with WordPerfect 5.1, this seems to be behind the state of the art. As it turned out, I had to call the PBS help desk to overcome a few minor programs that should not exist. Once I got over the installation hurdle, however, the programs worked just fine.

Pro-Search most resembles DialogLink in operation. In setting up the program, one enters the phone number, account number, and password for the system(s) one plans to access. This makes subsequent login a breeze and since search queries are prepared offline, searching can begin immediately after login. A feature in Pro-Search allows the use of the same menus for searching DIALOG or BRS, and it is even possible to search in DIALOG with BRS commands and vice versa. Assuming one can afford hard disk space (and the quarterly updates) one can store all the DIALOG Bluesheets so they can be accessed at any time. The program operates in either of two modes, Native and High-Level. In the Native mode, one sees what one is used to seeing when logging into an online system. In the High-Level mode, one can search both BRS and DIALOG with the same set of on-screen commands, and the program provides a combined BRS/DIALOG subject catalogue. As a chemist, I saw few reasons to use this option and so, beyond testing it to see if it worked as advertised (it did), I did not use it. Pro-Search suffers from being a little outdated in its user interface. For example, no list of function key functions is printed anywhere on the screen; to access this information, one must hit F1, then type H, then O. A single keystroke would be much more convenient. But all in all, Pro-Search is a good program, and it should prove useful to most online searchers.

The second program, Pro-Cite, is used after Pro-Search to help manage bibliographic records. It can also be used by entering records manually and using one of the Biblio-Links programs described below. The version of Pro-Cite that is reviewed here is 1.41. An update to this version is expected by mid-1991. Installation of Pro-Cite is very straightforward, although a bit cumbersome. The setup program is not very forgiving of errors, nor does it let you back up one step if you make a bad choice. Choosing the foreground and background, for example, is a two-step process, but if you choose a foreground which when you see the choices of the background you realize is wrong, then you have to rerun the entire setup program. You can not stop and exit from the setup program after you realize you don't like something you did. As setup is easy to rerun; however, these are minor problems.

Pro-Cite comes with 20 predefined work forms for storing a record in different ways. In addition one can define one's own work form of data structure formats. The system allows for up to 32000 records, and each record can contain as many as 16000 characters, so abstracts of virtually any length can be handled by the system. Pro-Cite, as distinguished from database management systems such as dBase, has a variable record length capability, so its storage requirements are kept to a minimum. The Pro-Cite editor is quite adequate for entering and modifying records, and records can be sorted on one or more fields. Duplicate records are automatically detected, and you can select the one you want to delete. One modern user interface feature that is missing here is that while one can retrieve and use a file from any disk directory, it is not always possible to specify where the results will be stored; the results are always put back in the directory from which they came. Thus if one does a search with Pro-Search, reads the file into Biblio-Links and then into Pro-Cite, one cannot store the file in the Pro-Cite directory without leaving the program and using the DOS copy command to put the Pro-Cite files in the Pro-Cite directory. In spite of such minor shortcomings, this module is very popular and very widely used, and I would recommend it. As an example of its use, the excellent book in chemical information, *Chemical Information Sources* by Gary Wiggins[5] comes with a Pro-Cite-generated computer-readable file, called the Chemistry Reference Sources Database, which contains over 2150 records of references from the textbook.

Biblio-Links, the companion module to Pro-Cite, is a widely used program which converts bibliographic references into a form Pro-Cite can handle. This program examines a downloaded search results file, extracting the fields for the previously defined Pro-Cite work form or your own custom format. Both the DIALOG (version 3.0) and STN (version 1.0) versions of the Biblio-Links programs worked smoothly when tested with small files from a simple search.

REFERENCES AND NOTES

(1) Pro-Search is available from Personal Bibliographic Software Inc., P.O. Box 4250, Ann Arbor, MI 48106. The price of the complete program (IBM PC and clones) is $495.00. Upgrades are available for $150.00 per year. There is also a Macintosh version.
(2) Pro-Cite is available from Personal Bibliographic Software Inc., P.O. Box 4250, Ann Arbor, MI 48106. The price of the complete program (IBM PC and clones) is $395.00. There is also a Macintosh version.
(3) Biblio-Links modules are available from Personal Bibliographic Software, Inc., P.O. Box 4250, Ann Arbor, MI 48106. The price of each module is $195.00. Reference 4 lists the modules available for the IBM PC and clones. The first three (asterisked) are also available for the Macintosh.
(4) The currently available modules for Biblio-Links are: BRS*, DIALOG*, MEDLARS*, OCLC, SilverPlatter, STN, NOTIS, USMARC, DGIS, DROLS, DOBIS, MUMS, and SCORPIO. According to the vendor, the BRS Biblio-Links version (3.2 or higher) can be used to transfer ORBIT records into Pro-Cite.
(5) Gary D. Wiggins. *Chemical Information Sources*. McGraw-Hill: New York, 1991.

The PESTICIDES Disk

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In the field of chemistry alone, one could spend a lifetime in the thorough review of information sources. When one adds biology, economics, and survival (i.e., agriculture) to the mix, the dimensions of the information problem grow factorially. Such is the domain of pesticide information. Chemistry in every form, shape, and fashion may be involved. Physical properties, synthesis, degradation and breakdown, transport, biochemical impacts, and so on, all may be key elements in both scientific or practical queries. Information about a selected problem/pest, of what crop, in what geographic region, with what soil/ecologic/cultural/economic factors present at what levels define possible vectors for searching. Concerns

might include labeling information, application timing and safety measures, allowable residues, disposal, toxicities, and antidotes.

Given an acceptance of chemical methods for pest control, The PESTICIDES Disk[1] brings the user a combination of many useful types of information in one package. The package is impressive, in some good ways and some bad. Running on KRS and GEM software (KnowledgeSet Corporation and Digital Research, Inc.), the disk is accessed through a graphic (somewhat) user interface (GUI).

I say "somewhat" because the internal (Pesticides) screens make little use of MS-Windows-style icons or graphic symbols. The software system's video display and I/O controller, GEM (Graphics Environment Manager), does use icons extensively, although these are infrequently seen in normal use of the system. GEM has a large number of features and facets that are not used in this particular application. The screens in The PESTICIDES Disk are mostly text-based. The cursor is moved to the appropriate block and clicked. The video reverses on "selectable" blocks of text, commands, or functions. There are screens with graphic representation of chemical structures (in two dimensions and black on white) of most pesticide chemicals. These screen segments utilize borders with symbols around them to activate functions for enlarging or moving the image window. The text screens have similar action on the sides for scrolling up and down. A menu bar across the top of the system screen provides access to system level features such as saving, printing, checking graphic image space, consulting the dictionary, exit, and so on.

Loading the software and accessing the CD successfully required phone calls. The KRS folks were helpful. The Pergamon Press staff at the number I tried in Massachusetts did not respond. I think that the ownership of this product may have transferred. Pergamon Electronic Publishing was listed on one brochure, but someone suggested that BRS Software should be contacted. Both are part of the Maxwell-Macmillan-Pergamon Publishing Corporation corporate complex. Probably a more seasoned CD-ROM installer would have succeeded in the installation where I stumbled.

The system needs a lot of computer resources. The documentation states that "at least 560K of memory" is required. I finally managed to get it running with 543K available, using MS-DOS 4.01. This was accomplished by trimming the "descriptor allocation" allotments for each of the separate databases. The descriptor space was reduced for each database program by changing the number allowed. I manually edited the preset number in each of the four KRSINF.* files, dividing the variable DESCNT by 10, at the suggestion of Ed Lillibridge of KnowledgeSet. Other requirements include using an IBM, AT, PS2 or compatible, with DOS 3.1 or later, having a CGA, VGA, EGA, or Hercules graphics card with compatible monitor, and a mouse (MS compatible). A mouse is required to run the software, with user input of query strings from the keyboard. Sometimes one or the other is required, and sometimes either may be used. This produced some frustration for me as a relative newcomer to rodent-controlled computing. After several hours of use, I got familiar with the mouse versus keyboard set-up. No doubt others would do as well or better, depending upon past experience.

The PESTICIDES Disk was written to rely on several installed device drivers for use with common CD-ROM players, presumably before the ISO 9660 standards and the newest versions of MSCDEX.EXE were embraced by most, if not all, CD-ROM hardware vendors. My new Toshiba XM-5100a1 was not included in the list of available drivers. The alternative instructions included in the User Manual were ineffective because they described the use of the older MSCDEX.DRV. A set of supplemental "tips" with more detailed discussion, explanation, and corrections were forwarded to me by Christine Baldwin of Pergamon Press in the U.K., unsolicited, to assist in this review. The above CD-ROM driver and extensions problems were corrected, and some tips on set-up of batch files to simplify rebooting to release needed memory were also included. These arrived just after I finally succeeded in configuring my system to operate The PESTICIDES Disk, using MicrosSoft Extensions and the Toshiba-supplied device driver. No further problems were encountered with this setup.

With all of these findings, one might wonder, "Why bother?" Well, The Royal Society of Chemistry feels that the data are worth repeating, since they included the contents of both *The Agrochemicals Handbook* and *The European Directory of Agrochemical Products* almost verbatim. The system is divided into four major sections. The Handbook portion covers chemical names, structures, properties, toxicology, and analytical methods for both products and residues. The Product Guide covers uses and tolerances and has brand names and distributor and manufacturer names. A listing of manufacturer addresses comprises a third section, accessible directly from the name listings in AH or EDAP. The Index Section is the fourth one, providing a quick access to a brief summary of listed items' activity, synonyms, and product and ingredient names.

When using the system, one is generally unaware that there are four separate databases involved. The interconnections are swift and smooth, for the most part. A slight annoyance was the fact that a search of the Pesticides Index section for a chemical name might retrieve a single item "title list". Selecting this title produces a brief screen with any products containing the compound identified. The chemical name appears here, but not highlighted. One must choose a product name to see the active ingradient name listed again, then select the (now highlighted) chemical name again to get a view of the structure or other technical data. Another difficulty is the sizing of the structure images. Many large compounds show the whole entity at first view, while some smaller molecules may require scrolling of the graphic screen to see the entire structure. The language is direct, the format is comfortable and clear, and there is minimal use of codes and jargon. Standard names for journals, organizations, etc. are abbreviated.

The help system is extensive, with context-sensitive display of help screens available from the F1 key. The escape key doesn't work in help. One needs to use the "Exit" window to quit the help screen and return to the database. Reading the manual is the best help, as usual. It is well written, excepting the installation errors. I didn't do this first, of course, and later learned many useful things when I took the time to look.

Some random cross-checks of entries were performed. Analytical methods entries were compared with those in *The Pesticide Manual 1987* (PM), by the British Crop Protection Council. An apparent discrepancy in the JAOAC citation entries for Tertbuthylazine were resolved when I checked the sources. One entry referred to the pure chemical, the other specified technical grade and formulations. Some toxicity findings found in the PM were not included on The PESTICIDES Disk. Some tolerance data found in other common sources were not seen. The later would be expected, owing to the ongoing nature of such research, and increases demand for pesticide impact information.

Another frustration is the lack of access to index entries. Terms not included as "title list" items are included in the index but are not directly retrievable. Most, such as number strings, etc. are surely irrelevant. The system reports occurrences of each searched term before displaying the final document count. The later number is almost always smaller, and I did not discover how to view all of the other records using the searched

term or where exactly the first number came from. Access to posted country names requires the printed Appendix and cannot be viewed on the system.

Printing the data for specific pesticide chemicals was troubled on my system by an apparent incompatibility with my selection of printer graphics modes. I tried both Epson LQ 2500 (recommended) and IBM Proprinter 24 modes on a Panasonic KXP-1124. I got all of the ASCII text, but subscripts were printed as control or other special characters. I never did resolve this problem. I was also never able to print any bit-mapped structure images. Direct printing is not allowed with this product. Online graphics print attempts prompt an error message. The bit-mapped image data are saved to disk via one of the Graphics control window options. A user is instructed by the manual to leave the CD databases and enter the GEM system to access and print the saved image file(s). Although I never managed to get this to work either, I suspect that my lack of experience and knowledge with my new printer could have been resposible for both problems. It may be noted that my printer does work well with MS-Windows image prints. I honestly wonder if the features and power available in GEM don't exceed the requirements of this application by a large margin.

The disk seems pricey to me, at almost $1600. (However, a similar CD-ROM disk from another vendor, described later in this review costs even more.) A large number of printed documents with pesticide information are available. The U.S.-published *Farm Chemicals Handbook* does not include any analytical information, but it does have structure diagrams, safety notes, limited toxicity data, addresses, some chemical properties, and is well indexed. It costs only $60. *The Merck Index* (1989) costs only $29. *Crop Protection Chemicals Reference* (1990) costs $90 and lists complete lable contents for products with indexing to names, categories, crop use, etc. Several useful appendices give access to safety measures, poison control centers, pesticide control officials, USDA extension specialists, etc. Printed versions of *The Agrochemicals Handbook*, AH (1987), and *The European Directory of Agrochemical Products*, EDAP (1988), cost a total of almost $850. These works are revised and usually reissued biennially. Online versions of these two titles are now available. DIALOG offers access to them as files 306 and 316, respectively, and charges database connect costs of $230 and $255 per hour. Online prints cost $1.60 and $1.35 per full record, respectively. Searches of the online databases revealed that the files were loaded in January 1991, but the Record Dates in File 316 (EDAP) span from 1986 to 1990, with about half (13 066) from 1990. The file dates in the CD-ROM list are all July 1990. I do not know of any data on the CD-ROM disk to indicate the creation dates of the records used. The Pergamon Press brochure states the disk will be updated every six months. Hopefully these updates would allow searchers to establish the date of creation and estimate the need for additional information.

A competing CD-ROM for pesticide information is SilverPlatter's Pest-Bank, based on major sections of the NPIRS (National Pesticide Information Retrieval System) database. This CD-ROM doesn't have structure pictures, analytical data, or toxicity test results. It does, however, have extensive lists of U.S. tolerances for U.S. commodities, as well as some technical data and registrant names and addresses. It is completely text-based and uses codes extensively. References to the CFR and Petition numbers are given. It is not as easy to move about in because it doesn't support the "hypertext" type functions available with the mouse. The SilverPlatter product is also expensive, with a current list price over $1700. SilverPlatter has included a lot more data on the disk. Pest-Bank is almost 250 Mbytes in size, about three times as large as Pergamon Press's The PESTICIDES Disk with its much greater compliment of system files. While there is no value comparison implied in this distinction, since entry types and formats are very different, I mention it because neither product fills the CD-ROM disk which carries it.

This is a growing concern. CD-ROM disks can hold over 500 Mbytes. When The PESTICIDES Disk is reviewed for reissue, I hope that Pergamon Press will take greater advantage of the storage capacity of the medium. There is an increasing body of potentially useful pesticide information that is not readily accessible today. I receive frequent requests for these types of information. Examples include integrated pest management (IPM) considerations and economic thresholds for pests, crops, and pesticide combinations; indirect (environmental) costs of a product; totals of production volumes; and geographic and crop specific distribution of application volumes. Pesticide alternatives, least-cost strategies, hydrologic impacts, and known groundwater contamination areas could also be included. While this does approach social and ecological idealism, it is recognized that there is great potential for negative economic impact on the pesticide industry. There will, however, be greater and greater interest and emphasis on these topics as public and regulatory awareness increases.

REFERENCES AND NOTES

(1) The PESTICIDES Disk (ISSN 0956-0602) is available from Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523, for $1580. Included in this price is a updated disk every 6 months.