ABSTRACT: The isolation of many veterinary practitioners from easy access to medical information is a concern to both veterinary and library professions. Despite the prevalence of personal computers in veterinary practice management, there is little evidence to demonstrate that veterinarians are taking advantage of the computer's telecommunications capabilities to search remote databases. The survey findings of Pelzer et al indicate that veterinarians continue to rely on personally owned books and journals as their major information resource and make limited, if any, use of online databases. A number of reasons offered by Langston and Waldhalm to explain this limited use include expense of the online services, lack of detailed abstracts/full text online, and the perceived difficulty of obtaining articles not available in the practitioners' personal library.

Pelzer's study also indicates that very few veterinarians take advantage of the computer's power to maintain personal indexes for the journals or reference files they do own. Langston and Waldhalm view the time required for data entry to constitute a hindrance to most veterinarians in creating a filtered bibliographic system based on their own libraries.

Three of the five journals identified by White as being key veterinary information resources have recently initiated a reader service which will enable practitioners to easily build an abstracted index to the articles in those journals. The Journal of the American Veterinary Medical Association, Compendium of Continuing Education for the Veterinary Practitioner, and Journal of the American Animal Hospital Association now carry datastrips containing authors' names, titles, abstracts, citations, and key words when available, of the articles contained in each issue.

This paper explains how the strips were developed, how they can be scanned, decompressed and imported into most commercial database applications. Examples will be provided for end-user manipulation of the coded information to retrieve articles through a variety of access points using both Macintosh and MS-DOS applications. A description is also given of a service provided by the Mississippi State University College of Veterinary Medicine Library to make the datastrip information available in decompressed files to faculty and students through a local computer network and to alumni via diskettes by mail.

Introduction

The isolation of many veterinary practitioners from easy access to current medical information is a concern to both veterinary and library professionals. Both professions share a vision for a means by which veterinarians can take greater advantage of the abundance of literature available to improve patient care. A study of the veterinary profession in the United States conducted by the Pew National Veterinary Education Program identified the improvements in information management technologies and the proliferation of scientific information as two of the external factors that may have significant impact on veterinary medicine in the years ahead. The Pew report, Future Directions for Veterinary
**Medicine** (1) recommends that veterinarians become more skillful at finding and using information and that these skills be developed as part of the veterinary education process. Librarians agree that skillful information management by practitioners could improve the quality of animal health care and that librarians have a role in teaching these skills to practitioners and students alike. (2) Librarians believe computer training is particularly appropriate for veterinary medical students because computer and telecommunication technologies are tools that can help to eliminate information isolation. (3)

This paper will briefly examine survey findings regarding use of various information resources by veterinary practitioners, identify some of the barriers to use of electronic resources, and discuss an inexpensive, user-friendly method of managing personal literature abstract files. This literature management tool is based on computer-scannable datastrips. An explanation will be provided of how the strips were developed, and how they can be scanned and imported into most commercial database applications. Examples will be provided for end-user manipulation of the coded information to retrieve articles through a variety of access points.

A description is also given of a service provided by the Mississippi State University’s College of Veterinary Medicine Library to make the datastrip information available to faculty and students through a local computer network.

**Veterinary practitioners’ use of information resources: patterns and barriers**

In February of 1989, Nancy Pelzer and Joan Leysen of Iowa State University (USA) began an investigation of the use of various information resources by veterinary practitioners. Typically, veterinary practitioners in the United States are small business owners located in or near a small city or suburban community, many without convenient access to veterinary medical libraries. Pelzer and Leysen first determined that at least 17 of the 27 libraries associated with veterinary medical schools in the United States made library services available to private practitioners. A survey was sent to a sampling of veterinarians practicing in these 17 states. Although the total number of respondents was small and results cannot be generalized to the entire veterinary practitioner population, the findings seemed to confirm earlier studies regarding veterinary and medical information use. Of those responding, 95% seldom or never used veterinary medical libraries and only 3% used computers to search databases for bibliographic information. They continued to rely heavily on personally-owned books and journals. Lack of access to computers did not seem to be a pertinent factor since almost half of the respondents used computers in their practice. (4)

Five years ago, R.L. Pyle of the Virginia-Maryland Regional College of Veterinary Medicine (USA) predicted that computer-based telecommunication would be widely accepted by veterinarians. Pyle expected that practitioners would be offered a growing list of information services such as Veterinary Network. (5) These expectations have not yet materialized. Instead, in 1990, the Veterinary Network and its print companion *Quarterly Index* were discontinued. Studies by Pelzer and others seem to suggest that the information seeking behavior of many private practitioners has not changed significantly over the last 15 years. In 1976, D.E. Gray of the Central Veterinary Laboratory Library (UK) contended that veterinarians could not spare the time to do their own literature searches and, moreover, did not want long lists of references but rather a few highly germane sources, preferably summaries and critical reviews. (6) A survey of American physicians conducted in 1989 by J.W. Williamson of the Veterans Administration Medical Center, Salt Lake City (USA) had very similar findings. Of the physicians responding, 74% never used computerized on-line systems. The major problems cited were a lack of time to search for information and the large proportion of irrelevant materials that had to be screened. (7) In 1959, V.C. Langston and S. J. Waldhalm of Mississippi State University (USA) offered a number of reasons to explain the limited use by veterinarians of commercial on-line bibliographic services, including the expense of the services, lack of specificity to the user’s interests, absence of detailed abstracts/full-text, and the perceived difficulty of obtaining articles not available in the practitioner’s personal library. (8)

Since reliance on personal libraries appears so prevalent in the United States, if not worldwide, some consideration should be given to how well this practice meets the information needs of veterinarians. The Pelzer survey found that only 21.5% of the respondents reported reading five or more veterinary or medical journals on a regular basis. These findings seem to confirm the results of a survey by Miriam Drake of Purdue University (USA) published in 1978. The Drake study reported that 23% of the responding veterinarians subscribed to five or more journals. (9) E. J. Moth, editor emeritus of Annals of Internal Medicine and author of numerous works on scientific writing and information management, maintains that the personal libraries of health professionals are too small and
that journals that are scanned as they arrive are rarely consulted later for solutions to specific clinical problems. Pelzer states that the narrow information base provided by a small number of journals does not lend itself to the broad range of information required for treating multiple animal species with disparate medical requirements.

On the other hand, M.E. White of the New York State College of Veterinary Medicine (USA) contends that "the number of sources of information needed to capture much of the published useful information in a speciality is surprisingly small." (11) White's conclusions are based on his development and maintenance of the CONSULTANT database for computer-assisted diagnosis. The CONSULTANT database contains information on the description, diagnosis, prognosis and treatment of diseases of dogs, cats, horses, cattle, sheep, goats and swine. Almost 6,000 diseases are covered with approximately 7,000 citations to the veterinary literature. Emphasis is on currency so most citations are from journals. Since CONSULTANT is designed to be a source of information on animal diseases worldwide, an attempt is made to include journals from around the world. However, CONSULTANT is biased toward English language journals since this is the first language of the creators and most users of the database. In December 1986, White conducted an analysis of journal citation frequency in CONSULTANT. Nine journals yielded 80% of the citations for small animal disease and 17 journals yielded 80% of the citations for large animal diseases. (12) White points out that "for the dog and cat portion of CONSULTANT 37 journals were cited, but a total of only 5 journals (Journal of the American Veterinary Medical Association; Journal of the American Animal Hospital Association; Veterinary Clinics of North America: Small Animal Practice; Compendium on Continuing Education; and Journal of Small Animal Practice) yielded almost three-fourths of all journal citations." (11) According to White, one could capture most of the disease description information on medical and surgical diseases of small animals by reviewing an average of a journal a week, especially if this were combined with regular use of major textbooks or computerized databases for assistance in case management and for access to information published in other sources.

Regardless of the ideal number of journals which should be subscribed to, efficient management of the owned resources is a major need. Langston and Waldhalm noted that many practitioners and research workers maintain a literature file for reference. Some veterinarians may keep intact journal issues, but many begin a literature file as a compilation of reprints or clipped articles. Some means of indexing and retrieving the articles is obviously needed if these files are to be useful. Though database programs for personal computers seem the most obvious solution, only 4% of the respondents in the Pelzer survey used computers for this purpose. Langston and Waldhalm view the time required for data entry to constitute a hindrance to most veterinarians in creating a filtered bibliographic system based on their own libraries.

Managing personal literature files using datastrip technology

Langston's and Waldhalm's suggestion is to simplify data entry by the use of computer-scanable datastrips containing the title, author(s), key words, citation and summary. The development of the datastrip was born from their experiences typical of many veterinary academicians. They attempted to stay abreast of current information by subscribing to a number of journals and acquiring books and conference proceedings relevant to their area of expertise. They selected pertinent articles and papers which were maintained in a file and used a computer program to provide an indexing system to identify particular documents as needed. The success of this effort was directly related to the time devoted to reading the literature, selecting and filing the documents, and typing indexing fields into the computer system.

Finding the time required for manually typing the indexing fields excessive, Langston began to investigate ways to enter the data more efficiently. Optical character recognition scanners proved unfeasible because databases with searching capabilities require the information to be divided into specific fields. The information could be scanned but then had to be manually defined into the nine fields typically assigned in bibliographic databases. Little time was actually saved.

Another possibility Langston considered was the use of barcodes to identify individual journal articles, book chapters, or proceeding papers. Including such barcodes at the time the work was printed could save thousands of manpower hours by eliminating the need for subscribers to enter the data individually. A computer-assisted literature search on this concept in a number of computer technology databases failed to document such a use of barcodes.

Langston then sought to discover by his own inquiry if barcodes could be used for such a purpose. He discovered that conventional bar codes like those
commonly used on retail merchandise require an inch for every six to ten characters. To include barcodes containing the desired information on each article would significantly lengthen journal issues. Since this could represent a considerable cost to publishers, another approach was needed.

Langston identified a company, Softstrip (TM), Inc., formerly called Cauzin which originated high capacity code capable of carrying computer information on paper. Their Softstrips (TM) contain approximately 450 bytes per inch, and are used predominantly in the computer industry to encode computer programs for distribution. The strips are a printed representation of binary data containing additional bits for parity and checksum which help to prevent read errors. Binary digits (bits) which can take the value 1 or 0 are represented in a Softstrip (TM) as a pair of squares of opposite contrast called DiBits. A binary 1 value is represented as a black block followed by a white block, and a 0 value by a white block followed by a black block. Each data line of the strip is made up of DiBits that allow a strip reader to find the edge of the strip, determine the center of the line and the alignment of the reader, as well as data DiBits and parity DiBits (See Figure 1). Softstrips(TM) can thus be encoded to contain any kind of information which can be represented in binary notation. Langston reasoned that these highly compressed strips could easily contain the desired information and field identifiers for all articles in a journal issue in the space of a single page. Figure 2 magnifies and describes the characteristics of the strip.
1. The header contains:
   - Number of bytes per line
   - Number of reader scans per line
   - Areas to establish contrast
   - Optical alignment information

2. The data section contains:
   - Length of the strips (in bytes)
   - A checksum for error-checking
   - A unique identification number
   - A sequence number (multiple strips)
   - Operating system type
   - Directory of files in the strip
   - Number of files in the strip
   - File types (program or data)
   - File-lengths (in bytes)
   - File names

3. The file section contains a maximum of ten files.
Since the technology existed to actually produce the strips, a tool to collect and organize the desired information into a computer file needed to be developed. With assistance from Stephen J. Waldhalm at Mississippi State University, Langston did just that. Together they developed several software programs. The first allows manual or automated data entry of bibliographic information and then creates an export file which can be made into a datastrip. The second works with an inexpensive reader to transfer the data from the strip to the user’s computer where it can be imported into most commercial databases. A third is a public domain MS-DOS utility that allows users to modify the coded information in the unlikely event that their own database fails to import the file. The utility also allows the option of selecting only certain articles for import. Langston wrote a MS-DOS shareware database program and Waldhalm developed a Macintosh hypercard stack for those users who do not have a commercial database for literature abstracts.

How journals produce strips

After completing these tasks in cooperation with personnel at Softstrip (TM), Langston contacted the publishers of 20 veterinary journals with the suggestion that inclusion of datastrips would provide a valuable service for their readers with relatively little time or money required on the publisher’s part. His first task was to describe how the strips would actually be created in a 2-step process: (1) organizing the bibliographic data in a standard format, and (2) actually producing the strip.

Organizing the data can be done manually or through an automated process. For manual entry, a clerk simply types into a program the information required: the title, authors, key words, journal name, year, volume, issue number, pages, and summary for each article. When all the articles are entered, careful proofreading must be conducted to assure accuracy. The clerk then exports the information into a file which is to be made into the strip. This is all done by a program which is provided at no charge to the journal.

Although manual entry is simple, it is time-consuming, and is usually redundant to the printing process. Regardless of how a publisher produces manuscripts, when the manuscript goes to the printing company, the information is generally typed into a typesetting machine. Embedded in the file are control codes that tell the typesetting computer what functions to perform. For example, these codes control the size and style of the type, where hyphenation occurs and a variety of other things.

Fortunately, the sections of bibliographic information needed for indexing are in different fonts and pitches. Searching for specific control codes can identify and separate the title from the authors from the abstract, and so on.

Nearly all typesetting computers allow for exporting data into a generic format called an ASCII file. A software program provided at no charge to the publisher can then strip out the pertinent information by recognizing the control codes as field identifiers. In the illustration below, the control code % indicates the beginning of a new article, and the information that follows is the title. The next code AAA marks the summary; \[ M \] marks the author statement; "w" marks the name of the journal; and << >> marks the key words.

%Surgically induced tumor seeding was diagnosed in 8 dogs and 2 cats.

AAA Highly malignant carcinomas were the most common tumor type and seeding occurred following a variety of causal procedures. Seeded tumors appeared within 30 weeks after surgery and most animals died or were euthanized by 131 weeks because of seeded tumors. \[ M \]


«Key words: canine species; feline species, neoplasia; surgery.

Using such a program can dramatically reduce the manpower necessary to produce a Softstrip(TM). For example, instead of taking the 50-60 minutes to key in a journal issue manually, the same file was produced in 2 minutes. An additional advantage of automated entry is the high degree of accuracy obtained in data transfer, requiring very little proofreading.

Printing the strips

Once the file is created by either manual or automated methods, the strips can be produced through a simple process. The program that produces the strip automatically converts the words in the designated file to either a strip or a Postscript graphics file as directed. The strip is output to a laser printer producing an image which the printing company photographically reproduces. A Postscript graphics file is fed directly to the typesetting machine. Because of the higher resolution a typesetter achieves compared to a laser printer, the density of information is higher in the typeset version, and thus fewer strips are required to hold the same information. The laser version has the advantage...
that it can be used by any printer capable of reproducing photographs. The Postscript method achieves higher density strips but does require that the printing company have a Postscript compatible typesetter. Figure 3 is an illustration (photographically reduced) of strips representing the interpretative summaries in a single journal issue.

Figure 3.
Journal strips

See notes listed in June 15, 1995 issue of the JAVMA (page 837) entitled "JAVMA announces computer-scanable strips for barcodes search" for information on the purpose and use of these strips.
Of the 20 veterinary journals approached by Langston, so far only four have chosen to include the data strips. A number of journals declining to offer the service were not convinced that data strip indexing was desired by subscribers. Others wanted to wait until the majority of veterinary journals had blazed the trail. Still others were not certain that the strips would consume only limited space and could be produced with very little effort and expense.

The Journal of the American Veterinary Medical Association (JAVMA) was the first to implement the service. The August 15, 1989 issue carried an announcement of the service and the first data strips, as well as the utility program (MS-DOS only) to allow users to modify the coded information if necessary. The source code of this utility program (written in Quick Basic) appeared in the computer-coded strips entitled SSUTIL.BAS on the inside back cover. The Journal of the American Animal Hospital Association, The Compendium on Continuing Education for the Practicing Veterinarian, and The Journal of the Association of Asian Veterinarians soon joined with JAVMA to produce the strips. The Proceedings of the Ninth Annual Veterinary Medical Forum published by the American College of Veterinary Internal Medicine and the Proceedings of the 1992 SAVMA Symposium, published by the Student American Veterinary Medical Association also carry the strips.

How the subscriber uses the strips

To use the proprietary data strip indexing, a user needs a Softstrip (TM) System which includes a strip reader and accessory kit (ordering information is provided at the end of this article). The reader consists of a slotted case containing a motorized truck and associated electronics which decode the contents of Softstrips (TM) and transmit them to a host computer via a standard RS232 serial interface. The reader works by illuminating the Softstrip(TM) with infrared radiation. The reflected radiation is conveyed through a system of rotating lenses to a detector which establishes a contrast level to distinguish the black and white areas of the Softstrip (TM). The StripRead program communicates with the reader to initiate a read cycle, display information about the contents of the strip, and offer the opportunity of saving the file to disk. Files which are saved to disk are ready to be imported into a database application.

StripSearch(c) is the database program designed to provide an inexpensive, user-friendly method of managing personal literature abstract files. Langston wrote the program for MS-DOS compatible microcomputers. For Macintosh users, Waldhalm developed a hypercard stack which was later modified by David P. Jennings to take advantage of the enhancements of Hyper Card 2.0 and to be compatible with System 7.0. StripSearch(c) allows the user to create records, customize imported records, and search/retrieve the citations in a personal database through a number of access points.

The MS-DOS version is a stand-alone program requiring approximately 380K of RAM (See Figure 4 for the main menu). It works in a textual mode to maintain compatibility with all MS-DOS computers. Color and monochrome displays are supported. Although capable of working on floppy disks, a hard disk enhances performance considerably.

Figure 4. StripSearch main menu

![StripSearch Main Menu](image)
When the user selects "import," he is taken to a menu which allows him to run the strip reader, decompress compressed files, as well as import files into the database. If the "import file" selection is chosen, a submenu (Figure 5) is displayed which allows the user to select StripSearch, DIALOG, NLM MEDLINE, or user-defined files.

Figure 5. Import file submenu

<table>
<thead>
<tr>
<th>StripSearch file (import format)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dialog file</td>
</tr>
<tr>
<td>NLM Medline file</td>
</tr>
<tr>
<td>Pending file (records awaiting further processing)</td>
</tr>
<tr>
<td>User defined file</td>
</tr>
<tr>
<td>Set your return address for reprint requests</td>
</tr>
</tbody>
</table>

The option is then given for either importing all articles into the database (as might occur with a specialty journal), or accepting or rejecting each article individually (Figure 6).

Figure 6. Article selection option

<table>
<thead>
<tr>
<th>TITLE: Clinical evaluation of cats with lower urinary tract disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUTHORS: Kruger, J. M. et al</td>
</tr>
<tr>
<td>JOURNAL: J Am Vet Med</td>
</tr>
<tr>
<td>YEAR: 1991</td>
</tr>
<tr>
<td>VOLUME: 2</td>
</tr>
<tr>
<td>ISSUE: 211-216</td>
</tr>
<tr>
<td>COMMENTS:</td>
</tr>
<tr>
<td>KEY WORDS: feline species urinary system</td>
</tr>
<tr>
<td>FILE DRAWER: Accept Reject File Drawer Edit Pending</td>
</tr>
<tr>
<td>SUMMARY: The cause of acquired lower urinary tract disease was evaluated in 141 male and female cats by use of contemporary diagnostic methods. Cats given treatment prior to evaluation and cats with other concomitant illnesses were excluded from the study. Specific diagnoses that were established in affected cats included urethral obstruction with</td>
</tr>
</tbody>
</table>

If this latter option is chosen, the user may also select from his own defined list of file drawer names to assign a location to the article (should he choose to file the journal by subject matter rather than numerically). Because scientific proceedings are now being produced in strip form, each record may be identified on import as to which format, journal versus book, is to be used when displaying the information.

StripSearch is designed to organize hard copy rather than replace it. The presumption was made early on that the user would have the journal article in his possession. With the addition of DIALOG and MEDLINE file imports, the user may have to send for a reprint or photocopy. To avoid adding articles into the database that are not yet in possession, the user may optionally place these citations into a "Pending" file for temporary storage until the
reprint/photocopy arrives. When the reprint is received, the record may be added to the database. The program will also produce reprint requests if the author's address is included.

Once imported, a search may be performed on the information using either key word indexing (Figure 7) or whole record searches. The former option is more rapid although slightly less inclusive.

Figure 7. Key word search

<table>
<thead>
<tr>
<th>Key Word(s) in C:\QB45\JAVMA</th>
<th>Matches</th>
</tr>
</thead>
<tbody>
<tr>
<td>canine</td>
<td>177</td>
</tr>
<tr>
<td>anemia</td>
<td>10</td>
</tr>
<tr>
<td>1 and 2</td>
<td>7</td>
</tr>
<tr>
<td>anaplasma spp</td>
<td></td>
</tr>
<tr>
<td>anaplasmosis</td>
<td></td>
</tr>
<tr>
<td>anatomy</td>
<td></td>
</tr>
<tr>
<td>anemia</td>
<td></td>
</tr>
<tr>
<td>anemia, aplastic</td>
<td></td>
</tr>
<tr>
<td>anemia, hemolytic</td>
<td></td>
</tr>
<tr>
<td>anemia, immune-mediated</td>
<td></td>
</tr>
</tbody>
</table>

F1=HELP
F2 / partial key word match
F3 / search for matches
F3 / view matching records

The program includes a key word generation routine that will either automatically index articles against an existing key word file, or prompt the user as to whether to add an unknown word to the key word list. "And/or" searches are supported for both key word and complete search options. Search results are displayed in a scrolling list (Figure 8) from which the user can select for viewing or printing the matching records (Figure 9). The results of searches can also be saved for future reference.

Figure 8. List of search results

CL:\QB45\JAVMA

TO CONTINUE SEARCH, PRESS RETURN
67  Idiopathic pleural effusion and pulmonary thromboembolism in...
68  Ehrlichiosis in a dog with seizures and nonregenerative anem...
85  Drug-associated aplastic anemia in dogs: Eight cases (1984-1...
219  Macrohematuria and life-threatening anemia attributable to s...
279  Heinz body hemolytic anemia associated with high plasma zinc...
335  Prednisolone and danazol for treatment of immune-mediated a...
531  Determination of erythrocyte pyruvate kinase deficiency in B...

F3=PRINT MATCHING RECORDS  F4=SAVE MATCHING RECORDS  Del=DELETE FROM LIST
Figure 9. Selected record

RECORD # 67

TITLE: Idiopathic pleural effusion and pulmonary thromboembolism in a dog with autoimmune hemolytic anemia

AUTHORS: Bunch, S.E.
et al

JOURNAL: J Am Vet Med

YEAR: 1989

VOLUME: 195

ISSUE: 12

PAGES: 1748-1753

COMMENTS:

KEY WORDS: canine species thromboembolism lungs anemia hemolytic

FILE DRAWER:

SUMMARY:

Pleural effusion and pulmonary thromboembolism were diagnosed in a dog with autoimmune hemolytic anemia. Clinical signs of tachypnea, then dyspnea in association with pleural effusion, developed after 10 days of immunosuppressive corticosteroid therapy (> 2 mg/kg of body weight/d, PO). The diagnosis of pulmonary thromboembolism was made tentatively on the

The Macintosh version assumes familiarity with the hypercard application and format.

Figure 10. StripSearch Mac home card.
When "Import Citations" is selected, the user is asked for the format of the source file: MEDLINE, DIALOG or StripSearch. Once the format is identified, a dialog box appears from which the desired document(s) can be selected (Figure 11).

Figure 11. Document selection

A list of the article titles in the selected document is displayed (Figure 12).

Figure 12. Articles to be selected

In contrast to the MS-DOS version, StripSearch Mac(c) does not have an option to select all articles simultaneously. The user must select each article by clicking on it. When the user clicks on "Import Selections", StripSearch Mac(c) creates a new card for each article title selected, filling in appropriate fields with the information available from the datastrip.
Figure 13. Article card

The user may then customize the record to satisfy individual needs. The “Location” field may be filled in to fit the user’s filing scheme, or simply clicking in the “Location” box generates an automatically assigned sequential number. If the user does not have the article in hand, the “Location” field is left blank until the article arrives. The “File Box(es)” field can be defined in a variety of ways, such as discipline, language, or document type. Additional key words may be added by clicking on the “Make KeyWord” button. The user may also create cards for book chapters, proceedings, charts, or any other document in his personal library for which indexing is desired. When the “New Citation” button is selected from the home card, the user identifies whether the information to be input relates to a book or a journal.

To search the citations, the user clicks on the appropriate button on the home card and a search card appears.

Figure 14. Search card

File: All files

Search Text:

enter one or more words separated by a space

HyperCard Find

Print List HyperCard Report Write File
For most content searches, using the default "All Fields" is most efficient and comprehensive. When searching reference number, author or journal, limiting the search to the relevant field decreases search time. The term "Ref. num." applies to the location number defined by the user. The author's last name is usually sufficient for an author search. Journal names are entered as cited in the datastrip, usually as abbreviations.

The search is initiated by typing search terms in the "Search Text" box. Including synonyms and truncating individual terms to the root will increase the chances of retrieving pertinent articles. Clicking on the "Or Search" button retrieves articles which include any of the terms entered. Clicking on the "And Search" button retrieves articles combining two or more terms. Titles of all articles that meet the specified parameters are listed in the scrolling "Hit List."

Figure 15. Hit list

To view the full record of any title in the list, the user clicks on the desired title (Figure 16). The search results may be written to a file or printed in a list or hypercard report format predetermined by the user.

Figure 16. Selected record from hit list
Library service to provide datastrip information

The College of Veterinary Medicine at Mississippi State University recognizes the need to incorporate the use of computers into the educational process. Since 1984, all incoming students have been required to purchase microcomputers so that they will learn to use the power of computing to store and retrieve all types of information. An Appletalk network provides the students electronic access to instructional materials, case simulations, course notes and syllabi, the online catalog of the Mississippi State University Libraries, a general bulletin board as well as several course-related bulletin boards, and e-mail within the building and some areas of campus.

The College of Veterinary Medicine Library routinely posts information to the electronic general bulletin board. A special folder designated "Journal Abstracts" (Figure 17) is maintained to receive the documents created when the periodicals assistant scan the datastrips as new journals are received. Within "Journal Abstracts" is a folder for each publication which carries datastrips.

Figure 17 Electronic bulletin board

![Diagram of electronic bulletin board with folders for general information and journal abstracts]

To conserve space, older issues are compressed into an archive document using Compact Pro software. The documents representing the two most recent issues are simply dropped into the folder.

Figure 18. JAVMA Softstrip™ folder

![Diagram of JAVMA Softstrip folder with issues 1989 to 1992]
New users of StripSearch(c) can create an index to their journal backfiles by downloading the archives documents from the bulletin board and importing the citations of the articles in their personal library. To avoid the necessity of scanning through the archives documents each time, users must check the bulletin board regularly to retrieve the current documents before they get compressed. Any user who is not connected to the AppleTalk network can use the public access computers in the Library to download the documents to diskette. Consideration is being given to a diskette-by-mail update service for alumni who request it.

Conclusion
Surveys seem to indicate that veterinary practitioners rely mostly on their own personal libraries for medical information and few use computer indexing to make the most of these resources. The time and effort required to type text into a system is one of the barriers to the utilization of computer information management systems. StripSearch(c) is an inexpensive but powerful computer application using encoded data strips to dramatically improve the efficiency of data entry. Since the usefulness of StripSearch(c) increases with the number of journals carrying data strips, readers are urged to contact journal publishers to offer this service.

Order information
The StripSearch System, priced at $219.90 in U.S. dollars, is available from Softstrip, Inc., 835 South Main Street, Waterbury, CT 06706, USA (telephone 203-573-0150; telefax 203-597-9762). Callers within the continental United States can order the system using the toll-free number 1-800-533-7323. The StripSearch Database program shareware (MS-DOS) is included in the system. User documentation is provided upon receipt of software registration and payment of $39.96 in U.S. dollars. Those interested in the Macintosh version should contact David Jennings, College of Veterinary Medicine, P.O. Drawer V, Mississippi State, MS 39752.

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