

SUBJECT HEADINGS AUTHORITY LIST (SHAL):  
A COMPUTERIZATION PROJECT AT CDA LIBRARY  
(SUBJECT HEADINGS AUTHORITY LIST (SHAL):  
UN PROJET D'AUTOMISATION POUR LA BIBLIOTHEQUE DU MINISTERE D L'AGRICULTURE)

M. Islam  
Agriculture Canada  
Ottawa, Ontario, K1A 0C5

ABSTRACT

Computer programs have been devised to create a machine readable data base of agricultural subject headings, photo-compose and typeset the Subject Headings Authority List (SHAL), generate catalogue cards of subject heading information, and to provide a mechanism for the routine maintenance and updating of the SHAL data base. A number of editing functions are performed by the computer to minimize and to eliminate, wherever possible, the laborious task of manual editing and updating. Further, the programs contain logic to produce printouts at any point during the process of data capture so as to facilitate the human effort required in subsequent inputting/updating/editing phases. Finally the data base has been designed in such a way that its integration into a multicomponent automated library system may be accomplished without difficulty. (Des programmes d'ordinateur ont été conçus pour établir un fichier central mécanisé des en-têtes des sujets agricoles, photocomposer et taper la liste autorisée des en-têtes des sujets (SHAL), produire des fiches cataloguées donnant des renseignements sur les en-têtes des sujets et fournir un mécanisme pour l'entretien périodique et la mise à jour du fichier central SHAL. L'ordinateur remplit un bon nombre de fonctions de mise en forme afin de minimiser et d'éliminer, chaque fois que c'est possible, les travaux manuels laborieux de mise en forme et de mise à jour. De plus, les programmes contiennent les éléments logiques nécessaires pour fournir des imprimés à importe quel moment durant le processus de la collecte de données afin de faciliter le travail de ceux qui voudront par la suite faire des entrées, des sorties et des mises en forme. Finalement, la façon dont est conçu le fichier central permet de l'intégrer facilement dans un système automatisé multicomposant de bibliothèque.)

## SUBJECT HEADINGS AUTHORITY LIST

### INTRODUCTION

In the CDA Library system the need had been felt for sometime for a subject heading authority list that would be an effective tool for subject retrieval while at the same time being easy to update and control. The effectiveness of our existing authority file, maintained manually at the Department's headquarters library, is greatly hampered by its unwieldy size, by the difficulties of manual revision and updating, and by the numerous inconsistencies of form, structure, and vocabulary that have crept into the file during a period of nearly 70 years. Moreover, this manual file maintained at the HQ library is of little use to the many branch and field libraries of the Department which are scattered all over the country.

In early 1974 a project was therefore initiated to produce a computerized subject headings authority list for the CDA library system. The immediate objective was to produce a printed list that could be adopted as the authorized list for the entire library system of the Department. The list was to be compiled, edited, and continuously updated at the Headquarters library of the Department in Ottawa and to be distributed to field and branch libraries for their use. Some of the field and branch libraries of the system have highly specialized and unique collections of their own. Provision has therefore been made for these libraries to expand the main list in certain specific areas in accordance with some explicitly adopted principles and guidelines. This will ensure that the specialized needs of the branch libraries are met while the overall management and control of the subject authority file is exercised at the Headquarters library.

### SYSTEM REQUIREMENTS

The information on a subject heading falls into one or more of the following categories:

- (a) the subject heading proper
- (b) the one-way "see also" reference
- (c) the two-way "see also" reference
- (d) the "see" reference tracing
- (e) the explanatory note defining the scope or limit of the given subject heading. This may be in the form of a scope note in natural language or a symbol attached to the subject heading, or both.
- (f) the category or class number signifying the correct position of the given subject heading in a classification scheme or schedule.

A subject headings database will normally consist of subject heading master records each of which will contain some or all of the above categories of information. Obviously, the information of the first category, that is, the name of the subject heading itself, is mandatory while the remainder of the above list is optional. In our system the subject headings data field is divided into six subfields corresponding to the above categories of information. However, at this stage the assignment of category or class numbers is not contemplated though this might be accomplished anytime in the future without difficulty.

## SUBJECT HEADINGS AUTHORITY LIST

In a well designed subject headings file, most of the headings are interconnected through the network of references. In a large subject authority file such as ours, the task of manually checking, revising, and updating the connections of this network is extremely tedious and prone to error. Most of the repetitive and mechanical aspects of this work can be taken over by the computer in a properly designed computerized system. Such a system can furthermore substantially reduce the manual task of keyboard inputting by taking advantage of the fact that most subject headings are interconnected with one another through the network of references.

For example, consider the subject heading

Beans  
                   sa Vegetables  
                   xx Soybeans  
                   x Phaseolus

In a purely manual system each of these four entries must be separately entered into the database. But once this subject heading with its associated references has been entered into the machine readable file appropriately coded and tagged, then the machine, if so programmed, can generate automatically the entries Vegetable, Soybeans, and Phaseolus with the appropriate references, tracings, etc. In the design of our subject authority project we have attempted to automate the repetitive and mechanical aspects of the file building and file maintenance work as far as this was practicable within the constraints of our computer systems capability.

### SYSTEM DESCRIPTION

Subject headings data are input into the system via an on-line ATS terminal located in the library's technical processing division. The coding of each category of information for the master records is extremely simple, being either mnemonic or based on conventional library usage (see appendix I). This has greatly facilitated the speedy and accurate inputting of subject headings data from the manual file into the system directly from the 3" x 5" cards (see appendix II).

The program was written by Alphatex of Ottawa in accordance with our specifications. Where appropriate, the program includes information relating to record lengths, whether record is mandatory or optional, record sort criteria, presence of sub-records, any special disposition of data, etc. Special editing checks ensure that every entry has one and only one subject heading and that the subject heading is properly coded. The data are processed on the premises of Alphatex.

One-way "see also references." Any valid subject heading entry may include one or more "see also" records. The computer is programmed to check whether the referenced one-way "see also" appears as a subject heading. If it does, another master record is not generated. Otherwise, the

## SUBJECT HEADINGS AUTHORITY LIST

appropriate subject heading is generated internally by the computer. Moreover, a check is automatically made by the computer to determine whether the referenced master record contains a backward "see also" link to the referencing master record. If so, a diagnostic is issued for this error condition.

Two-way "see also" references. The computer checks for reciprocity, and if necessary ensures it by generating the appropriate entry.

Tracing of "see" references. The computer performs the necessary inversions of "see" reference tracings. For instance, the following master record

Shm Alfalfa  
x Blue Lucerne

will automatically generate

Shm Blue Lucerne  
xr Alfalfa

The computer will automatically determine what type of subject heading is generated and insert the appropriate code, "xr" in this example. This will be expanded on the computer printouts and photocomposition to

Blue Lucerne  
see

Alfalfa

If a "see" reference tracing produces a master record which already exists in the database, an error diagnostic is displayed and the duplicate is automatically eliminated in the final edit process. Several terms can produce identical subject subject headings upon inversion of "see" reference tracings. This is recognized as a valid condition. Further, the computer ensures that if a master record contains one or more "xr" records, no other record types must appear within that master, except the main subject heading. If identical master records are generated, the corresponding terms referred to are grouped under a single subject headings.

General and scope notes. The program does not make a distinction between the two, and both are coded "ng". An "ng" record may follow and sh, sa, xx, or another "ng" record. If a note overflows a line, the overflow line is given no record code. An overflow line may follow an "ng" record or a previous overflow line. After sorting, notes and note overflow lines will appear immediately following the record that preceded them on input.

Sorting. When generated sort fields in subject headings are equal, the following collating sequence applies:

- (a) main subject heading
- (b) main subject heading plus subdivision
- (c) qualified main subject heading
- (d) inverted subject headings
- (e) subject heading phrase (identified by a symbol following the principal word or phrase inserted at the time of input).

# SUBJECT HEADINGS AUTHORITY LIST

Other simplifying devices. From our computerized list we have eliminated  
 corporate and personal names  
 geographical names and geographic subdivisions  
 form subdivisions

This has enabled us to keep the SHAL database to a managable size and structure. Form subdivisions from a standard list are added by cataloguers at their own discretion at the time of cataloguing. Corporate and personal name headings are established for the subject catalogue in a similar way as the case arises. Geographical names are adopted from a standard gazetteer, but a small list of geographic names is maintained that are likely to cause problems.

Instead of providing a scope note under each subject heading that may be geographically subdivided, we have marked all such subject headings by a dagger symbol.

To accelerate the inputing process, subdivision subject headings are coded using a unique delimiting code. For instance:

Alfalfa - abc

Alfalfa - mno

Alfalfa - xyz

may be abbreviated on input to:

shs Alfalfa - abc

shs § mno

shs § xyz

where § is used as the unique code. Where more than one subdivision appears the abbreviation includes the entry up to the last subdivision. These are expanded on printer output and publication.

At the time of writing this paper, we have entered into our system only about a tenth of our manual file. The computer program is still in the testing and trial stage. At the current rate of progress we may be able to complete the project and bring forth the computerized subject heading authority list by the summer of 1976.

## SUBJECT HEADINGS AUTHORITY LIST

APPENDIX ICoding of Subject Headings Data

| <u>Record Code</u> | <u>Record Type</u>   |
|--------------------|--|
| sh                 | Subject heading term.<br>This is the mandatory record in a master record entry. A maximum record length of 100 characters is allowed. If the maximum is exceeded an error message is produced. Subject heading terms are classified into five possible categories: |
| shm                | Main subject heading   |
| shs                | Main subject heading + subdivision   |
| shq                | Main subject heading qualified by word/words in brackets.  |
| shi                | Inverted subject heading   |
| shp                | Subject heading phrase<br><br>For purposes of sorting, the collating sequence is as above.   |
| sa                 | "see also" reference, one way only.  |
| xx                 | "see also" reference, two way.   |
| x                  | Tracing of "see" reference.  |
| xr                 | Subject heading code, computer generated from "see" reference tracing to designate the term "referred to".   |
| ng                 | Notes.<br>After sorting, notes and note overflow lines will appear immediately following the record that preceded them on input.   |

## SUBJECT HEADINGS AUTHORITY LIST

## Example of printout

## APPENDIX II

|     |   |    |
|-----|---|----|
| shs | Agriculture - Economic aspects #  | 12 |
| xx  | Agricultural economics//Acreage and production adjustment//Agriculture - Statistics//           | 13 |
| xx  | Agricultural credit//Agricultural surveys//Diminishing returns, 1a of//Economics//              | 14 |
| xx  | Farm finance//Farm management//Farm surveys//Farm tenancy//Farm consolidations//                | 15 |
| xx  | Geography, Economic//Farms, Incorporated//Farms, Size of//Income//Integration (Economics)//     | 16 |
| xx  | Land tenure//Land utilization//Marketing//Prices//Produce industry and trade//                  | 17 |
| xx  | Soil conservation//Subsidies//Water - Conservation//  | 18 |
| ng  | Also subdivision Economic conditions under names of countries, e.g. Canada - Economic           | 19 |
| ng  | conditions also subdivision Prices under specific subjects, e.g. Agricultural products - Prices | 20 |
| x   | Agricultural finance//Agriculture - Finance//Agricultural economics//Agribusiness//Farm costs// | 21 |
| shs | Agriculture - History   | 23 |
| xx  | Agriculture - Early works//   | 24 |
| ng  | Also subdivision History under Agriculture with geographical subdivision, e.g.                  | 25 |
| ng  | Agriculture - Canada - History  | 26 |
| shs | \$Indexes   | 28 |
| shs | \$Information services  | 30 |
| xx  | Agricultural extension work//Information services   | 31 |
| x   | Agricultural information services//   | 32 |
| shs | \$International aspects   | 34 |
| xx  | Economic assistance//Technical assistance//   | 35 |
| shs | \$Maps and mapping  | 37 |
| xx  | Soil maps and mapping//   | 38 |
| sa  | Maps and mapping//Agricultural remote sensing//   | 39 |
| xx  | Surveying, Aerial//   | 40 |
| x   | Agricultural maps//Maps and mapping, Agricultural//   | 41 |
| shs | Agriculture - Mathematical models   | 43 |
| shs | \$Postwar problems  | 45 |
| xx  | Agriculture and war//   | 46 |
| shs | \$Statistics #  | 48 |
| ng  | Used for works dealing with agricultural statistics in the general or comprehensive sense       | 49 |
| ng  | For statistical data on specific agricultural products see appropriate headings, e.g.           | 50 |
| ng  | Livestock products - Statistics, Crops - Statistics, etc.                                       | 51 |
| shs | Study and teaching  | 53 |
| ng  | Used for works dealing with methods of instruction. Cf. Agricultural education for general and  | 54 |
| ng  | comprehensive works on education in agriculture; and Agricultural colleges for works which deal | 55 |