracy, computers can predict the biological properties of molecules. This is an active area of research.

Other industries also use computational chemistry. For example some petroleum chemists knew that certain hydrocarbon impurities were in the batch of crude and they wanted to remove these compounds in a distillation column. The problem was they did not know the boiling points of these impurities, so they did not know what kind of distillation column to make. Here computational chemists came to the rescue. From the properties of other hydrocarbons, the computational chemists predicted the boiling points of these impurities, so the proper column could be built.

Several companies in computational chemistry are in the exhibit area. You can visit their booths.

People are starting to recognize that the field of chemical information is its own specialty field, a subdivision of chemistry in its own right. Chemical information is joining the other commonly recognized disciplines within chemistry like biochemistry, organic, inorganic, physical, and analytical chemistries. One positive note is that you can now get a masters degree in library science with a specialization in chemical information. This is at the University of Indiana. This flyer explains this program.

Many people are now doing research into new computerized and electronic products. Some researchers spend their entire careers addressing the question of how the vast amount of chemical knowledge can best be organized and given to chemists in a form that they can easily use. Chemical information is always fun. Anyone who works in this field is always growing and learning.