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ABSTRACT

Technical and financial assessments were conducted of the Draft EUDISED Program 1976-78, which is to coordinate information exchange activities in educational documentation and information on a European level. Facilities and staff for various technical and organizational alternatives are described, costs of each alternative are estimated, and recommendations are made concerning the feasibility of available options. Maintenance and use of the EUDISED multilingual thesaurus are discussed, along with standards and format of the data record. Collections, consolidation, and redistribution of data is covered, and user software packages are described. (SK)

EUDISED PROJECT

A PRELIMINARY ASSESSMENT OF THE DRAFT EUDISED PROGRAMME 1976-78

STRASBOURG 1975

A PRELIMINARY ASSESSMENT OF THE DRAFT EUDISED PROGRAMME 1976-78

A study commissioned for the EUDISED project by the Council of Europe and the Commission of the European Communities

STRASBOURG 1975

Editor :
Director of Education
and of Cultural and Scientific Affairs
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Mr. J. Viet Chairman, Committee for Educational Documentation and Information, Paris

Mrs. L. Cadoux Centre National de la Recherche Scientifique, Paris

Mr. Thomas International Labour Office, Geneva

Mr. J. Gibb Commission of the European Communities, Luxembourg

Mr. J. Linford British Library, London

C.V. Townsend
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1. OBJECTIVES

1.1 The draft EUDISED program 1976-1978 is described in the Council of Europe document number DECS/DOC (74)22 and is summarised briefly in section 2 of this document.

1.2 The purpose of this paper is to carry out a technical and financial assessment of this program with the following particular objectives:

1.2.1 An assessment of facilities and staff for various technical and organisational alternatives.

1.2.2 An indication of the order of magnitude of costs pertaining to these alternatives.

1.2.3 To provide recommendations concerning the feasibility of the available options.

2. THE DRAFT EUDISED PROGRAMME 1976-1978.

2.1 The proposals are based upon a need to co-ordinate information exchange activities in the field of Educational documentation and information at a European level.

2.2 To this end a centre of operations will be established to control a number of functions:.

2.2.1 The maintenance and use of the EUDISED multilingual thesaurus.

2.2.2 The standards and format of the EUDISED data record.

2.2.3 Consolidation of data collected from national agencies and maintenance of the combined database.

2.2.4 Redistribution of data to national agencies.

2.2.5 Provision of user software packages both for use at the national agency level and, where appropriate, at the centre.

3. BACKGROUND INFORMATION

3.1 Records distributed by the centre will be as described in the 'EUDISED document entitled 'STANDARDS, FORMAT, CHARACTER REPRESENTATION' of 1973 and in particular will conform to ISO 2709.

3.2 Estimates for computer time have been based upon a typical medium sized computer (e.g. the IBM 360/40). Costs may well vary with different computers, operating systems and charging structures but those given should give an acceptable order of magnitude.

3.3 Estimates of programming and analysis costs have been made on a basis of 50 units of account (u.a.) per day.

3.4 1 u.a. has been taken as equivalent to 50 Belgian Francs. (approximately £0.65)

3.5 Rates are taken as of February 1975. No allowance has been made for inflation or currency fluctuations.

4. COLLECTION OF DATA

4.1 Centralisation - the argument.

4.1.1 During the simulation exercise the input was received in the form of completed data sheets requiring central checking and processing.

4.1.2 The EUDISED should realistically expect to have to continue to do the bulk of the data checking and processing in the short to medium term.

4.1.3 This is because in all likelihood most of the participating centres will not be in a position to supply prepared information in suitable magnetic tape format or they may not have the finance or facilities to support their own data processing operation.

4.1.4 However, this should not be thought of as undesireable, for there are considerable advantages to be had from a centralised input operation.

4.1.5 Obviously there is a considerable cost benefit in establishing centralised keypunching, verification and database creation using dedicated staff and facilities.

4.1.6 An equally important advantage of centralised data creation is that during the early years of the EUDISED system it would be much easier to control the system standards. There would be less problem of trying to reconcile input of different standards from different sources.

4.1.7 There may be some disadvantage in that problems with records may not be easy to solve without reference back to the source. This would be true in any case, however, and possibly there might be fewer problems with data created at one place.

4.1.8 The same arguements apply even more strongly to establishing a central database search facility. Searching a single database for ten users is likely to be ten times as efficient as ten users each searching their own copy of the database.

4.1.9 This is not to imply that users should not be encouraged to process their own data or run their own searches, but it should be considered as a long term objective to have national centres bearing the main processing burden. Some national centres may not think it economically worthwhile in the initial stages of the system.

4.2 Volume of information.

4.2.1 The Draft EUDISED Programme document gives expected yearly values for quantities of information supplied. These values should be taken as a general indication only. The table below is constructed from these figures and is used as a basis for the costings in this report.

SOURCE OF INFORMATION	1976	1977	1978	1979
INFORMATION ON EDUCATIONAL R & D	2,000	1,000	1,000	1,000
NON-BOOK MATERIAL	-	3,000	1,500	1,500
OTHER BIBLIOGRAPHICAL MATERIAL	-	-	6,000	1,500
TOTAL FOR EACH YEAR	2,000	4,000	8,500	4,000
CUMULATIVE TOTAL AT END OF YEAR	2,000	6,000	14,500	18,500
AVERAGE TOTAL DURING YEAR	1,000	4,000	10,250	16,500

TABLE 1. Volumes of EUDISED information

4.2.2 There are a number of other sources of information which might possibly be employed by EUDISED to build up a viable database:

4.2.2.1 OECD - An estimated 30% of the OECD database would be of interest to EUDISED. That is around 600 records per year out of a total of 2000. However there are problems with the OECD database. They do not have an external information service and do not produce exchange tapes. The equipment used is Burroughs and would create some compatibility problems. Most importantly an estimated 90% of OECD documents are classified as restricted or secret and the general impression is that it can be complex and difficult to declassify them.

4.2.2.2 ILO - This information might be more relevant - up to 60% could be of interest to EUDISED. This would be around 5000 records per year. There would be no problem in machine terms in getting exchange tape versions of the data.

4.2.2.3 At some stage it may be considered worthwhile to search the UK, LC and other MARC databases.

4.2.2.4 There are many other possible sources of information such as the Educational Sciences tape from CNRS, the annual 'Scientific Research in British Universities and Colleges' from the U.K. Department of Education & Science etc.

5. DATA PREPARATION

5.1 Data preparation falls into two distinct divisions - the intellectual part and the mechanical part.

5.2 The cost associated with the intellectual effort involved in cataloguing, indexing and abstracting from an original article or book is generally found to be around 7 u.a. This is by far the greater part of the total and in the EUDISED system will be borne by the national centres.

5.3 The cost of key-punching and processing the record is estimated at around 2 u.a. by most MARC type record creators, a large percentage of this cost being absorbed by key-punching the data.

5.4 Using the figures quoted above the cost of data preparation of the EUDISED program is given in the following table. Volumes are obtainable from Table 1.

YEAR	INTELLECTUAL COST	MECHANICAL COST	TOTAL COST
1976	14,000	4,000	18,000
1977	28,000	8,000	36,000
1978	59,500	17,000	76,500
1979	28,000	8,000	36,000

TABLE 2. Data preparation costs of the draft EUDISED program in units of account.

5.5 There are two feasible alternative methods by which the mechanical part of the processing can be done. Either a traditional data preparation via off line keyboard with batched production runs or on-line preparation via VDU.

5.6 An on-line operation is more expensive in terms of equipment and programming although run costs are comparable with other methods. This method would be justifiable only if an existing on-line system was employed using a computer with all necessary equipment already installed.

5.7 However, a central on-line system would not benefit the national centres unless they also take over the complete system - an unlikely prospect.

5.8 A traditional data preparation method would be more appropriate to the FUDISED scale of operations. Programs would be considerably more easy to export to national centres as a software package.

5.9 The obvious medium for MARC type records is paper tape. Paper tape punches are reasonably priced, (around 5,000 u.a.) can have large character set, can produce hard copy simultaneously with the tape, can accommodate variable length records without waste, can be telex compatible for data transmission and are in general one of the cheapest methods of data preparation.

5.10 It would be advantageous to develop a generalised data spooling and validation package in a machine independent language for use at all national centres. The benefits would be as follows:-

a) The obvious cost benefit of saving duplicated systems development costs.

b) The method of ensuring that all centres are producing standardised record structures.

c) It may encourage further local program development to similar standards so that interchange of locally developed software may be possible.

5.11 A calculation of estimated cost of development of a generalised spooling package.

Investigation and analysis	15 weeks
Programming	20 weeks
Testing (program & system)	15 weeks
Documentation, including preparation of a new manual	5 weeks
Total	55 weeks

At a bureau rate of 50 u.a. per man day the manpower cost of the system development is:

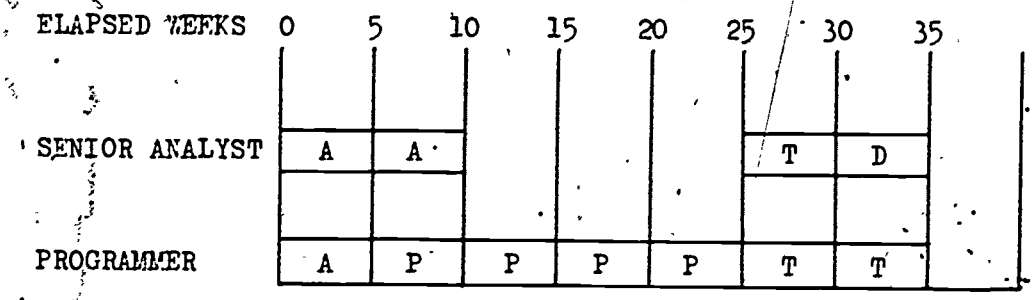
55 ' 5 50 13,750 u.a.

Estimating computer time and overheads at around 15% of staff costs	2,000 u.a.
Total development cost	15,750 u.a.

5.12 Such a package could be developed either by a software company or 'in house'. An 'in house' operation would be less expensive but would take longer as a bureau can compress the time scale by putting several people onto the job simultaneously.

5.13 Assuming the use of a senior analyst and an analyst/programmer, the minimum elapsed time required to complete the package would be 35 weeks as indicated in the following chart.

A - ANALYSIS P - PROGRAMMING T - TESTING D - DOCUMENTATION



By use of a second programmer, or if the senior analyst was also a programmer, the elapsed time could be shortened by 10 weeks to 25 weeks.

5.14 An alternative approach is to attempt to adapt an existing package to meet the EUDISED requirements, but there are not many such packages available. A possibility would be the British Library 'Software Package Module 2', which is a generalised spooling and validation program. It is available from the British Library at a cost of £200 and has been used for the EUDISED demonstration exercise. However, it is not a machine independent package, as it is written in IBM assembler language specifically for the IBM 360/370 range of computers.

6. TRANSMISSION OF DATA - STANDARDS

6.1 Until such time as a EURONET system involving data transmission over public telecommunication lines is created, the obvious method of transmitting complete files of EUDISED records is on magnetic tape. The standards are well defined, the information is in a very compact form and tapes are relatively sturdy.

6.2 The following magnetic tape formats may have to be supported:

7 track 556 b.p.i.
9 track 800 b.p.i.
9 track 1,600 b.p.i.

It is possible that the 7 track version may not be necessary, as most modern computer systems have standardised on 9 track.

6.3 The ISO 7-bit code has been accepted as a EUDISED interchange standard (ISO/R 646) using the ISO 2022 procedure for character extension.

6.4 Although not stated the use of these standards implies adoption of ISO/R 962 for the implementation of the 7-bit code on a 9 track tape, and the adoption of ISO/R 961 for the implementation onto 7 track tape if required.

6.5 Also ISO/1861 and ISO/R 1863 may be implied which relate to format and recording specifications. These standards give physical specifications for magnetic tapes and the way that data is recorded. One stated recommendation is that a block should have a length of between 18 and 2,048 characters inclusive. Block spanning techniques will have to be adopted - particularly for 7 track tapes, if used, as half of the characters require two positions

for representation on magnetic tape. (Under consideration by ISO/TC 97.)

6.6 As regards tape and file labels there are relevant standards (e.g. ISO/R 1001), but many suppliers of tape services have adopted unlabelled tapes. The lowering of security is compensated by the ease of use, there being no label compatibility problems from one machine to another.

6.7 ISO 2709 is adopted as the appropriate record structure for information interchange within the EUDISED network.

7. RECEIPT AND CONVERSION OF TAPES

7.1 A study by Jane Wainwright (1) of Aslib has shown that several major producers of bibliographic information do not follow ISO 2709. Even among those who do follow the standard there are considerable minor variations in format due to differences in choice of options.

7.2 There were also found to be large variations in cataloguing practices and character sets as well as in the content designators. IFLA, UNESCO and UNISIST are currently considering content standards.

7.3 In a report commissioned by EUDISED Mr. C. Tucker (2) has investigated and costed the problem of MARC record conversion.

7.4 In section 4 of this report he proposes a suite of four programs to handle the conversions required:

Program A - A generalised parameter driven program for conversion of MARC records to the EUDISED exchange format.

Program B - Special programs written to convert non-MARC information to the EUDISED exchange format.

(1) Wainwright J., "Standards used by Bibliographic Tape Services: A Comparison", Aslib, London. OSTI Rep. 5191 (1974)

(2) Tucker C., "EUDISED Network Interchange Requirements and MARC Record Conversion" (1974)

Program C – A program to convert EUDISED exchange format to the internal handling format.

Program D – To convert the EUDISED internal format to exchange format.

7.5 The cost estimate for programs A,C and D written as machine independent suites of programs at consultancy rates was £18,000 (29,000 u.a.)

(Program B requires a separate version for each data source. Costs could vary considerably with the record content and format. It is not clear whether there will be any such sources of data.)

7.6 Programs C and D are required for the EUDISED program to commence exchange of information.

7.7 Program A is intended to handle non-EUDISED MARC records such as those created by OECD, ILO or BNB/LC MARC services (however see Section 4.2.2) etc. Such records would certainly require further intellectual analysis to bring them fully into line with EUDISED standards, e.g. the addition of thesaurus terms and an abstract. This would require visual inspection by a qualified cataloguer and keyboarding of amendments. It is difficult to estimate the cost of this operation without detailed reference to a specific record, but a figure of around 0.5 to 1 u.a. would be of the right order of magnitude.

7.8 Breaking down the allocation of manpower for programs C and D gives the following:

	C	D
Analysis	4 weeks	4 weeks
Programming	3 weeks	3 weeks
Testing	5 weeks	6 weeks
Documentation	2 weeks	2 weeks
TOTAL	14 weeks	15 weeks
COMBINED TOTAL	29 weeks	

Using a per diem rate of 50 u.a. for analysis and programming, the total manpower cost is 7,250 u.a.

Adding 15% as an average figure for computer time and other overheads an overall total cost for programs C and D is 8,500 u.a.

7.9 Note that using the same per diem rate the cost of program A inclusive of all overheads would be 10,000 u.a.

8. MAINTENANCE OF THE DATABASE

8.1 Table 1 in Section 4.2 gives values for the amount of information expected each year. From this table the computer costs of maintaining the database can be calculated. The costs are based upon times used by systems such as the British Education Index, i.e. a batched tape base processing system.

FREQUENCY OF ACCESS	1976	1977	1978	1979
WEEKLY	420	680	1,010	1,350
MONTHLY	100	155	233	290

TABLE 3. Cost in u.a. of maintenance of the EUDISED database.

8.2 In the early life of the database, the file size will be small and the supply of information probably infrequent and it will be practical to access the database directly for all additions of information.

8.3 As the numbers of centres supplying information increase and the database size grows it will become more economical to merge the incoming information before applying to the master file.

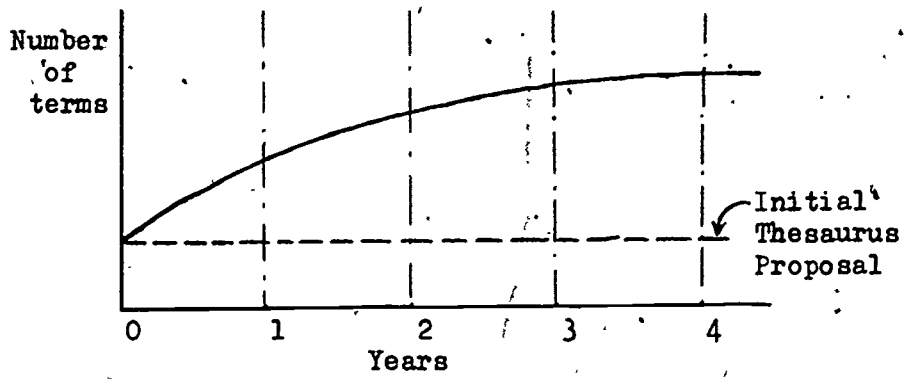
8.4 The staff cost involved in maintaining the database would be quite small - around 2 man weeks per year - 500 u.a.

9. THE EUDISED THESAURUS

9.1 The thesaurus at present consists of some 2,800 terms held in four languages with other language versions being prepared. The average term length is around 25 characters with a maximum of 35 characters.

9.2 At present the thesaurus is used as a reference tool only and there is not a great amount of amendment. There is a twice yearly meeting to discuss proposed changes or additions and a newsletter of such changes agreed is published.

9.3 When the thesaurus is used as a searching tool, one would expect initially a higher revision rate. This will also be true as extra language versions are added to the system. The graph below indicates the experience obtained with the ENDS and SDIM systems as to rates of change.



After 4 or 5 years the rate of increase approaches zero. There will always be a few new terms created each year.

9.4 The thesaurus has been maintained very effectively by Mr. Thomas of the Central Library and Documentation Service at the International Labour Office in Geneva. If it is thought feasible to use the ISIS system for the EUDISED centre, then there will be no problem in continuing this maintenance.

9.5 It seems unlikely that ILO could continue to maintain and manage the EUDISED thesaurus for other than a short term.

9.6 The cost of developing a system for maintenance of the thesaurus is estimated as follows:

Analysis	1½ man months
Programming	2½ man months
Testing	2 man months
Documentation	2 man weeks
TOTAL	6½ man months

At a rate of 50 u.a. per diem the manpower cost would be 7,000 u.a.

Assuming computer time and overheads at approximately 15% of the manpower cost gives an overall total for the system of 8,000 u.a.

9.7 This estimate is of course for a batch processed system using direct access storage rather than the on-line system in use at ILO.

9.8 Publication of the Thesaurus.

9.8.1 A new edition will probably be required every two or three years.

9.8.2 The actual layout and type of a printed thesaurus is a sensitive point with indexers. Most indexers would prefer to have a straightforward alphabetical list with cross references rather than a conceptually ordered list.

9.8.3 Some people also hold the view that a standard version of a thesaurus used by indexers does not need, and could be anti-constructive, to have Broader Terms (BT). The indexer needs Narrower Terms (NT) and Related Terms (RT).

9.8.4 These points are intended to illustrate the arguments that an output publication program for the thesaurus needs to be flexible and that the output should be discussed with those concerned before the next published edition.

9.8.5 A newsletter of changes or modifications will be published at regular intervals and to this end an internal indication of modified terms will be held on the computer file.

9.8.6 For costing of publications see the Section on output.

9.9 Compatibility with other Thesauri

9.9.1 Miss Ariane Iljon (1) has done an in depth study and comparison of two educational thesauri, and has ventured the opinion that before one can usefully employ a computer in conversion from one thesaurus system to another a formidable amount of intellectual effort of analysis and comparison must be done.

9.9.2 In the short to medium term all information received without EUDISED thesaurus terms will have to be analysed centrally or considered to be without terms and thus only available for free text searching.

However, the OECD Macrothesaurus is compatible with the EUDISED thesaurus and will present no problem. (But see Section 4.2.2)

(1) Iljon Ariane, 'Concordance et Compatibilite de deux thesauri en pedagogie: ..... DOPAED ..... t EUDISED' Padagogisches Zentrum, Berlin, 1974.

9.10 Thesaurus terms and the EUDISED record

9.10.1 The EUDISED record is created with an abstract which contains embedded thesaurus terms. The terms are identified by enclosing them between strokes.

9.10.2 For example,

...this study is concerned with exploring possibilities of /dramatisation/ in school for /teaching/ and /learning/. /Drama/ dramatisation and /school plays/ are conceived as .....

In this example five thesaurus terms are indicated.

9.10.3 The record can be in one of three languages - French, German or English. Publications will have three sections and all search requests can result in records in one or more of the three base languages.

9.10.4 It would be very helpful if some sort of translation aid was given with each record to enable a user, who is not familiar with the language of the record, to understand the subject matter as described in the abstract.

9.10.5 One proposal for solving this problem would be to include a list of the thesaurus terms in all three languages with the original abstract in printed publications as a miniature dictionary.

9.10.6 For example;

.....

.....

Abstract: On the assumption that forecasting

school /achievement/s on the basis of /intelligence test/s is of little reliability because verbal /comprehension/ is not tested, a /test/ for verbal comprehension is developed. The study tries to identify relationships of comprehension of /spoken language/ to intelligence, school achievements, age, sex and / social status/.

Achievements	Rendement
Intelligence test	Test d'Intelligence
Comprehension Test	Comprehension Test
Spoken Language	Langage Parle
Social Status	Status Social

9.10.7 In the above example a poor English reader would at least have a number of the key words translated, making comprehension of the abstract somewhat easier.

9.10.8 In the case of search requests, a similar 'dictionary' could be printed but would only be necessary if the language of the record was not the language of the requester.

9.10.9 In any case only two columns would be necessary - the record language and the language of the search request which could be any one of the languages held in the thesaurus.

9.10.10 The actual techniques employed in the translation of terms needs detailed work by a systems analyst, but I foresee no great problems. Mr. Thomas of Geneva informs me that a Mr. Kurmey of the IDRC in Ottawa is investigating a similar problem at this time.

9.10.11 It would seem probable that the solution would be to convert thesaurus terms via a directory to a reference number. These reference numbers could be held conveniently compactly within the record. On output the number will lead directly to a multilingual thesaurus entry on a direct access device and a suitable 'dictionary' constructed if necessary.
A search request can also be reduced to numeric equivalents and searching could be done more efficiently by this means.

9.10.12 It would be a simple matter to maintain statistics on the frequency of occurrence of terms in the EUDISED records and on the frequency of occurrence of terms used in searches. These statistics could be held on the thesaurus file and printed as frequently as required.

9.10.13 The system operated by ENDS (1) incorporates two levels of sophistication which may be valuable in the EUDISED context, in the long term, if not immediatly.
One is the use of an automatio correction mechanism. In essence this consists of a method of attempting to correct unrecognised thesaurus terms either by checking against an established list of known erroneous spellings or by a program which adds, deletes or exchanges letters in the incorrect term in an attempt to find a matching descriptor. This mechanism traps and corrects a very significant volume of errors.
The second is the use of a relevance feedback prooedure which enables a response to a request to become significantly more precise.

(1) Vernimb Carl and Stephan G., 'Nuclear Engineering & Design' Vol 25, No. 3, August 1973.

10. CREATION OF EXCHANGE TAPES

10.1 The major cost of an exchange tape service lies in the manual and related activities rather than the computer time used which is relatively small.

10.2 A cost of 6 u.a. per reel should cover computer charges, handling, postage and packaging. Of this amount between 1 u.a. and 2 u.a. are attributable to the postage costs.

10.3 A standard 600 foot (185 metre) reel of tape will cost around 6 u.a.

10.4 The tapes themselves can either be sold as part of the service, along with the information, or loaned and returnable for recycling.

10.5 The decision taken on this will no doubt depend upon the charging policy for the project. If exchange tapes are made available without cost to participants, then it would be logical to recycle the tapes and absorb the costs centrally.

10.6 If a service fee is charged then the best solution would be to charge users for each tape and to credit them for returned tapes. This is because some will wish to retain their input data during system testing or as security backups for indefinite periods. Others may wish to return them in batches to save on postage costs.

10.7 In either case the replacement cost of the tapes must be amortised over a certain period. Although it is quite possible to use a magnetic tape 50 or 100 times without degradation, I would propose that they be amortised over 10 uses as these tapes are subject to

greater wear and tear during postage and use on different types of computer in varying conditions.

10.8 The amortisation costs would then be 0.6 u.a. per reel giving a total reel cost of 6.6 u.a.

10.9 The following table gives the costs associated with running tape services for a varying number of users.

	SERVICE FREQUENCY		
NUMBER OF USERS	WEEKLY	BIWEEKLY	MONTHLY
1	345	172	80
2	690	345	160
5	1,720	860	400
10	3,430	1,720	800
25	8,580	4,290	2,000
50	17,200	8,580	4,000
100	34,300	17,200	8,000

TABLE 4. Exchange tape service costs in accounting units per year.

10.10 If tapes are to be recycled a stock will have to be established. For a weekly service the stock will have to be at least 8 reels per user and for a monthly service 4 reels per user. That is between 24 u.a. and 48 u.a. for each customer as a stock.

10.11 There will also be customers requiring seven track versions of the tapes. The host system computer may not have a seven track tape drive facility. This will necessitate location and use of a suitable computer.

If this computer is program compatible, then the exchange tape creation program can be written with a parameter driven conversion table, otherwise a conversion program will have to be written for 7 track conversion. (The British Library have a conversion program for use on IBM equipment, but this would require modification for use on the larger EUDISED character set.)

10.12 It is assumed that the host computer system will have 800 b.p.i. 9 track and 1600 b.p.i. 9 track.

10.13 Finally, there will also be requests for copies of the total database or sections of the total. This will require the same question to be met, i.e. are the tape reels supplied as part of the service or loaned with the information. The 2,400 foot (730 metre) magnetic tapes cost around 10 u.a.

10.14 The cost of a master file exchange copy can be calculated roughly from the equation $(4 + \frac{2N}{1,000})$ u.a. where N = number of records on the file.

10.15 For example, if the database contains 10,000 records, the cost of creating an exchange version would be

$$4 + \frac{20,000}{1,000} = 24 \text{ u.a.}$$

11. PROFILE SEARCH FACILITIES

11.1 Description of facilities required

11.1.1 Profile search facilities will be required to provide occasional Retrospective Searches (RS) on specific demand by a new and a regular Selective Dissemination of Information (SDI) service for a group of users interested in particular subsets of newly acquired material.

11.1.2 The same computer program would be able to handle both RS and SDI services.

11.1.3 The thesaurus terms are expected to be of primary importance within a user's profile.

11.1.4 However, users may require other significant items in their profiles such as the following;

a) A specific associated name e.g. author/researcher/ research assistant etc.

b) Work carried out at a particular institute.

c) The presence of specific words or phrases in the title or abstract or notes.

d) Works of a particular nature i.e. books/films/ microfilms etc.

e) Works of one language only or of one stated country of publication.

f) Works with a specific date or range of dates of publication etc.

11.1.5 Requests for profiles may be of a simple or complex type.

11.1.6 For example, a simple profile could request any record with the term queuing theory in the list of thesaurus terms.

11.1.7 A more complex profile could be for example:-

Any book published in the English Language in or after 1974 with the term statistical but not statistical mechanics, statistical services or statistical thermodynamics.

11.2 PROFILE SEARCH PROGRAMS

11.2.1 Ideally, programs to do this type of search would be written in a machine endependent language (such as COBOL) for use at all levels within the network.

11.2.2 The documentation would necessarily have to be of sufficient calibre and detail that a systems analyst working at national or local level could easily create a working profile.

11.2.3 This assumes a relatively straightforward sequentially organised tape based system supplying an exchange tape or a printed list.

11.2.4 Such a system is estimated below.

Investigation and Analysis	4 weeks
Programming	5 weeks
Program and system testing	9 weeks
Documentation, including preparation of a new manual	4 weeks
TOTAL	22 weeks

At 50 u.a. per diem, the manpower costs	5,500 u.a.
Computer time and overheads estimated at 15%	800 u.a.
Total development costs	6,300 u.a.

11.2.5 The British Library has a profile search facility as part of the 'Library Software Package - Module 1' This is not machine independent, being written in Assembley language for IBM computers. This program

would require very little modification to run on EUDISED format records and could thus make a useful initial search facility at the EUDISED centre. It is available from the British Library at £200 inclusive of complete documentation and could probably be made operational on EUDISED records at a total cost of under 1,000 u.a.

11.2.6 An alternative and more sophisticated system would use on-line terminals for RS such as the systems operational at ILO in Geneva or at the European Commission in Luxembourg.

11.2.7 An on-line dialogue provides instant feed back to the terminal operator with statistics on the number of matches achieved. This allows immediate modification of the profile to yield a convenient number of answers.

11.2.8 In the experience of the ENDS (1) system introduction of on-line RS facilities has enabled them to achieve a greater throughput. One is in effect replacing low grade clerical staff by a high grade expert at a terminal.

11.2.9 However, the interest in and volume of RS for EUDISED could not be expected to create any throughput problems in the early years of the EUDISED database. There are no great advantages in an on-line system for SDI.

11.2.10 There are substantial drawbacks to operating an on-line system. Although actual computer time costs are not significantly more than for a batch system there are related costs for Visual Display Terminals, modems, connecting lines and disc storage which could add at least 10,000 u.a. per annum to the operational costs.

11.2.11 The initial system development for an on-line operation is considerably more expensive than for a batch

(1) Vernimb C., 'Nuclear Engineering and Design' Vol.25 No. 3 August 1973.

system but the ISIS system at ILO and the ENDS systems at CEC could be made available. Both systems operate in the same basic way and both have been proved over years of operational life.

11.2.12 The ILO (1) system would appear to be more suitable for EUDISED purposes being based upon a MARC record very similar to the EUDISED record, particularly as regards the method of holding the abstract. Complete statistics are available on term frequency and main subjects investigated by maintenance of historical files on searches. The ILO system incorporates a complete bibliographical control system including file maintenance, catalogue and index formatting (for computer typesetting) and a loans system (of possible long term interest).

11.2.13 Mr. W. Schieber of ILO estimates that one should expect a systems transfer cost of around $ 10,000 assuming there is a suitable host computer system.

11.2.14 The systems in use at the CEC are more search oriented than the ISIS system and appear to have an extra level of sophistication with the relevant feed back mechanism and automatic correction facilities. This is necessary due to the very large number of searches and the very large database, but would not be significant in the EUDISED scale of operations.

(1) Schieber W., 'ISIS - A General Description of an Approach to Computerised Bibliographical Control' ILO, Geneva, 1973

11.3 PROFILE FORMULATION COSTS

11.3.1 The cost of creating a profile is primarily attributable to the staff costs of an experienced person. The time taken may vary from a few minutes for a very simple profile to an hour or more for a complex profile.

11.3.2 The working document produced by the Panel on Pricing Policy of the CIDST (1) gives information on systems operated by 18 information centres.

11.3.3 Although the resulting figures were divergent, reflecting the heterogeneity of the systems studied, a general order of magnitude can be usefully obtained. Where appropriate I have included the experience of the British Library into figures quoted.

11.3.4 Retrospective search (RS) profiles are normally 'once off' for each user and thus are not subject to amendment and addition as are SDI searches as users gain in experience. Thus the cost of creation of RS profile is less than those of SDI profiles on average.

11.3.5 A typical figure for an RS profile was around 15 u.a. (around 1.5 u.a. per search term).

(1) Drees Gerd., 'Cost of Scientific and Technical Information and Documentation Systems'

11.4 Search Machine Run Costs

11.4.1 The CIDST working document gives figures for the cost of a retrospective search of between 0.06 u.a. and 0.27 u.a. per search term per thousand records in the database.

11.4.2 There is a very wide variation according to type of database, degree of useage, method of calculating costs, etc. The costs for the ENDS system for example are very low due to the high useage and the search techniques used.

11.4.3 A series of experiments was carried out at the British Library using the search facilities of the Library Software Package. This is a simple sequential batched search and resulted in an average search cost of 0.10 u.a. per term per thousand records searched.

11.4.4 The relative cost for very small files is somewhat greater as there are fixed overheads for any computer run whether on a small or large file.

11.4.5 Also the cost of an RS run for a very small profile becomes greater as input tape reading delays become greater than the processing time per record.

11.4.6 A figure for costs per reference found is less meaningful since it is up to the user to choose a broad spectrum search with a resulting high success rate or a narrow band search with a lower success rate and hence higher costs per reference. On average the cost for the systems investigated was around 1 u.a. per reference supplied.

11.4.7 The following equation will give an order of magnitude cost for a retrospective search run.

$$\left(\frac{T \times N}{10} + \frac{N}{3} + 6\right) \text{ u.a.}$$

where T = No. of search terms

N = File size in thousands of records.

This does not include the cost of profile formulation, checking, output creation or dispatch.

11.4.8 The average file size for each year is given in Table 1 Section 4.2.1. The number of search terms if not known can be calculated at a rate of 11½ terms per profile - this figure derived from the CIDST study.

11.4.9 Given the above information we can postulate a typical useage pattern and calculate the cost.

11.4.10 Let us suppose that in the first year of operation there are 10 users, say, 2 in April, 2 in July, 3 in September and 5 in December. The average file size is 1,000 records. (N = 1)

April run $\frac{NT}{10} + \frac{N}{3} + 6$

$\frac{1 \times 23}{10} + \frac{1}{3} + 6 = 8.6$ u.a.

July $\frac{1 \times 23}{10} + \frac{1}{3} + 6 = 8.6$ u.a.

September $\frac{1 \times 34\frac{1}{2}}{10} + \frac{1}{3} + 6 = 9.8$ u.a.

December $\frac{1 \times 57\frac{1}{2}}{10} + \frac{1}{3} + 6 = 12.1$ u.a.

Total for year = 39.1 u.a.

11.4.11 For the second year let us postulate 2 users each month. Average file size is 4,000 records (N = 4)

Average monthly cost $\frac{4 \times 23}{10} + \frac{4}{3} + 6 = 16.5$ u.a.

Total for year 198.4 u.a.

11.4.12 For year 3 let us suppose there are on average 4 users each month. The average file size is estimated at 10,000 records.

Average monthly cost $\frac{10 \times 46}{10} + \frac{10}{3} + 6 = 53.3$ u.a.

Total for year 640 u.a.

11.4.13 The table below gives the annual maximum possible costs of a monthly RS run for a varying number of users each year.

TOTAL USERS DURING YEAR	1976	1977	1978
1	9	15	27
2	17	30	53
5	40	63	119
10	78	119	208
20	112	198	379
50	181	405	862

TABLE 5. Maximum annual cost of an R.S service for a given number of users. (Machine time only)

11.4.14 For an SDI service the same equation will give an order of magnitude cost per run but the value of N will be much lower as the SDI is run only against the latest added or amended information.

11.4.15 Averaging over a year we can say that the cost will be:-

$$F\left(\frac{NT}{10} + \frac{N}{3} + 6\right)$$

where F is the number of runs in a year.

11.4.16 The table below gives an indication of the annual cost of a monthly SDI service for a varying number of users.

USERS FOR EACH MONTHLY RUN	1976	1977	1978
1	75	78	85
2	77	82	94
5	84	96	124
10	96	119	173
20	119	165	270
50	188	303	563

TABLE 6. Annual cost of an SDI service for a given number of users.

11.5 Search Output Costs

11.5.1 Successfully retrieved records may be supplied to the user either as a printed list or as an exchange file.

11.5.2 The average number of references supplied by a retrospective search was found, by the working party, to be 45. The average for an SDI was 30 records.

11.5.3 In either case the cost of printing is low:- at 500 lines per minute and 20 lines per record it takes less than 2 minutes, i.e. 3 u.a., say 4 u.a. inclusive of handling and post.

11.5.4 The cost of creation of an exchange tape is somewhat greater at about 6 u.a. inclusive of handling and postage.

11.6 Annual SDI and RS costs

11.6.1 From the preceding sections we can estimate the total search costs over a typical 3 year program.

11.6.2 Let us postulate an RS usage of 5 users in year 1, 10 users in year 2 and 20 users in year 3 for a monthly run.

a) Profile costs - a total of 35 profiles at 15 u.a. gives 525 u.a.

b) Machine costs - from Table 5 we get machine costs of 40 u.a., 119 u.a. and 379 u.a., totalling 538 u.a.

c) Assuming half of the output to be printed and the rest on exchange tapes and the figures in Section 11.5 we get a total of 175 u.a.

11.6.3 Similarly for a postulated use of 10 in year 1. 20 in year 2 and 50 in year 3 for a monthly SDI service;

a) Profile costs - 60 at 25 u.a. gives a total of 1,500 u.a.

b) Machine costs - from Table 6 yearly costs of 96, 165 and 563 u.a., totalling 824 u.a.

c) Output costs - again assuming half printed and half on exchange tape the output costs total 4,800 u.a.

Thus the total SDI costs will be 7,124 u.a.

11.6.4 An amount should also be added for programmer/analyst run control management, requiring 1 day per run at 50 u.a. per day.

11.6.5 The overall total for the search operation becomes;

RS	-	1,238 u.a.
SDI	-	7,124 u.a.
Management	-	3,600 u.a.
TOTAL	-	11,962 u.a.

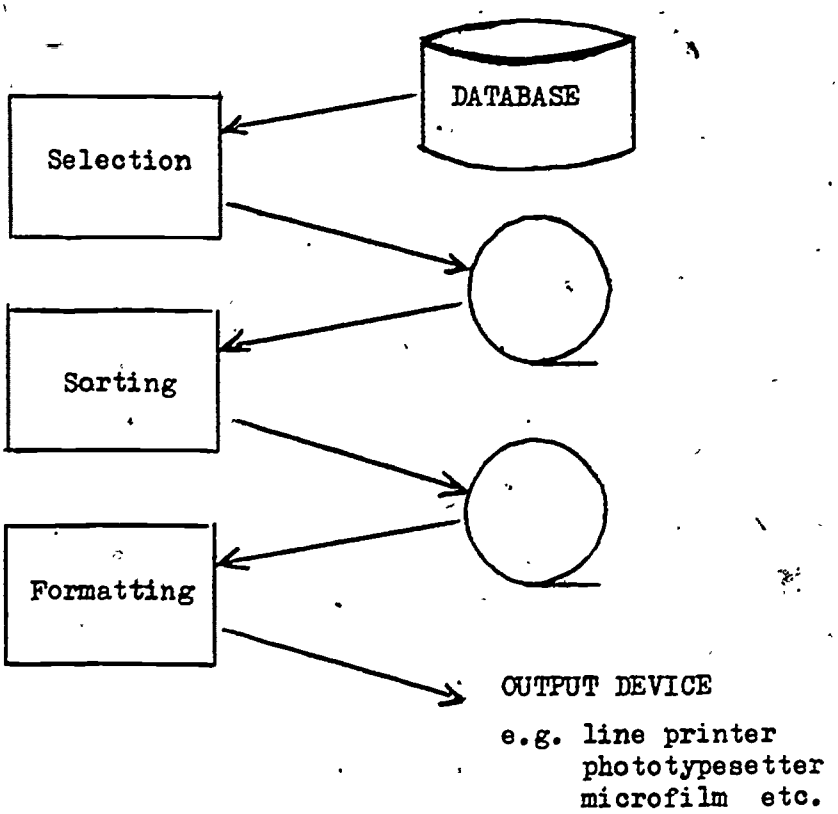
11.6.6 Note that these examples are based upon guesses with which the reader is welcome to disagree.

12 OUTPUT

12.1 Formatting of output data

12.1.1 In the simplest terms the formatting of most output catalogues will require the following basic steps:

a) selection
b) sorting
c) formatting
d) output production



12.1.2 The selection of data could be for a current awareness publication or for a catalogue of a particular class of material, e.g. all microfilmed publications, all English language material etc.

This step may involve preformatting of sort keys. This operation has been costed for various types of publication and the highest average figure taken for the following costing excercise. The figure taken is 3 u.a. per thousand records selected.

12.1.3 The cost of sorting relates to the size of the records and the number of records. The highest average figure takes into account the fact that a single original record can produce three or more records to be sorted. For example a single record could give rise to an Author entry, a Title entry and more than one cross reference entry in an alphabetic index. The figure taken in this case is 3.5 u.a. per thousand (originating) records.

12.1.4 Output formatting will depend to some extent on the output type, i.e. whether for a line printer (simple) or for a phototypesetter (complex) etc. A figure taken for a complex example is 4.5 u.a. per thousand (originating) records.

12.1.5 In each case a minimum figure of 1 u.a. has been assumed to cover the costs of job submission, file mounting etc.

12.2 Publication sizes.

12.2.1 Current awareness publications, typically have several sections, usually two or more of the following - classified section, index section, subject index section.

12.2.2 Overall, publications which employ records with large abstracts tend to drop below a figure of 8 records per page (A4 size) of complete publication. That is a publication with 400 records would take at least 100 pages.

12.2.3 The British National Bibliography which employed a full MARC record, but without an abstract, averaged around 9 records per printed page. The I.L.O. Bulletin which uses a less comprehensive record, but has a lengthy abstract with each record, is around 7 records per page.

12.2.4 For the following costing notes I have assumed a figure of 7 records per printed A4 page.

12.2.5 A normal printed A4 page can comfortably contain twice as much information as a standard computer line printer page. For computer print out of complete catalogues a figure of 3½ records per line printer page has been assumed.

12.2.6 Table 1 gives information on the expected annual increase in data base size. In essence this comes to the following:

1976	2000 records
1977	4000 records
1978	8500 records
1979	4000 records

12.2.7 Although these are only estimates they will serve as a basis for the following costing excercise. Splitting each years increment into weekly, monthly and quarterly segments the following table is derived.

	1976	1977	1978	1979
Weekly	39	77	164	77
Monthly	167	333	709	333
Quarterly	500	1000	2125	1000
Annually	2000	4000	8500	4000

TABLE 7 Periodic increments in the EUDISED database.

12.2.8 From these figures the sizes of current awareness publications and annual volumes can be calculated.

	1976	1977	1978	1979
Weekly	6 (12)	11 (22)	24 (47)	11 (22)
Monthly	24 (48)	48 (96)	102 (203)	48 (96)
Quarterly	72 (143)	144 (286)	304 (608)	144 (286)
Annual	286 (572)	572 (1143)	1215 (2430)	572 (1143)

TABLE 8 Size of EUDISED printed publications. Figures in brackets are for line printer pages.

12.2.9 Formatting costs for the above publication sizes can be calculated and are given in the following table.

	1976	1977	1978	1979
WEEKLY	3	3	3	3
MONTHLY	3	4	8	4
QUARTERLY	6	11	23	11
ANNUAL	22	44	94	44

TABLE 9. Formatting costs in u.a. for various possible EUDISED publications.

12.3 Line Printer Output

12.3.1 The American Library Association (ALA) print chain has a set of 162 unique characters for use on IBM equipment. Individual characters are replaceable on application to IBM.

12.3.2 The rental for such a chain is around 80 u.a. per month or purchase at approximately 3,000 u.a.

12.3.3 The disadvantage of such a chain is that it runs considerably slower than a standard upper/lower case chain.

12.3.4 Normal bureau printing charges for an HN (upper case only) print chain are between 0.5 u.a. and 1 u.a. per thousand lines. Most bureaux would not increase this charge unless there was a disproportionate amount of printing. However, large print runs could be timed for slack periods, over weekends etc.

12.3.5 I shall assume a cost of 1 u.a. per thousand lines inclusive of bursting and binding and the cost of paper.

12.3.6 At 60 lines per page this works out to be 0.06 u.a. per computer line printed page.

12.3.7 From Tables 8 and 9 the cost of a line printed publication including formatting can be calculated. The results are given in the table below.

	1976	1977	1978	1979
WEEKLY	3.7	4.3	5.8	4.3
MONTHLY	5.8	9.8	20.2	9.8
QUARTERLY	14.6	28.2	59.5	28.2
ANNUAL	56.3	113.0	240.0	113.0

TABLE 10. Cost of a single line printed copy of a EUDISED publication inclusive of formatting.

12.3.8 If use of multipart stationery is made then the cost of multiple copies can be reduced substantially. One could expect up to three legible copies as well as the top copy. In the following table which gives costings of multiple line printed copies the figures in brackets are for the cost using 4 part stationery.

	1976	1977	1978	1979
WEEKLY	39 (12)	69 (20)	144 (40)	69 (20)
MONTHLY	147 (40)	292 (79)	620 (166)	292 (79)
QUARTERLY	438 (118)	875 (234)	1,847 (497)	875 (234)
ANNUAL	1,738 (468)	3,476 (936)	7,384 (1,990)	3,476 (936)

TABLE 11. Cost per run of 50 copies of line printed EUDISED publications. Figures in brackets are those if 4 part stationery is used.

12.3.9 The cost of more than 50 copies can be obtained by simple addition sufficiently accurately, e.g. 1,000 copies of 1976 annual

1,738 (468) x 20 = 3,4760 (9,360) u.a.

12.3.10 From these tables can be derived the cost of a complete line printed publication program. For example, if it is decided to produce a monthly current awareness (CA) publication and an annual volume [illegible] edition of 50 copies for the CA and 1,000 copies of the annual then the cost each year would be as follows:-

YEAR 1	36,500 u.a.	(9,800)
YEAR 2	73,000 u.a.	(19,700)
YEAR 3	155,000 u.a.	(42,000)
YEAR 4	73,000 u.a.	(19,700)

Figures in brackets are again using 4 part stationery.

12.3.11 Quality - a sample listing using the ALA chain is attached at Appendix A. As can be seen, the listing is adequately legible although probably not acceptable for a prestige publication.

12.3.12 A significant advantage of line printer output is that it is immediate - no production delays except possibly for binding.

12.3.13 A considerable improvement in line printer quality can be achieved by using a carbon ribbon in much the same way as with a typewriter. As the ribbon can only be used once the cost is somewhat greater but the output quality makes the lithographic reproduction of a reasonable quality feasible. (see section 12.4) A sample page produced by this method is shown in Appendix D.

12.4 Lithographic Printing

12.4.1 The table below gives approximate values per page for the cost of offset lithographic printing.

Number of copies of each page	Cost per page in u.a.
10	0.3
20	0.17
50	0.08
100	0.05
500	0.015
1,000	0.009

TABLE 12. Cost of lithographic printing in u.a. per copy. The rates include plate making set up, paper, collation and binding.

12.4.2 As can be seen the cost for a small number of copies is disproportionately high due to the high setup cost which is around 2.5 u.a. per page.

12.4.3 One should expect up to one weeks delay in production of 50 bound copies.

12.4.4 Litho plates can be made from any good quality master including line printer output. A photographic reduction in page size is possible at the same time.

12.4.5 If a carbon ribbon is used on a line printer the print quality is suitable for lithographic reproduction. Cost of this type of publication are the same as those given in table 13 in Section 12.5

12.5 Direct line-printing onto lithographic stencils

12.5.1 A specially coated paper can be used in line printers so that the printed output can be mounted directly onto a litho machine.

12.5.2 Line printing costs are as for a single copy plus a small extra cost for the paper but several hundred copies can be made from the original.

12.5.3 The quality can only be described as barely adequate but the process is cheaper than direct line printing for 100 copies or up.

12.5.4 The cost of EUDISED publications using this technique is given in the following table.

	1976	1977	1978	1979
Weekly				
50 copies	52	92	194	92
100 copies	64	114	234	114
Monthly				
50 copies	198	394	832	394
100 copies	238	490	1040	490
Quarterly				
50 copies	587	1180	2500	1180
100 copies	730	1460	3100	1460
Annual volume				
50 copies	2350	4700	10000	4700
100 copies	2920	5830	12400	5830
500 copies	4350	8690	18500	8690

TABLE 13 Cost per run of line printing onto offset litho stencils.

12.6. Lithographic Printing via Phototypesetting

12.6.1 Computer phototypesetters are driven by a magnetic tape which contains all necessary information as to type size, format, etc. The characters are generated digitally onto a cathode ray screen and recorded onto a photographic film by a lens system.

12.6.2 The advantages of computer phototypesetters are that they offer a virtually unlimited character set in a wide range of sizes and extremely rapid operation. Modern typesetters can operate at up to 6,000 characters/second (or more) and produce output of the highest quality.

12.6.3 Costs are in the order of 2 u.a. per page, depending on the proportion of white space to print.

12.6.4 The following table gives the cost of an edition of 50 copies of EUDISED publications.

	1976	1977	1978	1979
WEEKLY				
50 copies	39	69	144	69
100 copies	45	80	171	80
MONTHLY				
50 copies	144	292	620	292
100 copies	171	340	722	340
QUARTERLY				
50 copies	438	875	1,847	875
100 copies	510	1,019	2,150	1,019
ANNUAL VOLUME				
50 copies	1,738	3,476	7,384	3,476
100 copies	2,024	4,048	8,600	4,048
500 copies	2,740	5,480	11,650	5,480

TABLE 14. Cost per run in u.a. to produce phototypeset & litho printed copies of EUDISED catalogues.

12.6.5 An alternative method of use of a phototypesetter is to drive it as if it were a line printer with unit spacing of letters, no justification etc. Data is not as compressed as with normal typesetting, but the rates are usually cheaper. Overall the cost of a catalogue produced by this method is likely to be similar to figures given in Table 14.

12.6.6 The great advantage is that a good quality image for lithographic printing is produced without requiring the rather complex programming necessary for phototypeset output.

12.6.7 Samples of both types are attached at Appendix B and Appendix C.

12.7 Output on Micro-publications

12.7.1 Simple microfilm or microfiche offer a limited character set and a limited composition facility. The packing density is similar to that produced by a line printer standard page.

12.7.2 Graphic arts COM (Computer on Microform) devices are appearing on the market now and offer a high quality microfilm with a large character set and type styles. Obviously this is more expensive than standard COM.

12.7.3 One should expect a few days delay in production of 50 copies except for ultrafiche which can take up to a month.

12.8 Microfilm

12.8.1 A microfilm cassette can contain up to 2,400 frames of information which are accessible serially. Devices are available for automatic location of a selected page, but are expensive compared to simple microfilm readers.

12.8.2 Standard bureau charges for microfilm record are 16 u.a. per thousand frames for the master copy and 1 u.a. per thousand frames for copies on diazo film. Additionally there is a charge of 0.5 u.a. for loading a cassette and 1 u.a. for each cassette (which are reusable, however). There is a minimum run charge of 16 u.a. for originals and 1 u.a. per copy.

12.8.3 There are a large variety of readers on the market starting at around 100 u.a. for the simplest to several thousand accounting units for sophisticated models which have automatic frame location and copy page printing facilities.

12.8.4 The costs of the publications are given in the table below. Figures given exclude cassette costs at 1.5u.a. each inclusive of loading.

TABLE 15. Cost of microfilm publishing in u.a. per run.

	1976	1977	1978	1979
WEEKLY				
50 copies	69	69	69	69
100 copies	119	119	119	119
MONTHLY				
50 copies	69	70	73	70
100 copies	119	120	124	120
QUARTERLY				
50 copies	72	77	89	77
100 copies	122	127	139	127
ANNUAL				
50 copies	88	119	255	119
100 copies	138	176	376	176
500 copies	538	633	1,348	633

12.8.5 As can be seen from the table the minimum run costs are predominant until one reaches annual volume sizes of publication.

12.9 Microfiche

12.9.1 These are sections of 105 mm film about 150 mm long with a number of frames of data recorded thereon. A 42:1 reduction ratio gives 208 frames per fiche with an acceptable standard. The advantage over film is that the user can go more or less directly to the required frame having selected the required fiche. The fiche can be labelled with a contents note and does not require a special container.

12.9.2 The basic master creation for microfiche costs slightly less than for microfilm, i.e. about 13 u.a. per thousand frames with reductions for large quantity runs. Again there is a minimum charge of around 16 u.a. but copying costs are 0.13 u.a. per fiche.

12.9.3 Fiche reader costs start at around 70 u.a. and also go up to several thousand units of account for sophisticated models.

12.9.4 The table below gives microfiche costs of the postulated EUDISED program inclusive of formatting.

	1976	1977	1978	1979
WEEKLY 50 copies	39	69	144	69
100 copies	45	80	171	80
MONTHLY 50 copies	144	292	620	292
100 copies	171	340	722	340
QUARTER 50 copies	438	875	1,847	875
100 copies	510	1,019	2,150	1,019
ANNUAL 50 copies	1,738	3,746	7,384	3,746
100 copies	2,024	4,048	8,600	4,048
500 copies	2,740	5,480	11,650	5,480

TABLE 16 The cost of microfiche publishing in u.a. per run inclusive of formatting.

12.10 Graphic arts quality COM

12.10.1 This is a recent development in COM technology, and so far there are not very many machines available.

12.10.2 In the United Kingdom the only machine available to the public so far is the COMp 80 at the National Data Processing Service in Leeds. The COMp 80 combines the speed of normal microfilm with some of the flexibility quality and large character set of the photosypesetter.

12.10.3 The cost depends on the character set and facilities used, but with a standard upper/lower case character set and a reasonable range of accents a price of 16 u.a. per thousand frames is quoted. There is a minimum charge of 48 u.a., making it expensive for small runs but duplication costs are the same as conventional film/fiche.

	1976	1977	1978	1979
WEEKLY				
50 copies	58	58	58	58
100 copies	64	64	64	64
MONTHLY				
50 copies	58	59	63	59
100 copies	64	65	69	65
QUARTERLY				
50 copies	61	72	91	72
100 copies	68	85	110	85
ANNUAL				
50 copies	90	131	220	131
100 copies	109	170	298	170
500 copies	265	482	922	482

TABLE 17. Cost in u.a. of various EUDISED publications created via graphic arts COM.

12.11 Ultramicrofiche

12.11.1 This is a system developed by NCR Company and is similar in concept to standard microfiche but the reduction ratio is 1:150 and the fiche can contain up to 3,010 frames.

12.11.2 A special reader made by NCR has to be made, costing around 400 u.a. These readers are not very widely used.

12.11.3 The quality is not as good as standard microfilm or fiche and there can be considerable production delays.

12.11.4 The cost for a master is 310 u.a. plus 0.08 u.a. per frame (a maximum of 550 u.a.). This high initial cost makes ultrafiche too expensive except for runs with a large number of pages and a large number of copies. The copies cost 1.0 u.a. each.

12.11.5 The following table gives costs inclusive of formatting.

	1976	1977	1978	1979
WEEKLY				
50 copies	364	365	367	365
100 copies	414	415	417	415
MONTHLY				
50 copies	367	372	384	372
100 copies	417	422	434	422
QUARTERLY				
50 copies	377	394	432	394
100 copies	427	444	482	444
ANNUAL VOLUME				
50 copies	428	495	648	495
100 copies	478	545	698	545
500 copies	878	945	1,098	945

TABLE 18. Cost in u.a. per run for ultramicrofiche publications.

12.12 Comparison of results in terms of cost per copy

12.12.1 To give a better general picture of costings, some of the results are reproduced below in terms of copy costs. I have taken 1977 weekly, monthly and annual volume as being of average size over the period in question.

TYPE OF PUBLICATION	COST PER COPY, WEEKLY OVER 50 COPIES	MONTHLY OVER 50 COPIES	ANNUALLY OVER 500 COPIES
			$
Line Printer	0.40	1.58	18.7
Line Printer & offset litho	1.84	7.90	17.4
Phototypesetting & offset litho	1.38	5.84	10.96
Microfilm	1.38	1.40	1.27
Microfiche	0.51	0.53	0.90
Graphic Arts Microfiche	1.16	1.18	0.96
Ultrafiche	7.30	7.44	1.89

TABLE 19. Cost comparison of various publication methods per copy.

12.12.2 Taking a monthly current awareness publication and an annual volume as being a probable approach, a total annual cost for each method is given in the table below assuming a subscription of 50 to the monthly and sales of 500 for the annual. Again 1977 is taken as the sample year.

TYPE OF PUBLICATION	COST IN U.A.
Line printer	10,300
Line printer & offset litho	13,400
Phototypesetting & offset litho	8,980
Microfilm	1,473
Microfiche	770
Graphic Arts Microfiche	1,190
Ultrafiche	5,409

TABLE 20. Cost comparison of various methods of publication for a complete year.

12.12.3 Comparing results it would appear that graphic arts microfiche is the obvious choice for a micro-publication. For a printed publication offset lithography of a phototypeset master would appear to be the logical choice, giving the best range of characters and the best quality of output. A second alternative would be to use the facility offered by some phototypesetters to act as a line printer. This would obviate the expensive programming required for normal phototypesetting.

	Line Printer	Line Printer & Offset Litho.	Phototypsetting & Offset Litho.	Microfilm	Microfiche	Graphic Arts Microfiche	Ultrafiche
LEGIBILITY	+	−	+++	+	+	++	−
DURABILITY	+	+	++	+	+	+	+
CHARACTER SET	+	+	+++	+	+	+++	+
FORMAT FLEXIBILITY	−	−	+++	−	−	++	−
ACCESS TIME (for searcher)	+	+	++	−	++	++	+
PRODUCTION DELAYS	++	−	−	+	+	+	—
PHYSICAL SIZE	Bulky	Less Bulky	Average	Very Compact	Very Compact	Very Compact	Extremely Compact
COST							
SMALL PUB.	++	−	+	+	++	+	—
MEDIUM PUB.	+	—	−	+	++	+	—
LARGE PUB.	—	—	−	+	++	++	+

KEY	
EXCELLENT	+++
GOOD	++
AVERAGE	+
POOR	−
VERY POOR	—

TABLE 21. COMPARISON OF TOTAL TYPE CHARACTERISTICS

12.13 Output programmes

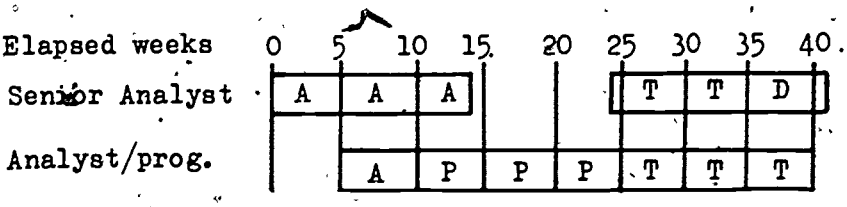
12.13.1 The ideal output system would be a machine independant package enabling national and local centres to create their own catalogues & listings.

12.13.2 If computer typeset output is required would have to be quite complex and could be difficult to write as a machine independant package.

12.13.3 An estimate of the cost of developing a generalised output package capable of producing line printer, microfilm/fiche or computer typeset output is tabled below.

Investigation and analysis	18 weeks
Programming	16 weeks
Testing (program & system)	24 weeks
Documentation (including preparation of a user manual)	7 weeks
Total	65 weeks
At 50 u.a. per diem	16,250 u.a.
Plus computer time and overheads at around 15%	18,500 u.a.

12.13.4 Assuming the use of a senior and a programmer/analyst the elapsed time for such a project would be around 40 weeks as illustrated below.



Use of more staff or a bureau could reduce the time to a minimum of, perhaps, 25 weeks.

12.13.5 The alternative approach would be to adapt an existing system to EUDISED requirements.

12.13.6 The British Library 'Software Package - Module 4' is a generalised output system written in Assembly language for I.B.M. computers. It will produce catalogue entries or indexes in a format specified by the user, as a line printer listing or as a magnetic tape suitable for driving a microfilm/fiche unit. It does not, at present, handle fully formatted phototypesetting but has been used to drive a phototypesetter using unit spacing (i.e. behaving as a line printer) giving very good quality results. (See section 12.6.5)
An estimated 5 man months would be required to create a complete phototypesetting capability. (approx. 5000 u.a.)

12.13.7 The ISIS system at IIO also incorperates a generalised output facility. Again this is written in Assembly language for I.B.M. machines. This program also does not have full typesetting capabilities but presumably could be modified at a similar cost to the above estimate.

13 SUMMARY AND CONCLUSIONS

13.1 Systems Options

13.1.1 The following alternatives have been examined:-

a) Designing a complete system specifically for EUDISED.

b) Adopting packages where available, modifying them where necessary and complementing them by 'in house' programs.

c) Taking over a complete package and modifying that as necessary again complemented by 'in house' programs.

13.1.2 The costs of these options are examined below.

a) To write a complete basic system

Spooling suite	15750 u.a.
Conversion programs	18500 u.a.
Thesaurus maintenance	8000 u.a.
Searching	6300 u.a.
Output	18500 u.a.
Total	67050 u.a.

b) Using such packages available from the British Library (used for the EUDISED trial) estimating at 1000 u.a. per package inclusive of modification.

Spooling	1000 u.a.
Conversion programs	18500 u.a.
Thesaurus maintenance	8000 u.a.
Searching	1000 u.a.
Output	1000 u.a.
Total	29500 u.a.

c) Adopting the ISIS system from ILO has been estimated at around 7000 u.a. in general transfer costs plus 18500 u.a. for conversion programs, a total of 25500 u.a. However the ISIS record structure would have to be modified to the EUDISED standards and this would necessitate substantial program modifications. The overall cost would certainly be greater than that of option (b) but without detailed inspection of ISIS it is difficult to give a figure.

13.1.3 An on-line system such as ISIS has overheads associated with terminals, lines and on-line discs which would make the running costs greater than a batched system but the experience could be valuable in a EURONET context.

13.1.4 However if it is intended to create machine indepant packages for use by the national and local centres then there is no alternative to using method (a) and writing or using a software bureau to write a EUDISED system.

13.2 Input and Output options

13.2.1 EUDISED should create a centralised data preparation operation until such time as all participants are able to maintain their own national centres for this purpose.

13.2.2 Although microfiche would be the best solution in cost terms and particularly graphic arts fiche which has the required character set capabilities, a printed catalogue is the most widely acceptable to a general public.
In the initial year or two full computer typesetting capabilities may not have been developed. If this is the case the next best alternative would be to create a line printer tape to drive a computer typrsetter. This system can produce excellent quality results at a comparable cost to complete phototypesetting.

13.3 Staffing Requirements

13.3.1 It was assessed at the EUDISED project meeting of experts in Paris, in December 1974, that in order to bring the EUDISED format up to full implementation status a consultant expert would be required for between 6 and 12 man months.

13.3.2 For a complete 'in house' system to be written in a reasonable time scale at least 3 analysts and 3 programmers would be required for 1½ years. An alternative would be to make use of a software house in conjunction with a EUDISED senior analyst.

13.3.3 If packages or a system are adopted the requirement will be a minimum of 1 senior analyst and 1 analyst/programmer for 1½ years.

13.3.4 The average input keyboarding load will be about one ½ man. The remainder of this mans time could be used for keying thesaurus amendments, search profiles and general office duties.

13.3.5 For checking of input data sheets, resolving problems, maintaining the thesaurus, handling search requests and general management one senior grade person will be required initially.

13.4 Location, timing etc.

13.4.1 The most obviously suitable location would be the European Commission at Luxembourg. They have the equipment and the expertise at setting up this type of operation.

13.4.2 For effective results to be realised in 1976 a head of project and a senior analyst should be appointed before the end of 1975

13.5 Estimated Annual Costings

13.5.1 The following figures have been extracted from the relevant sections in this report. They are based on estimates of the probable usage of the system. Complete tables appear in the appropriate sections from which the reader can create his own estimates.

13.5.2 The values are not given for any systems development work (see 13.1) or for profile searching (see section 11)

	1976	1977	1978	1979
Data Preparation costs (see Table 2)	18000	36000	76500	36000
Data base maintenance for a monthly update (Table 3)	100	155	233	290
Exchange tape service. Assuming 10 users per month increasing to 25. (Table 4)	800	1000	1500	2000
Computer typeset publication at 50 copies per month increasing to 100. (Table 14)	1750	3600	8300	4100
Thesaurus maintenance not including publication. (Est.)	150	150	150	150
Systems staff to handle computer runs	5000	6000	7000	7000
TOTALS	25,800	46,905	93,683	49,540

TABLE 22. Estimated Annual Run Costs for Central Computer Linked Activities. (u.a.)

13.5.3 In addition to computer run and associated costs there will be costs for many peripheral activities such as correspondance, telephones, postage, accounts etc etc. These figures of course have not been included in the tables, nor has a figure been given to management costs.

13.5.5 The figure given for data preparation assumes a centralised operation. If national centres begin to handle their own data preparation then the figure given can be correspondingly reduced.

ZAKONOMERNOSTI RAZVITIYA KAMENNOUGOL'NOI FLORY YUGA EVROPEISKOI CHASTI SSSR / E.O.Novik
Kiev: "Naukova dumka", 1974. 140p; 27cm. - At head of title: Akademiya nauk Ukrainskoi SSR. Institut geologicheskikh nauk

LOCATION
S268504009 BAYSWATER (B) CU 67

ZAMOSHSKII, M.E.
Kliniko-fiziologicheskie aspekty regionarnoi elektropletizmografii legkikh / B.I.Mazhbich, L.Ts.Ioffe, M.E.Zamoshskii
Novosibirsk: "Nauka", 1974. 144p; 21cm. - At head of title: Akademiya meditsinskikh nauk SSSR. Sibirskii filial, Institut fiziologii and Ministerstvo zdravookhraneniya KazSSR. Institut klinicheskoi i eksperimental'noi khirurgii

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S268772002 BAYSWATER (B) GR 18

ZANINA, A.A.
Dal'nevostochnye raiony, Kamchatka i Sakhalin / A.A.Zanina
Leningrad: Gitrometeoizdat, 1958. 168p.; 22cm. - Issued for the Glavnaya geofizicheskaya observatoriya imeni A.I.Voeikova

LOCATION
S268373000 BAYSWATER (B) OP 464

ZAPOROZHETS, A.A.
Posleoperatsionnyi peritonit : patogenez i profilaktika / A.A.Zaporozhets
Minsk: "Nauka i tekhnika", 1974. 184p; 20cm. - At head of title: Akademiya nauk Belorusskoi SSR. Institut fiziologii

LOCATION
S269022007 BAYSWATER (B) GU 64

ZÁRÓKÖZLEMÉNYEK
Budapest: KDV, 1973. 128p; 29cm. - At head of title: Közlekedéstudományi Egyesület. - Contents list in English

LOCATION
S269041001 BAYSWATER (B) UY 40

ZEIGER, S.G.
Volnovye i fluktuatsionnye protsessy v lazerakh / [S.G.Zeiger ... et al.]; pod redaktsiei Yu.L.Klimontovicha
Moscow: "Nauka", 1974. 416p; 22cm

LOCATION
S268443009 BAYSWATER (B) QJ 52

683'.32 — Doors. Lock furniture. Testing. *Standards*
British Standards Institution
Specification for builders' hardware - lock and latch furniture (doors)/ British Standards Institution. — London: B.S.I., 1973. — 14p: ill; 30cm. — (BS4951: 1973)
Pierced for binder
ISBN 0 580 07747 0 Sd: £2.00
Primary classification 683'.31
1 Ti

684 — FURNISHINGS AND WOODWORK
684'.08 — Woodworking. *Secondary school texts*
Knight, Geoffrey William
Woodwork for GCE: a revision book of the theory of woodwork for the General Certificate of Education/ by G W Knight. — Metric ed. — [Exeter]: Wheaton, 1973. — 95p: ill; 21cm.
Previous ed. 1959
ISBN 0 08 017754 7 Pbk: £0.65
1 Ti
(B74-06452)

686.2 — PRINTING
686.2'09423'4 — Printing. *Guernsey, to 1816*
Stevens-Cox, Gregory
The earliest books printed in Guernsey/ [by] Gregory Stevens Cox. — [Wymondham] (The Orchard, Wymondham, Leicestershire): Brewhouse Private Press, 1973. — 1v ill, facsims; 27cm.
Fold sheet (8p.) and 5 leaves of plates in folder — Bibl. p 8
ISBN 0 900190 25 6 £1.80
1 Ti
(B74-06453)

690 — BUILDING
690'.12 — Block walls & slab walls. *Standards*
Council for Codes of Practice
Code of practice for walls and partitions of blocks and of slabs/ Council for Codes of Practice. — London: British Standards Institution.
Part 3 Metric units. — 1973. — 41p: ill, 30cm. — (CP122: Part 3: 1973)
Pierced for binder — The present edition of CP122 Part 3, Metric units, is the metric revision of CP122 Part 2: 1952. — Foreword. — Index.
ISBN 0 580 07913 9 Sd: £3.00
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Maintenance Management: the maintenance, servicing and cleaning of the fabric and contents of industrial, commercial and public buildings. —. Epsom (172 Kingston Rd, Ewell, Epsom, Surrey): A.E. Morgan Publications Ltd.
Vol 12, no 1. — Jan. 1974. — 1974. — ill, 42cm
Monthly. — 12p in Vol 12, No 1 issue. — Continues 'Maintenance'
Sd: £3.50 yearly
(B74-06455)

690'.8'3 — Houses. Construction
Chudley, Roy
Construction technology/ by R. Chudley; illustrated by the author. — [Harlow]: Longman. — (Longman construction series)
Vol 1. — 1973. — xix,245p: ill, 23cm.
Bibl. p.239 — Index
ISBN 0 582 42018 0 £3.20
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(B74-06456)

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Do-it-yourself housebuilding step-by-step/ by Charles D Neal. — New York: Macmillan; London: Collier Macmillan, 1973. — x, 246p: ill; 29cm.
Index
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(B74-06457)

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693.5'4 — Reinforced concrete building components. Design
Rogers, Paul, *b.1909*
Reinforced concrete design for buildings/ [by] Paul Rogers with the assistance of Michael L. Baltay. — New York, London [etc.]: Van Nostrand Reinhold, 1973. — xxiii,272p: ill; 24cm.
Index
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1 Ti 2.Baltay, Michael L
(B74-06458)

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Anderson, Leroy Oscar
How to build a wood-frame house/ by L.O. Anderson; [for the United States Department of Agriculture]. — New York: Dover Publications; London: Constable, 1973. — [1],vii,223p: ill, maps, plans; 28cm.
— unaltered republication of the revised 1970 edition of Agriculture Handbook No.73, originally published by the United States Government Printing Office — under the title "Wood-frame house construction" — title page verso. — Bibl.: p.209 — Index.
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The art of Vietnam/ [by] J. Hejzlar; with photographs by W. and B. Forman; [translated from the Czech MS. by Till Gottheiner]. — London [etc.]: Hamlyn, 1973. — 3-263p: ill(some col); 28cm.
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1 Ti 2.Forman, Werner 3.Forman, Bedřich
(B74-06465)

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Review of the development control system, interim report/ by George Dobry; presented to the Secretary of State for the Environment and the Secretary of State for Wales. — London: H.M.S.O., 1974. — vi,102p; 25cm.
ISBN 0 11 750727 x Sd: £0.73
1 Ti 2.Great Britain. Department of the Environment 3.Great Britain. Welsh Office
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Index.
ISBN 0 85941 003 x Pbk. £1.00
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Index.
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1 Ti
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658.89'0705'730942 — Bookselling. *Great Britain, to 1970*
Mumby, Frank Arthur
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Previous ed. / by Frank Arthur Mumby. 1956 — Bibl. p.578-649 — Index.
ISBN 0 224 00827 7 £12.00
Primary classification 070.5'0942
1 Ti 2.Norrie, Ian

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658'.91'00164 — Computer systems. Management. *Conference proceedings*
Conference on Organisation and Management of Computer Based Control and Automation Projects, *Institution of Electrical Engineers, 1973*
Conference on Organisation and Management of Computer Based Control and Automation Projects 1-3 October 1973 [at the] Institution of Electrical Engineers/ organised by the Control and Automation Division of the Institution of Electrical Engineers in association with ... [others]. — London: Institution of Electrical Engineers, 1973. — vi,121p: ill; 30cm. — (Institution of Electrical Engineers. Conference publications; no.104)
ISBN 0 85296 113 8 Pbk. £5.30
I Institution of Electrical Engineers. Control and Automation Division 2.Sr
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'73: 11th exhibition. — 1973 — ca 330p: chiefly ill; 30cm.
Index.
£7.50
I Designers and Art Directors' Association of London
(B74-06440)

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Mecklenburgh, John Campion
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'Prepared 1969-72 for the Engineering Practice Committee of the Institution of Chemical Engineers by [a] Working Party (Chairman, Dr J.C. Mecklenburgh)' — Bibl. p.137-141. — Index.
ISBN 0 249 44125 x £3.50
1 Ti 2.Institution of Chemical Engineers
(B74-06451)

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662'.2'0216 — Authorised explosives. *Great Britain. Lists. Serials*
Great Britain. *Home Office*
List of authorised explosives/ Home Office. — London: H.M.S.O. 1974, January 1st/ [by] E.G. Whitbread, H.M. Chief Inspector of Explosives. — 1974 — 30p; 21cm.
ISBN 0 11 340074 8 Sd: £0.22
1 Ti 2.Whitbread, Edgar George
(B74-06442)

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Great Britain. *Department of Trade and Industry*
Explosion from a steam pipe expansion piece at the works of the Radcliffe Paper Mill Company Limited, Johnson Street, Radcliffe, Manchester on 9 October 1972: report of preliminary inquiry no.3466/ Department of Trade and Industry. — London: H.M.S.O., 1973 [i.e. 1974]. — [2],14p: ill; 30cm.
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683'.31 — Doors. Latch furniture. Testing. *Standards*
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Specification for builders' hardware - lock and latch furniture (doors)/ British Standards Institution. — London: B.S.I., 1973 — 14p: ill; 30cm. — (BS4951: 1973)
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COLVILLE, John Rupert 355.3320924
Man of valour the life of Field-Marshal the Viscount Gort, VC, GCB, DSO, MVO, MC. 1972.
404656 - BL - 611816.0 0002112906

Companion guide to the coast of north-east England. (SEYMOUR, John, b.1914)
1974. 914 280485
496039 - AA AE2 AF AG AH AK AR AW AX2 BD BH BK BL BM BP BS BT BW HC3 HR KC - 611531.0 0002111888

Companion guide to the coast of south-west England. (SEYMOUR, John, b 1914)
1974. 914.230485
496038 - AA AC AE2 AF AG AH AK AR AS AU AW AX BD BH BK BL BM BP BS BT BW EC HC3 KC - 611547.0 000211187x

Competition in British industry restrictive practices legislation in theory and practice
1974. 343.4207
496937 - AA 0043380662

Compleat angler, 1676, with Charles Cotton Complete angler and Robert Venables Experienced angler. (WALTON, Izaak)
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BL b7901676

Complete plain words. (GOWERS, Sir Ernest)
1973. 428
BL - 611059 0117003409

Complete printmaker the art and technique of the relief print, the intaglio print, the collagraph, the lithograph, the screen print, the dimensional print, photographic prints, childrens prints, collecting prints, print workshop. (ROSS, John)
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0029273706

Complex numbers (WILLIAMS, John, b 1922)
1972. 512.7
496130 - AA 0045120188

Computers and the social sciences (BRIER, Alan)
1974 001.640440243
496784 - AA 0091169704

Computers in business an introduction (SANDERS, Donald H)
1972. 658.054
BL - 613115.0 0070546177

CONAGHAN, John
The man of mode 1973.
495954 - AA 0050026925

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496642 - AA AC AH AR AX KC 0091184509

Concordance to the essays of Francis Bacon edited by David W Davies and Elizabeth S. Wrigley (DAVIES, David W)
1973. 824.303
BR b7901976

Concorde fiasco (WILSON, Andrew, b 1923)
1973 338.47629133349
BR - 000000 0140523065

Conservative politics in France (ANDERSON, Malcolm)
1974. 320.60944
496120 - AA 0043200931

Consumers guide to the British social services (WILLMOTT, Phyllis)
1971. 361.942
BL3 - 607393.0 0140208712

Containment of urban England. (HALL, Peter, b 1932)
Vol 1 Urban and metropolitan growth processes, or Megalopolis denied
1973. 309.2620942
494031 - AA 0043520405

Containment of urban England (HALL, Peter, b 1932)
Vol.2. The planning system
1973 309.2620942
494032 - AA 0043520413

Contemporary decoupage new plastic materials, new and traditional processes (NEWMAN, Thelma Rita)
1972. 745.54
487529 - AA 0047300205

Convento della Carita (BASSI, Elena)
1971. 726.7044551
BR b7901751

CONWAY, Laura 823.91F
The sweet lost years. 1974
138474 - BK BL BS BT BW - 068154.0 0002337843

COOPER, Kenneth 613.71
The new aerobics 1970 (reprint 1972).
BL b7901949

COULSON, Charles Alfred 541.224
The shape and structure of molecules. 1973.
496171 - AA 0198564435

COULTER, David
Speak with confidence, based on the London Weekend Television series I say. 1974
497157 - AA AG AH AK AP AQ AU AW AX EC HC 0091198607

COUSINS, Geoffrey 796.352
An atlas of golf. 1974.
496256 - AC AX BD BH BM BP 0171620092

Covenant with death. (HARRIS, John, b.1916)
1973. 823.91F
BK BL - 186190.0 009116270x

COWELL, Frank Richard 913.37
Cicero and the Roman Republic 5th ed. 1973(1 e 1972).
496692 - AA 0140203206

CRAIG, Albert M 1973.
490147 - AA 0049500165

CRAWLEY, Aidan 943.087
The rise of Western Germany, 1945-1972. 1973.
BL - 613020.0 0002117282

CREASEY, John, b.1908 823.91F
The black spiders. 1973.
BL - 069232.0 0091170206

CRIME CLUB 1974.
BD BH BM BP - 065296.0 0002316718

CRIME CLUB 1974.
134571 - BK BS BT BW - 067328.0 0002317761

CRIME CLUB 1974.
135055 - AE4 AK BC KC 0002311402

CRIME CLUB 1974
135161 - AB AC AE7 AF AG AH AK AN AP AR AS AU AW BL3 EC2 HC2 KC 0002311917

CRIME CLUB 1974
135110 - AC AE7 AG AH AN AP AR AS AU AW AX EC2 HC3 HH HO HV KC LC 0002311410

CRIME CLUB 1974.
BD BH BM BP - 069601.0 0002313049

CRIME CLUB 1974
134964 - AB AC AE6 AF AG AH AK AN AP AQ AR AS AW AX BD BH BL2 BM BP BS BT BW EC HC2 HH HO HV 0002316343

CRIME CLUB 1974
134919 - AC AE3 AG AH AK AN AP AS AU AX KC 0002315696

CRIME CLUB 1974
BD BH BM BP - 069904.0 0002316064

CRIME CLUB 1974.
135551 - AB AC AE11 AF AH AK AN AP AQ AR AS AU AW AX BD BH BK BL2 BM BP BS BT BW EC6 HC4 HH HO - 068730.0 0002316382

CRIME CLUB 1974.
135317 - AC AE5 AF AH AK AN AP AS AU AW AX BL EC6 HC4 HH HP - 068760.0 0002317788

CRIME CLUB 1974
134520 - BD BH BK BL BM BP BS BT BW KC - 067914.0 0002312484

CRIME CLUB 1974
BD BH BM BP - 069217.0 000231780x

Crime wave. (RUSSELL, Martin)
1974 823.91F
135055 - AE4 AK BC KC 0002311402

Crisis and conflict in Nigeria. a documentary sourcebook: (in 2 vols) (KIRK-GREENE, Anthony Hamilton Millard)
Vol 1: January 1966-July 1967
1971. 966.90508
494214 - AA 0192156411

Crisis and conflict in Nigeria: a documentary sourcebook: (in 2 vols) (KIRK-GREENE, Anthony Hamilton Millard)
Vol 2 July 1967-January 1970
1971 966.90508
494215 - AA 019215642x

CRITCHLOW, Keith $16.00
Order in space a design source book. 1969.
BL - 613184.0 b7901978

CRONBACH, Lee Joseph 152.8
Essentials of psychological testing. 3rd ed. Harper international ed 1970.
497364 - AA 0063501263

CROSS, O.
Steam in Scotland volume 1. 1968.
BL - 611822.0 07901906

APPENDIX D.- A line printer sample using carbon ribbon.

ALA CHARACTERS IN PRINT TRAIN SEQUENCE PAGE 4

X α x ALPHA

X β x BETA

X γ x GAMMA

X % x PERCENT SIGN

X ± x PLUS OR MINUS

X & x AMPERSAND

X) x RIGHT PARENTHESES

X (x LEFT PARENTHESES

X ; x SEMI COLON

X $_1$ x SUBSCRIPT 1

X $_2$ x SUBSCRIPT 2

X $_3$ x SUBSCRIPT 3

X $_4$ x SUBSCRIPT 4

X $_5$ x SUBSCRIPT 5

X $_6$ x SUBSCRIPT 6

X $_7$ x SUBSCRIPT 7

X $_8$ x SUBSCRIPT 8

X $_9$ x SUBSCRIPT 9

X $_0$ x SUBSCRIPT 0

X $_-$ x SUBSCRIPT MINUS

X $_+$ x SUBSCRIPT PLUS

X ˛ x RIGHT HOOK

X $_)$ x SUBSCRIPT RIGHT PARENTHESES

X $_($ x SUBSCRIPT LEFT PARENTHESES

X ̣ x DOT BELOW

X ̤ x DOUBLE DOT BELOW

X ̭ x CIRCLE BELOW

X ̲ x UNDERSCORE

X ̐ x CANDRABINDU

X ̳ x DOUBLE UNDERSCORE