

# ORGANIC CHEMICAL LITERATURE 2003

This document contains a brief set of instructions on access to the chemical literature by established methods. Many of the searching techniques described are in the process of being superseded by computer-based information retrieval, and every organic chemist will need to be able to use these methods. The emphasis in the lecture will be on the demonstration of computer-based retrieval methods [REACCS, BEILSTEIN, Web of Science, Scifinder Scholar and others]

## General Points

Most of the literature you will need is located in the DP; most current chemistry journals are accessible in electronic format. The Dyson Perrins Laboratory has a well-found library containing almost all the information which is necessary to pursue research. Its contents are conveniently considered in several categories. Firstly, there is a full set of Chemical Abstracts, which is the main abstracting journal covering all papers published in the chemical literature. The major journals of organic chemistry are stocked and most of these have long back-runs. There are a number of important review journals and serial publications on more specialist topics. Finally, there is a good collection of reference books on most aspects of organic chemistry. A complete catalogue of the contents is available in the Library

There is one extremely important rule which must be observed by all members of the department for the general well-being of Library users, that is, books and journals may not be taken out of the Library other than for the immediate

purpose of making Xerox copies of articles. The Library is permanently open.

The Library will cover the needs of most students in the department almost all the time. Exceptions may occur for students whose work borders on inorganic or physical chemistry, or for those who need a thorough access to the biochemical literature, e.g. Organometallics and Journal of Organometallic Chemistry are not housed in the department but are readily accessible in the Radcliffe Library. The Dyson Perrins Library takes several of the major biochemical journals but because of the vastness of the literature in that area it will be necessary for students whose research topic involves biochemical methods to make frequent use of the collection on the first floor of the new Radcliffe Library.

Many journals are now accessible in on-line format with the advantages that they are available much earlier and specific articles can be printed or computer-stored separately. Most of the details can be obtained from the Oxford Chemistry Journals Web site at:

<http://www.chem.ox.ac.uk/cheminfo/ejournals.html>.

## **Keeping up with the Literature**

You need a systematic reference filing system. Students will find that keeping up with the literature, both in a general sense and in their specialist field, plays a centrally important part in research and it is essential to develop some indexing system right at the start. There are basically three methods, but the information content of the file is much the same. Firstly, a database file on a microcomputer can be adapted to store literature records; the advantage of this is that ordering and selecting of references can be done automatically - the best program for doing this is ENDNOTE 3.1 (there is a

University licence and the disc is available from the Computer Shop). Alternatively some students prefer to have a hardback notebook and summarise papers directly, others prefer index cards, say 6" x 4" or 8" x 5", and use these for the same purpose. Whatever the method abstracted information should be prefaced by the literature reference in the form that it will appear in a thesis :- see recent models within the research group.

E.g T.Imamoto, K.Sato and C.R. Johnson, *Tetrahedron Lett.*, 1985, **26**, 783

followed by the key information contained in the paper, and structural diagrams of key transformations. So what should you read and abstract? For specialist material you should consult your supervisor, who will have an opinion on the extent to which you should attempt to cover the primary literature. Everybody should stay conversant with major developments in organic chemistry, however. This is can be very confusing for the beginning student who sees a vast array of Journals seemingly replaced by new ones at weekly or even daily intervals. It is possible to be selective, however.

A good general rule is to read the following as they come into the library : *Journal of the American Chemical Society*, particularly the Communications section; *Journal of Organic Chemistry*; *Tetrahedron Letters*; *Tetrahedron*; *Tetrahedron Asymmetry*; *Chemical Communications* and the *Communications in Angewandte Chemie* all of these are accessible in electronic format. Good papers do occur in many other Journals including the *Perkin Journals of the Chemical Society*, the *Swiss Journal Helvetica Chimica Acta* and in more specialist journals. With some experience you will learn to scan journals quickly and identify those papers which are of particular interest. While you are learning to do

this don't commit too many entries to your notebook or electronic card index, try to be fairly discriminating.

## **Carrying Out Specific Searches**

### **a) The State of Knowledge in a Particular Field:**

This is the area where one relies on reviews and review journals. The major journals are as follows:

Accounts of Chemical Research. This includes short articles which review a particular author's contribution to a chemical field. They are highly topical and very useful.

Chemical Reviews and Chemical Society Reviews are much broader and useful for assessing what is currently known about a set of compounds or a particular chemical reaction and so on.

Tetrahedron Reports and Tetrahedron : Asymmetry Reports fulfil the same purpose and in many cases provide the definitive review in a field.

Angewandte Chemie provides reviews covering a very wide range of chemistry which are always attractively presented. To locate information on a desired topic it takes a relatively short time to scan the indices of the last few years of these journals.

Sometimes it is valuable to look at the General Subject Index of Chemical Abstracts. If you locate the desired topic then review articles in that area are indicated by the prefix R before the abstract number.

### **b) Searching for a Particular Compound:**

It is first useful to make a judgement whether the compound is likely to be reasonably common or rare. If it is common then it can probably be accessed rather easily through encyclopaedic volumes such as Heilbron's Dictionary of Organic Compounds in the serial section of the Library, Rodd's Chemistry of Carbon Compounds in the same place, or the Merck Index in the Reference Section. If it is rare then generally speaking Chemical Abstracts is to be used for post-1940 searches and Beilstein for pre-1940 searches. Take Chemical Abstracts first: a lot of difficulties arise for beginners because of the confusion in providing accurate nomenclature for a compound, and sometimes a Chemical Abstracts naming is different from IUPAC naming.

Using Hard-Copy Chemical Abstracts : The DP Chemical Abstracts subscription ceased in 1997. Current issues are available in the RSL and a CD version is accessible on-line. Nobody actually reads Chemical Abstracts and the searches are generally carried out through the computer-based file, Scifinder Scholar.. For hard-copy searches, the best technique in practice is to search first in the Formula Indices to locate the correct Chemical Abstracts name. Do this in the most recent issue and bear in mind the fact that Chemical Abstracts names tended to change drastically in the mid-1970s when their indices started to become computerised. Having located the correct name search for this in the Subject Index. You should work backwards from the present time using first the half yearly indices and then the decennial indices prior to 1981. The advantage of this approach is that entries are specified in the subject indices so that you can weed out those particular papers which appear to be irrelevant. For example, if you want preparations of a particular ketone by oxidation methods then the Subject Index will guide you to these. You may find that the papers

you want have been published in the last three or four years, in which case it isn't necessary to do a complete and systematic search all the way back to the beginnings of chemical time.

When necessary the older literature is accessed through Beilstein and note that it is not necessary to have a comprehensive knowledge of German to use this important reference work (the Library does have an English/German Dictionary for Chemists). There is a display chart available in the Library which explains details of a search in Beilstein and you should consult this before starting. Beilstein is extremely comprehensive and although the D.P. Library ceased to subscribe around 1976 the Radcliffe has a complete copy. If you want full physical data on a compound this is an extremely useful way of finding it.

If you seek spectroscopic information on a compound or a class of compound there are a number of standard works in the spectroscopy section of the book collection which you should also consult. For a simple N.M.R. spectra the Aldrich library of N.M.R. spectra which is contained in the Reference Section should be useful. One further point; the D.P. Library has a complete set of Comprehensive Organic Chemistry, Comprehensive Organic Synthesis, Comprehensive Organometallic Chemistry and Comprehensive Heterocyclic Chemistry and it may well be that the information you seek is easily found by consulting the relevant volume of one of these.

### **c) Reaction Types:**

If you want to find out about a particular organic reaction look first in the multi-volume set Organic Reactions and for specific examples in Organic Syntheses. It is well worthwhile

to go through the twenty volumes of Fieser's and Fieser's Reagents for Organic Synthesis looking at key reagents which might help. Checking the General Subject Index of Chemical Abstracts is also very useful. This will quickly access recent work on say Wittig Reactions or Hydroboration, or even Carbon -Carbon Bond Formation.

## **Databases**

Access to a microcomputer or other terminal which is linked to the University network then you will be enabled to gain access to Scifinder Scholar, REACCS, Web of Science, Beilstein and other databases which store chemical information. In the lecture these will be demonstrated in outline; Karl Harrison runs courses for Part II's (register through your supervisor) that cover individual database's in more detail. Summary

It should be clear that a short account of this type can only provide the most superficial impressions of the techniques for searching and surveying the chemical literature. Practice and experience are the most valuable guide. Different workers develop their own individual approaches and you will quickly find that as you become more conversant with the contents of the Library you will acquire the information in increasingly shorter times. Suggestions for improvements of the content of the Library are, of course, always welcome.

John Brown

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