

TELIDON TREES

Part I: Report, Appendices D, E, F

Report submitted to

Dr. Eric Lee

Behavioural Research Group
Department of Communications

Contract OER 79-00471

by

Ann H. Schabas

June 27, 1980

revised September 4, 1980

TK
7882
I6
S328
1980

TK
7882
I6
S328
1980

2
1
TELIDON TREES

Part I: Report, Appendices D, E, F

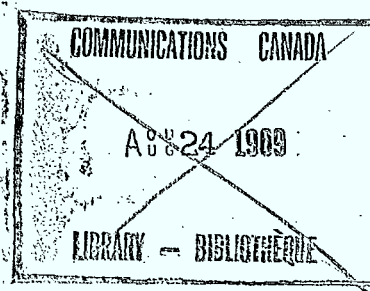
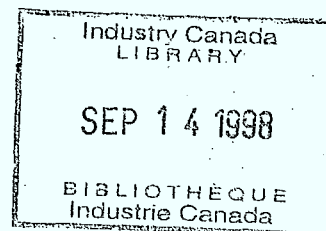
Report submitted to

Dr. Eric Lee
Behavioural Research Group
Department of Communications

Contract OER 79-00471

by

1/ Ann H. Schabas



June 27, 1980

revised September 4, 1980

DL 885 6728
1305

TK
9882
L6
5328
1980

CONTENTS

I	Introduction	1
II	Methods	
	1. Background	2
	2. Definition of the data base	4
III	The deliverables	
	1. Introduction	7
	2. The A products	9
	3. The B products	22
	4. The C products	23
IV	Conclusions	26
	Appendix D: Bibliography	27
	Appendix E: Report on literature search	28
	Appendix F: List of documents	30
	Appendix A: Telidon tree A - tree with no cross - references or duplication permittedVolume	2
	Appendix B: Telidon tree B - tree with duplication..Volume	3
	Appendix C: Telidon tree C - tree with cross references Volume	4

TABLES

I	List of products	8
---	----------------------------	---

FIGURES

I	Sample 'document' card	6
II	Root Frame & Menu 1	14
III	Menu 12	15
IV	Menus 1133 & 11331	15
V	Menus 42 & 421	17
VI	Menus 3521 & 35212	17
VII	Menu 13312	19
VIII	Menu 137	19
IX	Menu 1344	19
X	Menu 146	21
XI	Menu 151 (MENUS-C)	21
XII	Menus 2, 21 & 211 (MENUS-C)	25

I Introduction

One of the major services to be offered on Telidon is information retrieval. The amount of information that will probably be available on a commercial Telidon information base will probably be large - perhaps as many as 100,000 to 200,000 pages. With such a large data base, it is important that users be able to find the information that they seek and that the information can be found quickly and easily (without making any mistakes).

At present information is retrieved on Telidon by searching through a hierarchical tree structure. Recent experiments conducted by the Behavioural Research Group indicate that considerable difficulty is often met in retrieving the right information using the present Telidon tree structure. The current tree needs to be improved to make it easier for people to use. Particular attention must be paid to improving the first menu page in the tree for it must be accessed on every single search for information in the data base. There are several alternatives for retrieving information which should also be considered. One alternative is a printed alphabetical subject index to the information base (a directory). A second alternative is the same alphabetical directory, included in the Telidon data base. A third alternative is a key-word search system.

At this time it is not clear which of the access methods or combination of methods is optimal for the typical user. However, the degree to which users make use of Telidon will depend to a very great extent on the speed and ease with which they can find information on Telidon. People will simply not make use of Telidon if they are directed down the wrong branch of the tree too often or if the terms that they search for in the directory aren't there or take too long to find. These various alternative methods for finding information on Telidon must be prepared, investigated and evaluated systematically. The preparation of some of these alternative retrieval mechanisms is the purpose of the work described in this report.

The deliverables of the contract as set down in its Statement of Work are:

1. A strict tree structure with no cross-references and no duplication of documents.
2. A strict tree structure with duplication of documents allowed.
3. A tree structure with cross-references between branches.
4. A directory (alphabetic index) for each of the trees listed above (1,2,3).
5. A final report describing work and the procedures developed.

II Methods

1. Background

a) Introduction

Three steps were taken to acquire the special knowledge necessary for the project: a literature search relevant to Telidon; a visit to London to observe the British Post Office's PRESTEL and to meet with key people involved with PRESTEL; work at a Telidon terminal to gain familiarity with it from the user's point of view.

b) The literature search

The reference librarian at the Faculty of Library Science of the University of Toronto conducted the literature search. This involved a manual search of relevant printed indexes and on-line searches of data bases such as LISA, INSPEC, NTIS. Her report is given in Appendix E.

The search was unfruitful. With one exception (Item 1) the 'tree structure' items found did not deal with the logical aspects of information. The PRESTEL, Viewdata, Teletext and Videotex searches retrieved items already known or with contents too similar to ones already known to be of use. This outcome was not unexpected. It was important to carry out the search if only to establish that the literature provides little help for this project.

Three useful manuscript items (Items 4, 5, 6) were acquired in London. These, with several other useful items, are listed in the short bibliography (Appendix D).

c) The London visit

The visit to London, England was made in mid-April, 1980. It included meetings with the following:

Ederyn Williams of PRESTEL
Catherine Sullivan and David Oliver of Aslib
Hilary Thomas of Communications Studies & Planning, Ltd. (CSP)
Derek Austin of the British Library
Christine Smith of BLAISE
Ken Knight of Mills and Allen Communications Ltd.
A. Vickery of the University of London
Goeffrey Bush of PRESTEL in Cambridge.

Hands on experience with PRESTEL was gained at five sessions, courtesy of Aslib, CSP, BLAISE, Mills & Allen and PRESTEL. A number of documents were acquired: reports, directories, Aslib's PRESTEL data organization, etc.

Of particular interest are PRESTEL/Telidon differences regarding modes of access. PRESTEL's 'double digit' displays to accommodate more than 10 options on a menu is impressive. The PRESTEL software which interprets keyed digits without waiting for a 'send' character makes this routing very smooth. The same effect could be simulated -- but more awkwardly -- on the present Telidon system.

The other impressive feature of PRESTEL is its ability to interpret menu responses as cross-references. Cross-references can thus be listed as menu options, making them 'transparent' to the user and avoiding the need to enter long strings of digits (page numbers). This also involves special software and some additional effort at data entry.

The overall design of menu frames on PRESTEL reflects two years of experience in achieving menu option clarity: at the higher levels, options are extended with qualifiers; highlighting techniques, effective use of colour and typography, are exploited.

d) Telidon terminal

Approximately ten hours were spent in April and May, 1980 working at a Telidon terminal. Routing methods and keypad capabilities were studied systematically. Wording weaknesses in frame headings and in menu options were identified. Illogical groupings and unsatisfactory document positions were noted.

e) PRESTEL seminar

A special PRESTEL seminar, sponsored by CSP, was attended in Toronto on May 22, 1980. It provided an opportunity to clarify the impressions of the London visit.

f) Martin Lane

A meeting was held in early May with Martin Lane of INFOMART (formerly with FINTEL) to discuss accessing differences of PRESTEL and Telidon.

2. Definition of the data base

There were three versions of the DOC Telidon data base from which to work:

(1) a printout of menu and document frames dated June, 1979; (2) a printed listing of the tree structure dated November 22, 1979 (hereafter referred to as the November tree); (3) the frames available at a terminal at the time of working -- March-June, 1980. A careful examination of the three versions revealed that a few document frames had been deleted between successive versions and there were minor changes in a few menus from version to version; but these differences were very slight. For convenience, it was decided to work from the November tree.

A copy of this listing was then examined to arrive at the document set for the project. By agreement, the OECA section (4) and the Western Canada section (5) were not included. The very small Australian tour section (81) was also excluded. In some cases, where an array of like 'documents' was present only one or two was chosen to serve as an example. It was felt that this would reduce the bulk without affecting the logical structure of the ultimate tree. Typical arrays from which only one or two 'documents' were selected include: Toys by age group, Radio programs by the day of the week and the time of the day, Ballet companies, Prime ministers. A few large arrays were left intact in order to establish techniques for handling them (e.g., Small appliances). Some array members were kept because of anticipated use for the later trees (e.g., Children's car seats). Others were kept because there was some doubt about their location (e.g., Market area restaurants). A small number of 'documents' were left out because their meanings were unclear (e.g., Mixers (1756), Hunting & fishing (1375) and Transportation (13866)).

Once the November tree had been reviewed and marked to indicate the choice of 'documents' the reclassification was started. The development of a classification of documents is facilitated if each document is described on a separate slip of paper of standard size. To this end, each 'document' of the document set was recorded on a separate card along with its series of broader terms in the November tree to set it in context and define it (Figure I).

CONCERTS	12432.0	D
MUSIC		
THE ARTS		
ENTERTAINMENT		
GENERAL INTEREST GUIDE		




Figure I: Sample 'document' card

It should be pointed out that the 'documents' -- the ends of the branches of the November tree -- are not really all documents or document positions. It is, therefore, somewhat misleading to refer to them as 'documents'. In many cases they are the umbrella headings for unexpanded branches. For example, no doubt Duplexes (1312) represents a menu which would subdivide by district and/or price, as Apartments (1311) does. But, for want of a better term and to avoid introducing yet another jargon word, all ends of branches of the November tree are referred to as 'documents'. Furthermore, only some of the document positions actually have documents -- Telidon frames -- associated with them. For example, several ballet companies are listed on menu 12421 but only The Royal Winnipeg Ballet leads to a document. The presence of an actual document was noted on the 'document' cards by a 'D', as shown in Figure I.

The absence of documents for most of the document positions (a rough estimate suggests 75%) meant that considerable guesswork was involved in visualizing what

documents were intended. Existing documents in an array set a pattern for the empty document positions in the same array, and the umbrella terms gave clues, but it is quite likely that some empty document positions were misinterpreted, resulting in placements and structures which contradict the original intent. The reclassification work was more a classification of categories than of actual items.

III The deliverables

1. Introduction

Deliverables 1-4 fall logically into three product groups, named the A products, the B products and the C products, corresponding to the tree structures defined as deliverables 1, 2 and 3, respectively, set down in the Statement of Work. Deliverable 4 is actually three deliverables, one associated with each of deliverables 1, 2 and 3. Table I lists the products by product group.

Deliverables 1, 2 and 3 have each been prepared in two formats: a list format (TREE-A, TREE-B and TREE-C) showing the successive levels of the tree structure by indention, similar to the November tree; and a menus format (MENUS-A, MENUS-B and MENUS-C) displaying the tree structure as an ordered series of menu frames, as they would be presented to a user. The menu format has been worked out and included because it is believed that the retrieval effectiveness of a hierarchy is dependent not only on a logical structure but also on a clear presentation of that structure to the user. Furthermore, these menus, if mounted on cards, could be used to simulate on-line searching and hence allow for expeditious and inexpensive testing.

DIRECTORY-A, DIRECTORY-B and DIRECTORY-C (deliverable 4) are the 'printed' indexes to each of the trees. DIRECTORY-C has also been integrated into TREE-C, where the cross-referencing feature makes this possible.

TABLE I: List of Products

A Products (Appendix A)

TREE-A	A rigid tree structure for all the documents in the data base with no duplication of documents and no cross-references.
MENUS-A	The TREE-A structure in menu form, each menu designed to fit the dimensions of the Telidon screen: not more than 20 lines of not more than 40 characters.
DIRECTORY-A	A printed directory to TREE-A.
CROSS-INDEX-A	A cross listing of DOC tree numbers and TREE-A numbers to show the relationship between the DOC data base and the data base used for this project.

B Products (Appendix B)

TREE-B	The same as TREE-A with the addition of duplicate postings to locate some documents in more than one place.
MENUS-B	The TREE-B structure in menu form.
DIRECTORY-B	A printed directory to TREE-B.
DUPLICATES-B	A list of the duplicate documents present in TREE-B and MENUS-B.

C Products (Appendix C)

TREE-C	The same as TREE-A with the addition of a branch to include DIRECTORY-C.
MENUS-C	The TREE-C structure in menu form with the addition to the menus of two types of cross-references: cross references to serve in lieu of the document duplications of TREE-B; cross-references to direct the user to related menus and documents elsewhere in the tree structure.
DIRECTORY-C	The printed version of the directory branch of TREE-C.
CROSS-REFERENCES-C	A list of the cross-references present in MENUS-C.

In addition each set of products has a fourth product: CROSS-INDEX-A links TREE-A numbers to the November tree numbers; DUPLICATES-B lists the documents duplicated in TREE-B; CROSS-REFERENCES-C lists the cross-references present in MENUS-C.

The products are included as appendices: the A products in Appendix A, the B products in Appendix B and the C products in Appendix C.

2. The A products

a) TREE-A

The preparation of TREE-A was the heart of the project. A large proportion of the project time was spent working and reworking its structure. The set of cards representing the 'document' set selected from the November tree were grouped and regrouped into categories. The object was to find mutually exclusive groupings.

Classifiers recognize the contradiction between subdividing knowledge into increasingly smaller units of mutually exclusive categories with each unit of knowledge in its absolute and right position, and arranging units of information in a tree structure. The units of information often don't fit the plan - there may be no place for them or they may belong in more than one place. For example, are toys best grouped with children's needs or with recreation? Specialized classification schemes can define their user group to minimize compromises, but this is not yet possible for Telidon, since the 'typical' Telidon user has not yet been identified. And the problems of rigid tree structure classification are increasing as our society increasingly stresses the importance of inter-disciplinary relationships.

The grouping and regrouping was done by one person -- the Principal Investigator -- in consultation with the Research Associate.

A policy decision was made to group together documents which would probably be used together. Further, it was decided to give importance to the notion of 'concretes' first proposed by J. Kaiser (Kaiser, J. Systematic indexing. London, 1911) and more recently discussed by E.J. Coates (Coates, E.J. Subject catalogues. London: The Library Association, 1960). This notion of concretes takes the position that users of subject indexes tend to search for the most concrete aspect of a subject and therefore it should be given prominence by the indexer. Concretes are things which can be touched or seen. Prominence, in a classification scheme, means grouping. Giving prominence to concretes, then, means grouping together 'documents' which share a concrete. For a particular object, for example, the 'for sale' document and the 'advice on buying' document are grouped together. This approach removed the poorly defined umbrella terms, such as Advice, Leisure and Marketplace, which it was felt, made selection of options difficult in the November tree. Initially some groupings 'fell together' quite naturally and, in fact, showed close correspondence to groupings in the November tree (The Telidon User's Guide and Telidon Explanation; The Business Guide; The Canadian Government; Emergency; Travel; Education, News; Weather & Sports; Employment; Notice Board) even though the method of work -- the complete fracturing of the November tree into separate 'documents' and their reassembly as an independent classification -- had removed all traces of the November tree structure. Two other groupings that emerged easily were Real estate and Motor vehicles.

The remaining 'documents' were more difficult to categorize. Eventually, they were assigned to one of two piles depending on whether they were seen as 'utility' information or 'quality of life' information. This utility/quality of life separation was not without problems. Are Antiques furnishings (a basic necessity) or collectors' items (a hobby)? Are Pets part of household welfare or a luxury? It could be argued that this dichotomy introduces a new element of subjectivity, and to a degree this is true; but it worked surprisingly well.

And such placement problems occur elsewhere in the tree, too. Is the Sculpture Walk cultural or athletic? Should Educational films be with Movies or with Education? What about hobby courses, maps (with the place or all together), car insurance (with cars or with other insurance)? There was often no single right place for a document and an arbitrary decision was made in such cases. It is the 'problem' placements such as these that make qualifiers in the early menus so important. Through this process the Root frame and menu 1 began to take shape.

Once these groupings of 'documents' had stabilized, the structure of each group was tackled. This meant looking for mutually exclusive subgroupings and sub-subgroupings. A decision was made not to limit the number of subdivisions at any one point to fewer than ten. Rather, their number was worked out to suit the category, independent of technological constraints of the system. There are enough techniques available to handle situations with any number of subdivisions (options); and it was decided to deal with each situation on its own logical merits.

Nor was any attempt made to keep down the number of hierarchical levels by filling up the options at any one point to eight or nine. Again, the nature of the categories alone dictated the number of options. It is believed that a user has less trouble following a trail of easy decisions through more levels than following a trail containing difficult and confusing choices through fewer levels.

The process was iterative and was stopped when it was felt that no further improvements could be made.

Eventually, all the cards were regrouped according to a new numbering system to represent the new strict hierarchy. TREE-A was produced. (Appendix A) In addition to the new hierarchy number, the corresponding November tree number has been included with each of the 'documents'. The code 'D' indicates those documents which were actually available for consultation either from the set of printouts dated July, 1979 or at the terminal.

As TREE-A developed; a few additional 'documents' were added. These are marked in TREE-A with an 'X' in the DOC number column. The 'documents' in TREE-A represent the final set of documents. A separate listing of these has been provided as Appendix F. This same set was used for the B products and the C products. It is further suggested that this set also be used without change for future prototype access methods to allow for meaningful comparisons.

The products have all been produced with the help of a text editing system. However, the texts were not machine generated and the opportunity for human error was great within a product and between products. A notification of any errors of this sort would be appreciated.

b) MENUS-A

MENUS-A was then prepared. To some extent this was a mechanical transfer from TREE-A. However, the wording of menu headings and menu options was subjected to careful examination. One of the user's problems with tree searching is maintaining a sense of 'location'. For this reason it is recommended that all frames, both menu and document, carry headings sufficient to set them in the context of the hierarchies in which they have been placed. (One small exception is discussed later in this section.)

One way of easing the constraint of the nine option limit is the double use of a single digit, as illustrated by options 2, 5 and 6 in menu 1, Figure II. It usually requires the setting up of a double menu frame at the next level, as shown by menu 12 in Figure III.

The double use of a single digit is one extreme of a technique which can also be used, slightly differently, for long arrays - double digit routing. This technique can be implemented in two ways on Telidon. One way is to instruct the user to key the four-key sequence: digit, send character, digit, send character. The other way is to present the user with the same choices twice. The latter approach has been taken here. (See menus 1133, 11331 in Figure IV.) This technique was used at menu 162 in the November tree. Even when a category such as Sports (1133) is first introduced into

ROOT FRAME

- 1 TABLE OF CONTENTS for the General Interest Guide
- 3 BUSINESS report, Business opportunities, Commercial real estate, Commercial services
- 4 MISCELLANY: Metric conversion tables, Horoscope, etc.
- 5 EMERGENCY telephone numbers, first aid procedures
- 6 TELIDON: How to use it, How it works
- 7 NOTICE BOARD: Personal advertisements, Births, Deaths, etc.

TABLE OF CONTENTS

1

- 1 NEWS, WEATHER, SPORTS NEWS
- 2 REAL ESTATE, Rentals, Buying advice
- 2 MOTOR VEHICLES, Mobile homes, Trailers, etc. for sale, etc.
- 3 HOUSEHOLD & FAMILY: Planning, Management, Shopping, Services
- 4 HOME & COMMUNITY: Entertainment, Hobbies & hobby supplies, Events, Sports & sports equipment, Worship
- 5 EDUCATION: Opportunities, Resources
- 5 JOBS, Employment agencies, Careers
- 6 TRANSPORTATION, Travel, Maps
- 6 PLACES: Provinces & countries
- 7 Your GOVERNMENTS

Figure II: Root Frame and Menu 1

REAL ESTATE, RENTALS, BUYING ADVICE, 12
MORTGAGES

- 1 Houses, etc. for sale
- 2 Rentals
- 3 Houses wanted
- 4 House buying advice, Mortgages

MOTOR VEHICLES, MOBILE HOMES, TRAILERS

- 6 Servicing, Repairs, Towing, Parking,
Appraisals, Insurance
- 7 Driver education
- 8 Sales & sales advice, Accessories

Figure III: Menu 12

NEWS BY SPORT 1133

- 1 Baseball
Football
Hockey
- 2 Horse racing
Soccer

(BASEBALL, ETC.) 11331

- 1 Baseball news
- 2 Football news
- 3 Hockey news

Figure IV: Menus 1133 and 11331

the tree it should be set up for double digit routing if its expected full set can be estimated at more than nine. The second level frames in a double digit routing situation need not have titles (this is the one exception mentioned above); in practice it is difficult to assign useful and meaningful titles for these frames. They are presented here in parentheses as token titles.

In organizing a double digit situation it is desirable to exploit the options at the first level to minimize the size of the option list at the second level. (Menus 42 and 421 in Figure V illustrate this.) If the members of an array are too many for one frame an alphabetical index frame can be inserted, as menus 3521 and 35212 illustrate in Figure VI.

The wording of options should aim to avoid any overlap in meaning. This can be achieved two ways. One way is to add qualifiers and/or examples. This is particularly important for the first frames accessed. Menu 1 (Figure II) is a good example. This is the menu which distinguishes the 'utility' documents from the 'quality of life' documents (options 3 and 4, respectively) and the qualifiers help in this regard. They crowd the frame; but there are only five frames like this. It is qualifiers, more than anything else, which help to overcome the unavoidable compromises of hierarchical classification.

Another way to distinguish between options is to sequence the more specific options first so that the user knows when he scans down to a more inclusive option that the specific options above it are excluded. HOUSEHOLD & FAMILY (option 3 of menu 1) does not include real estate because REAL ESTATE is option 2.

HOROSCOPE 42

- | | |
|----------|---------------|
| 1 Aries | 4 Libra |
| 2 Taurus | 5 Scorpio |
| 3 Gemini | 6 Sagittarius |
| 4 Cancer | 7 Capricorn |
| 5 Leo | 8 Aquarius |
| 6 Virgo | 9 Pisces |

(ARIES, ETC.) 421

- 1 Aries
- 2 Taurus

Figure V: Menus 42 and 421

ELECTRONICS EQUIPMENT 3521

- 1 A-B
- 2 C-D

ELECTRONIC EQUIPMENT C-D 35212

- 1 Communications equipment
- 2 Computers and peripheral
- 3 Control systems
- 4 Counting & timing
- 5 Data acquisitions systems
- 6 Data processing equipment
- 7 Digitizers
- 8 Display systems

Figure VI: Menus 3521 and 35212

In contrast to the detailed option wording at the top of the tree, very brief wording is desirable at lower levels where the frame title carries the context. (See menu 13312 in Figure VII.) It has already been noted that vague umbrella terms were avoided. The same is true of vague options further down the structure such as 'Other' and 'Miscellaneous'.

Sometimes, wording was adjusted to help the fit of options on the frame. Rugs was used deliberately on menu 137 (Figure VIII) because it is short. Joint & bone conditions was split to avoid a run-on in the list format of menu 1344 (Figure IX).

Some kind of logical sequencing of options in a menu is desirable. How important is it to put effort into this? Certainly, it can help to define the limits between options, as noted earlier. Often, there are natural groupings of options for one menu. Sometimes there is a 'built in' sequence (menu 42). Generally, with lists such as menu 1344, alphabetic sequence is desirable.

But the real problem is maintaining an established sequence. The very nature of Telidon presupposes a changing data base. This means changing menus, which causes a considerable 'ripple effect' down the branches. Even if the machine could adjust the numbering of the affected branches automatically, the users who access frames from a printed directory would be led to the wrong frames. It is more practical to add on options rather than insert them to keep the sequence.

Effective use of bold letters and colours either to highlight the bold or to set alternative options apart can help legibility considerably. These effects can be seen on PRESTEL. An attempt has been made in MENUS-A to highlight with BOLD type. Note GOVERNMENTS, for example, in Figure II.

TREE SERVICES

13312

- 1 Care
- 2 Removal

Figure VII: Menu 13312

FURNISHINGS, FOOD, CLOTHING,
PERSONAL NEEDS, HOUSEHOLD NEEDS

137

- 1 Furnishings, Large appliances, Rugs
- 1 TV sets, Radios, etc.
- 2 Food
- 3 Clothing & footwear
- 4 Personal needs: Jewelry,
Luggage, etc.
- 5 Household needs: Linens, Cleaning
supplies, Small appliances, etc.

Figure VIII: Menu 137

ILLNESSES & PHYSICAL PROBLEMS

1344

- | | |
|---------------|------------------|
| 1 Anemia | 3 Influenza |
| Appendicitis | Joint conditions |
| Arthritis | Bone conditions |
| Asthma | Kidney disease |
| Cancer | Liver disease |
| 2 Diabetes | 4 Pneumonia |
| Epilepsy | Psoriasis |
| Gall bladder | Stroke |
| Gonorrhea | Syphilis |
| Heart disease | Tuberculosis |
| Hernias | 5 Ulcers |
| | Varicose veins |

Figure IX: Menu 1344

There is an obvious advantage, in some situations, to storing information on menu pages. This has been done for restaurant ratings and credit card codes on menu 146 (Figure X).

Menu pages within multi-frame documents (such as are used in the DOC data base for restaurants) is useful when the documents are many and there are no logical categories in which to group them. This level of access has not been included in the products but it is endorsed.

c) DIRECTORY-A

The directory was prepared by examining the menus in MENUS-A. Directory entries were considered for each menu in turn. In addition, the penultimate menus were considered for directory entries to their options.

Special care was taken to include directory entries for hard-to-locate items. For all entries, synonyms which would file quite differently from one another were sought. On the other hand, if several candidate entries filed together in the directory also pointed to the same branch, they were often replaced with a single umbrella entry.

d) CROSS-INDEX-A

For convenience of referral from the November tree a cross-index was prepared, as a companion to TREE-A. It provides the links from the November tree to TREE-A.

RESTAURANTS, NIGHT CLUBS, ETC. 146

1 Regional cuisine	RATING GUIDE
2 Special atmosphere	* Fair
3 Dancing	** Good
3 Food specialties	*** Excellent
4 Family restaurants	
4 General fare	PRICE GUIDE
6 Tea/coffee houses	* Reasonable
7 Fast food, 24-hour	** Moderate
8 Bars, Pubs	*** Expensive
8 Lounges	
9 Cabarets	CREDIT CARDS
9 Nightclubs	AE American Express
	CB Carte Blanche
	DC Diners Club
	MC Master Charge
	VS Visa

Figure X: Menu 146

SCHOOLS, COLLEGES, LIBRARIES 151

- 1 Schools
- 2 Trade schools
- 3 Community colleges
- 4 Universities
- 5 Reference & research libraries

For Public libraries KEY 1454
For Children's camps KEY 1364

Figure XI: Menu 151 (MENUS-C)

3. The B products (Appendix B)

The best of strict classifications will result in a fifty percent failure rate for documents which belong equally well in two (or more) places. One way to overcome this is to put some documents in more than one place. The set of B products takes this approach to improving retrieval.

The documents for duplication were identified during the preparation of the A products. They are listed in DUPLICATES-B. They were the ones which gave most difficulty in setting up the strict hierarchy. The preparation of B products was, therefore, relatively mechanical once the TREE-A work was completed.

The amount of duplication is considerably more than DUPLICATES-B suggests at first glance. TREE-B includes several umbrella pairs

- Cars for sale (by make, year)
- Cars for sale (by year, make)

- Restaurants (by type)
- Restaurants (by district)

- Clubs (by type)
- Clubs (by district)

- Movies (by type)
- Movies (by theatre)

- Commercial real estate (by type)
- Commercial real estate (by province)

each of which represents duplicate document sets.

TREE-B is the same as TREE-A with the addition of duplicate entries. MENUS-B is the corresponding set of menus.

DIRECTORY-B was derived from DIRECTORY-A. Some entries were given second and third frame numbers. There is some doubt about the advisability of

including two frame numbers in the directory for one document. On the one hand the user who browses in Telidon will benefit by following both leads. The user who looks up one number and then expects to find something different at the other number will be disappointed.

Not all duplicated documents lead to changes in the directory, since many of the directory entries are to umbrella frames and not to the document level of the tree.

Some entries, included in DIRECTORY-A more because they were judged 'hard-to-find' than because they merited space in the directory for reasons of importance, were not included in DIRECTORY-B. Children's car seats is a case in point.

4. The C products (Appendix C)

The duplication of documents is not a satisfactory approach to overcoming the constraints of rigid classification. It is uneconomical of space and it does not help the user to find his way to related documents.

Cross-referencing can do the job that duplication of documents does and it can set out road maps within the tree to alert the user to related material. The C products use this technique.

The duplicates of DUPLICATES-B were translated into cross-references. This was not mechanical. In some situations the cross-reference was made at a

level in the tree above where the duplicate document had been put. It makes sense to tell the user at menu 151 that Public libraries is at frame 1454 rather than put the cross-reference on frame 1515 (Figure XI). It saves him a step.

Opening up the tree to include cross-references also means that the directory can be on-line. It is at frame 2 in TREE-C (Figure XII). TREE-C also includes a general Maps section and a Telephone number section, but no documents are assigned to either. In other respects TREE-C is identical to TREE-A.

MENUS-C is the menu equivalent of TREE-C showing the cross-references. Some cross-references are reciprocal, others are not. A general policy is to make general-to-specific references one-way. The more loosely defined 'related' cross-references were dealt with on an individual basis regarding reciprocity.

Cross-referencing introduces the problem of keying long numbers. The PRESTEL technology has avoided this by linking menu options to cross-references so that the user only needs to key in one digit and, in fact, may not even be aware that a jump is being made to another branch.

One situation that cross-references cannot help is demonstrated by the Cars for sale documents. If the document itself includes the last sequencing (by year under make or by make under year) all cars for sale will have to be listed twice.

The on-line directory (frame 2) is a special application of cross-referencing. Alphabetic breakdown should be directory specific to ensure good distribution

ALPHABETICAL INDEX

2

1 A, E
2 C, D
3 E, F, G
4 H, I, J, K
5 L, M, N, O
6 P, Q
7 R, S
8 T, U, V
9 W, X, Y, Z

ALPHABETICAL INDEX: A - B

21

1 A - AM	6 BA
2 AN - AO	7 BE - BI
3 AP - AQ	8 BL - BR
4 AR - AS	9 BU - BY
5 AT - AZ	

ALPHABETICAL INDEX: A - AM

211

Accidents	5
Accommodation (Living)	122
Advertising	1353
Air travel	162
Ambulance	51
Amusements	14

Figure XII: Menus 2, 21 and 211 (MENUS-C)

of entries at the last level. This has been worked out at frame 211 (Figure XII) as an example.

One last point about cross-references. Mention was made earlier about the need to help the user maintain a sense of 'location'. For this reason, and to avoid the 'where do I go next' situation, it is recommended that all document frames have at least one cross-reference back up the hierarchy, not necessarily just to the next level above which is handled by the key pad.

IV Conclusions

This project has attempted a systematic organization of the Telidon data base, to provide a relatively logical structure, within the constraints of the hierarchical tree. Directory and cross-reference devices have been developed to improve access and reduce problems of retrieval where more than one location in the tree structure is desirable. The products to support the organization are presented in a form ready for testing.

APPENDIX D

BIBLIOGRAPHY

1. Hardgrave, W. Terry. Ambiguity in Processing Boolean Queries on TDMS Tree Structures: a Study of Four Different Philosophies. In International Conference on Very Large Data Bases, 5th, 1979. Proceedings. New York, Institute of Electrical and Electronics Engineers, 1979, p. 373-397.
2. Information on PRESTEL. In PRESTEL Business Directory, October 1979. London, The Financial Times, 1979. 12 p.
3. Martyn, John. PRESTEL and Public Libraries: an LA/Aslib Experiment. Aslib Proceedings 31 (May 1979): 216-226.
4. Structure and Design. In Information Providers' Manual, Chapter 4. 22 p. (Photocopy.)
5. Sullivan, Catherine, and Oliver, David. Aslib/Library Association Local Information Database. London, Aslib Research Department, December 1978. pages unnumbered. (Photocopy.)
6. Thomas, Hilary B. "Tree Structure: the Root of Videotex?" 9 p. (Photocopy.)

APPENDIX E

REPORT ON LITERATURE SEARCH

May 2/80

I ONLINE DATABASES

The following online databases were used on the DIALOG System to locate information relevant to the topic. The search terms were used either individually or in conjunction with the other search terms listed.

DATABASE

SEARCH TERMS USED

ABI/INFORM 1971-

business information needs
business information utilization

COMPENDEX 1970-

teletext
videotex
telereference
Prestel
Telidon
Tic Tac
Vista
Viewtron

DISSERTATION ABSTRACTS
INTERNATIONAL 1861-

tree structure

ERIC 1966-

Telidon
Oracle
Prestel
telereference
videotex
telset
Antiope
Ceefax
Tic Tac
Vista
Viewtron
business information needs
business information utilization
citizen information needs
general public information needs

INSPEC 1969-1977

tree structure
cc=C7240
cc=C6120
cc=C4210
cc=C7220
cc=C7250

INSPEC 1978-

tree structure
videotex:
teletext
business information needs
business information utilization
citizen information needs
general public information needs

I ONLINE DATABASES (continued)

DATABASE

SEARCH TERMS USED

LISA

Telidon
Oracle
Prestel
telereference
videotex
telset
Antiope
Ceefax
Tic Tac
Vista
Viewtron
business information needs
business information utilization
citizen information needs
general public information needs
tree structure

MAGAZINE INDEX 1977-

teletext
videotex
telereference
Prestel
Telidon
Tic Tac
Vista
Viewtron

NTIS 1964-

Telidon
Oracle
Prestel
telereference
videotex
telset
Antiope
Ceefax
Tic Tac
Vista
Viewtron
tree structure

SSCI 1972-

tree structure
videotex
teletext

SSIE CURRENT RESEARCH 1978-

tree structure

II MANUAL SEARCH

The Faculty of Library Science Card Catalogue was searched under the following headings: Business - Information Services; Information Services.

LIST OF DOCUMENTSTREE-A
Number

1111	News in brief
1112	News of the past hour
11131	Today's local news
11132	Yesterday's local news
11141	Today's national news
11142	Yesterday's national news
11151	Today's international news
11152	Yesterday's international news
11211	Local weather report
11212	Local weather forecast
11213	Local weather statistics
11221	National weather report
11222	National weather map
1123	Temperatures throughout the world
1124	Special weather stories
1131	Sports news in brief
1132	General sports news
11331111	Baseball League standings
11331112	Baseball League: Today's games, scores
11331211	Football League standings
11331212	Football League: Today's games, scores
11331311	Hockey League standings
11331312	Hockey League: Today's games, scores
11331313	Hockey League leaders
113321	Horse racing (news)
113322	Soccer (news)
1211	Houses for sale (by place, price)
1212	Condominiums for sale
1213	Cottages for sale
12141	City properties for sale
12142	Country properties for sale
1215	Real estate services
1221	Houses for rent
1222	Garden homes for rent
1223	Duplexes for rent
1224	Condominiums for rent
1225	Apartments for rent (by place, price)
1226	Sublets (Rentals)
1227	Rooms for rent
1228	Room & board (Rentals)
1229	Shared accommodation (Rentals)
123	Houses wanted (for purchase)
1241	Consumer reports on housing
1242	How to buy a house
1243	How to buy a condominium
1244	How to buy a guaranteed home
1245	How to shop for a mortgage
12611	Advice on motor vehicle repairs
12612	Motor vehicle servicing, repairs
12613	Motor vehicle winterizing (services)
12614	Anticorrosion guide for motor vehicles
1262	Motor vehicle towing (services)
12631	Garages for rent

12632	Indoor parking spaces
12633	Outdoor parking spaces
1264	Motor vehicle appraisals
1265	Motor vehicle insurance
127	Driver education
128111	How to buy a car
128112	How to buy a used car
128113	Consumer reports on cars (by make)
12812	Cars for sale (by make, year)
12814	Sports cars for sale
12815	Antique cars for sale
12816	Car leasing
12817	Cars wanted
12821	How to buy a pickup truck
12822	Trucks for sale (by make, year)
12823	Specialized trucks for sale
12824	Customized vans for sale
12825	Truck bodies for sale
12826	Trucks wanted
12831	Trailers for sale
12832	Trailers for rent
12833	How to buy a recreational vehicle
12841	How to buy a mobile home
12842	Mobile home parks
12843	Mobile homes moved
12844	Mobile homes exchanged
12845	Mobile homes for sale
12846	Mobile homes for rent
128511	Motorcycles for sale
128512	Motorcycles for rent
128521	Mopeds for sale
128522	Mopeds for rent
128531	Scooters for sale
128532	Scooters for rent
12861	Car parts for sale
12862	Car accessories for sale
12863	How to buy tires
1311	General financial advice
13121	House insurance (advice)
13122	Life insurance (advice)
13123	Medical insurance (advice)
1313	Investments (advice)
13141	Retirement planning (advice)
13142	Wills & estate planning (advice)
1315	Advice on signing contracts
1316	How some people manage on so little (financial advice)
132111	Consumer reports on tools
1321121	How to buy an electric drill
1321122	How to buy portable power tools
1321131	How to buy a hammer
1321132	How to buy a handsaw
13212	Do-it-yourself maintenance
13221	General building services
13222	Ceramics (Building supplies & services)
13223	Drywall & cement (Building supplies & services)
13224	Flooring (Building supplies & services)
13225	Masonry (Building supplies & services)
13226	Roofing (Building supplies & services)
13227	Sheet metal (Building supplies & services)

1323	Plumbing & heating services
13241	How to build a fuel-saving house
132421	Advice on insulation contractors
132422	Insulation services
13243	Insulation materials
13244	Cut fuel bills (how to)
13245	Solar heat(ing) (advice)
13246	Wood and fuel for sale
13251	How to buy paint, paper, paneling
13252	Painting & decorating services
13253	Carpentry services
1326	Anti-theft measures
13311	General landscaping services
133121	Tree care (services)
133122	Tree removal (services)
13313	Top soil for sale
13321	Snow blowers for sale
13322	Snow removal services
13331	How to buy a lawn mower
13332	How to buy a ladder
1341	General health care
1342	Infant & childhood diseases
134311	Allergies
134312	Colds
134313	Constipation
134314	Cysts
134321	Headaches
134322	Insomnia
134323	Motion sickness
134411	Anemia
134412	Appendicitis
134413	Arthritis
134414	Asthma
134415	Cancer
134421	Diabetes
134422	Epilepsy
134423	Gall bladder
134424	Gonorrhea
134425	Heart disease
134426	Hernias
134431	Influenza
134432	Joint & bone conditions
134433	Kidney disease
134434	Liver disease
134441	Pneumonia
134442	Psoriasis
134443	Stroke
134444	Syphilis
134445	Tuberculosis
1344511	Ulcer symptoms
1344512	Treatment of ulcers
134452	Varicose veins
13451	Hypochondria
1346	Home medical supplies
1351	How to get consumer help
13521	Shopping for quality (advice)
13522	How to read labels
13523	Hidden hazards (advice)
13524	Comparison shopping

13525	Guarantee or warranty (advice)
13531	Advertising
13532	Telephone & mail solicitations
1354	Consumer rights
1355	How to complain
13561	Credit advice
13562	Shop for credit (advice)
13563	Buying at the bank
13564	Choosing a credit card
1357	Conserver society
1361	A new baby (how to prepare for)
1362	Baby services
1363	Day care centres
1364	Children's camps
13651	General buying advice on toys
13652	How to buy bicycles & tricycles
136531	How to buy rattles & pacifiers
13661	How to buy playpens
13662	How to buy cribs & cradles
13663	How to buy children's car seats
1369	Pets for sale
137111	Ranges (advice)
137112	Refrigerators (advice)
137113	Freezers (advice)
137114	Dishwashers (advice)
137115	Clothes washers (advice)
137116	Clothes dryers (advice)
137117	Vacuum cleaners (advice)
137119	Energy labeling (of large appliances)
137121	How to buy audio equipment
1371221	How to buy a TV set
1371222	TV sets for sale
1371231	How to buy a radio
1371232	Radios for sale
1371241	How to buy a citizens' band radio
1371242	Citizens' band radio equipment for sale
1371251	How to buy a record player
1371252	Stereos for sale
1371261	How to buy a tape recorder
1371271	How to buy loud speakers
1371311	How to buy upholstered furniture
1371312	How to buy a piano
137132	Kitchen furniture
137141	Furniture repairs
137142	Appliance repairs
137151	How to buy a carpet
137152	How to buy floor coverings
137153	Carpet installation (services)
137211	Consumer reports for foods
137212	Universal product code for foods
137213	No-name food products (Quality control)
137221	How to plan a menu
137222	Nutrition
137223	Grocery List
137224	Metric measures for food
1372251	Food dollar by unit pricing
1372252	Food dollar by grade
1372253	10 ways to get more for your food dollar
1372261	Bread & cereals dollar

1372262	Fruit & vegetables dollar
1372263	Meat & meat alternatives dollar
1372264	Milk & milk products dollar
137227	Meat alternatives
13723	Catering services
13731	Textile labeling
13732	Cleaning instructions for clothes
13733	Dry cleaning for clothes
13734	Clothing that lasts (advice)
13735	Dressmaking (services)
13736	How to buy shoes
13741	How to buy luggage
13742	How to buy jewelry
137431	Drugs (advice)
137432	Toilet soaps (advice)
137433	Shampoos (advice)
137434	Hair dyes (advice)
137435	Wigs (advice)
137511	How to buy blankets
137512	How to buy pillows
137513	How to buy towels
137514	How to buy sheets
137521	How to buy pots & pans
1375311	How to buy a blender
1375312	How to buy a coffee maker
1375313	How to buy an electric knife
1375314	How to buy a food processor
1375315	How to buy an iron
1375321	How to buy a mixer
1375322	How to buy a pressure cooker
1375323	How to buy a slow cooker
1375324	How to buy a toaster
1375325	How to buy a waffle iron
137541	Detergents (advice)
13811	Commercial cleaners
13812	Carpet cleaners
13813	Chimney cleaners
13821	Household moving advice
13822	Movers
1383	Household storage services
14111	Autobiographies, Biographies
14112	Classics
141131	Novels
141132	Science fiction
141133	Mystery & suspense books
14114	History books
141151	How to buy an encyclopedia
14116	Literature courses
14121	TV stations
1412211	Monday, etc. morning, etc. TV programs
14123	TV movie guide
14124	TV sport guide
14125	Consumer reports on TV programs
14131	Radio stations
1413211	Monday, etc. morning, etc. radio programs
14133	Radio specials
14134	Consumer reports on radio programs
141411	Peanuts cartoon
141412	Video-tex cartoon

141421	Telidon colour illusions
141422	Telidon geometric illusions
141423	Telidon ambiguous effects
1414311	Telidon geometry games
1414312	Telidon match games
1414313	Telidon algebra games
1414314	Telidon logic games
141432	Telidon word games
141433	Telidon chess
141434	Telidon orbit
141435	Telidon pong
141436	Telidon road rally
141441	Grey Cup quiz
14145	Telidon jokes
14146	Telidon stories
142111	Brownies (Recipes)
142112	Buns (Recipes)
142113	Cookies (Recipes)
142114	Fish 'n brews (Recipes)
142115	Omelet (Recipes)
14221	Gardening
14222	Plants
1423	Carpentry
1424	Sewing
1425111	Antique shops
1425112	Antiques for sale
1425121	Art collecting
1425122	Fine art for sale
1425123	Canadian artists
142513	Bicycle collecting
142514	Book collecting
142515	Camera collecting
142521	Collecting cars
142522	China collecting
1425231	Coins for collectors
1425232	Coin collecting
1425241	Stamps for collectors
1425242	Stamp collecting
142611	Crafts courses
142612	Crafts
142621	Dancing lessons
142631	Musical instruments
142632	Music lessons
142641	Art workshops
1426421	Theory of design (Art courses)
1426422	Fine arts courses
142651	Cameras for sale
142652	Photography courses
143111	Hull arenas (Local athletic facilities)
143112	Ottawa arenas (Local athletic facilities)
14312	Gymnasiums
1432111	NCC guided walks
1432112	Summertrails
143221	Swimming pools
143222	Swimming
143231	How to buy fishing gear
143241	How to buy exercise equipment
143251	Riding academies
143311	Golf courses

143312	How to buy golfing equipment
143321	Squash courts
143331	Tennis courts
143411	Skating
143412	Skates for sale
143413	How to buy skating equipment
143414	Skate centre
143421	Cross country ski trails
143422	Cross country skiing conditions
143431	How to buy skis
143432	Skis for sale
143433	Ski centre
14344	Tobogganing
14351	Hockey
143611	Boats & motors for sale
143621	Aviation equipment for sale
14363	Motor sports
143641	Bikeways
143642	Bicycles for sale
14371	Motor sports events
144	Community centres, Community clubs
14511	National Museum of Man
14531	Art galleries
14532	Art exhibitions
145331	Introduction to the Sculpture Walk
145332	Hull Sculpture Walk
1453331	Ottawa Sculpture Walk map
1453332	Ottawa Sculpture Walk guide
1454	Public libraries
146111	Afghanistan (Restaurants)
146115	European (Restaurants)
146121	French (Restaurants)
146122	French-Canadian (Restaurants)
146125	Indian (Restaurants)
14621	Restaurants with historic atmosphere
14622	Outside restaurants
14623	Dine & dance restaurants
14624	Restaurants with musical entertainment
14625	Market area restaurants
14626	Other restaurants with special atmosphere
14631	Brunch (Restaurants)
14632	Crepes (Restaurants)
14633	Natural foods & vegetarian foods (Restaurants)
14634	Seafood (Restaurants)
14635	Steak (Restaurants)
14641	Canadian restaurants
14642	General fare
1466	Tea and coffee houses
14671	Fast food restaurants
14672	24-hour restaurants
14681	Bars
14682	Pubs & taverns
14683	Lounges
14691	Cabarets
14692	Clubs with country western music
14693	Clubs with folk music
14694	Jazz clubs
14695	Night clubs
14696	Clubs with show bands

14697	Rock clubs
14711	Movie reviews
14712	Consumer reports on movies
14713	Special film showings
14714	Drive-ins
147151	Comedy movies
147152	Drama movies
147153	Historic movies
147154	Horror movies
147155	Mystery/suspense movies
147156	Romantic movies
147157	Science fiction movies
147158	Westerns (Movies)
147211	Royal Winnipeg Ballet
14722	Folk dance
14723	Modern dance
14731	Band concerts
14732	Music festivals
14733	Musicals
14734	Opera
14735	Orchestra concerts
14736	Music recitals
14741	Theatre at the National Arts Centre
14742	Ottawa Little Theatre
14751	Local event guide
14752	Icecapades
1476	Entertainment for children
14771	Auctions
14772	Craft fairs
14773	Flea markets
14774	Specialty shops
1478	National Arts Centre program
1481	Sunday services
1511	Schools
1512	Trade schools
1513	Community colleges
1514	Universities
1515	Reference and research libraries
152	Educational films & lectures
153	Tutors and lessons
1541	Business education
1542	Language learning
1543	Mathematics education
15441	TV & radio announcing work/study program
1545	Science education
15461	Car mechanics education
154621	Electronics education
154622	Electronics educational institutes
155111	Domestic jobs
155112	Baby services (jobs)
15512	Office work (jobs)
1513	Restaurant & hotel work (jobs)
15514	Sales jobs
155151	Beauticians, Barbers (jobs)
15521	Employment in administration & finance
15522	Employment in architecture and engineering
15523	Employment in computers & communications
15524	Employment in graphics
15525	Employment in hospitals

15526	Employment in laboratories
15527	Employment in the sciences
15528	Employment in technology
1553	Contract work (Employment opportunities)
1554	Out-of-town employment opportunities
156	Employment agencies
1561	Canada Manpower
1562	Government (Employment agencies)
1563	Domestic employment contractors
1564	Executive employment contractors
1565	Industrial employment contractors
1566	Office employment contractors
1567	Professional employment contractors
1568	Technical employment contractors
157	Employment wanted
161111	Local transit regular routes
161112	Local transit early bird routes
161113	Local transit express routes
161114	Local transit interprovincial routes
161115	Local transit Sunday routes
161121	Local transit regular fares
161122	Local transit transfers
161123	Local transit reduced fares
161124	Local transit monthly passes
16113	Local transit Dial-a-bus service
16114	Local transit charters & sightseeing
16115	Local transit service for handicapped people
16116	Lost & found
16117	Local transit route index
1612	Local road conditions
1613	Car rental
1614	Taxis
1615	Delivery services
16211	Air Canada reservations and tickets
16212	Air Canada arrivals
16213	Air Canada departures
16214	Air Canada express & freight services
16215	Air Canada Expedair
1631	Bus transportation
1632	Train transportation
1641	Boat transportation
1642	Ferry transportation
165	Special transportation services
166	Travel agencies
167	Travel packages
1681111	History of Newfoundland
1681112	Geography of Newfoundland
1681113	Map of Newfoundland
1681121	By air to Newfoundland
1681122	Surface routes to Newfoundland
1681123	Ferry services to Newfoundland
16811311	Road map of Newfoundland
16811312	Trans Canada Highway in Newfoundland
16811313	Gravel highways in Newfoundland
16811314	Newfoundland traffic regulations
16811315	Newfoundland vehicle inspection
16811316	Newfoundland liability insurance
1681141	Newfoundland hospital & medical services
1681142	Newfoundland drinking laws

1681143 Regulations about animals & pets (in Newfoundland)
 16811511 Labrador, etc. hotels, motels, hospitality homes
 16811521 Labrador, etc. camp sites & trailer parks
 1681153 Newfoundland lodges and cabins
 1681161 Newfoundland Visitor Centre
 16811621 Camping in Newfoundland
 16811622 Picnicking in Newfoundland
 168116231 Hiking trails in Newfoundland
 168116232 Map of hiking trails in Newfoundland
 16811624 Boating in Newfoundland
 168116251 Fishing in Newfoundland
 168116252 Newfoundland hunting & fishing regulations
 16811626 Swimming in Newfoundland
 1681163 Winter sports in Newfoundland
 1681171 What to see in St. Johns, Newfoundland
 1682111 History of Switzerland
 1682112 Geography of Switzerland
 1682113 Map of Switzerland
 16821141 Languages of Switzerland
 16821142 Religion in Switzerland
 1682115 Government of Switzerland
 16821161 Agriculture in Switzerland
 16821162 Gross National Product of Switzerland
 16821163 Working population of Switzerland
 16821164 Industries of Switzerland
 168212 Travel routes in Switzerland
 1682131 Holiday resorts in Switzerland
 1682141 Geneva, Switzerland
 1682211 War Between the States (United States history)
 1682221 Map of US physical divisions
 1682231 United States Declaration of Independence
 1682232 United States executive departments
 1682233 How a bill becomes law in the US
 1682234 Action of a committee on a bill in the US
 1682241 Gross National Product of the US
 171111 Liberal MPs (Canadian federal government)
 171112 New Democrat MPs (Canadian federal government)
 171113 Progressive Conservative MPs (Canadian federal government)
 171114 Social Credit MPs (Canadian federal government)
 171115 Other MPs (Canadian federal government)
 17112 House standings (House of Commons)
 17113 House seating plan (House of Commons)
 1712 The Senate (Canadian federal government)
 1713 The Judiciary (Canadian federal government)
 17141 Department of Agriculture
 1714211 DOC administration telephone numbers
 1714212 DOC finance telephone numbers
 1714213 DOC personnel telephone numbers
 1714214 CRC telephone numbers
 1714215 Other DOC telephone numbers
 171422 DOC policy
 171423 Organization of DOC
 171424 The work of DOC
 171425 Research at DOC
 1714251 DOC Research Sector
 1714252 Technology transfer research at DOC
 1714253 DOC Information Society Program
 1714254 DOC Rural Communications Program
 1714261 DOC Space Sector

1714262	Alouette Satellite Program
171427	DOC spectrum management
1714281	1979 telecommunication by household statistics
1714282	1979 telecommunication by industries statistics
1714283	1949-79 telephone statistics
1714284	Radio use statistics
17143	Department of Consumer and Corporate Affairs
17144	Department of National Health and Welfare
17145	Department of Industry, Trade and Commerce
17146	National Research Council
1715	Canadian cabinet ministers
17161	Sir John A. MacDonald (Canadian prime ministers)
17171	Communications research (Federal reports)
171721	Science expenditure estimates for 1978/79
171722	Major funders of federal science activity
171723	Special science applications expenditures
171724	Extramural scientific activities expenditures
1717251	Science expenditure summaries: Man years
1717252	Science expenditure summaries: Science activities
1717253	Science expenditure summaries: Science & performer
1717254	Science expenditure summaries: By performer
1717255	Science expenditure summaries: Activity & performer
172	Provincial governments
173	Municipal governments
311	Canada's real GNP growth
312	International GNP comparison
31311	World grain exports
31321	Canada's domestic exports
313221	Canada's share of grain exports
313222	Canada's grain exports (by destination)
314	Consumer prices & jobless rate
315	Current account balances forecast
316	Foreign control of Canada's manufacturing industries
317	Weekly economic facts
321	The Canadian dollar exchange rates
322	World currency rates
323	Money supply
324	Canadian debt financing
325	Bank prime lending rates
331	Employment rates
332	Unemployment rates
333	Unemployment by age & sex
334	Growth in jobs
3411	Food companies profit comparison
3412	Top 10 restaurants/catering firms (Industry summaries)
3421	Top 10 computer firms (Industry summaries)
3431	Car sales (Industry summaries)
351	Canadian construction companies (Industry summaries)
352121	Electronic communications equipment (Canadian companies)
352122	Computers & peripherals (Canadian companies)
352123	Electronic control systems (Canadian companies)
3521241	Digital clocks, Timers, Recorders (Canadian companies)
352125	Electronic data acquisition systems (Canadian companies)
352126	Data processing equipment (Canadian companies)
352127	Digitizers (Canadian companies)
3521281	Norpak Ltd. (Canadian companies)
3522	Electronics components (Canadian companies)
35231	Electronics consultants (Canadian companies)
35232	Geophysical electronics consultants (Canadian companies)

3524. Electronics research organizations
 3525 Electronics associations & societies
 353 Canadian fishing companies
 354 Canadian manufacturing companies
 355 Canadian mining companies
 356 Canadian publishing & recording companies
 357 Canadian pulp & paper companies
 358 Canadian shipping & rail companies
 359 Canadian textile companies
 3611 Corporate bonds, Debentures (Bond market)
 3612 Bonds of unlisted industrials, Mines (Bond market)
 3613 Federal government bonds (Bond market)
 3614 Provincial government bonds (Bond market)
 3615 Municipal bonds (Bond market)
 3616 Bond yields (Bond market)
 3617 New issue bonds (Bond market)
 3618 Bond quotations (Bond market)
 3621 Your own money (investments)
 3622 What money earns now (investments)
 363 Mutual funds
 364 Stock market
 36411 TSE 300 index & volume
 36412 TSE composite index
 36413 Stock market new highs & lows
 3642 Stock market quotations
 3643 Stock market new issue filings
 3644 Stock dividends declared
 3645 Stock dividend changes
 3646 Stock earnings report
 365 Commodities
 366 Quick market facts
 3711 Business opportunities
 3712 Manufacturing opportunities
 3713 Investment opportunities
 3714 Franchises for sale
 3721 Office space for sale
 3722 Retail properties for sale
 3723 Warehouse space for sale
 3724 Farms for sale
 3725 Resorts for sale
 3726 Hunting & fishing lodges for sale
 3731 Machinery for sale
 37321 Horses (for sale)
 37322 Poultry (for sale)
 37411 Printing (services)
 37412 Sign making (services)
 37421 Typing (services)
 375 Funds available (Business opportunities)
 376 Funds wanted (Business opportunities)
 381 Personal taxes
 382 Corporate taxes
 411 Linear metric conversion
 412 Liquid metric conversion
 413 Pressure metric conversion
 414 Temperature metric conversion
 4211 Aries (Horoscope)
 4212 Taurus (Horoscope)
 5 Emergency telephone numbers
 51. Ambulance

52	Fire
53	Police
54	Distress Centre
551	Hospitals
552	Poison control
56	Rape Crisis Centre
57	Other emergency telephone numbers
581	Basic dos & don'ts in an emergency
5821	Mouth-to-mouth artificial respiration
5822	Neilson method
5823	Closed-chest heart massage
5831	Bleeding & hemorrhage (Emergency procedures)
5832	Bandaging (Emergency procedures)
584	Poisoning (Emergency procedures)
585	Shock (Emergency procedures)
591	Emergency procedures for infants & children
592	Artificial respiration for babies
61	Getting off the Telidon system
621	Telidon keypad buttons
622	Telidon keypad commands
623	Telidon keypad functions
624	Telidon keypad command control
632	Telidon index page selection
633	Telidon direct page selection
634	Telidon document page selection
64	Telidon errors and system faults
651	Telidon tree structure diagram
661	Telidon PDI command list
662	Telidon PDI byte format
663	Telidon picture drawing sequence
664	Telidon PDI demonstration
665	Telidon test patterns
666	Telidon resolution demonstration
667	An artist's conception of Telidon
67	Telidon system components
711	Articles for sale
712	Articles for rent
713	Articles for swap
714	Articles wanted
715	Garage sales
72	Learning exchange
73	Personal memos
74	Lost articles
75	Found articles
76	Births
77	Deaths
78	Announcements

84365

TK
7882
I6
S328
1980

DATE DUE

PRINTED IN U.S.A.

