

CITATION INDEXES

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PART II

FORMAT AND ARRANGEMENT

The *SCI* consists of three separate but related indexes. These are the *Citation Index*, the *Source Index*, and the *Permuterm Subject Index*. All three indexes making up the *SCI* are published quarterly for the first three quarters of the year. The indexes for the fourth quarter are incorporated in the annual cumulation for each index. Eleven volumes of about 1400 pages each were required for the annual cumulation for the 1969 *SCI* which contains 4 million citations extracted from about 341,000 source items.

The *Citation Index* is arranged alphabetically by cited author. An entry for a cited item (reference) contains the first author's name and initials, the year the cited item was published, and the name of the publication in which the cited item appeared along with its volume and page number. When there is more than one cited item for any author, these are arranged chronologically by cited year. The source items citing a particular reference work are arranged alphabetically by source author immediately under each reference line. The source item line contains the citing author's name, name of the publication in which the citing item appeared, and the publication year, volume, and page. There is also a coded symbol indicating whether the citing item was an article, abstract, editorial, etc. Cited items may be from any year in recorded history; citing items, however, are always from the current year. In the *Citation Index* only the *first* author is shown for the cited and citing items. The *Source Index* (discussed below) gives *all* authors for each citing item. Figure 2 shows part of a typical column from the *Citation Index* of the *SCI*.

A separate section of the *Citation Index* is used for anonymous items (no personal author specified for the cited work). These items are arranged alphabetically by the titles of the cited publications.

Another separate section within the *Citation Index* contains a *Patent Citation Index*. This is a listing of all patents (foreign and domestic) which have been

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Volume 5, Pages 16-40, Marcel Dekker, Inc., New York (1971)

Author	Journal	Source Volume	Source Page	Source Year	Number of References Cited	Issue, Part or Supplement Number	ISI Issue Accession Number
Abdalla FH	AND BOTANY	33	253	68	170	R124	C6832
EFFECTS OF TEMPERATURE AND MOISTURE ON PRODUCTION OF GENETIC CHANGES IN SEEDS OF BARLEY BROAD BEANS AND PEAS DURING STORAGE							
Abdalla FH	AND BOTANY	33	160	68	100	R124	C6832
EFFECT OF SEED STORAGE CONDITIONS ON GROWTH AND YIELD OF BARLEY BROAD BEANS AND PEAS							
Abdalla AM							
ADCH I PHAR		176	395	68	130	N2	C6304
COMPARATIVE STUDY OF ABRORECTIC ACTIVITY OF D-AMPHETAMINE, CHLORPHENTERMINE AND FENFLURAMINE IN AUROTHIOGLUCOSE OSESE AND NON OSESE UNCE							
Abdalla AM	WV	KHALIFA H					
Abdel-LAAZ	WEDRICK B						
FED PAGE		78	278	68	NO 8	N2	C2297
ADENOSINETRIPHOSPHATASE ACTIVITY AND METABOLISM OF NUCLEOTIDES IN RAT BRAIN SYNAPTOSOMES							
Abdelal A	KESLER DP						
J BACT		97	606	68	68	N1	C6916
GENETIC AUTOTROPIC PHENOTYPE RESULTING FROM A MUTATION IN PLYA GENE OF ESCHERICHIA COLI B-R							
Abdelal ZE							
IRRAD ALIM		9	14	68			C6932
EXTENDING STORAGE LIFE OF INITIALLY SHROUDED POTATO TUBERS BY GAMMA RADIATION USUALLY CROP							
Abdelaziz ME							
B AM PHYS S		34	224	68	M	NO 8	N2
BEAM EMISSION TIME VARIATION OF 50 MEV PROTON LINEAR ACCELERATOR OF ZERO GRADIENT SYNCHROTRON							
Abdelaziz MS	WV	ELSHAWSH A					
Abdelaziz MI	WV	BIALY G					
INT J FERT		16	39	68	178	N1	C6916
EXCRETION OF RADIOACTIVE NESTRANOL IN MILK OF ANGOUS							
Abdelaziz SM	WV	HANTOUCH A					
J CHEM WAR							11
Abdelaziz MB							
PROLIFERATION		5	417	68	508	N4	C7204
1FD LIPID GENESIS IN POTATO TUBER (SOLANUM TUBEROSUM L.) I ANALYSIS AND BIOSYNTHESIS OF LIPIDS IN PARENCHYMA TISSUE							
Abdelaziz MB							
AGING OF TUBER SLICES INFLUENCES THIS BIOSYNTHESIS							
Abdelaziz MB	WV	HAZELER P					
DUAL PLANT							16
Abdelaziz AS	MOORIS LL						176
P AND S HOBT		93	831	68	100	DEC	C6935
PHYSIOLOGICAL STUDIES OF GAMMA IRRADIATED TOMATO FRUITS I EFFECTS ON DEGRADATION AND SHELF LIFE							
Abdelaziz AS	MOORIS LL						
P AND S HOBT		93	863	68	320	DEC	C6935
PHYSIOLOGICAL STUDIES OF GAMMA IRRADIATED TOMATO FRUITS I EFFECTS ON ASCORBIC ACID CONTENT ACIDITY AND TEXTURE							
Abdelaziz MA							
INT J ELECT		25	177	68	98	N2	C6647
AN INCONSISTENCY IN ANALYSIS OF ALPHA PARTICLE SCATTERING							
Abdelaziz ME	WV	ELASCHKE AP					
J CHEM S C							622
Abdelrahman MB	WV	KIRA H					13
J CHEM WAR							153
Abdelrahman MA	WV	KIRA MA					
TETRAHEDR L							109
Abdelrahman MA	MICHAEL SH						
ELAROSI H							
AND AP BIOL		61	95	68	154	N1	C6780
HOT WATER TREATMENT OF SEED AS A METHOD FOR DECREASING INCIDENCE OF CERTAIN COTTON AND FLAX SEEDLING DISEASES							
Abdelrahman MB	TENTAMY SA						
Abdelrahman MB		74	67	68	128	N1	C1704
FAMILIAL TURNER PHENOTYPE							
Abdelrahman GA	SHOLIEF YS						
EL-SAWEDY SM							ABASSAY AS
ZETTOUR MM							HASSANETEA
ACT PAED SC		50	54	68	140	N1	C6156
STUDIES ON TRYPTOPHAN METABOLISM IN BILHARZIAL HEPATIC FIBROSIS AND NON BILHARZIAL HEPATIC CIRRHOSIS IN CHILDHOOD							
Abdelrahman AS	WV	BAKSHYSHAE					
RUSS J PH B							47

FIGURE 3. Typical column from the Source Index portion of the Science Citation Index.

" A CONFORMAL MAPPING METHOD TO PREDICT LOW-SPEED AERODYNAMIC
CHARACTERISTICS OF ARBITRARY SLENDER RE-ENTRY SHAPES"

the Permuterm technique results in the following indexing entries.

PRIMARY TERM CO-TERM	PRIMARY TERM CO-TERM	PRIMARY TERM CO-TERM
AERODYNAMIC ARBITRARY CHARACTERISTICS CONFORMAL LOW-SPEED MAPPING METHOD PREDICT RE-ENTRY SHAPES SLENDER	LOW-SPEED AERODYNAMIC ARBITRARY CHARACTERISTICS CONFORMAL MAPPING METHOD PREDICT RE-ENTRY SHAPES SLENDER	RE-ENTRY AERODYNAMIC ARBITRARY CHARACTERISTICS CONFORMAL LOW-SPEED MAPPING METHOD PREDICT SHAPES SLENDER
ARBITRARY AERODYNAMIC CHARACTERISTICS CONFORMAL LOW-SPEED MAPPING METHOD PREDICT RE-ENTRY SHAPES SLENDER	MAPPING AERODYNAMIC ARBITRARY CHARACTERISTICS CONFORMAL LOW-SPEED METHOD PREDICT RE-ENTRY SHAPES SLENDER	SHAPES AERODYNAMIC ARBITRARY CHARACTERISTICS CONFORMAL LOW-SPEED MAPPING METHOD PREDICT RE-ENTRY SLENDER
CHARACTERISTICS SEE STOP LISTS	METHOD SEE STOP LISTS *	SLENDER AERODYNAMIC ARBITRARY CHARACTERISTICS CONFORMAL LOW-SPEED MAPPING METHOD PREDICT RE-ENTRY SHAPES
CONFORMAL AERODYNAMIC ARBITRARY CHARACTERISTICS LOW-SPEED MAPPING METHOD PREDICT RE-ENTRY SHAPES SLENDER	PREDICT AERODYNAMIC ARBITRARY CHARACTERISTICS CONFORMAL LOW-SPEED MAPPING METHOD RE-ENTRY SHAPES SLENDER	

* No entries are created for the words "A", "TO", "OF". These illustrate "full stop" words and are not indexed. The words "METHOD" and "CHARACTERISTICS" illustrate "semi stop" terms. Semi stop words are suppressed as Primary Terms but do appear as Co Terms. Hyphenated words such as "RE-ENTRY" or phrases such as "LOW-SPEED" are treated as one term.

FIGURE 4. Indexing entries that result when Permuterm technique is applied to an article title.

accession number: this is the code by which the *source journal* is filed at *ISI*. Figure 3 shows part of a typical column from the *Source Index*.

Within the *Source Index* is a separate section called the *Corporate Index*. In the *Corporate Index*, all of the source items processed are listed alphabetically by author under the name of the organization where the work was performed. If more than one organization is involved in a given project, an entry is created for each organization.

The third major index contained within the *SCI* is the *Permuterm Subject Index*. Permuterm is a contraction of the phrase "permuted terms." In the *PSI*, the term "permuted" is used in its correct mathematical sense. This is to be distinguished from a Key-Word-In-Context (KWIC) index which rotates the words in an article title rather than fully permuting them.

To produce the *PSI*, a computer is used to permute all significant words within each title and subtitle of every item included in the *Source Index*. All possible pairs of terms are formed. Thus, for a title containing n significant words, there will be $n(n - 1)$ pairs. With this system, every significant word takes a turn at being the primary term as well as being a co-term (14). Figure 4 shows the indexing entries that result when the Permuterm technique is used.

The *PSI* is arranged alphabetically by primary term. Terms which begin with numbers appear at the end of the index. All co-terms co-occurring with a particular primary term are indented and listed in alphabetical order under that primary term. Co-terms beginning with numbers appear at the end of the list. Dashed lines lead from each co-term to the name and initials of the author whose item contains that co-term and its associated primary term. For anonymous entries, the journal title is given in place of the author's name. Figure 5 shows part of a typical column from the *Permuterm Subject Index*.

BASIC SEARCH TECHNIQUE

Using the *Science Citation Index* involves the following steps. The searcher starts with the name of an author he has identified as having written an item related to the topic of the search. He then enters the *Citation Index* and looks up the name of that author. Once the author's name is located, the searcher can see the items that have currently cited the various items listed for this author. The searcher then notes the author, journal, volume, and page of each citing item. The searcher then turns to the *Source Index* and looks up the name of the citing author. At this entry he will find the complete bibliographic data for the citing item including the complete title and all co-authors. At this point, the searcher should examine source item titles and select those items which seem most likely to be relevant to his topic. He can then obtain the journals containing the items of interest from the library. This basic search technique is illustrated in Figure 6.

A search may be readily expanded in order to build a more extensive bibliography for a particular inquiry. For example, once he finds a number of source items, the searcher can use the bibliographies of one or several of these to provide

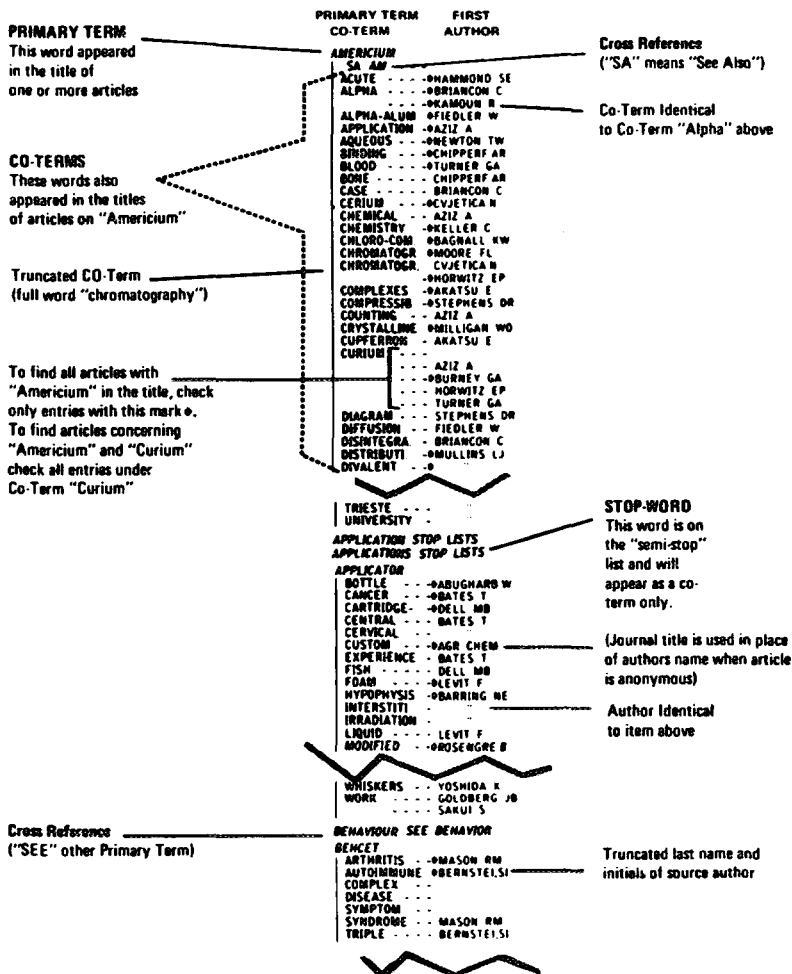


FIGURE 5. Typical column from the Permuterm Subject Index portion of the Science Citation Index.

the names of other authors to look up in the *Citation Index*; this process is called "cycling." Figure 7 is a diagram of the basic cycling procedure. [More sophisticated cycling procedures exist, but are not discussed here (15).]

Examination of the *Source Index* itself may yield additional relevant current items by a given source author, even though they may not cite any of the known starting references.

To perform a basic literature search with the Science Citation Index:

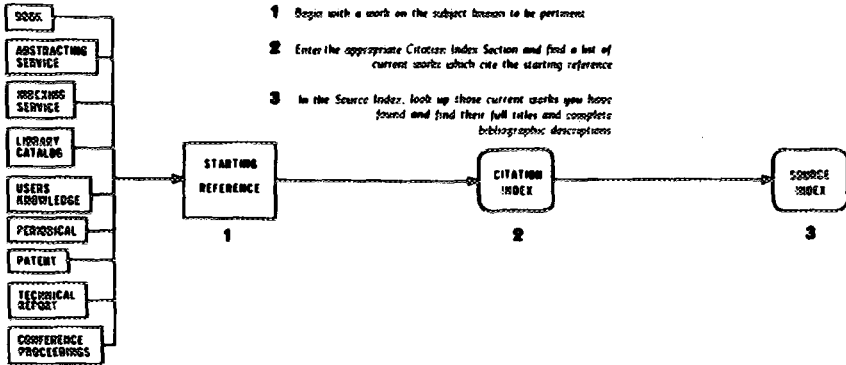


FIGURE 6. Basic search technique for the Science Citation Index.

The *Permuterm Subject Index* is used when the searcher does not know a specific author of interest by which he can enter the *Citation Index* or the *Source Index*. To use the *PSI*, the searcher first compiles a list of terms that are likely to describe his topic of interest. The searcher then enters the *PSI* and locates a primary term that is the same as one of the terms he has listed. He then sees all the authors in the current year that have used that term in the title of an item. Usually, the searcher will want to be more selective. He can accomplish this by locating a co-term under the primary term that further defines his topic. He can then select only those authors that have used the co-term as well as the primary term. Once the appropriate author(s) is identified, the searcher can enter the *Source Index* to obtain the full title of an article along with other bibliographic data. The searcher can then obtain desired items and/or look up appropriate items in the *Citation Index* for subsequent citing sources. Figure 8 diagrams the use of the *PSI* to obtain a starting author to conduct an *SCI* search.

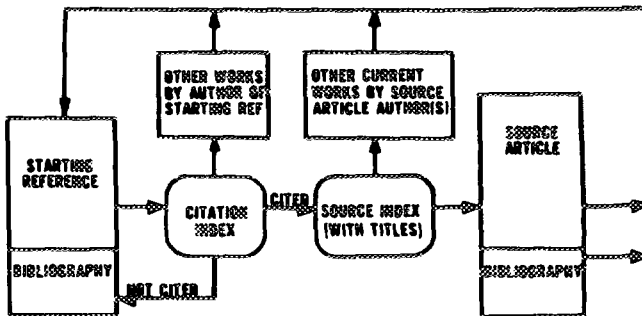


FIGURE 7. Use of "cycling" in basic search technique for the Science Citation Index.

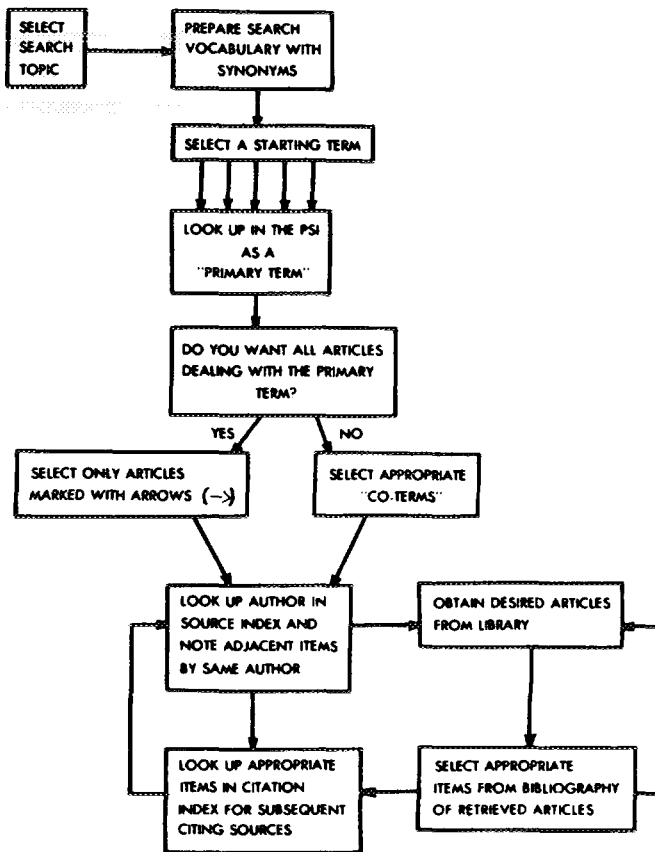


FIGURE 8. Use of the Permuterm Subject Index to obtain a starting author to conduct a Science Citation Index search.

REFERENCES

14. E. Garfield, "Citation Indexing, Historio-Bibliography, and the Sociology of Science," in *Proceedings of the III International Congress of Medical Librarianship*, Excerpta-Medica Foundation, Amsterdam (1969).
15. A. E. Cawkell, "Search Strategies Using the Science Citation Index," in *Computer Based Information Retrieval Systems* (B. Houghton, ed.), Bingley, London, 1968, pp. 27-44. See also: "Current Comments," *Current Contents Life Sciences*, 12(44), 89-103 (1969); "Current Comments," *Current Contents Physical Sciences*, 9(44), 89-103 (1969); "Current Comments," *Current Contents Chemical Sciences*, 3(45), 49-63 (1969); "Current Comments," *Current Contents Education*, 1(41), 33-47 (1969); and "Current Comments," *Current Contents Behavioral, Social & Management Sciences*, 1(34), 41-56 (1969).

(Part III of this article will appear in the next issue of *Current Contents*®.)