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44e année - 1990 - n° 3 **44ste jaar - 1990 - nr 3**

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POST PROCESSING OF ONLINE SEARCHES (P.P.O.S.-CONCEPT)

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Centre de St Jérome,
Université Aix Marseille III
13397 Marseille Cédex 13

Abstract : online information has been, for the last decade, one of the best way to obtain fast and accurate bibliographic references. But, the increasing amount of data, the facilities offered by very powerful micro-computers and the progress accomplished in information sciences open a new area of research : the PPOS. In this paper, we will show how the post processing of downloaded online searches open the door to a wide research area. Examples will be given with patent mapping using DERWENT CODES, research and technology comparisons using the processing of GET results and the consideration of the age of a technology within the cited patent field of the USPA database.

1 - The PPOS concept :

If we consider a large amount of references : e.g. a bibliography dealing with a certain subject, we may look at it in two ways. One is to consider each reference as a whole and to focus all our strength in storing, sorting, retrieving this reference. In this case, the information will be considered only on a library point of view, that is to say a certain amount of data which may be stored and retrieved by various means. Therefore if a bibliographic reference is splitted in the most possible accurate information parts (e.g. words, index terms, codes, ...), the recombination of these parts will lead to an information content identical to the starting one.
The second way to look at a bibliography is very different. If we consider all the references and if we do the same than above for all of them, the recombination of the various parts will give rise to new informations (plus the starting ones). These new informations are virtual since present in the amount of references but impossible to detect without post processing.

We believe, that this is the processing of stored data, leading to new informations, which will be the core of information research for the next future.
In our opinion, the storage of millions of data on a CD ROM, is not part of the information research, this is only a technical and physical transformation. But, the aim to replace boolean operators by more sophisticated means of retrieval is truly part of information research.
This leads to consider any output of a database as a complex object, and not as a physical entity which can

be only stored or retrieved accurately. Then, the seek of the various relationships which do exist within a set of complex objects (the bibliographic references) will give rise to clusters, maps, networks of new informations, impossible to obtain by reading or browsing the data.

Two years ago, we briefly (1) described such an approach of information research. Today, many results provided by the literature emphasize the necessity of Post Processing to reach strategic informations. Meanwhile, works have been performed with softwares such as PATSTAT or BATELLE. But, in this paper we will only present the processing results obtained with new softwares developed in our laboratory.

2 - Processing downloaded references :

All parts of a reference may be considered as significant. Then, the codes, words, authors, sources, institutions... are significant information bits which may be retrieved, sorted, and analyzed to give rise to a new set of informations.

To illustrate this first approach, let us consider the following question : what are the significant differences in the strategy between firm A and firm B working in the cosmetic area ? (The date will be coming from an "in house" database providing 368 patents for firm A and 155 patents for firm B. Other examples as the post processing of the GET files will deal with the same firms but with all the references contained in the WPIL database). Is it possible to follow this trend every year ?

The answer will be given by the post processing of the Derwent Codes from the references retrieved from WPIL (MC may also be used for a more accurate comparison).

a - strategy mapping :

To facilitate the analysis, the Derwent Codes, have been divided in eight parts : general, mechanical, sx-elec ... or food plus detergent (to get a sufficient number of Derwent Codes). These eight parts will give rise to a set of DC codes which will be the reference lists to which all the DC codes present in the bibliography will be compared. All the DC from the references of firm A and firm B, are retrieved, sorted, ... and represented on a chess board where the number of squares is the same as the number of Derwent Codes of the considered area. The Derwent Codes are put on the chess board from square 1 to x, in increasing order according the eigth lists of codes. See e.g. the list giving a part of the mechanical area.

Each code is represented as a cyclinder, and its height is proportional to the code

---

(1) New aspects of online retrieval, get more from your downloaded data. Noise can be useful !
Henri Dou, Parina Hassanaly, Albert La Tela, 11th Online Meeting, London, December 8-10, 1987. Learned Information pp. 397-407, 1987

DERWENT CODES : Part of the Mechanical Area

01 Vehicles in general. Wheels; tyres; connections Q11
02 Vehicles in general. Suspension; heating; doors; screens Q12
.....
14 Special vehicles. Aircraft; aviation, cosmonautics Q25
15 Conveying, packaging, storing. Packaging; labelling Q31
16 Conveying, packaging, storing. Containers Q32
17 Conveying, packaging, storing. Closures Q33
18 Conveying, packaging, storing. Packaging elements, types Q34
19 Conveying, packaging, storing. Refuse collection; conveyors Q35
20 Conveying, packeting, storing. Handling thin materials Q36
21 Conveying, packeting, storing. Container traffic Q37
22 Conveying, packeting, storing. Hoisting; lifting; hauling Q38
23 Conveying, packeting, storing. Liqd. handling; saddlery, upholst. Q39
24 Building, construction. Road, rail, bridge construction Q41
.....
40 Engineering elements. Securing machine parts together Q61
41 Engineering elements. Shafts; bearings Q62
42 Engineering elements. Couplings Q63
43 Engineering elements. Belts Q64
44 Engineering elements. Pistons Q65
45 Engineering elements. Valves Q66
46 Engineering elements. Pipes Q67
47 Engineering elements. Other engineering elements Q68
48 Engineering elements. Storing/distribution gas/liquid Q69
49 Lighting, heating. Lighting Q71
50 Lighting, heating. Steam generation Q72
.....
57 Lighting, heating. Weapons Q79
58 Electroplating, electrolytic treatment, electro-deposition anodising M11
59 Chemical cleaning and degreasing, cleaning, pickling M12
60 Coating material with metal, diffusion, anamelling, cathodic sputtering M13
61 Other chemical surface treatments, etching, cathodic protection, inhibit. M14
62 Mechanical working of metal, rolling wire tube profile sheet forging M21
63 Casting, powder metallurgy, foundry, moulding, patterns, cores, casting M22
64 Soldering, welding, brazing, flamme cutting, scarfing, unsoldering M23
65 Metallurgy of iro and steel, blast furnaces, converters M24
70 Changing physical struct. of non-ferrous metals and alloys M29

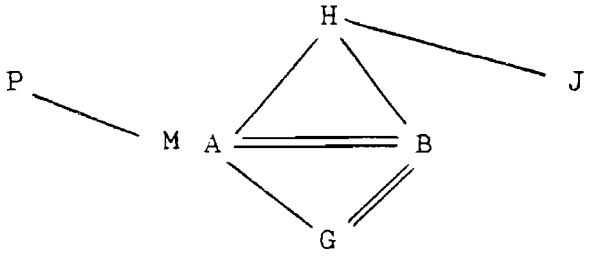
frequency in the set of references. The figures 1, 1 bis and 1 ter show the differences in strategies and subjects of the firms A and B, for 3 WPIL areas. The total areas screened in a comparison is 8.

b - The technical research network :

During the same time, for each reference, all the Derwent Codes pairs withing the same DC field have been computed, stored and sorted. The pairs of Derwent Codes are available till frequency 1. This table of pairs allows to develop the technical research network described by the Derwent Codes. We choose an interval of frequencies from F maximum to 6, to draw the networks of firms A and B.
If several DC fields from a set of references contain the following Derwent Codes such as :

DC - A B G
 computed pairs : AB, AG, BG
DC - A B H
 computed pairs : AB, AH, BH
DC - H J
 computed pairs : HJ
DC - B G
 computed pairs : BG, PM

AB is equivalent to BA, and so on. Then the following network may be made :



The networks in figures 2 and 3 show the different strategies of the two firms. One has three main subjects, mapped in three clusters. The other has two clusters, one of them being different from those of firm A.
Firm A also, shows an independant cluster. This mapping is important since it underlines a strategy impossible to detect if only the bibliographic references are provided.

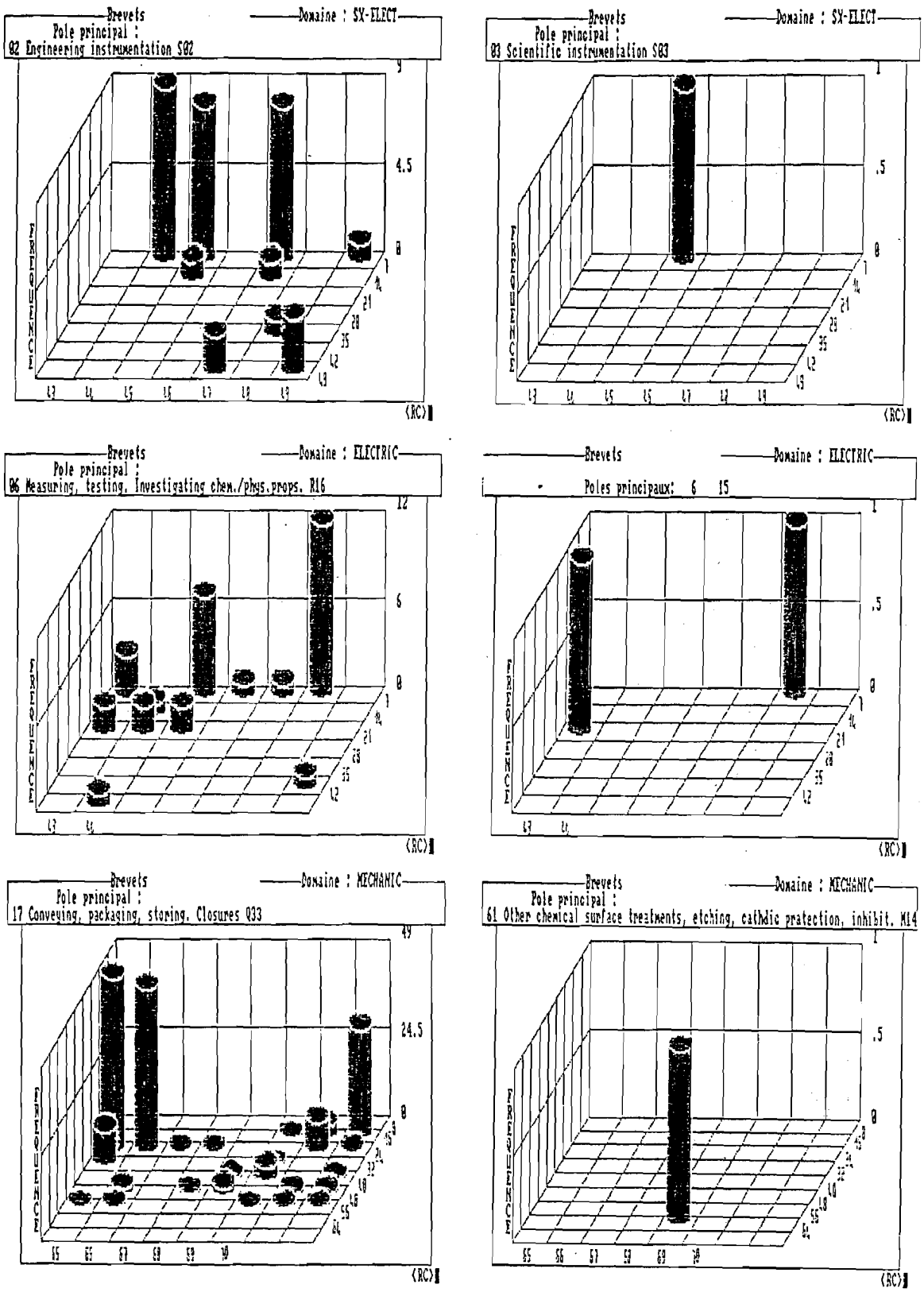
It is important to keep in mind that networks as above, condens in one picture the informations coming from several hundred of references (in this case 368 refrences from firm A and 155 from firm B).

The network nodes show the critical subjects, and the backbone with the upper frequencies indicates the broader lines of the patent strategy of the firms.
All these graphic informations may be stored if necessary on floppies and presented as scenario using a slide show program.

3 - Synergy between online commands and post processing :

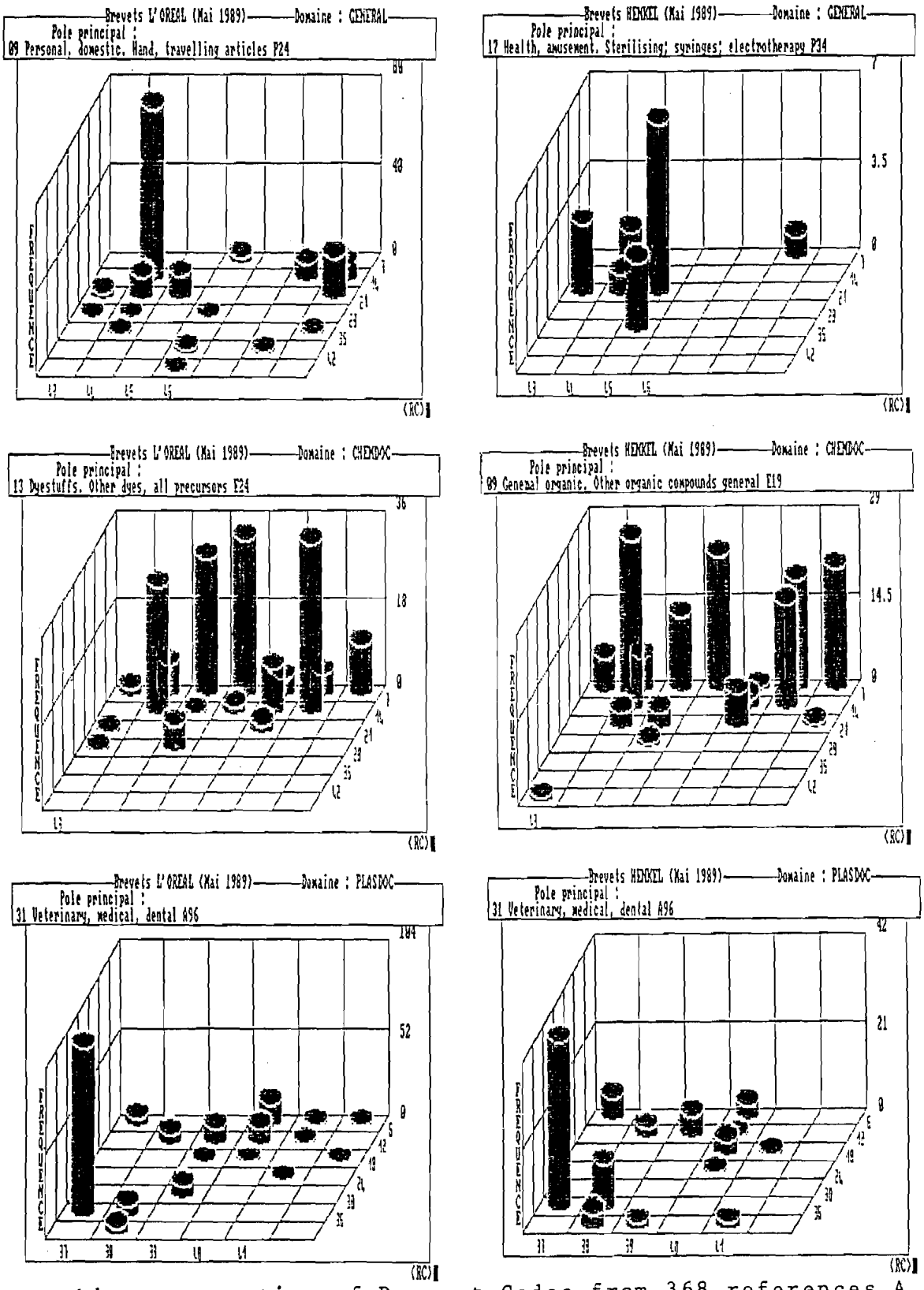
To give part of the "hiden" information contained in a posting term, various hosts developed statistical commands such as the GET, ZOOM ... (2). They give rise to a file which may be downloaded and which contains the terms present in a selected field and their occurrences.

(2) GET, MAP, MEM, ZOOM et les autres (GET, MAP, MEM, ZOOM and the others), Jean Pierre Lardy, Revue Française de Bibliométrie, pp. 68-82, 1987



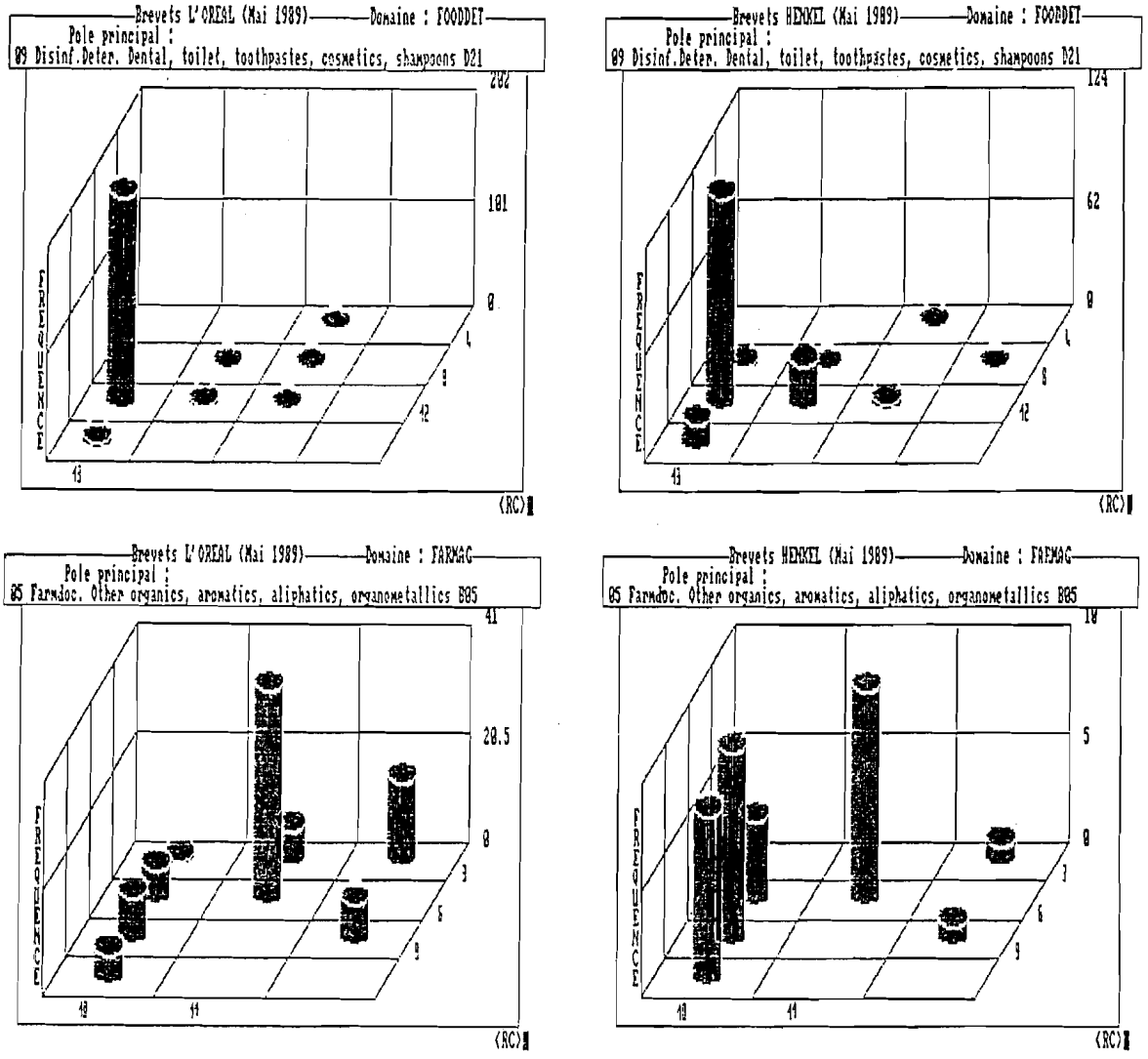
Graphic presentation of Derwent Codes from 368 references A and from 155 references B.

FIGURE 1



Graphic presentation of Derwent Codes from 368 references A and 155 references B.

FIGURE 1 bis



Graphic representation of Derwent Codes from 368 references A and 155 references B.

All the figures are generated en CGA (EGA also available) from DATACODE (produce by CRRM).

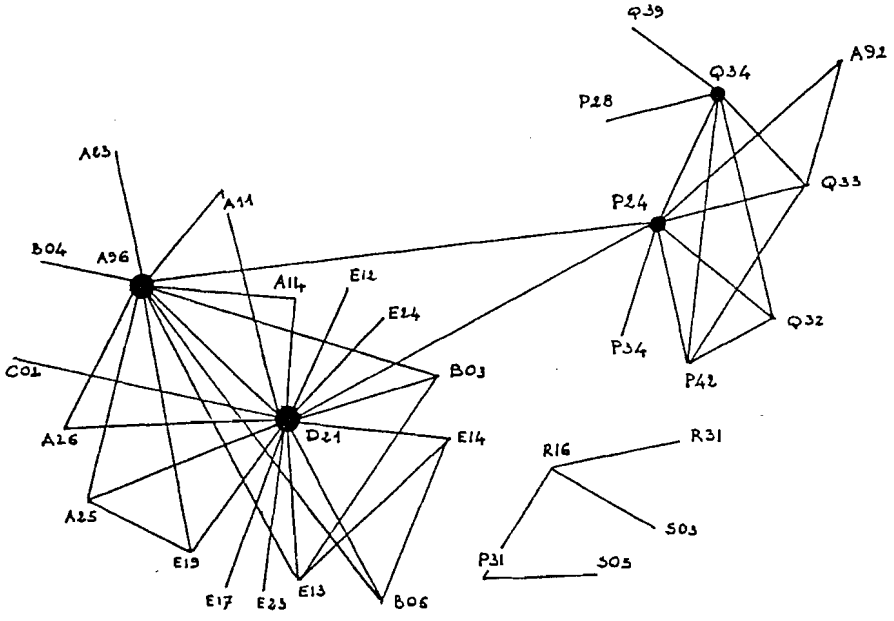
FIGURE 1 ter

Edition des fréquences de paires de la base : orealdc

368 références traitées.

593 paires ayant une fréquence entre 1 et 1000

Paires :			Fréquence :
A96	/	D21	90
D21	/	E24	35
D21	/	E14	32
D21	/	B05	30
D21	/	E13	28
E19	/	D21	26
P24	/	Q33	21
A96	/	E19	20
Q33	/	Q34	20
P24	/	Q34	20
Q32	/	P24	16
A96	/	A14	15
Q32	/	Q33	15
A96	/	B05	15
D21	/	A14	14
Q32	/	Q34	14
Q34	/	P42	13
D21	/	B03	13
D21	/	P24	12
A96	/	P24	12
P24	/	P42	11
D21	/	A25	10
E13	/	B03	10
D21	/	E17	10
B05	/	E14	10
D21	/	E23	10



Resaerch network from Derwent Codes generated by DATACODE from CRRM. 368 references A.

FIGURE 2

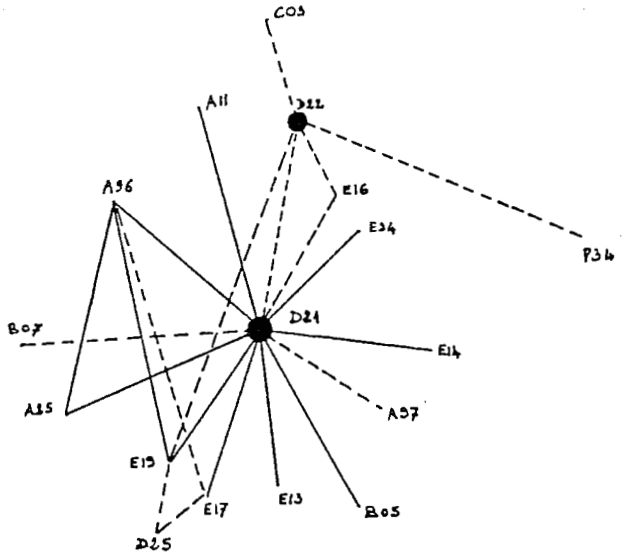
Edition des fréquences de paires de la base : henkeldc

155 références traitées.

249 paires ayant une fréquence entre 1 et 1000

Paires :			Fréquence :
D21	/	A96	37
D21	/	E19	23
E14	/	D21	23
D21	/	E17	19
D21	/	E24	18
E19	/	A96	15
D21	/	E16	10
D21	/	E13	10
D21	/	B05	8
D21	/	D22	8
D22	/	E16	8
D21	/	D25	7
D21	/	A97	7
E17	/	A96	7
E19	/	D22	7
D22	/	C03	7
D21	/	B07	7
D21	/	A11	6
A96	/	A25	6
D22	/	P34	6
D25	/	E17	6
D21	/	A25	6
D25	/	E19	6

. . . . . .



Research network from Derwent Codes generated by DATACODE from CRRM. 155 references B.

FIGURE 3

The difference with the above treatment is that with a GET command, it is not necessary to download the references to obtain the informations.
But, the use of a GET command is limited because the information is static. The GET files, cannot give, online, comparisons between two set of references coming from two different posting terms.

To overcome this difficulty, we design a softwareable to post process the GET files in various ways. To obtain more informations we may present the GET terms and their frequencies as an histogram or transfer it to Lotus 123. It will be also necessary to compare the two GET files to determine which terms are common (this is the method of partial advantages (3)). The comparison of terms and frequencies present only in one file will give rise to the total advantages (3) of A versus B, or B versus A.
In all cases, a reference GET file, may be created from your own data. This will enable you to follow our best competitors, a set of Derwent Codes, RN, or authors.

In the following example, we used the WPIL database and we select the patents produced by firm A and firm B (same firms as above). We obtained 547 references for firm A and 1598 references for firm B. The GET were performed in the following ways :

GET DC RANK TOP 1000 SS x (4)

where DC are the Derwent Codes, 1000 is a number large enough to retrieved all the terms of the GET (here the DC), and x is the rank of the search statement on which the GET is performed. The results were :

<u>firm A</u> : 547 patents, 132 terms for the GET
<u>firm B</u> : 1598 patents, 196 terms for the GET

The results are indicated in <u>figures 4, 4 bis and 5</u>. The histograms have not been represented for place saving.
All these results help to built up indicators between two firms or subjects... The same treatment repeated at the different intervals will indicate the trends of the two firms strategies.

---

(3) <u>Les choix technologiques pour l'entreprise</u>. (Technological choices for a company)
Maurice Reyne,
Lavoisier, Paris, 1987

(4) <u>Orbit Search Service - Quick Reference Guide</u> - QRG89 - Achilles House - Western Avenue - London W3 OUA - England

GET profiles of files GETA and GETB, DC.

Statistics on file : get
****

Length of the GET file: 196

Frequencies partition:
Saved as: gethenke.FRQ for Lotus 123

Frequency	nb of terms
1	48
2	20
3	12
4	11
5	6
6	5
7	4
8	4
9	4
10	3
11	3
12	2
13	6
14	3
15	3
16	2
18	3
19	2
20	1
21	2
22	1
23	3
24	1
25	2
28	2
29	1
30	5
31	1
32	1
34	1
35	1
36	1
39	1
43	1
46	2
48	1
50	1
51	1
52	1
54	2
55	1
61	1
64	1
66	1
70	1
78	2
82	1
88	2
91	1
97	1
99	1
101	1
107	1
115	2
149	1
184	1
202	1
209	1
297	1

Statistics on file : get
****

Length of the GET file: 132

Frequencies partition:
Saved as: getoreal.FRQ for Lotus 123

Frequency	nb of terms
1	49
2	18
3	10
4	7
5	1
6	4
7	3
8	3
9	3
10	2
11	4
12	1
13	3
14	3
15	1
16	1
17	3
18	2
21	1
22	1
23	1
36	1
39	1
41	1
47	1
50	1
53	1
54	1
58	1
105	1
150	1
299	1

100% Advantages of Derwent Codes - WPIL -

101	A81
51	J01
50	E34
48	H14
32	H07
30	E33
30	L02
25	A21
24	H25
19	A93
19	P41
16	A35
16	F09
14	A95
13	E37
13	H12
10	A12
10	H01
9	H11
9	Q45
9	Q49
8	H06
7	H08
7	H09
7	P63
6	A88
6	Q43
5	A89
5	F01
5	Q73
4	A94
4	P13
4	Q46
4	Q67
3	A85
3	C04
3	H13
3	H22
3	H24
3	P85
3	R31
3	X12
2	B06
2	C01
2	D24
2	G05
2	H04
2	J06
2	P75
2	Q12
2	Q44
2	Q74
2	R41
1	A31
1	A69
1	A86
1	A91
1	D14
1	E25
1	E31
1	E35
1	F02
1	F04
1	F08
1	G01
1	J03
1	K03
1	L03
1	M23
1	P23
1	P26
1	P52
1	P55
1	P61
1	Q17
1	Q22
1	Q38
1	Q51
1	Q52
1	R34
1	V04
1	V07
1	W05
1	X22

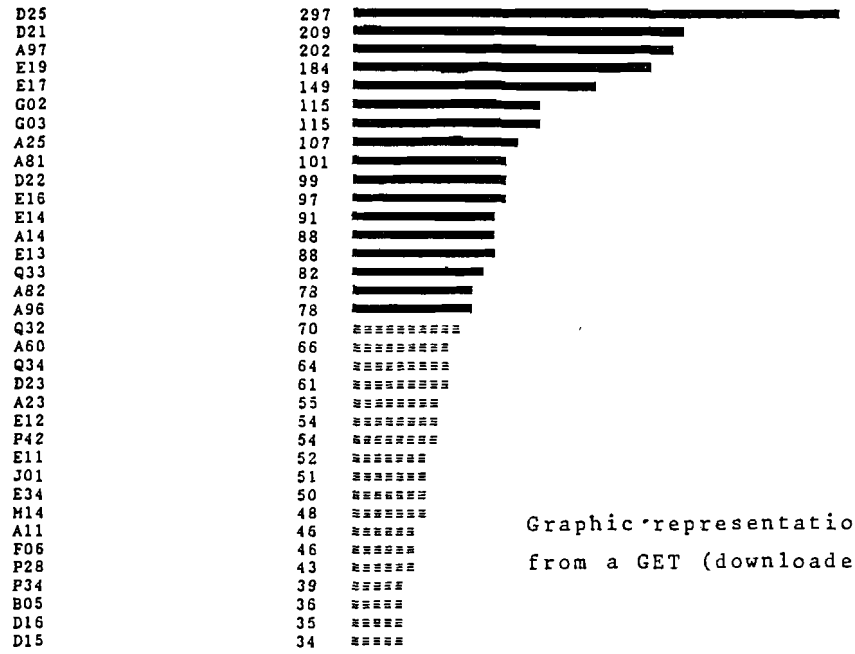
100% Advantages of Derwent Codes - WPIL -

13	S05
4	P77
3	E22
2	R15
2	R28
1	A83
1	C21
1	P36
1	P51
1	P86
1	Q55
1	Q77
1	R12
1	R18
1	R19
1	R25
1	R57
1	S01
1	T01
1	T04
1	W04

Total advant ges, from A over B and B over A. Generated from two files. 1598 references B, 547 references A.

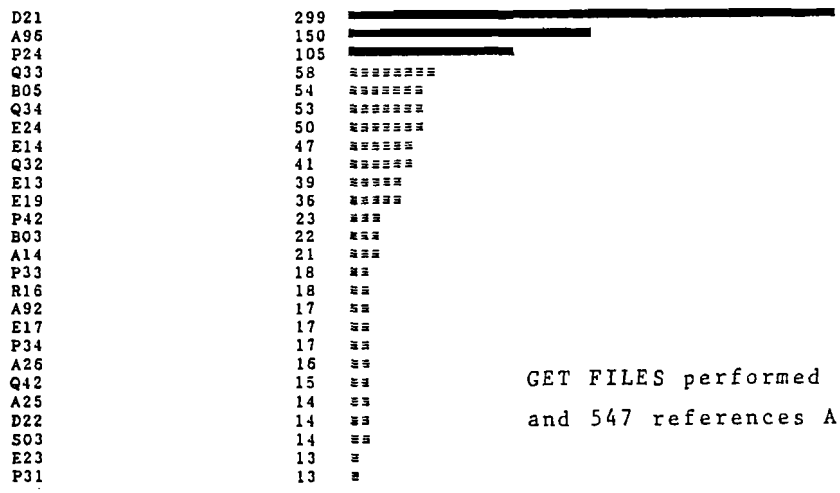
FIGURE 4

GET on DC codes, HENKEL Group
196 values.



Graphic representation of Derwent Codes from a GET (downloaded) of ORBIT

GET on DC codes, L'OREAL Group
132 values.



GET FILES performed on 1598 references B and 547 references A.

FIGURE 4 bis

Terms common to files: get and get
Terms from file: getoreal are printed first. Key= 10

299	D21
209	D21
150	A96
78	A96
105	P24
29	P24
58	Q33
82	Q33
54	B05
36	B05
53	Q34
64	Q34
30	E24
31	E24
47	E14
91	E14
41	Q32
70	Q32
39	E13
88	E13
36	E19
184	E19
23	P42
54	P42
22	B03
13	B03
21	A14
88	A14
18	P33
4	P33
18	R16
12	R16
17	A92
15	A92
17	E17
149	E17
17	P34
39	P34
16	A26
14	A26
15	Q42
13	Q42
14	A25
107	A25
14	D22
99	D22
14	S03
10	S03
13	E23
5	E23
13	P31
3	P31
12	A97
202	A97

11	B07
14	B07
11	E12
54	E12
11	P32
21	P32
11	S02
28	S02
10	B02
15	B02
10	B04
8	B04
9	F06
46	F06
9	P28
43	P28
9	Q39
6	Q39
8	C02
6	C02
8	C03
30	C03
8	E16
97	E16
7	A23
55	A23
7	J04
30	J04
7	R13
30	R13
6	A11
46	A11
6	D16
35	D16
6	D25
297	D25
6	E15
22	E15
5	R11
1	R11
4	G02
115	G02
4	P14
3	P14
4	Q31
13	Q31
4	Q56
4	Q56
4	Q68
1	Q68
4	X27
23	X27
3	A17
11	A17
3	D13
25	D13
3	D23
61	D23
3	F07
28	F07
3	P21
5	P21
3	P62
2	P62

3	P73
18	P73
3	R14
1	R14
3	R27
1	R27
2	A18
15	A18
2	A28
9	A28
2	A32
6	A32
2	A60
66	A60
2	D15
34	D15
2	D17
4	D17
2	E11
52	E11
2	E36
18	E36
2	G04
20	G04
2	P43
23	P43
2	P81
7	P81
2	Q35
4	Q35
2	Q63
1	Q63
2	Q66
2	Q66
2	R26
11	R26
2	X25
8	X25
1	A41
23	A41
1	A82
78	A82
1	A84
8	A84
1	A87
12	A87
1	B01
18	B01
1	D18
21	D18
1	E21
1	E21
1	E32
1	E32
1	G03
115	G03
1	H03
3	H03
1	J02
3	J02
1	L01
13	L01
1	P27
11	P27

1	P35
4	P35
1	P53
2	P53
1	P64
2	P64
1	P72
2	P72
1	P76
1	P76
1	P78
4	P78
1	Q25
1	Q25
1	Q36
1	Q36
1	Q41
1	Q41
1	Q47
2	Q47
1	Q61
2	Q61
1	Q65
1	Q65
1	Q69
4	Q69
1	Q71
1	Q71
1	Q72
1	Q72
1	Q76
2	Q76
1	Q78
2	Q78
1	R29
1	R29
1	R59
1	R59
1	T06
5	T06

Derwent Codes common to A and B. From two GET files treated by DATAGET from CRRM. 1598 references B and 547 references A.

FIGURE 5

The GET command which can be performed on a wide number of databases and fields is a powerful tool when combined with post processing.The results obtained underline the differences which exist between the Post Processing and the bibliographic used of the GET command.

4 - The age of a technology:

It is very interesting when you are considering a certain patent or group of patents, to see if these patents are cited, where, and in which clusters of countries, patent assignees, ages... From these considerations various authors have pointed out (5, 6) that the analysis of the cited patent fields is of primary importance.

In the following examples, we will use the USPA database, available from Orbit Information Technologies, to show the types of informations provided by the extensive use of the Cited Patent field.
We will consider, in this case study the patents from the CNRS (French National Research Center) as patent assignee (from 1982 to date). Of course the CNRS also participate in patenting with French industries. But, it is nevertheless interesting to analyse the real CNRS patents.

The strategy to determine the US patents which must be analysed is very simple in this case, since we are seeking for patents which have CNRS in the Patent Assignee field. The query (made directly in the USPA file) is :

CNRS/PA leads to 47 patents.

It is important to point out that in other cases strategies to retrieved US patent numbers may be very different. For instance use the Chemical Abstracts file, and search for patents containing RN. Print Select the Patent Numbers. Transfer the PN to the WPIL file, retrieved all the patents. GET TOSEL (3) the PN field, this will give all the PN ranked alphabetically. Go to USPA, and SEL from x to y the US patents.

Variations may be made, using Japio (japanese kokai) with truncated chemical names, or Topfrag (from Derwent) to use special chemical Derwent codes, or to

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(5) Evaluation de la Recherche et du Développement par analyse de brevets (Trends in research and development by patent analysis).
F. Narin.
Computer Horizon, USA. Colloque sur l'Information Elaborée, Ile Rousse, Mai 31 - June 2, 1989

(6) Patent analysis as a technology forecasting tool.
W.B. Ashton, R.S. Campbell, L.O. Levine.
Batelle Pacific North West Laboratories. Chemical Marketing Research Association - Fall Conference - Atlantic City, NJ, USA - September 18-21, 1983

retrieve all companies related to a "mother one". But the mechanism of PRT SEL, or GET TOSEL, will remain the same.

a - The cluster related to the CNRS patents :

To determine to which cluster (7) belong the CNRS patentwe used the CT field of the CNRS patents. We PRT SEL the CT field of the 47 patents. This selects all the patents cited by the 47 CNRS patents (about 265). We then retrieved the number of patents which cited the 265 formers. This ends with 567 patents which include the CNRS patents and which are the familly of related patents (this is the first generation). Now, to find the second generation cluster of patents, we REQUAL select the CNRS patents in CT (selected first as US---/PN and requalified as US-----/CT), and from this selection we retrieved the number of patents citing the CNRS patents, this gives 21 references.
For the third generation cluster of patents, we did the same with the 21 former patents, this gives a cluster of 13 patents which cited the 21 former patents.
The forth generation cluster of patents was worked out with the 13 former ones with the same technique. 3 patents were selected.

Figure 6 illustrates the various patent clusters. These data are part of the patent life and must be determined at various intervals. This is the first indication of the behaviour of a set of patents among all the patents production in the United States. We believed that USPA is significant enough since most of the good patents will cover the United States.

b - Age of the technologies related to the CNRS patents :

The downloading of the various references allows to obtain two interesting set of data : the date of the patents, and cited patents.

Now see figure 6 bis for an example of reference from the USPA database.

The processing of the patent date fields (PD) will indicate the dates of the patents, for instance here are the dates of the 47 CNRS patents :

date	numbers of patents
1983	2
1984	2
1985	6
1986	8
1987	12
1988	11
1989	6

The CT fields (cited patent and academic papers) are extracted, separated, and processed. Figure 7 indicates the age of the technology (all dates of US,

(7) Clustering Multidiscyplinary Chemical papers to provide new tools for research management and trends. Application to coal and organic matter oxidation. Henri Dou, Parina Hassanaly, Luc Quoniam, Jacky Kister J. Chem. Inf. Comput. Sci. pp. 45-51, v. 29, 1989.

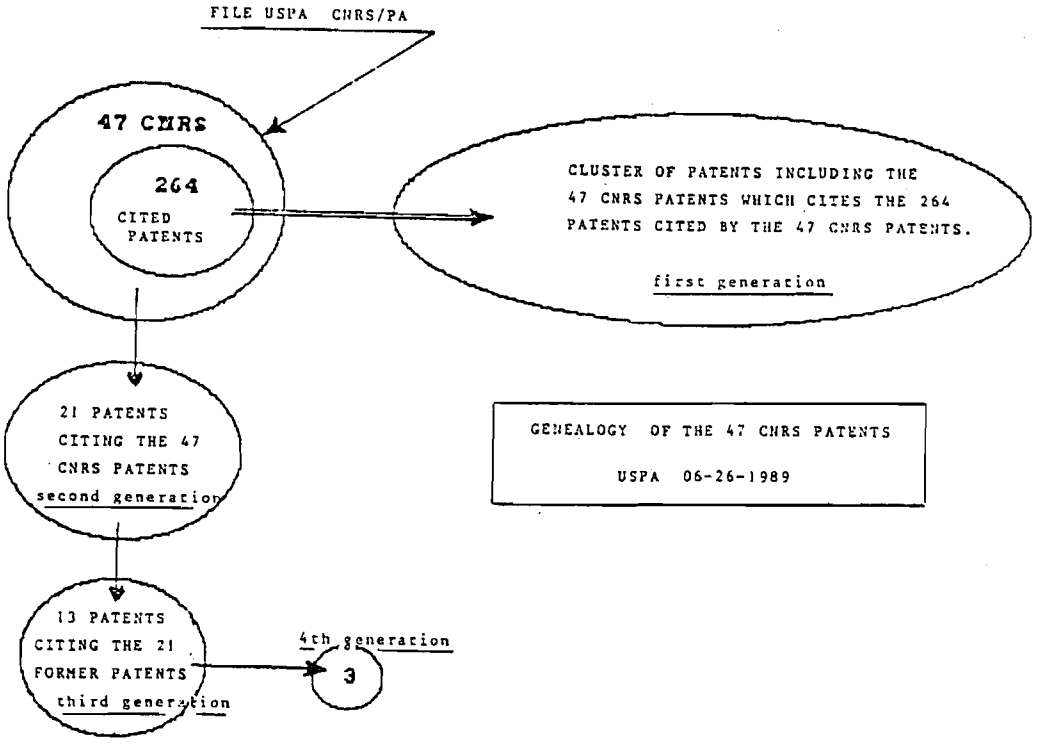


FIGURE 6

PN - US4810479
TI - Preparation of cubic boron nitride using as a flux a fluoronitride
IN - Biardeau, Gilles, Talence, FR; Demazeau, Grard, Gradignan, FR; Pouchard, Michel, Le Pian Medoc, FR
PA - Centre National de la Recherche Scientifique (CNRS), Paris, FR
PD - 89.03.07
AP - 87.04.15 87US-038565
PR - 86.04.15 86FR-005353, FR 8605353
CT - US3959443, 5/1976, Kabayama, 423/290.
US4287164, 9/1981, Endo et al., 423/290.
US4389223, 6/1983, Corrigan, 423/290.
US4409193, 10/1983, Sato et al., 423/279.
US4443420, 4/1984, Sato et al., 423/290.
US4469802, 9/1983, Endo et al., 423/290.
US4551195, 11/1985, Iizuka et al., 423/290.
US4551316, 11/1985, Iizuka, 423/276.
US4562050, 12/1985, Koeda et al., 423/290.
US4590034, 5/1986, Hirano et al., 501/96.
US4699687, 10/1987, Yazu et al., 423/210.
GB0860499, 2/1961, 423/290.
- The Journal of Chemical Physics, vol. 34, No. 3, Mar. 1961, pp. 809-812, Wentorf, Jr.
Materials Research Bulletin, vol. 14, No. 12, Dec. 1979, pp. 1541-1551, Kobayashi.

FIGURE 6 bis

patents), the age of the technology in the United States (all dates of US patents)the age of the technology for all patent but the United States and the age of the technology for all Japanese patents (Kokai excepted).(The figure 7 bis show an example of recent technology).
The same can be done with the patents of the second and third generations (figure 7 ter).

The profile of the age of cited patents is very interesting. It points out the roots of the technology. Different profiles are obtained according to the technology analysed.
In the case of the CNRS patents, it is noticeable that the age of the technology is not very recent and that references to old patents are made. The number of Japanese patents cited is low in contrast to other fields or other patent assignees, where the numbers of Japanese cited patents is often from 3 to 5 percent of the total and is related to very recent dates. This is the case for the second and third generation clusters. As pointed out by Narin (5) and Batelle (6), the analysis of the cited field of patents will enlarge the knowledge of your competitor strategies (do they cite your patents or related patents). The same will be true for your patrons : if they cite your patents or closely related ones, they are perhaps trying to develop their own technology.

When partnership or joint venture have to be established, the used of citations is very powerfull since it will emphasize the complementarity of the commercial and technological strategies.
It also compares the age of your technology with the age of those of your competitors.

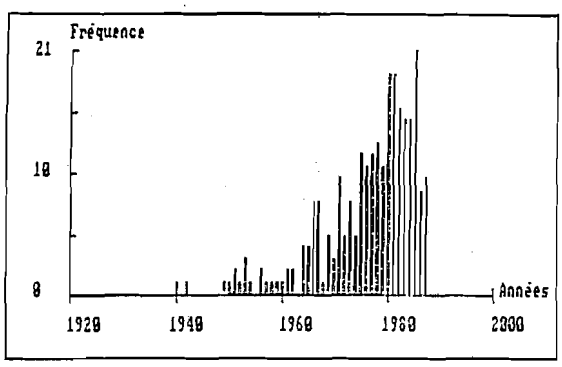
In this short paper, it is not possible to develop all the uses of the cited patent fields. But, the few above examples underline the facilities and the quality of the informations provided. We also said, that within the CT field we separated the academic papers. They are stored into a separed file. This file may be used to retrieved more academic work related to this technology.

Conclusion :

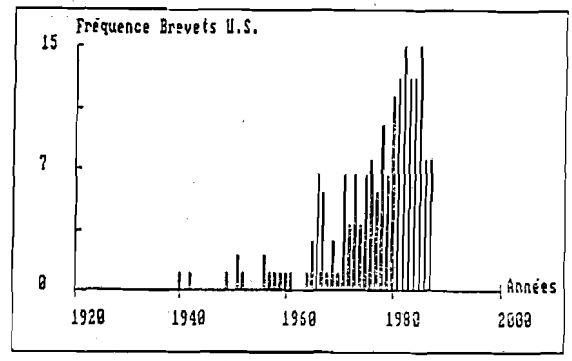
The Post Processing of Online Searches (PPOS) appears to be a very powerfull tool. It provides new types of information and indicator. The speed of the analysis (a few minutes in almost all the cases), the storage of the results for further comparisons, give an endless way to look at technologies, researches, competitors, laboratories...

One of the advices which may be done to users is to select a host offering a large cluster of technical databases, good facilities to Print Select results, Requalified them, and transfer them to other databases. When this is done, download the GET files, or the references in ASCII, keeping in mind that the bibliographic information if necessary is not the primer goal.

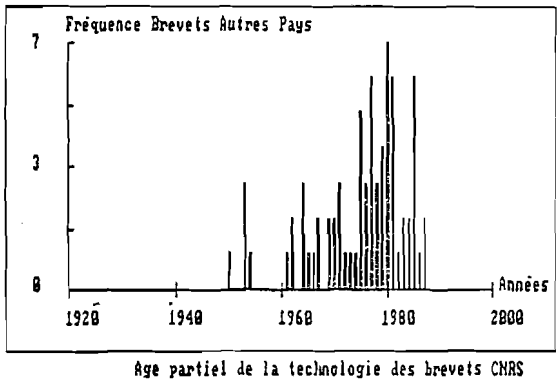
Think that most parts of a reference may lead to poten-



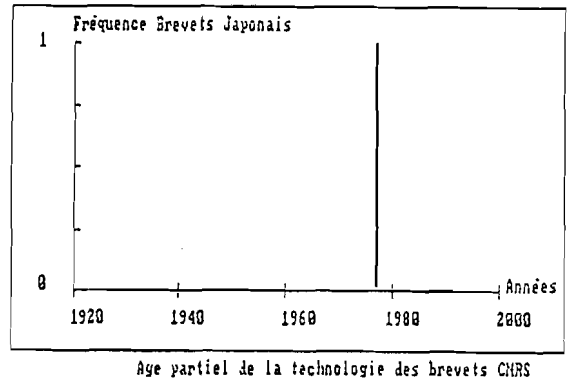
Age de technologie issue des brevets CNRS



Age partiel (USA) de la technologie des brevets CNRS



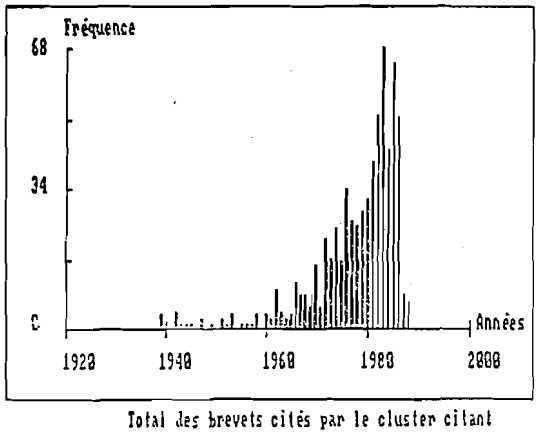
Age partiel de la technologie des brevets CNRS



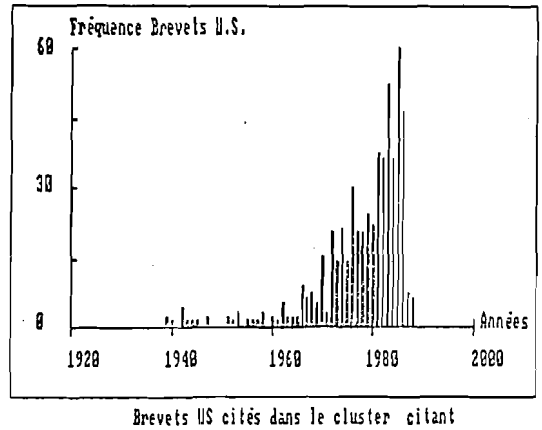
Age partiel de la technologie des brevets CNRS

AGE OF THE TECHNOLOGY OF THE 47 PATENTS FROM CNRS - AVERAGE 1976 - NUMBER OF CITED PATENTS 265 -

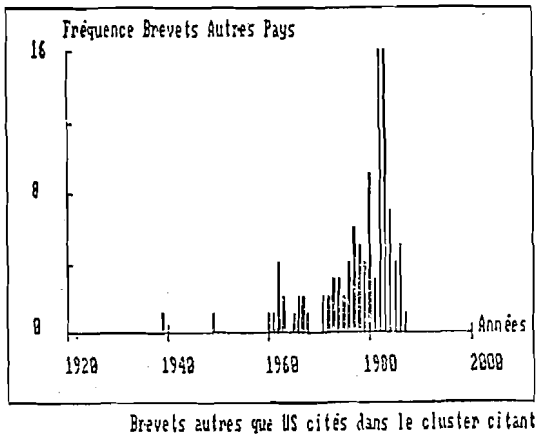
FIGURE 7



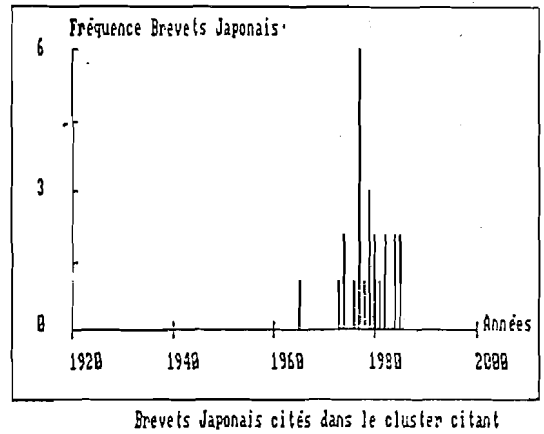
Total des brevets cités par le cluster citant



Brevets US cités dans le cluster citant



Brevets autres que US cités dans le cluster citant



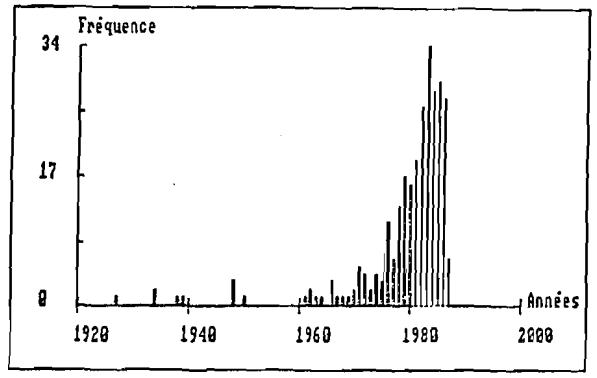
Brevets Japonais cités dans le cluster citant

EXAMPLE OF RECENT TECHNOLOGY - PATENT OF FIRM Z DEALING WITH THE POLYMERIZATION OF POLYPROPELENE WITH VARIOUS CATALYSTS -

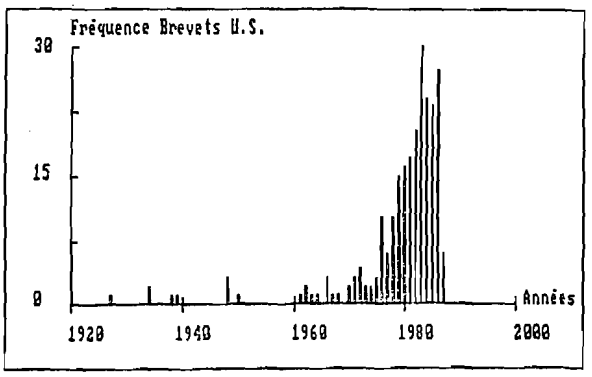
1 = AGE OF ALL CITED PATENTS 2 = AGE OF ALL US PATENTS

3 = AGE OF ALL COUNTRIES BUT US 4 = AGE OF CITED JAPANESE

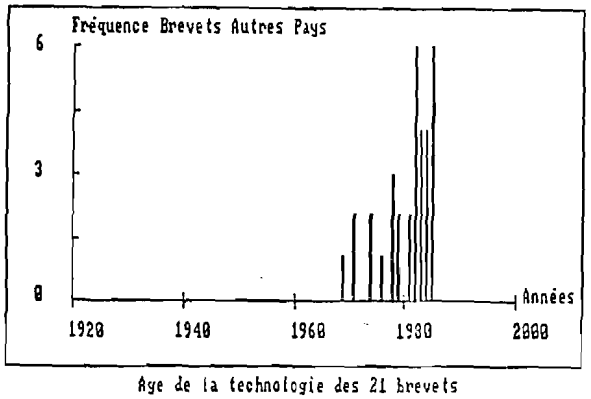
FIGURE 7 ter



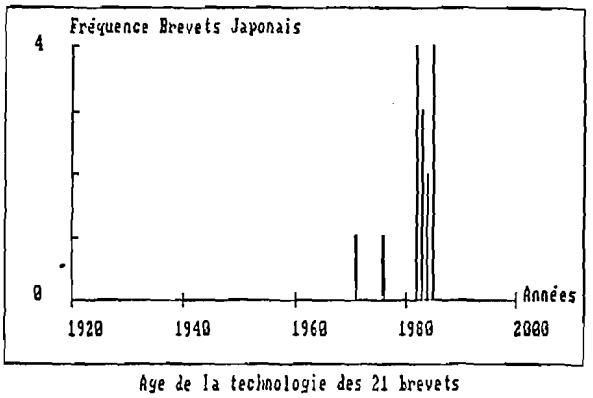
Age de la technologie des 21 brevets



Age de la technologie des 21 brevets



Age de la technologie des 21 brevets



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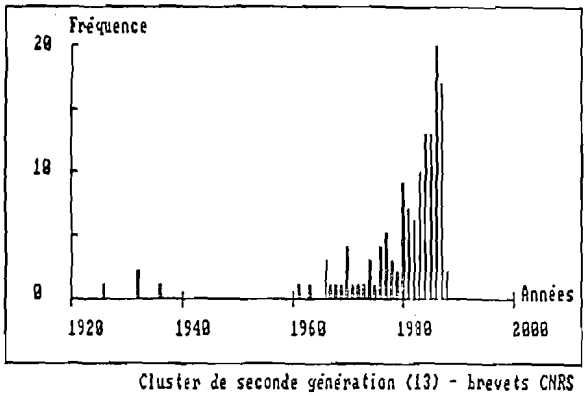
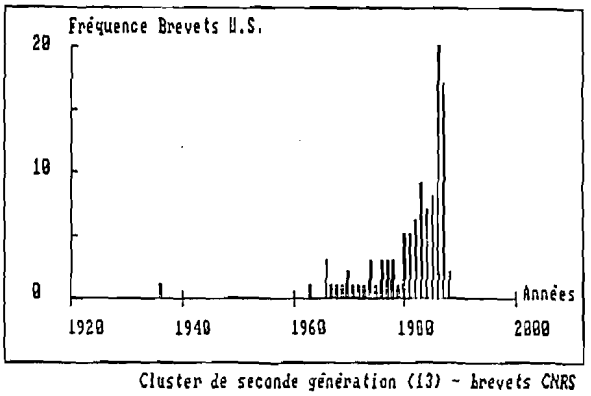


Cluster de seconde génération (13) - brevets CNRS



Cluster de seconde génération (13) - brevets CNRS

AGE OF PATENTS FROM THE SECOND AND THIRD GENERATION OF THE CNRS PATENTS - 1 TO 4 CLUSTER OF SECOND GENERATION AVERAGE AGE 1979 - NUMBER OF CITED PATENTS 273 -
5 TO 6 CLUSTER OF THIRD GENERATION - AVERAGE AGE 1979 - NUMBER OF CITED PATENTS 134 -

FIGURE 7 ter

tial indicators and that the host software facilities must be used widely to provide you with the best files to analyze.

Different softwares, currently used in our laboratory have not been presented here. They deal with other groupments involving one or more matrixes. This analysis which involved primarily the automatic or semi automatic choice of the matrix elements will necessitate a different approach. They will be developed in further papers.

We are very pleased to thank Orbit Information Technologies and specially Mrs S. INGLIS and C. GREEN for the help provided during the realization of this work.

ENSEIGNEMENT DE LA DOCUMENTATION EN BELGIQUE

ONDERWIJS VAN DE DOCUMENTATIE IN BELGIE

(addendum)

B. ENSEIGNEMENT SUPERIEUR NON UNIVERSITAIRE - NIET-UNIVERSITAIR HOGER ONDERWIJS

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