ON-LINE USE OF DATABASES

CHARGING PRACTICES OF DATABASE PRODUCERS

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Foreword

This Working Paper reports on a study undertaken by us as a private venture for the Commission of the European Communities. The subject-matter is however closely related to the sub-task, International Data Exchange, included in the 1977 research plan of the Computer Science Group: one of the main areas of international data exchange at the scientific and technical level is the interactive interrogation of computer bibliographic and fact databases. During the present decade this has grown from insignificant levels to become an international business in North America and Europe with a total utilisation of several hundred thousand hours of terminal connections per year.

At a Workshop on International Data Exchange held by IIASA at Toronto in August 1977, to identify the critical issues for research in this general field, economic issues scored the highest individual rating, and it is evident that such problems may have a determining effect on future growth-rates, particularly outside the industrialized regions.

The study reported here was essentially a fact-finding exercise on one aspect of the economics of scientific and technical information flows, that of the relation between charges to users and charges levied by the producers of scientific and technical information databases for the use of computerised versions of their products. Other important aspects remain open, in particular the influence of the changing policies of international carriers and telecommunication administrations on total user costs, the economies of scale to be obtained from multi database operators etc.

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MANAGEMENT SUMMARY

Note: *To assist the reader who wishes more detail on certain points, references to the conclusions chapter and to tables or other data elsewhere in the report are noted in the lefthand margin.*

OBJECT OF THE STUDY

pp. 4-5 The study was designed to provide factual information on

(i) Charging systems and levels applied by database producers for on-line use.

(ii) The proportion of total user charges represented by the database element.

(iii) Trends in levels of charging for the database element.

The terms of reference also called for investigation of the methods of collecting payments for on-line use of the database, condition of access, effect of discount schemes, etc.

Limitations

pp. 5-6 Broader questions of the economics of database production, including the effects of expansion of on-line use on revenue from printed versions and longer-term future trends in prices were expressly excluded in the study.

Operator Charges

While the study objectives are primarily concerned with isolation of the database element in costs to the user, it is apparent that, to derive the proportion of this element in total user charges, it is necessary also to examine operator and other elements. Aside from this question of arithmetic, in almost every case the prices which the user must pay are those levied by the system operator; database charges and operator charges and charging systems are not independent of each other. For these reasons, equal weight to both aspects has been given in the data collection and analysis for this study.

THE DATA

pp. 9-14

Tables 1-4

Altogether data on some 80 databases were collected for the study. While all the candidate databases for EURONET were examined, rather few of European origin were able to produce quantitative data for the study, although a number contributed information on charging systems. The table below shows the databases included by country of origin.

Databases by Country of Origin

p. 13

Belgium	1	France	6
FRG	5	Netherlands	1
U.K.	7	U.S.A.	56
	International 4		

Databases contributing information to the study represent an almost 100% sample of those publically

p.14 available on-line in the USA and Europe. End-user prices were available for about 90% of the sample, the remainder not yet having fully developed pricing policies. Quantitative data on the database price element was directly available for 35 databases in the sample: the remaining cases are discussed under "Database Charging Systems" below.

Data was collected from both systems operators and database producers, in order to bring to light any anomalies which might exist.

CHARGING SYSTEMS

Database Charging Systems

The databases contributing information to the study can be classified thus:-

pp. 34-35 Table 5 pp. 90-91 (i) No-charge systems in which the database price element is zero. Most of these are the result of input-exchange agreements e.g., MEDLARS and INIS (input costs may be included in end-user prices but if so are not separately identified). Eleven no-charge databases were included in the sample.

pp. 35-37 Table 6 p. 91 (ii) Fixed, Published Price Systems, in which producers make their prices generally available: the database element is therefore transparent to the user. Twenty-four databases were in this category, and typically these were produced by learned institutions in the pure and applied sciences. Examples are Chemical Abstracts Condensates, BIOSIS, INSPEC. Charges typically include a license fee payable by the operator and royalties payable by the user.

(iii) Confidential Business Arrangements between producer and operator in which the parties concerned do not disclose the manner in which payments from the user are shared. Probably the majority involve a straight split of the end-user price between the parties, often with exclusive rights to the operator and possibly a minumum guaranteed sum to the producer. It was not possible to identify unambiguously all such databases, but thirteen are certainly in the confidential class, a further eleven are highly probable and three doubtful. This class contains a relatively high proportion of business, marketing and patent information; some institutional producers are also represented.

pp. 30-40
Table 7
pp. 91-92

(iv) Operator as On-line Contractor to Producer: one such system was positively identified (DERWENT). The producer controls all access to the database and bills users direct

pp. 39-40
p. 92

Since the user cannot know the financial arrangements between producer and operator in categories (iii) and (iv) above, the database element is non-transparent for about twenty-five databases or some 30% of the sample.

Operators' Charging Systems

Operators providing access to the great majority of databases in the study require the user to pay an access fee per connect hour and a charge per item printed, the amounts varying according to the database. Both may include royalty payments to the producer, not separately identifiable by the user in the cases of Lockheed and SDC. SDS now bills

pp. 28-29
p. 87

the user for access and royalties in a single account, but publishes the royalties demanded by producers.

pp. 30-31
p. 87

A second method is to charge a flat rate for access to any of the databases offered: royalties are billed separately. This system is adopted by BRS, BLAISE and FIZ-4. Two operators (DIMDI and

pp. 31-32
p. 88

the EPIC management) charge by the amount of computer resources used in a search. There are a few cases in which operators require a substantial annual subscription in addition to a connect-hour payment.

LEVELS OF CHARGING

Producer Charges

The results of the study in this area are briefly summarized in the following table.

DATABASE CHARGING LEVELS

Table 19
pp. 62-65

Table 21
pp. 74-75

DATABASE CLASS	CONNECT-HOUR ROYALTIES $		PRINT CHARGES $	
	MEAN	RANGE	MEAN	RANGE
No charge				
Fixed Published Price	15	4* - 30	0.04	0.02 - 0.10
Confidential (inferred)	28	10 - 78	no information	

Notes:

(a) The total return to the producer for fixed price databases will be increased by the license fee; apportioning this to the connect hour charge depends

*There is however one case in which no royalties are charged.

on the volume of use achieved by the different operators. $2 - 3 should be added to the producer's return to allow for this but the amount could be as high as $7 for COMPENDEX at a total usage rate of only 1000 hrs per year.

p. 61

(b) In the case of confidential databases, the accuracy of the return to the producer cannot be exactly known: the average given is inferred using the price of no-charge databases and other data on operator charges.

pp.71-73

Operator Charges

These charges were investigated as a step towards calculating the proportional return to the producer. They proved to have an important effect on both end-user prices as such and on the proportion returned to the producer. The results may be summarized thus:-

pp. 88-89

(i) The price of no-charge databases provide a base operating cost for different operators, e.g.

Table 17, p. 58

Lockheed	$25
SDC	$35
SDS	$28.

(ii) End-user prices for the fixed published price databases show that both major US operators increase their charges for those databases substantially above the base cost: SDS does not, in the general case, although in all three cases the variance for different databases about the mean is rather high, indicating that operators make business decisions in establishing an end-user price for a database. Operator charges as a proportion of the base cost (price/cost factor) averaged over these databases,

pp. 66-68

with variance are as follows:-

PRICE/COST FACTOR IN OPERATOR CHARGES

Table 20 p. 66

Operator	Mean Price/Cost Factor	Variance
Lockheed	1.46	0.36
SDC	1.34	0.35
SDS	1.03	0.19

THE DATABASE ELEMENT AS A PROPORTION OF END-USER CHARGES

Proportion of Connect-hour Price

Neglecting users' own costs, networking and telecommunication charges, and charges for print-out, but making some allowance for leasing fees, the following are the proportions returned to the producer:-

pp. 68-70 Fig. 2 pp. 93-94

(i) For fixed-price databases, the range is between 10% (3 cases) and 40% (1 case). For the majority of databases, the proportion lies between 20% and 30%. For any particular database the proportional return may differ considerably between operators as a consequence of operator charges.

pp. 73-75 Table 26 p. 94

(ii) For the confidential class of databases, the return to the producer is higher, ranging between 20% and 50%, with the majority between 30% and 40%. No great accuracy can be claimed for the proportion for individual databases in this class.

Relative Importance of Other Elements in User Charges

Aside from users' own costs, two other elements could significantly modify the proportions of total end-user charges returned to the producer. These are communications costs and print-out charges. At present, network charges in Europe (SDS) are a minimum of $22 per hour, and probably around $50 per hour for accessing U.S. operators.

pp. 56-57
p. 97

Off-line Print Charges, which often include a royalty element, can substantially increase total user costs if this option is exercised. The additional cost might be as high as $20 - $30 per hour, or even more. Print-out charges in excess of $0.06 to $0.10 will usually include a royalty element.

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pp. 76-78
p. 97

Discount Systems

Discounts are offered by the major U.S. operators and SDS. Except for BRS, they apply to the total connect hour price, and therefore have the effect of reducing the operator's share of this cost. There are a number of options available in the US systems, including higher discount rates for guaranteed rates of use: SDS offers a cash rebate without guaranteed minimum use and is now competitive with similar schemes offered by US operators. The following table summarises the percentage reduction for two classes of user.

pp. 40-54
Fig. 2
p. 96

DISCOUNTS OBTAINABLE - PERCENT REDUCTIONS

pp. 53-54
p. 96

OPERATOR	U S E R	
	Major Documentation Centres 120 hours per month	Libraries, etc. 20 hrs/month
Lockheed	27 - 32%	12 - 25%
SDC	18%	9%
SDS	30%	15%
BRS	25 - 31%	7%

TRENDS IN DATABASE PRICES

pp. 78-82
pp. 94-96
see also
pp. 23-27

Charges required by the producers for access to their databases have increased from zero to their present levels of $15 - $20 for fixed price databases as a consequence of three factors:-

(i) The early history of on-line was dominated by no-charge databases.

(ii) The institutional databases reacted to increased on-line use (1974-1975) by a change from leasing arrangements appropriate to batch-mode operation to licensing/royalty systems. Only a few producers of such databases have increased their royalty levels more than once since introducing licensing systems.

(iii) The entry of a new category of databases into the on-line market in the USA under confidential business arrangements with operators has considerably increased the price per connect-hour averaged over all databases.

The market has in general not yet fully adapted itself to the on-line situation; revenue from this source is not yet a substantial element for most institutional producers, and there is considerable uncertainty about the future development of pricing policies in general. There is some evidence tending to show that institutional databases recently added to operators' lists are associated with royalty levels in the region of $30-$40 per connect hour as compared with the $10-$20 level currently required by those with a longer on-line history.

IMPACT ON EURONET POLICY AND DEVELOPMENT

End-user prices are one, but not the only factor in the rate at which on-line use grows. While increases in the database element in these prices are naturally a matter of concern, at their present level (20% of the hourly connect charge, not taking into account network charges), they probably do not greatly deter users, bearing in mind the price they must pay under present levels of telecommunications and network charges in Europe. Nevertheless, the present trend towards increasing database prices may continue, and therefore the situation requires regular monitoring and review.

Possible Action by the EURONET Management

It is unlikely that the EURONET management can directly influence database prices, which are at present probably more dominated by the North American market conditions than those in Europe. However, fact-finding studies and projections of trends where possible, will help to make the developing situation more transparent to managers and users. EURONET could play a major role in this

respect. Aside from the promotion of studies such as EFAG-21 and 22, the following specific points might receive attention:-

(i) Encouragement of information exchange between host operators to assist them in their negotiations with producers.

(ii) An in-depth study, in cooperation with host operators, of the actual impact of print-out charges on end-user prices: we do not know how far the examples of numbers of items printed as a result of an hour's searching quoted in this study are typical, and what factors influence this.

(iii) Assistance to host operators at present developing their pricing policies with the aim of arriving at systems and charging levels which can command a large measure of user acceptance.

The Confidentiality Issue

Whether the spread of confidential business arrangements between operator and producer noted in this report is in the general interest is arguable; at all events it seems that such arrangements have resulted in increased user charges. This practice has now spread to European producers, mainly in negotiations with U.S. operators, but clearly influencing charges in EURONET.

Database Costs in Relation to Share of the Market

Database costs are virtually a fixed element, not necessarily very visible, in the costs which a user sees in his monthly bills. Increasing costs

for access to databases can only be offset by decreased telecommunications charges or operators' charges. EURONET therefore has an interest in promoting low network charges and increased volume of use, thus enabling host organisations to take advantage of better economies of scale.

This raises the problem of competition with U.S. operators for the European on-line market, which while outside the terms of reference for this study, is indirectly linked with its findings. U.S. operators offering services in Europe currently face a penalty in the shape of high transatlantic data transmission costs: however, if current guesstimates of the degree of US penetration can be believed, total prices for on-line access may have a less determinant effect on user acceptability of services than has been previously assumed. Users may not choose the cheapest option, but questions of familiarity with a system, the possibility of interrogating a large number of databases without complications, system reliability, and general user support, may be of at least equal importance. We do not know, however, whether European users of the U.S. services, particularly users of the more expensive databases in these collections, constitute a typical cross-section, or whether as a group they are less concerned with costs than the average user. These are large and difficult questions, but outside the scope of the present study.

CHAPTER I

INTRODUCTION AND OVERVIEW

BACKGROUND TO THE STUDY

The price which a user must pay for on-line interrogation of a scientific and technical information (STI) database is governed by a number of factors, including particularly the charges imposed by database producers, those required by the systems operators, and network and communication costs. The present study is chiefly concerned with the first of these, the database element. Prices paid by on-line users have been surveyed and analysed by P. Vickers and J. Collins in "Financing and Pricing Policy in Europe for STID Services" (Aslib, February 1977), but that study was primarily concerned with tarification policies of and prices charged by service operators, rather than with analysis of the price to users to derive the database element in such prices.

In the early days of on-line searching, it was often quite impossible to separate out the database element from the computer centre operating cost elements, and this is still difficult in many cases. Database producers in the last few years have developed charging systems which have rendered the database element in total charges much more visible to both system operators and users. Many producers now require payments, whether from the user or the operator, which are directly related to the amount of use made of the database in the on-line mode; royalty payments, at so much a connect hour for manipulation of the data-base and charges for print-out of selected items are examples. Thus users, both in the United States and in Europe, have become conscious of the database cost element in the prices they pay; the earliest use of on-line systems was built up on the basis of a zero - database element, because the databases themselves were governmentally produced and made available without charge to restricted user groups. MEDLARS, NASA, and NSA are examples.

With the rapid broadening of the field to include databases produced by professional institutions, and latterly by commercial organizations, charges directly related to the database are becoming an increasingly visible (and significant) proportion of the total charges payable for on-line interrogation. Major retailers of on-line services are now a dominating part of the scene, replacing to a large extent government agencies as the "trend setters". This has resulted in a major extension of the user population, particularly in the U.S.A., and the total number of on-line connect hours in the U.S.A. and Europe is now probably at least 300.000 per annum. It seems clear, that under these circumstances, whether producers and operators are government agencies, learned institutions, or for-profit organizations, total prices to the user are bound to involve considerations of cost recovery or even of a commercial nature.

It is against this background that the concern over database price increases expressed by some sections of the STI community should be viewed.

Importance in the EURONET Context

When full first stage operational status is achieved, EURONET will be a major retailer and distributor of STI; because of its co-operative basis, its relationships with its users and service suppliers (host organizations) will essentially be of a different nature, compared with those of the major American retailers. While it is clearly impractical, if not undesirable, to control prices or conditions of access for users, some degree of harmonization in these areas may be considered appropriate. At all events, there are many different charging systems at both the data-base producer and system operator levels, and making users aware of the situation is clearly the kind of coordinating activity which is best performed at the network management level. Trends in total prices, as well as trends in the data-base price element, may also be important if it appears that beyond a certain level price is a deterrent to the expansion of use, since this could affect traffic patterns and traffic volumes, an essential pre-occupation of EURONET management.

Outside these longer-range problems of EURONET policy and development, it is also perhaps now opportune to carry out a survey of existing charging systems and levels of charging: it seems that many of the European host organizations for EURONET have not yet developed a clear pricing policy. A survey of the kind carried out in this study may therefore be of some assistance in providing these organizations with a general picture of what has happened elsewhere, and current charging systems and price mechanisms. In this connection, it may be appropriate to note that EURONET will exist in a competitive environment; it seems to be generally accepted that the major American retailers have already obtained a significant foothold in the European market for on-line services, and in spite of the heavier network charges necessitated by the transatlantic links to TYMSHARE and TELENET, it cannot be assumed that EURONET will enjoy a

monopoly position in Europe. Many of the databases available from American-based operators are not available here as yet, and some national telecommunication administrations are already tying their TYMSHARE and TELENET nodes into their domestic data transfer services. The competing U.S. retailers already have some years experience of successful operations and marketing in Europe, at a level which may not be immediately attained by many European host organizations by the start-up date for EURONET. While price of services may not be the determining factor, therefore, it will be important for the EURONET management and host operators to keep price structures under continuous review in providing effective answers to the U.S. competition for its European client base.

STUDY OBJECTIVE

The general objective is to provide factual data on charging systems and charges for the on-line use of STI data-bases, to analyze the trends in these charges, and to derive the proportion of the total charge payable by the user which is represented by the database element. The terms of reference are set out below:-

"Purpose of the Study

The study is aimed at assessing the present and near-term situation with regard to:

- charging schemes and levels currently applied by data-base producers
- the proportion of total charges payable by the user that the data base charge represents
- the procedures used to collect data base charges from the user
- the terms and conditions to which the user must agree before purchasing the data-base service.

The study is primarily meant to throw light on *current trends* in data-base charging practices. Hence special emphasis should be given to recent modifications in charges, especially where the method of calculation has changed, as opposed to the actual price level. The investigation and analysis should be undertaken with a view to providing information and guidelines for EURONET development.

Work to be Carried Out

The contractor should gather data from a representative range of data base suppliers, host operators and users, and the co-operation and viewpoints of organizations such as ICSU AB and EUSIDIC should be sought. In collecting the data required for analyzing the above-mentioned factors, the contractor should also note related factors, such as any minimum charges applied, any different approaches to levying for SDI services, off-line printing, etc."

Limitations

It should be noted that the study objectives are limited. They do not extend to analysis of the underlying reasons for price trends, still less with an examination of the effects of increasing use of data-bases in the on-line mode on the complex problems of economics of data-base production. While it is obvious that data-base producers, whether they be learned institutions or purely commercial organizations, must relate steadily rising costs in the intellectual and publishing work of creating a database with the increase of on-line access, and a possible decrease in revenue from printed versions, these questions are explicitly outside the scope of the present study. Nevertheless, it has become apparent in collecting the data for this study, that we are as yet in an early stage of database pricing policy in facing a new situation caused by the expansion of on-line services. Many of those producers interviewed during the course of the study were uncertain about the ultimate effects of on-line access on their operations; pricing policies are at the moment based less on a thoroughly worked out long-term strategy than on an ad-hoc trial-and-error basis. The data obtained in the study should therefore be used with caution, especially in inferring the longer-term trends.

Further, the situation both with respect to operator and the data-base producer charges is changing rapidly. Data collection for the study took place during the summer and early autumn of 1977, but some of the information collected was already out of date by the close of the data collection

phase. While as much follow-up action as was practicable was undertaken to check on such changes, it is inevitable that material presented in January 1978 may not reflect the true situation at that time. During the preliminary analysis of the data obtained, producers began to announce their on-line prices for 1978, and so far as possible, the prices quoted are those for 1978. One major European operator, the Space Documentation Service (SDS) of the European Space Agency reorganized its entire price structure in November; these changes have been incorporated in the report, but there can be no guarantee that all such tarification changes have been identified.

METHODOLOGY

Since it was probable that data on something approaching 100 databases might have to be collected, a pilot questionnaire approach was adopted - questionnaires were tested on a sample of European producers and operators in face-to-face interviews, followed by general issue of the revised questionnaires, and backed up by further interviews to the extent that the available time made this possible. Altogether, host operators and producers were visited in France, Italy, the United Kingdom and the U.S.A. Owing to scheduling problems it was not possible to visit Germany in the data collection phase, but this loss to the study was compensated by active assistance rendered by Frau Dipl. Chem. Ockenfeld, whose help in administering the questionnaires, and in interpretation of their results was invaluable.

From the outset, it was decided to collect data from both producers and operators, to provide a check on price data, and also because it was recognized that anything approaching a 100% response to questionnaires would be impossible; lack of a reply to a questionnaire would not necessarily be a statistically random event which could be ignored, provided the sample was large enough and reasonably homogeneous, but might be due

to the information being regarded as confidential. Consequently, it was decided to use the preliminary interview phase to discuss the study as a whole with operators and producers, particularly in the U.S.A., so that some feel could be obtained for the extent to which confidential pricing arrangements existed.

The emphasis on U.S.-produced data-bases was felt to be necessary as together with one or two Europeans, they appeared to constitute the "market leaders" in the on-line business. Nevertheless, since the study results would be examined in the EURONET context, it was decided at the outset, to try to obtain data on all the data-bases offered by host operators for the opening phases of EURONET, irrespective of country of origin. However, a relatively large number of European databases announced for EURONET are not as yet at the point at which their sponsors can contribute hard data in terms of pricing policy in an international networking environment.

Following the initial data collection phase, the existence of special arrangements with confidential prices between producers and operators was established as a factor likely to be of importance in the study. These arrangements appeared to relate particularly to U.S.-produced databases offered exclusively by U.S. producers, and it was therefore decided to extend the study to this group.

Analysis

Sophisticated methods of statistical analysis were felt to be inappropriate in this study, and in general only a simple analysis into functional categories (from the price policy point of view) was attempted. Historical data on which to base recent trends was provided for in the questionnaires, but this was supplemented by the very detailed information given in "Computer Readable Bibliographic Databases, a Directory and Data Source Book" by M. Williams and S.H. Rouse, published by the American Association for Information Science in October 1976. This document gives price data for 1975. Because of the comparatively

short on-line history of many databases, extensive time series in terms of charging rates and policies are not possible. It was hoped that the analysis could be supplemented by using pre-on-line batch processing charging rates as a base line from which to estimate the "added value" which the database producers might place on their product as a consequence of the possibility of on-line access, but this proved impracticable following a trial analysis.

Where the database price to the operator is not known, because this is confidential information, an approximate level may often be determined by reference to the access price of a zero-cost database, i.e., one for which the producer requires no cash payments. This technique and its limitations are described in Chapter IV.

CHAPTER II

THE DATABASE SAMPLE - DATA OBTAINED

OFFERS FOR EURONET

The point of departure in selecting databases for the study was the list given in document EHG/9/77, at the EURONET host information meeting on 10th January 1977, and amplified in document CIDST/306/77 of 17th June 1977. The resulting list was examined with the assistance and advice of members of the EFAG 21 working group, in order to delete any which, for one reason or another, were unlikely starters: for example, because they were as yet experimental and were after all unlikely to be available for the first phase, etc. Table 1 below lists the initial deletions at this stage.

TABLE 1

EURONET DATABASES: INITIAL EXCLUSIONS

FRG	Poisons, Experts and Institutions in Environmental Protection, IDIS (Social Medicine), Hospital Affairs, Sport Science (DIMDI), IDC databases, Astronomy and Astrophysics, Crystallography (FIZ-4), Kraftfahrwesen (FIZ-16/DKF), Zentraler Datenpool der Agrardocumentation, Deutsche Bibliographie.
France	No initial exclusions, pending more information on offers.
Italy	No initial exclusions, pending more information on offers.
U.K.	CADC Cambridge (Computer-aided design).
Commission	No Commission databases to be included, as all data is already available.

These deletions reflected the position as far as it was known, in July/August 1977; it is probable that the formulation of pricing policies will reach a point in early 1978 at which some of the excluded databases could well be re-examimed, but that is both beyond the time scale and scope of the study.

Subsequent Modification of the EURONET Sample

While the remaining databases on the original list of offers for EURONET were all the subject of enquiries, either by visits, telephone calls or questionnaires, it subsequently became necessary to modify the list still further. The general basis for this modification was the new information on the

French and Italian databases which became available from visits, and the replies from questionnaires and other inquiries in Germany and the U.K. Bearing in mind the objects of the study, to obtain information on pricing policy and price trends, it was necessary to exclude database producing organizations who as yet, had not offered an on-line service, or who had no pricing policy for on-line use. The distinction should be made here between organizations having a pricing policy, but as yet no general on-line service, and those offering an on-line service with regular price schedules. While the first group could not contribute much to the numerical part of the analysis, i.e. that concerned with the relation of total costs to the user and the database price element, they could potentially contribute to the analysis of the charging systems as such. Consequently, they are retained in the overall sample.

The results of the second round examination are given in Table 2 below:-

TABLE 2

EURONET DATABASES: EXCLUSIONS ON PRICING POLICY GROUNDS

FRG	*DECHEMA	No on-line price data
	KKF	"
France	*BIAM	"
	*CDIUPA (CERDIA)	"
	INRA databases	"
	CANCERNET	"
	PLURIDATA	"

Table 2 cont'd.

Table 2 cont'd.

Italy	Environmental Database, CNUCE Pisa	experimental
	Fine Arts, CNUCE Pisa	database under development
	Geological Database, CSATA Bari	experimental
	Geothermal Database, CNUCE Pisa	experimental
	Marc Italy	no information
	MTS Naples	experimental
	Oceanography CNUCE Pisa	experimental
	Other proposals	no information
Netherlands	*EXCERPTA MEDICA	contracts for on-line use still under negotiation
U.K.	*NCC Databases	no on-line price data
International	*AGRIS	no operator yet for on-line services
	IRRD	Management committee not yet decided on hosts.
USA	*Int.Pharm.Abstracts	no operator charges

*These databases, while not yet able to provide on-line price data, contribute information on charging systems.

INCLUSION OF ADDITIONAL U.S. DATABASES

While the original EURONET sample contained a number of U.S. databases, particularly those available from ESA, DIMDI and BLAISE, it was decided for the reasons noted in Chapter I (the "special arrangements" problem) to extend the overall sample by including as many as possible of the databases offered by Lockheed and SDC, but not available directly from operators in Europe. Accordingly, a further batch of

questionnaires was sent to database producers in the U.S.A. in respect of some 45 additional databases. Response was good (about 75% of questionnaires were returned, although not always providing full information). At the final count therefore, including U.S. databases from the original EURONET sample, inquiries were made of some 45 American databases. For some, the only information is that given by one or the other of the U.S. operators, and this will not include database royalties and other charges payable to the producer.

The final sample, by country of origin, is therefore made up as follows:

TABLE 3

FINAL SAMPLE BY COUNTRY OF ORIGIN

Belgium	-	1	(EPIC)
FRG	-	5	(DECHEMA, DOMA, IKK, Nuclear Pool, ZDE)
France	-	6	(ARIANE, BIAM, CDIUPA, PASCAL, THERMODATA, and TITUS)
Netherlands	-	1	(EXCERPTA MEDICA)
UK	-	7	(CAB, DERWENT, Library & Information Science Abstracts, INSPEC, ISMEC, MARC UK, and NCC Databases)
USA	-	55	(including US-based services which are operated independently in Europe under input exchange arrangements) - see Table 4 for details).
International	-	4	(AGRIS, Electronic Components Databank [SDS], FSTA, and INIS).
TOTAL		80	

Note: This table includes seven databases which do not contribute quantitative data to the study (see Table 2).

The sample is clearly heavily weighted towards U.S. originated databases, but this was necessary and inevitable for the purposes of the study, since it is these databases which have a longer on-line history, and for which pricing data is available, or can be deduced.

THE FINAL SAMPLE

Table 4 below lists in alphabetical order, all the databases making up the final sample for the study, with producers and operators. The operator notifications are probably not fully complete, but they represent the sources from which confirmatory data has been obtained.

The individual databases are coded thus:-

* End-user price data obtained
† Database price data to operator obtained.

No superscript - no on-line price data available yet, but non-quantitative data on charging policy or system exists.

Thus, the final sample consists of some 80 databases; for 34 of these we have data on both end-user prices and prices to the operator. Price data on end-user prices only is available on a further 39 and the remaining 7 do not contribute quantitative data, providing information on charging systems only.

It may be noted that the sample contains some examples of factual and numerical databanks, in addition to the bibliographic databases. Details on the databases considered in this study are given in Annex I. The information is mostly taken from operators' publications.

Table 4

FINAL SAMPLE - DATABASES CONTRIBUTING TO THE STUDY

	Name of Database	Producer	Operator
*	ABI/INFORM	Data Courier	Lockheed SDC BRS
*	ACCOUNTANTS INDEX	Am. Inst. C.P.A.	SDC
*	AGRICOLA (CAIN)	N.A.L.	Lockheed SDC BRS
	AGRIS	F.A.O.	
*	AMERICA: HISTORY AND LIFE	Am. Bibl. Cen.	Lockheed
*†	AIM/ARM	C. Voc. Ed. Ohio Un.	Lockheed
*	APILIT	A.P.I.	SDC
*	APIPAT	A.P.I.	SDC
*†	APTIC	E.P.A.	Lockheed
*	ARIANE	CATED	CATED
*	ART BIBLIOGRAPHIES MODERN	Am. Bibl. Cen.	Lockheed
*	ASI	Cong. I.S.	SDC
	BIAM	Banque d'Inf. automatisée s.l. Medicaments	Banque d'Inf. aut. s.l. Med.
*†	BIOSIS	B.A.	DIMDI SDS Lockheed BRS SDC
*†	CAB	C.A.B.	Lockheed SDS
*†	CANCERLINE/CANCERLIT	N.L.M.	DIMDI
*†	CANCERPROJECT	N.L.M.	DIMDI
*†	C.A. CONDENSATES	C.A.	INFOLINE SDS LOCKHEED BRS

Table 4 cont'd.

	Name of Database	Producer	Operator
	CDIUPA	CERDIA	
*†	CHEMLINE	CA/MEDLARS	BLAISE
*	CLAIMS/CHEM	I.F.I.	Lockheed
*	CLAIMS/CLASS	I.F.I.	Lockheed
*	CLAIMS/GEM	I.F.I.	Lockheed
*†	COMPENDEX	Eng. Index	Lockheed SDC SDS FIZ-4
*	CIS INDEX	Cong. I.S.	SDC
*	COMP. DISS. INDEX	U. Mic. Int.	Lockheed SDC
*	CRECORD	Capitol Serv. Inc.	SDC
*	CRIS	U.S.D.A.	Lockheed
	DECHEMA (Chem. Technik)	DECHEMA	DECHEMA
*	DERWENT	DERWENT	INFOLINE/SDC
*	DOMA	DOMA	ZDE/FIZ 4
*†	EIDB	ERDA	
*	ELECTRONIC COMPONENTS	SDS	SDS
*†	ENERGYLINE	E.I.C.	SDC SDS
*	ENVIROBIB/EPB On-line	Env. St. Inst.	Lockheed
*†	ENVIRONMENTAL SCIENCE INDEX (ENVIROLINE)	E.I.C.	Lockheed SDS
*†	EPIC	Belg.Min.Econ.Aff.	
*†	ERIC	N.I.E.	Lockheed SDC BRS
*†	EXCEPT. CHILD ED. RESOURCES	Counc. Except.Children	Lockheed
	EXCERPTA MEDICA	EXCERPTA MEDICA	
*	FOUNDATION DIRECTORY	Foundat. Center	Lockheed
*	FOUNDATION GRANTS INDEX	Foundat. Center	Lockheed

Table 4 cont'd.

	Name of Database	Producer	Operator
*†	FSTA	IFIS	Lockheed SDC ZMD
*†	GEOREF	Am. Geol. Inst.	SDC
*	GRANTS	Oryx Press	SDC
*	HISTORICAL ABSTRACTS	Am. Bibl. Cen.	Lockheed
*	IKK	FIZ 4	FIZ 4
*†	INSPEC	IEE	Lockheed SDC SDS INFOLINE BRS FIZ 4
*†	INIS	IAEA	C.T.I. of Belg. Min. of Econ.Aff.
	INT. PHARM. ABSTRACTS	Am. Soc. Hosp. Pharm.	
*†	ISMEC	IEE	SDS/Lockheed
*	LANGUAGE & LANGUAGE BEHAVIOUR ABSTRACTS	Soc. Abstracts	Lockheed
*	LIBCON E & F	SDC	SDC
*	LIBRARY and INFORMATION SCIENCE ABSTRACTS	Libr. Assoc. England	SDC
*	MARC U.K.	Brit. Library	BLAISE
*†	MEDLARS	N.L.M.	DIMDI/BLAISE BRS
*†	METADEX	Metals Abstracts	Lockheed SDS
*	METEOROLOGICAL and GEOPHYSICAL ABSTRACTS	Am. Met. Soc. & NOAA	Lockheed
	NCC Databases	NCC Manchester	NCC Manchester
*	NICEM	Nat. Inf. Cent. Educ. Media	Lockheed
*†	NTIS	NTIS	Lockheed SDC SDS BRS FIZ 4
*	NUCLEAR POOL	FIZ 4	FIZ 4
*†	OCEANIC ABSTRACTS	Data Courier	Lockheed SDS

Table 4 cont'd.

	Name of Database	Producer	Operator
*†	PAPERCHEM	Inst. Paper Chem	SDC
*†	PASCAL	CNRS	SDS
*	P/E News	API	SDC
*†	Pollution Abstracts	Data Courier Inc.	Lockheed SDC SDS BRS
*	Pharm. News Index	Data Courier	Lockheed SDC BRS
*	PREDICASTS	PREDICASTS	Lockheed
*†	PSYCHOLOGICAL ABSTRACTS	Am. Psych. Ass.	Lockheed SDC ZMD DIMDI BRS
*†	SCIENCE CITATION INDEX	ISI	Lockheed DIMDI SDS
*	SOCIOLOGICAL ABSTRACT	Soc. Abstracts	Lockheed
*	SSIE	Smithsonian Sc.Int.Exch.	SDC
*	STAR/IAA	NASA	SDS
*†	THERMODYNAMIC DATA	Thermodata Grenoble	Thermodata Grenoble
*†	TITUS	Institut Textile	Institut Textile ZTDI SDC
*†	TOXLINE	NLM	DIMDI BLAISE
*	TULSA	Univ. Tulsa	SDC
*†	World Aluminium Abstr.	WAA	SDS LOCKHEED
*	ZDE (Electrotechnik)	ZDE	ZDE

* End-user price data obtained

† Dataprice data to operator obtained.

No superscript - no on-line price data available yet, but non-quantitative data on charging policy or system exists.

DATA OBTAINED

The price data obtained is presented in tabular form in Annex II. While these data will form the basis of detailed analysis in Chapters III and IV, some more general points are briefly discussed in this section.

Sources

Questionnaires and interviews were structured slightly differently for database producers who did not themselves operate their own databases, those who were both producers and operators, and for systems operators running databases obtained from producers. Prices paid by end-users were obtained directly from systems operators, but prices (license/lease fees, royalties etc.) required from operators by producers were sought from both operators and producers, in order to get the most complete information possible. In some cases as was expected, either the producer or the operator expressed a certain sensitivity about these payments and therefore the source of data on prices to operators is not specifically disclosed in this report. End-user prices for the same database may vary from operator to operator, and all such variations are noted in Annex II.

Producer/Operators

From one point of view, organizations who both produce and operate a database might be expected to have the best overall view of the price-cost relationships involved in both areas of charging policy. For this reason producer-operator organisations were asked what their charges would be to another operator should they make their database available for use by other user groups in this way: they were also asked to give their best estimate of the percentage of their own charges to users which they considered should be allocated to the costs of producing the database.

Unfortunately there are rather few producer/operators in the sample: DOMA and ZDE were able to give information on the charges they would apply to other operators; BLAISE and FIZ 4 have a single access price for all the databases they offer, whether their own or imported, and were thus clearly unable to make any division of the price charged for their own databases. SDS are both the producer and operator of the Electronic Components Databank, but this has only recently reached full on-line operational status. While an on-line price per connect-hour exists, the SDS management considers this as unrealistic: an entirely different tarification system is required where an enquiry may be precisely answered in a few minutes' interrogation.

It is concluded therefore that no particular insights can be gained by more detailed study of producer-operator data in present circumstances.

Some Anomalies

It will be noted that there are a number of cases in the sample in which the database has no price attached to it by the producer. The majority of these involve exchange agreements to provide input, the whole database (or access to it) being provided free to the exchange partners, who may be subject to certain restrictions in providing an on-line service. These are identified as "no-charge" databases in the study. This does not necessarily mean, however, that the database element in on-line charges to users is nil; some operators may seek to recover their costs in providing input; some may not, and this may result in differential charges for use of the same database operated by different organisations. This problem is more fully analysed in Chapter III, but in the present context it is sufficient to note that "no charge" are not necessarily free; their user price may include hidden charges for input.

Not-for-Profit and Commercial Databases

Producers were asked to classify their operations (in the information products area) in terms of (i) input exchange arrangements, (ii) not-for-profit, or (iii) commercial for-profit. Of those responding to this question (45) about 57% (26) consider themselves not-for-profit and 28% (13) commercial. Following a trial analysis, this categorisation was abandoned as a means of analysing price levels and conditions. While, as would be expected, exchange agreement (no charge) databases were clearly the cheapest in terms of end-user prices, and some of the commercial databases were the most expensive, neither charging systems nor levels of charging among the majority of not-for-profit and commercial databases were correlated with this classification. While some fine distinctions could be drawn in terms of the relative occurence of certain elements in charging systems between the two charging policies, these are of academic interest only: from a practical point of view no useful generalizations can be made by comparing not-for-profit and commercial database production.

CHAPTER III

CHARGING SYSTEMS AND CONDITIONS OF ACCESS

HISTORICAL

To understand the present charging systems for on-line use of databases, it is necessary to go back to the early 1960's, when computers began to be extensively used in the preparation of abstract and indexing journals. Most of these operations involve the translation of worksheets in which the bibliographical and indexing information, including abstracts where these were prepared, into machine-readable form, the resulting tape being operated upon by computer programs to produce listings by category and author, etc.; these listings being subsequently converted into master pages from which the journal was printed, by a photocomposition process. At the various stages in the process of creating the printed version, there were therefore machine-readable products which could be

used for retrieval, and the governmental and institutional organisations publishing such journals often made these machine-readable products available for use by other organisations, as well as providing their own computerised retrieval service for particular sections of their clientèle. By and large, government agency tape producers did not, at this stage, offer their products for sale, but instead negotiated input exchange agreements in exchange for free copies of the database on tape, and these exchange agreements included certain restrictions on how the exchange partners could use the machine-readable database. Often, since the agency concerned would negotiate several bilateral agreements, there were geographic restrictions on the extent of services which the exchange partner could provide from the database. In other cases, the exchange partner undertook to provide service only to those organisations within his territory who provided input, or were otherwise approved by the agency owning the database itself.

At this stage, the agencies producing machine-readable databases were largely, if not exclusively, those of the U.S. government, for example, the National Library of Medicine, NASA, and AEC. They operated under policies for the free exchange of unclassified information pursued by the U.S. government, and consequently the emphasis was less on financial terms than on the promotion of a free and equal international exchange of information. To a considerable extent, such considerations still apply in the case of the U.S. government agency databases which are made available under exchange agreement conditions. However, financial considerations have begun to enter into these bilateral or multilateral arrangements in recent years; for example, the bilateral agreements which cover the provision of input to, and the use of, the MEDLARS databases now often include a commitment by the exchange partner to supply input to a value of so many thousands of dollars, rather than the former, less precise, commitment to provide input from local sources. The case of NTIS is somewhat different. NTIS is made available overseas, less on the basis

of input exchange agreements (though foreign input is sought) than on semi-commercial considerations. NTIS contains references to all new technology generated under U.S. government contracts, and its distribution, particularly overseas, is subject to a form of cost recovery policy.

The Institutional Databases

Side by side with the developments noted above, professional institutions who were publishers of abstract journals began also to make the computer-readable versions of their databases, produced as a by-product in the publication process, available for use for retrieval purposes by third parties. In most cases, however, there was not the same requirement for extending coverage by exchange agreement techniques, since information collection was already worldwide in character, and consequently, tapes were made available under leasing or purchasing arrangements. In the earlier stages, clients for such tape services were largely big industrial firms whose information departments wished to provide retrospective and SDI services for their own internal clients: or were information centres, usually government department-or university-operated who had missions to provide information to a relatively restricted user clientèle. Most such information services serving external clients operated on a part cost recovery policies, and charged for their information products. Tape services were (and probably still are) a very small part of the turnover of the institutions producing these databases, and the policy for charging for tapes seems mainly to have been one of recovering the marginal cost of producing the tape copy plus a minor contribution to overheads. The basic cost of acquisition, processing and convertion into machine-readable form was regarded as part of the production costs of preparing the printed version, and these costs were met by sale of the printed products. However, in view of the different use made of the machine-readable version by information centres serving a purely in-house clientèle, and

those offering services against repayment by outside clients, the practice grew up of charging different leasing fees in these two cases. Moreover, since a tape copy could be used to derive many or few services, these leasing arrangements have developed into licensing systems under which the receiving organisation may pay additional charges based on the number of SDI profiles run. A present-day example of such differential pricing systems is provided by COMPENDEX; in addition to the license, royalties for SDI services are payable on a sliding scale, ranging from $3.20 per profile per year for the first hundred profiles to $2.40 for each profile over 1000 profiles.

Batch and On-line Processing

The leasing charging systems developed by the institutional database producers were essentially designed to deal with batch process retrieval operations by third parties. With the advent of on-line systems, which offered far greater potential exposure of the information contained in a database, pure leasing systems were thought, by many institutional producers, to be no longer applicable to the new circumstances. Aside from the question of the greater potential exposure, it was virtually impossible to estimate the kinds of use made of the database by a large number of simultaneous on-line users; simple leasing systems were therefore replaced by a two-part royalty system plus a licensing charge payable by the systems operator. The latter corresponds approximately to the leasing or licensing payments required under the earlier charging systems, while the royalty payment per connect hour may be viewed as a charge for consulting the database, and the royalty per item printed out may be thought of as a charge for copying the relevent parts of the database. Not all institutional producers require a per item charge for printout.

It may also be noted that some institutional producers have adapted their charging systems in such a manner that they can decentralise their input collection and processing operations,

the Chemical Abstracts Service (CAS) is an example. CAS, Columbus, have reached agreements with agencies in the U.K., Germany and Japan, to provide input in exchange for distribution rights, including on-line. Although the arrangements differ in that the U.K. provides physical input, while the German agency provides cash in lieu of undertaking the actual collection and processing, both arrangements are not unlike the type of agreement which NLM makes with its foreign partners, except of course, for the financial provisions covering the local distribution rights. From the on-line users point of view, it of course makes little difference whether royalty payments go to the agency with whom CAS has an agreement in the country concerned, or whether they are paid direct to Columbus.

Commercial and Institutional Producers

In the last few years, the governmental agency and institutional database producers have been joined by commercial organisations offering machine-readable databases in areas such as economics, business information, and marketing. These organizations can be regarded as commercial publishers, the computer database being a product to be marketed as part of a range, in much the same way as financial news letter services or market analyses. Arrangements with retailers of on-line services tend to be regarded more in the light of confidential business deals than those of the institutional producers who, for the most part, have open, non-confidential contracts with systems operators. Also, exclusive rights clauses in which a particular operator has exclusive rights to exploit on-line use of the database, are more common in the case of commercial than institutional databases. Too fine distinctions should not however be drawn. In terms of charging systems, both groups require royalty payments of one kind or the other; commercial databases may cost more to the user than institutional databases, and so far as can be ascertained, commercial producers are more likely to dispense with annual lease payments, and

demand instead a straight percentage of the connect charges payable by the user.

SYSTEMS OPERATORS' CHARGING SYSTEMS*

Several widely differing types of charging systems for on-line access practised by systems operators have been identified in this study, and as some of them are virtually independent of the database price element, operator charging systems will be discussed first in this analysis. They will be dealt with in three main classifications, first, variable price database-dependent systems, second flat-rate systems independent of the database, and third, computer operations-dependent systems independent of the database. There are, in addition, a few examples of charging methods which do not fit readily into any of these categories.

Variable Price Database-dependent Systems

This type of approach to charging by the systems operator is probably the most wide-spread; it is the method adopted by Lockheed, SDC, and SDS, and several producer-operators such as the Institut Textile de France for TITUS, and THERMODATA Grenoble in charging for use of a single database. In the case of Lockheed and SDC, users are required to pay three types of charges: 1) a per connect hour access fee which includes the royalty payable to the database producer (not separately visible to the end-user), 2) a hit charge per reference printed, again with print-out royalties included but not visible in the price, and 3) a network charge if the database is accessed through TYMNET or TELENET. For the user in the United States, the network fee is separately identified and payable to the operator. For users in Europe, following new arrangements made by certain telecommunications administrations with TYMSHARE and TELENET, networking operations and

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*See also P. Vickers and J. Collins in "Financing and Pricing Policy in Europe for STID Services" (Aslib, Febr. 1977)

tariffs have been taken over by these PTT's who publish tariffs for access to databases and computer systems on the two American networks. These tariffs are usually on the basis of a fixed access charge per connect hour plus a per character charge for data passing over the network node. There may additionally be a signing-on fee, also payable to the PTT at the commencement of an access contract.

For SDS, the system employed up to the end of 1977 involved the following payments relative to access to a particular database: access fee payable to SDS, expressed in accounting units, an SDS printout charge also in accounting units, database royalties per connect hour and per item printed, expressed in U.S. dollars, and fees dependent on the mode of access, also in accounting units. These latter were embodied in the terminal rental and maintenance charges for high speed terminals, and for dial-in connections were expressed in accounting units per connect hour.

Network charges as such were not separately identified, although the dial-in surcharge could be viewed as a means of recovering part of the cost of concentrators. The reasons for this complicated system were historical. The sole advantage to the user was that unlike with the Lockheed and SDC systems, the royalties required by the database producer were clearly stated in price lists and monthly accounts. From 1st January 1978, a simplified system with a single connect-hour price and a print-out charge, both expressed in accounting units, has been adopted, though the royalties payable to the database producer will continue to be clearly identified, but not separated in the access price schedules.

The raison d'être of these variable price, database-dependent systems is that they permit the operator to show, in his scale of prices, not only the relative costs of the databases to him, but also the relative amount of his resources required to maintain, update and operate the databases. The degree to which price follows costs for different databases is however far from precise, since the operator must take into account market factors.

Flat-rate Systems Independent of the Database

In these charging systems the operator requires a single access fee per connect hour, independent of the database chosen by the user, presumably establishing this price by averaging out the costs of database operation, maintenance and updating. Where the database producer demands connect hour royalty payments, these are usually passed on to the user directly, though this may not be a universal practice. Network access and telecommunication charges are shown separately. Typical of such charging systems are BRS in the United States, BLAISE and FIZ-4 in Europe. In the case of BRS, one of the leaders in discount systems, the basic connect hour price is highly dependent on the volume of use which the subscriber makes of the service; the effect of this and other discount schemes on the end-user prices are discussed later in this chapter. Database royalties are accounted for separately in the billing procedure. BLAISE offers all its bibliographic databases at a fixed price, irrespective of costs. In the case of U.K. MARC no separate charges for creation of the database are identified, and in the case of MEDLARS, in which a U.K. input operation is involved, no specific proportion of the on-line charges to recover input costs can be identified. This operator also employs a discount scheme of a special kind, the connect hour rates varying between £20 and £25 per hour, depending on the amount the client decides to pay in advance. An advance of £1,000 is associated with a connect hour price of £20, a £100 advance with a price of £23, and no advance payment with a price of £25. Database royalties are in addition to the basic connect hour price. It may also be noted that BLAISE charges an annual subscription of £25 to all its clients, but this can be regarded as a special charge for introductory and updating training courses and regular documentation on the BLAISE system. It is understood (mid-December 1977) that BLAISE is contemplating a new charging policy.

FIZ-4 is still in the process of determining their charging policy in respect of clients outside Germany, but it seems that they will also operate on the basis of a fixed connect hour price irrespective of the database used. A figure of DM 107 per connect hour has been suggested. This may be associated with a fixed communications charge within Germany, in the form of a "package-deal" on the lines of the Bundespost's access arrangements for TYMSHARE and TELENET.

Fixed price systems are the simplest from the user's point of view since, aside from royalty payments there are no complications and he can switch from one database to another without accounting problems. However, they are only possible for small, relatively homogeneous collections where the price to the operator of each database does not vary greatly.

Computer Operations-dependent Systems

These are characterised by an attempt on the part of the operator to charge on-line users for the actual use they make of the machine; an important example is the charging system adopted by DIMDI. There are separate charges for connect time and computer operations, but the connect time charge is associated with the intellectual costs of question formulation and only applies to questions run by DIMDI staff on behalf of clients. Operating charges are divided into four elements CPU seconds, input/output operations, and two other charges approximately corresponding to hit charges in other systems (Zielinformation und Versandeinheiten). Royalty charges are added as a separate item. Hit charges are associated with "segments" of the databases, since in general, the larger databases are divided into on-line and off-line segments. DIMDI states that the average cost of a search lasting about 34 minutes is between 20 and 50 DM, the lower figure corresponding to searches of the on-line segment only. These costs do not include the connect hour price for intellectual work in running the question, nor do they include database royalties. Converting these prices into an overall connect hour fee, for

comparison with the systems previously discussed, it appears that a comparative figure might be between DM 40 and DM 100 per hour.

The EPIC system in Belgium also has a charging system dependent upon CPU use, with additional sums for connect hours and print-outs. 50% is added to cover maintenance and development expenses. The dominant part of the tariff is the cost per CPU second at BF 7.7 for off-peak hours and BF 12 per second during normal working hours. On the average, one hours' interrogation of EPIC costs about BF 1000.

Miscellaneous

The following may be noted:-

INFOLINE - charging policy not yet announced, but it is expected that it will follow a connect hour pattern. The partners in this operation being for the most part database producers, will presumably require normal royalty payments in addition to an element for operating costs.

CDIUPA - a connect hour price with print-out charges and a fee to cover maintenance and data elaboration.

DECHEMA - no on-line price policy had been determined up to October 1977, but this organisation was willing to sell copies of the database for a basic fee of DM 10,000 plus 0.5 DM per reference on the file.

DOMA - propose a monthly subscription of DM 500 plus DM 0.4 per connect minute. They are also prepared to make their database available to other operators for about 30% of the cost of input. (DM 2.5 per item).

Use of Systems Operator Data

For each of the charging systems discussed in the previous paragraphs, it is possible to obtain comparative figures of the total cost per connect hour which the user

must pay to access various databases by different systems operators. Except in the cases of U.K. MARC (BLAISE) and Nuclear Pool, all the databases offered in flat-rate price systems are also offered in the variable price systems; end-user prices from the variable price systems will be used in Chapter IV in preference to the prices charged in flat-rate systems, because this will permit database and operator's elements in the price to the user to be more accurately assessed.

DATABASE PRODUCERS' CHARGING SYSTEMS

The evolution of charging systems for on-line use of databases has been discussed in the first section of this chapter. It remains to classify these systems into convenient groupings to provide a basis for discussing prices in the next chapters. A review of the charging practices of the databases listed in Table 4 (Chapter II) suggests the following groups:-

1) No-charge databases, including those whose use is governed by exchange agreements.

2) Fixed price, non-confidential license/royalty systems.

3) Confidential business arrangements between producer and operator, involving shared connect hour charges.

4) Operator as contractor to the producer.

No-Charge Databases

These are listed in Table 5 below:-

TABLE 5

NO-CHARGE DATABASES

AIM/ARM	Exceptional Child Education Resources
AGRICOLA (CAIN)	INIS
AGRIS	MEDLARS
APTIC	NASA/IAA
EIDB	THERMODATA
ERIC	
TOTAL - 11 databases	

Of these databases, AGRIS, possibly EIDB, INIS, MEDLARS, NASA/IAA and THERMODATA are databases to which access or copies of the database itself are granted without direct payment under input etc. exchange agreements. AGRIS and INIS are made available to countries participating in these U.N. agency programs, and the INIS arrangement is that each member country is responsible for exploiting both on-line and off-line use within its own territory. In addition, the INIS management proposed to make on-line access available from their own computer to those member states wishing this service. It is also available to EEC countries under an arrangement made by the Commission with the Belgian authorities. AGRIS will be made available on-line, alongside INIS, by the IAEA in 1978, for those AGRIS participants who wish to avail themselves of this service.

EIDB, formerly produced by the Energy Research and Development Administration in the U.S.A., now the U.S. Department of Energy, is made available outside the U.S.A. under bilateral arrangements, the precise contents of which have yet to be formalised; it is understood that these may follow the same pattern as in the case of the earlier NSA database,

taking into account the ability of the partner organization to provide input. The bilateral agreements with NLM in the case of MEDLARS involve the provision of input and a certain restriction on the geographical limits within which services from the database may be offered by the exchange partner. In the case of the THERMODATA data bank, a number of laboratories interested in the thermodynamic behaviour of chemical compounds have agreed together to provide input and these have free access to the bank. On-line operations are at present confined to the central THERMODATA unit at Grenoble, who make a charge for computer operations, but no charge for the database itself.

The NASA database (STAR/IAA) is made available in Europe under an exchange agreement between NASA and ESA. Terminal users on ESANET who require access to the database are required to sign a simple form of agreement with ESA and NASA under which they undertake to provide input and report on use of the database.

Fixed Price, Non-Confidential Licensing Arrangements

The databases listed in Table 6 below clearly belong in this category.

TABLE 6

FIXED PRICE, NON-CONFIDENTIAL LICENSING ARRANGEMENTS

* ABI INFORM	DOMA
ARIANE	* ENERGY LINE
BIOSIS	* ENVIROLINE
CANCERLINE/CANCERLIT	EPIC
CA CONDENSATES	FSTA
* CHEMLINE	GEOREF
COMPENDEX	INSPEC

Table 6 cont'd.

Table 6 cont'd.

ISMEC	* Pharmaceutical News Index
METADEX	Psychological Abstracts
NTIS	* Science Citation Index
Oceanic Abstracts	* TITUS
PASCAL	* TOXLINE
T O T A L	24 databases

* indicates price published by operator, but no confirmatory data from producer.

We are left with some 40 databases which are neither no-charge, nor clearly in the fixed price non-confidential classifications. Many of these are producer operated with quite open price policies, but the producer is unable to allocate part of the total on-line charge to database production, or has not yet fully developed a pricing policy. The following belong in this class: BIAM, CDIUPA, DECHEMA, Electronic Components Databank, IKK, NCC Databases, MARC U.K., and Nuclear Pool.

Among the remainder there are some doubtful or ambiguous cases. The producers of CRIS state clearly that it is only available to government departments in the U.S. and to SSIE and therefore no price tag can be applied to it. However, it is operated commercially by Lockheed. Library and Information Science Abstracts is almost certainly non-confidential in price, but no confirmation has so far been obtained.

Sociological Abstracts is probably a similar case, but the producer replied ambiguously to questions on this point. LIBCON E & F has been sold by the original producer to SDC, the operator; no reply has been received to an inquiry about the estimated percentage of the database element in SDC's prices. EXCERPTA MEDICA is in process of finalising its contracts for on-line use of its two databases, and at this point can contribute no useful information on the database price element in on-line costs. It would appear that the conditions under which the EXCERPTA MEDICA databases are made available for on-line use are more of a straightforward commercial nature than on a published royalty basis.

Possible Confidential Arrangements

It was not possible to positively identify all confidential arrangements in respect of database prices, even though the second batch of questionnaires was dispatched in early October, and reminders sent if the reply had not been received within one month. Some eventual replies were ambiguous and follow-up letters were not always answered. However, it is possible to make an estimate of the probable extent of these confidential arrangements by reference to two factors: first, it was positively stated during the interviews of database operators that "exclusive" in the publicity material meant in fact, a confidential arrangement to divide on-line charges between producer and operator. Second, we know that several databases offered by the U.S. producers are no-charge databases, and therefore their on-line price per connect hour can to a first approximation be regarded as the base price of their operation. As will be shown in the next chapter, this can be verified numerically by comparison with SDS, whose charging mechanisms are more transparent. Based on such calculations, approximate royalty levels paid by the systems operator can be determined in the cases of the suspected confidential arrangements. In one or two confidential cases, the percentage of the total on-line price required by the producer is known. These percentages are significantly higher than for non-confidential

databases. Therefore by reference to the estimated base price associated with a particular operator, a percentage of the total price equal to or greater than that in the known "confidential" cases, probably indicates a confidential arrangement.
Table 7 below lists those databases for which confidential arrangements have either been firmly established, or can be inferred on these grounds.

TABLE 7

POSSIBLE CONFIDENTIAL BUSINESS ARRANGEMENTS

Database	Remarks
Accountants Index	No reply. SDC "Exclusive"
APILIT) APIPAT)	Ambiguous reply. SDC "Exclusive"
ASI	No reply. SDC "Exclusive"
CAB	Stated to be confidential by producer
CLAIMS CHEM) " CLASS) " GEM)	Stated to be confidential by producer
CIS INDEX	No reply. "SDC Exclusive"
COMP.DISS.INDEX	Producer states "special arrangements"
CRECORD	Producer states "by negotiation". SDC "Exclusive".
ENVIROBIB/EPB on-line	Stated to be confidential by producer
FOUNDATION DIRECTORY) " GRANTS INDEX)	Stated as confidential by producer

Table 7 cont'd.

Table 7 cont'd.

Database	Remarks
GRANTS	No reply. SDC "Exclusive"
Historical Abstracts) America: History and Life) Art Bibl. Modern)	Confirmed as confidential by producer
Language and Language Behaviour Abstracts	Exclusive to Lockheed. Ambiguous reply, but connect hour price at medium level.
Meteorological and Geoastrophysical Abstracts	Producer states subject to negotiation, but Lockheed price at medium level.
NICEM	Ambiguous reply, but high Lockheed price.
PAPERCHEM	Stated as confidential by producer.
P/E News	No reply. SDC "Exclusive"
PREDICASTS	No reply. High Lockheed price
SOCIOLOGICAL ABSTRACTS	See above note. Exclusive to Lockheed but medium price level.
SSIE	No reply. SDC "Exclusive". High price.
TULSA	No reply. SDC "Exclusive". High price.
T O T A L	27 databases of which 13 are confirmed as confidential arrangements, 11 are highly probable and three doubtful.

Operator as Contractor to Database Producer

One case of this kind has clearly been established: it is that of DERWENT. The producer of this database places a contract with an on-line retailer (SDC, presumably to be followed by a similar contract with INFOLINE), under which the price to the end-user is set by the database producer, who controls all access, and undertakes all billing and invoicing procedures himself. The system operator is a contractor to DERWENT,

undertaking all necessary operations to make the database available for on-line use, but having no responsibility himself for setting prices, or for collecting the proceeds for use of the database. The exact details of the contractual relationship are not published. The producer offers several options at different prices, depending on the extent to which the user subscribes to the printed version of the various component parts of the database itself. It may be that this is not the only arrangement of this kind, but it is the only one that is publically acknowledged.

Other Elements in Operator/Producer Business Arrangements

Aside from the three broad types of business arrangements between operator and producer, and the terms under which no-charge databases are made available to an operator, a few more detailed points may be noted. Not all the "confidential" arrangements seem to be equally regarded by both producers and operators, and there are a number of cases in which royalty payments openly published by one operator are at variance with figures obtained from another. Most of these relate to royalty levels published by BRS: a possible reason for the discrepancy is the addition of averaged figures for print-out, to simplify accounting. Aside from these cases, all producers in the two categories whose databases are available through more than one operator apply the same royalty levels to all, as would be expected.

One or two cases of producers requiring a minimum guarantee have been noted, and it is possible that in these cases operators may be treated differently: the minimum guarantee clauses seem to be regarded as negotiable by some producers.

DISCOUNT SYSTEMS

The effects of the charging systems discussed in this chapter on the prices paid by the end-user may be considerably

modified by discount schemes introduced by the operator, which are primarily designed to promote increased use of the databases. Differential price schemes such as that operated by BLAISE could also be regarded as a type of discount, but in this case the object is probably more to increase cash flow than directly to promote increased use. Nevertheless, some of the options offered by the major operators having extensive discount schemes have features in common with BLAISE, i.e., lower unit prices for higher subscription payments.

While most of the major operators have offered some kind of discount for high volume users, the present systems can be said to have originated in consequence of the entry of BRS into the on-line market. From the outset, BRS offered several discount options, starting at very low levels of use, and including group discounts. Coupled with low unit prices, this had an immediate effect in enabling them to secure a satisfactory share of the market, even though the files available were not so numerous as those of their competitors, and only provided recent material rather than on-line access to substantial back-files. Other operators have since extended their discount schemes to meet the new challenge.

Before the present schemes are examined in detail, mention should be made of another important element in discount policy, the free service given on signature of a contract.

Discounts on Signature of Service Contracts

The object of these offers are to provide new users with an opportunity of familiarizing themselves with systems and databases at little or no cost. The following are the main features:-

Lockheed: on signature of the contract Lockheed offers two hours free connect time per database (communication charges and off-line printing costs are excluded.)

SDC Identical with the Lockheed offer.

SDS offers approximately $ 90 reduction, upon signature of a contract, which will be deducted from the first bill. The credit cannot be carried over to the second month's account.

BRS holds an initial session of at least one day for all new users (on user's site or on a selected site). Further search workshops take place throughout the year.

Previous Studies

Discount options of the major operators were extensively described and contrasted by J. Soreille, of the Bibliothèque Royale, Brussels, issued as ESA/DAG (77) 16 in May 1977. Since that date SDS has announced a major revision of its discount policy, and this has changed the situation considerably. Nevertheless the Soreille study remains a key paper in reviewing the effects of discount schemes on total end-user prices, including elements relating to print-out charges and communication charges. The following summary treatment follows that of the earlier paper, taking into account changes announced by SDS for 1978.

The Lockheed Options

Lockheed's first option is dependent on the connect-hours accumulated over a month. It results in a simple cash rebate on the monthly bills, increasing with hours used, as shown in Table 8 below.

TABLE 8

DISCOUNTS - LOCKHEED FIRST OPTION

Total hours/month	Discount/hour
0 - 4.99	0 $
5 - 9.99	5 $
10 - 19.99	9 $
20 - 39.99	12 $
40 - 79.99	14 $
80 -	15 $

The Second Lockheed Option is on a cash reduction per hour billed basis, associated with various levels of expenditure per month guaranteed by the user. The higher the amount guaranteed per month by the user, the greater the per-hour discount. Moreover, the hourly discount rate is broken down into segments, the higher segments attracting a higher discount rate than the lower, as shown in Table 9 below:-

TABLE 9

DISCOUNTS - LOCKHEED SECOND OPTION

Total connection time	Minimum amounts billed				
	200 $	400 $	800 $	1600 $	3200 $
	Discount per hour billed				
from 0.00 h to 4.99 h	5 $				
from 5.00 h to 9.99 h		9 $	12 $		
from 10.00 h to 19.99 h	9 $			14 $	
from 20.00 h to 39.99 h	12 $	12 $			15 $
from 40.00 h to 79.99 h	14 $	14 $	14 $		
+ 80.00 h	15 $	15 $	15 $	15 $	

Example: when a customer committed to a monthly minimum of 400 $ attains 26 h of connection he is entitled to a reduction of 252 $, broken down as follows:

20 hours at	9 $	=	180 $
6 hours at	12 $	=	72 $
			252 $

The Third Lockheed Option applies to group contracts. It is basically the same as the second option, but with different ranges. A group gets multiples of five passwords, for each level guaranteed. The ranges are the following:

TABLE 10

LOCKHEED GROUP DISCOUNTS

Hours billed per month	Guaranteed Monthly Minimum				
	$500	$1000	$2000	$4000	$8000
	Discount per hour billed				
0 - 49	$5				
50 - 99	9	$9			
100 - 199	12	12	$12		
200 - 399	14	14	14	$14	
400 -	15	15	15	15	$15

SDC Single Option

The discount is proportional to the number of connect-hours accumulated over a month. Some points in the continuous discount function are as follows:

TABLE 11

SDC DISCOUNT SCHEME

Hours/month	Total Discount	Average Discount/hour
0 - 4.9	0	0
10	$ 26	$ 2.6
20	96.74	4.84
30	188	6.27
40	294	7.35
50	410.14	8.2
.	.	.
.	.	.
90	864.95	9.61

SDS

The discount scheme offered by SDS up to the end of 1977 was mainly based (for historical reasons) on the use of the service by documentation centres serving external clients by high-speed terminals. It was not therefore helpful to the increasingly large number of users operating low-speed terminals with dialled connections to ESANET nodes, who had different usage patterns. The 1978 scheme is designed to rectify this, and is based on a simple cash rebate per hour of connect time, increasing with the number of hours used, as in the first option offered by Lockheed. The slightly less favourable position of high volume users operating high-speed terminals as compared with the earlier scheme is offset by other reductions, e.g., in terminal rental and maintenance costs.

TABLE 12

SDS DISCOUNT SCHEME

Hours/month	Rebate/hour
0 - 4.9	$ 0
5 - 14.9	6.54
15 - 29.9	10.9
30 - 49.9	13.08
45 -	15.26

BRS Options

There are three different options for accessing BRS:-

BRS First Option. Hourly contract access, which guarantees a minimum number of access hours per month. If more hours are used, the next lower rate will apply for the surplus, etc.

TABLE 13 A

DISCOUNTS: BRS FIRST OPTION

Minimum hours/month	Cost/hour
5	$25
10	20
20	16
40	13

(The hourly costs do not include communication charges, royalties and off-line printed references).
The prices per hour may be converted into cash rebates for comparison with other operators' schemes, as follows:-

TABLE 13 B

BRS FIRST OPTION REBATES

Hours/month	Rebate/hour
0 - 9.9	$ 0
10 - 19.9	5
20 - 39.9	9
40 -	12

BRS Second Option (Annual Subscription Access). This is similar to the first option, but the user guarantees a minimum number of hours per year. The surplus is handled differently: it is charged in the same way as the required minimum (corresponding to the subscription rate).

TABLE 14 A

DISCOUNTS UNDER BRS ANNUAL SUBSCRIPTION OPTION

Annual Connect Hours	Subscription Price	Cost/hour
60	$ 1500	$ 25
120	2400	20
240	3800	15.83
480	6000	12.50

Five passwords may be used simultaneously and thus a higher discount might be achieved by pooling several users to one bill. Translating this to hourly discounts we obtain:

TABLE 14 B

BRS REBATES: ANNUAL SUBSCRIPTION OPTION

Hours/year	Hours/month	Discount/hour
0 - 119.9	0 - 9.9	$ 0
120 - 239.9	10 - 19.9	5
240 - 479.9	20 - 39.9	9.17
480 -	40 -	12.50

BRS Group Membership Access: In this option a minimum of 160 hour/month must be guaranteed.

Note: The MEDLARS database is available for $10/connect hour, regardless the number of hours accessed.

Comparison

In order to compare the Lockheed second and third discount schemes with those offered by the other distributors, the commitment limits for the discount applications ($200, $400, ...) were divided by the average hourly cost of a Lockheed database. The corresponding connect hours are then:

TABLE 15

LOCKHEED SECOND AND THIRD OPTIONS: AVERAGE COMMITMENT

	Monthly Commitment	hours/month
Single User		
	$ 200	3
	$ 400	6
	$ 800	12
	$ 1600	24
	$ 3200	48

Table 15 cont'd.

Table 15 cont'd.:

Monthly Commitment	hours/month
Group Discount	
$ 500	7.5
$ 1000	15
$ 2000	30
$ 4000	60
$ 8000	120

If one assumes that a user is able to estimate accurately his monthly use, he can always stay at the maximum possible discount level. The resulting values for Lockheed are plotted in Figure 1.

The BRS tariffs were recalculated to give hourly discount at different levels, dependent upon the starting point. Lockheed offers two discount methods, a continuous function (first option) and a step function (second and third options). SDS has a continuous discount function, which is slightly better, in terms of higher discount rates than Lockheed. Its plateau is $15.26/hour discount, that of Lockheed is at $15. SDC has also a continuous function, but its plateau is at $10.5. It is worse than Lockheed and SDS at any level of use. The discount scheme of BRS is somewhat more complicated, as it depends very much on the commitment incurred, which must be maintained for the next six months; the same is true for Lockheed who offer either six-monthly or yearly contracts under their subscription options. A BRS user who is quite unable to estimate the level of his requirements is on the least advantageous discount curve. The minimum commitment is five hours per month. On a monthly commitment basis the different discount curves for BRS are rather close together at the 200 hours level and higher.

If one considers the yearly commitments, the discount is the same for each hour, starting from a minimum usage which will always be billed. If one divides the commited hours by the number of possible passwords, the BRS discounts are very advantageous at a lower level (5 - 40 hours/month). From 110 hours/month onwards they all are worse than Lockheed (all three options) and SDS. One advantage of the yearly commitment must be stressed, and that is the possibility to use up the hours in a much more flexible way (within one year) than in the cases of SDS, Lockheed and SDC, who require monthly minima.

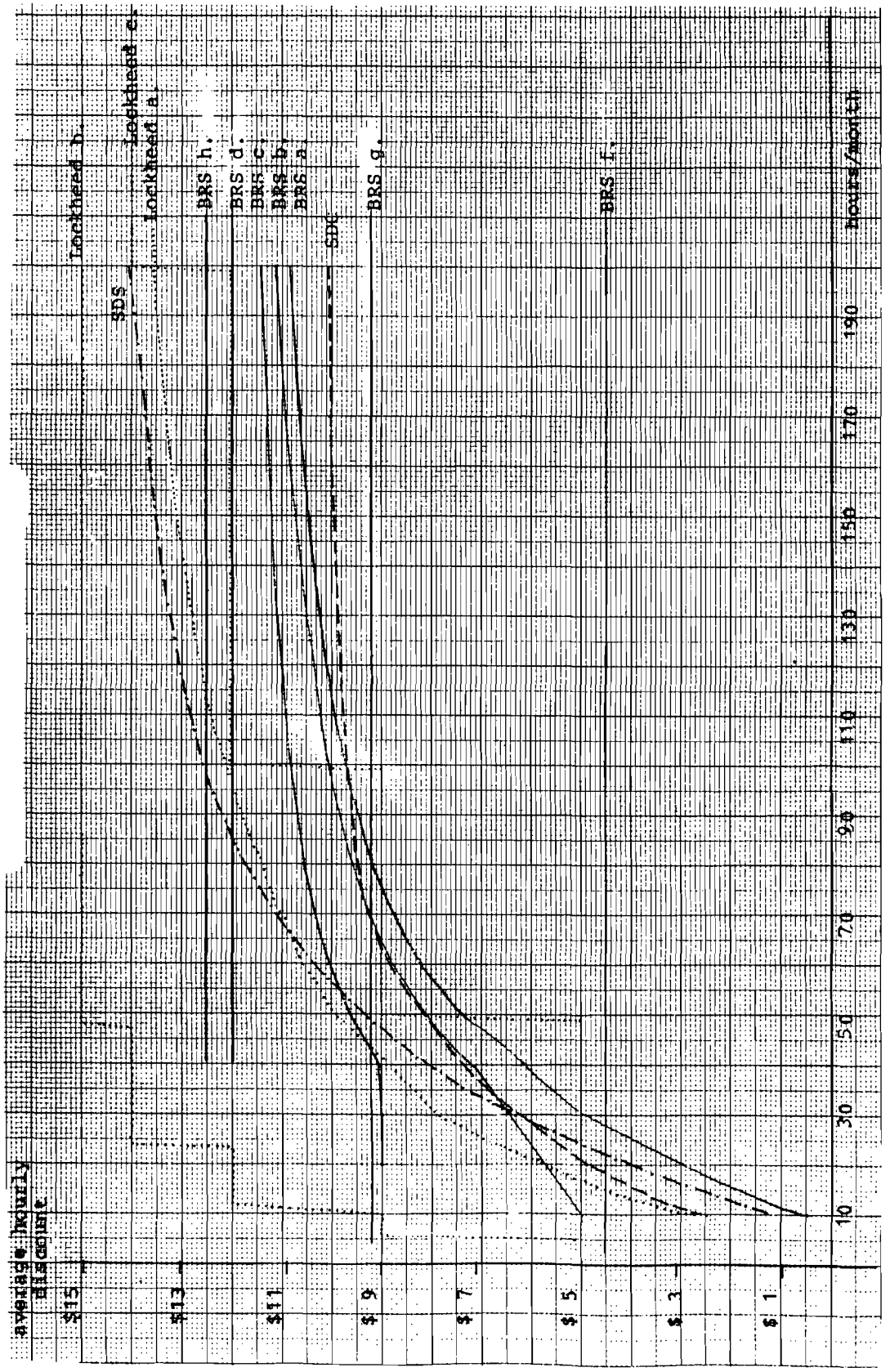
The effect of the various discount schemes is plotted in Figure 1 on the opposite page. The various curves are as follows:-

Lockheed a. - Normal hourly basis
Lockheed b. - Minimum guarantee
Lockheed c. - Group discount, minimum guarantee.

BRS a. - Hourly contract/month, minimum 5 hours/month
BRS b. - " " " " 10 " "
BRS c. - " " " " 20 " "
BRS d. - " " " " 40 " "
BRS f. - Hourly contract/year, minimum 120 hours/year
BRS g. - " " " " 240 " "
BRS h. - " " " " 480 " "

FIGURE 1

COMPARISON OF DISCOUNT SCHEMES



Comparison of Systems in Terms of End-user Prices

For this purpose, databases offered by three out of the four major suppliers have been covered. In Table 16 below royalties and access charges have been recorded separately, since while BRS does not include royalty payments in the prices to which discount applies, the other three operators apply discount rates to the total access price including royalties. The maximum hourly discount rate has been chosen from the best option for each distributor.

Averaging on the listed databases, BRS has the most advantageous offers, specially as the discount rate applies from very low usage (in the subscription access). As noted above however, BRS offers rather few databases, without substantial backfiles. The next best offer in general is that of SDS, followed by Lockheed: the latter however offers more databases.

TABLE 16

COMPARISON OF DISCOUNTED ACCESS PRICES FOR COMMON DATABASES

Database	Royalties	1 hour royalty & access				1 hr.roy.& access - max.discount			
		Lock	SDC	SDS	BRS	Lock	SDC	SDS	BRS
	$	$	$	$	$	$	$	$	$
ABI/INFORM	30.0	65.0	65.0	-	55.0	50.0	54.50	-	42.50
AGRICOLA	-	25.0	35.0	-	25.0	10.0	24.50	-	12.50
CHEMCON	4	35.0	60.0	37.27	29.0	20.0	49.50	22.01	16.50
COMPENDEX	10	65.0	65.0	45.18	-	50.0	54.50	29.92	-
INSPEC	15.0	45.0	-	44.05	40.0	30.0	-	28.79	27.50
NTIS	12	45.0	45.0	40.68	37.0	30.0	34.50	25.42	24.50
BIOSIS	15.0	40.0	65.0	44.05	40.0	25.0	54.50	28.79	27.50
POLLUTION	30(10)	65.0	65.0	51.98	55.0	50.0	54.50	36.72	42.50
ERIC	-	25.0	35.0	-	25.0	10.0	24.50	-	12.50
PHARM.NEW.I.	30.0	65.0	65.0	-	55.0	50.0	54.50	-	42.50
AVERAGE		47.50	55.55	43.87	40.11	32.50	45.05	28.61	27.61
MAXIMAL DISCOUNT		15.0	10.5	15.26	12.50				

Summary, Effects of Discounts on End-user Prices

If we average the database prices over all the databases for which discounts apply, and assume maximum possible discount rates, then for Lockheed users connect hour rates are reduced by 25%, for SDC users by 13%, for SDS users by 33% and for BRS users by 32%. A more realistic comparison is given if we take into account only those databases operated by at least three of the major operators. The maximum possible discount is then for Lockheed 32%, for SDC 19%, for SDS 35%, and for BRS 31%. The difference may be accounted for by the fact that databases operated by at least three operators are more likely to be popular, attracting high usage rates; the higher percentage discounts are more a reflection of lower connect-hour prices, probably more competitively calculated, than a function of the discount schemes themselves. However, maximum discount rates only apply to very high levels of usage, i.e. about 400 hours per month which is clearly unattainable, except on multi-password contracts.

A more realistic intensive-use level of utilisation might be 120 hours per month, appropriate to a documentation centre running questions for clients at a total of 6 connect-hours per working day. For SDC and SDS the percentage discount is than 18% and 30% averaged over the popular databases (i.e. those operated by at least three of the major operators). For Lockheed and BRS the percentage discount depends on the form of contract; for Lockheed the rates are either 27% or 32% (see Lockheed First and Second Options, Tables 8 and 9). For BRS the rates are 25% or 31% of the basic connect hour price, again depending on whether the contract is with guaranteed annual minimum usage or otherwise (see Tables 13B, 14A and 14B). For the small but regular user, 20 hours/month, Lockheed offers a favourable discount if this degree of utilisation can be guaranteed: 25%, if not, 12%. SDC and SDS provide discounts of 9% and 15% of the connect-hour price, without guaranteed minima. For BRS, only the worst option is open to this class of user, who obtains a discount of 7%, the more

favourable rates, on a subscription basis are only available for users who guarantee an average utilisation of 40 hours per month.

It must however be stressed that these summary discount rates only apply to connect hour charges. Off-line prints and communication charges are excluded. For users of US systems in Europe communication charges might amount to 100% or more of the undiscounted connect charges, and therefore the price reductions offered by discount schemes are not so attractive in terms of the total the user must pay, as they would seem from the foregoing discussion. The effect of communication charges and print-out charges are more fully discussed in the following chapter.

CHAPTER IV

THE DATABASE ELEMENT IN THE PRICE TO THE USER

PRICE ELEMENTS

The price a user has to pay in order to access a database is composed of three main elements:-

a) Communication charges (from the user's site to the database operator's site)

b) Database charges (mostly in the form of royalties, tape leasing charges or licensing fees)

c) Operating charges (handling of the database at the operator's site).

In this chapter, these three elements will be analysed in order to see how they influence the price structure of database costs for the end-user.

Communication Charges

The costs to access the distributor's site of a database are distance- and geography-dependent, therefore they were not included in the analysis. If we had included them, the results would neither have been general enough, nor applicable to other countries (continents). On the other hand, taking into account all possible tariffs would not have been practicable. But a few important figures can be given.

- It is possible to access the SDS database via the SDS network. The communication charges are as follows:

dial up at 300 bps	$22/hour
dial up at 1200 bps	$26.50/hour
leased at 2400 bps	$29/hour

- TELENET charges $5 per connect-hour in the US, Canada and Mexico; TYMNET users in those countries pay $8 per connect-hour. They are also accessible in some European countries. The tariffs are:-

FRG:	$23.68	(DM 54) / connect hour
	$ 0.63	(DM 1.50) / 1000 characters transmitted
France:	$23.76	(Fr 108) / connect hour
	$ 0.55	(Fr 2.5) / 1000 characters transmitted
	$393	(Fr 1800) / year subscription fee
UK:	$11.25	(£ 6.6) / connect hour
	$ 0.51	(£ 0.3) / 1000 characters transmitted
	$ 8.85	(£ 5) / 3 months subscription fee
Belgium:	$14	(BF 480) / connect hour
	$ 0.70	(BF 24) / 1000 characters transmitted
	$26	(BF 900) / month subscription fee

Netherlands:	$10.50	(Fl 25) / connect hour
	$ 0.52	(Fl 1.25) / 1000 characters transmitted
Switzerland:	$24	(SFr 60) / connect hour
	$ 0.52	(SFr 1.30) / 1000 characters transmitted
Austria*:	$45	(AS 720) / connect hour
	$ 0.63	(AS 10) / 1000 characters transmitted
	$ 6.25	(AS 100) / month subscription fee

*probable prices from 1st March 1978 onwards, when the service will start.

The number of characters transmitted per hour are typically 15000-30000 (on a 300 bps terminal). The local line costs to a node may have to be added to the Telenet fees in Belgium, Netherlands and U.K.

Another reason for not including the communication costs in the analysis was that they are operator independent and do not influence the other elements.

Database Charges

The database costs (licence fees, royalties etc.) which the operator pays to the producer are in some shape or form passed on to the end-user. Some operators split their bills very clearly into database costs (royalties), operating costs, etc., as for example BRS.

Operating Charges

It is difficult to determine the handling costs of a database. Some operators list each separate function of the operating cost and its price (CPU seconds, I/O operations, core memory, etc), such as DIMDI. But the disadvantage of this method is the difficulty of determining the hourly

operation cost for each database from that operator, without a broad enough experience of the interaction between retrieval system and database. In most cases such a detailed division is not attempted and an estimate of the operational costs must be made by other methods.

For Lockheed, SDC, BRS and SDS the price to the user of "no charge" databases was taken as the "base price", representing the pure operating cost for that operator. This assumption could be challenged on two main grounds. First, some databases may be more expensive to operate than others (more storage or more complex software); second, overheads and any profit elements may not be evenly distributed over all files operated.

It is clear that prices per database reflect actual costs only indirectly: operators do not employ carefully balanced cost-accounting methods in arriving at access prices. As a first approximation, however, the concept that the relative prices of a no-charge database, as compared with prices of other databases, is a valid measure of the operator's "base price", seems not incorrect.

The following Table 17 shows operator, no-charge database and connect hour charge (operation cost):-

TABLE 17

OPERATOR'S ASSUMED BASE COST

Operator	Database	Connect hour charge
BRS	any	$ 25
Lockheed	ERIC	$ 25
	ECER	$ 25
SDC	ERIC	$ 35
SDS	STAR/NASA	$ 28

Print Charges

This element in charges to the user, while not strictly a charge for on-line access to a database, requires special mention here; the cost of printing references selected as the result of a search could have a substantial influence on the total cost per search. Print charges are composed of charges representing the costs of the batch-mode computer operation, including overheads such as mailing, plus in many cases a royalty element for the database producer. Total print-out charges of $0.10 per reference are not uncommon, and may be as much as $0.30 per reference.

The general impact of these charges is directly dependent on the number of references printed out as the result of an hour's searching: one study carried out at the Bibliotheque Royale, Brussels (reported by J. Soreille in ESA/DAG(77)16, May 1977), suggests that the average number of references for which prints are required per hour of searching was 300, based on a ten-month survey. Intuitively, this figure seems high: much may depend on the type of query, the role of the intermediary, etc.: the subject requires further study. For the present, it may be noted that if the Belgian figures are typical, the cost of an hour's interrogation could be increased by about $30 - $90, depending on the database. The effect on the split of total charges between operator and producer will be discussed later in this chapter.

ANALYSIS OF COST COMPONENTS BY DATABASE CLASS

In Chapter I a sample consisting of some 80 databases was derived as the basis for the study (see Table 4). For seven of these no price data was available, for example, because there was no regular on-line price as yet. The databases on which some form of price data was available were classified into four main categories (see Chapter III) as follows:

- no charge
- fixed price, published royalties/license fees
- confidential business arrangements

- operator as contractor to producer.

In this section we discuss the available price data on each category from the point of view of the price components noted in the previous paragraphs.

NO-CHARGE DATABASES

The producer charges neither royalties nor lease/license fees. The connect hour price for the several distributors can be considered as the base price to a first approximation, as discussed earlier. There were 11 databases in this category, but two of them (AGRIS and EIDB) were not available on-line on a regular basis; a third, INIS, is operated by Belgium on behalf of the Commission under terms which it is understood, will shortly be revised. Prices etc. for the remainder are listed in Table 18 below.

TABLE 18

NO-CHARGE DATABASE PRICES

Database	Operator	Charge per Connect hour
AIM/ARM	Lockheed	$25
ERIC	Lockheed	$25
	SDC	$35
	BRS	$25
Exc. Child Ed. Res.	Lockheed	$25
INIS	Belgium	$62.50
MEDLARS	DIMDI	$17.50
	BLAISE	$45 - $36
STAR/IAA (NASA)	SDS	$28
Thermodynamic Data	Thermodata Grenoble	$51
AGRICOLA	Lockheed	$25
	SDC	$35
	BRS	$25

FIXED PUBLISHED PRICE DATABASES

Royalties per connect hour and off-line printed reference, leasing or licencing fees are available on request from the producers or are openly published by the operator(s), for the 27 databases in this class, Table 19 lists these data for each database and operator; royalties are per connect hour and per off-line print (where available) and licence etc. fees are for the current year only, in order to facilitate comparison between databases.

Licence fees often constitute a substantial sum which must be included along with royalties in the return to the producer: they should ideally be spread over the total usage of the database for each operator. Operating statistics of this kind are not available from the U.S. operators, but we know that SDS (with about 20 databases) has a total usage of about 20,000 connect-hours per year: assuming an average utilisation rate of 1000 hours of each database per year, which is of course inaccurate, we can obtain a very approximate figure for the licence fee element per connect-hour for this operator.

Although no firm evidence is available for Lockheed and SDC utilisation rates per year, it is thought that they might be of the order of 120,000 hours and 60,000 hours per year respectively, and these figures were used to derive the licence fee element per connect hour for these two operators. Column e in Table 19 shows the sum of all known price elements (excluding off-line): column f shows the connect hour charges, not necessarily the same for different operators offering the same database.

Column g gives the quotient between the connect-hour prices and approximate hourly cost calculated on the rough-and-ready assumptions described above. This quotient gives an indication of the revenue achieved by the different operators; this price/cost factor will also be used in subsequent calculations.

TABLE 19

PRICE ANALYSIS OF FIXED PUBLISHED PRICE DATABASES IN US DOLLARS

NAME OF DATABASE	OPERATOR	*a* Royalty/ hour	*b* Royalty/ off-line reference	*c* License etc. fee	*d* Base cost/ hour	*e* *a+c+d* per hour	*f* connect hour charge/ hour	*g* *f* divided by *e*	*h* $\frac{a+c}{f} \cdot 100$	*i* $\frac{a}{f} \cdot 100$
* ABI/INFORM	Lockheed	30	?	?	25	-	65			
	SDC				35		65			
	BRS									
*† APTIC	Lockheed	-	-	1800	25	25.70	35	1.36		
* ARIANE	CATED						100			
*† BIOSIS	DIMDI									
	SDS				28	46.78	44	0.94	42	34
	Lockheed	15	0.025	3540	25	41.38	45	1.09	36	33
	SDC				35	52.66	65	1.23	27	23
	BRS									
* CANCERLINE	DIMDI	—								
* CANCERPROJECT	DIMDI	—								
*† C.A.CONDENSATES	INFOLINE									
	SDS	4	0.02	4000	28	36.24	37	1.03	21	11
	Lockheed				25	30.50	35	1.15	16	11
	SDC				35	42.00	60	1.43	12	7
	BRS									
*† CHEMLINE	BLAISE	14	0.04				45			32

NAME OF DATABASE	OPERATOR	*a* Royalty/ hour	*b* Royalty/ off-line reference	*c* License etc. fee	*d* Base cost/ hour	*e* *a+c+d* per hour	*f* connect hour charge/ hour	*g* *f* divided by *e*	*h* $\frac{a+c}{f} \cdot 100$	*i* $\frac{a}{f} \cdot 100$
*† COMPENDEX	Lockheed				25	37.89	65	1.72	20	15
	SDC	10	0.03	7700	35	50.78	65	1.28	24	15
	SDS				28	45.94	45	0.98	39	22
*† ENERGYLINE	SDC	10	-	3500	35	47.63	95	2.00	13	11
	SDS				28	41.74	52	1.25	26	19
*† ENVIROLINE	Lockheed	15	-	6500	25	42.44	90	2.12	19	17
	SDS				28	49.74	45	0.91	48	33
*† EPIC	Belgium	8		8750			25			32
*† FSTA	ZMD									
	Lockheed	22	0.03	3060	25	48.90	65	1.33	37	35
	SDC				35	60.05	65	1.08	39	35
*† GeoRef	SCD	15	0.10	1200	35	51.00	75	1.47	21	20
*† INSPEC	INFOLINE									
	Lockheed				25	42.53	45	1.06	39	33
	SDC	15	-	6750	35	55.06				
	SDS				28	49.99	44	0.88	49	34
	BRS									
* ISMEC	SDS	10	0.03		28		60			16
*† METADEX	Lockheed	25	0.04	1600	25	50.60	80	1.58	32	31
	SDS				28	54.84	53	0.97	50	47

Table 19 cont'd.

NAME OF DATABASE	OPERATOR	*a* Royalty/ hour	*b* Royalty/ off-line reference	*c* License etc. fee	*d* Base cost/ hour	*e* *a+c+d* per hour	*f* connect hour charge/ hour	*g* *f* divided by *e*	*h* $\frac{a+c}{f} \cdot 100$	*i* $\frac{a}{f} \cdot 100$
*† NTIS	Lockheed				25	38.50	45	1.17	30	27
	SDC	12		4000	35	50.00	45	0.90	33	27
	SDS				28	48.24	40	0.84	39	29
*† OCEANIC ABSTRACTS	Lockheed	5	0.03	2500	25	30.94	55	1.78	11	9
	SDS				28	35.74	51	1.45	14	10
*† PASCAL	SDS	13	-	4075	28	45.32	45	1.-	38	29
* Pharmac.News Index	Lockheed				25	55.-	65			
	SDC	30	-	?	35	65.-	65			
	BRS									
*† Pollution Abstr.	Lockheed				25	35.75	65	1.82	17	15
	SDC	10	-	2000	35	46.50	65	1.40	18	15
	SDS				28	40.24	51	1.29	23	19
	BRS									
*† Psychol. Abstr.	Lockheed				25	45.30	50	1.1	41	40
	SDC	20		800	35	55.60	?			
	BRS									
	ZMD									
	DIMDI									
*† SCIENCE CITATION	Lockheed				25	42.50	70	1.65	25	14
INDEX (SCI)	SDS	10	-	20000	28	58.24	50	0.87	59	20

NAME OF DATABASE	OPERATOR	*a* Royalty/ hour	*b* Royalty/ off-line reference	*c* License etc. fee	*d* Base cost/ hour	*e* *a+c+d* per hour	*f* connect hour charge/ hour	*g* *f* divided by *e*	*h* $\frac{a+c}{f} \cdot 100$	*i* $\frac{a}{f} \cdot 100$
*† TITUS	ITF						71			
	ZDI	20	?	?						
	SDC				35		80			25
*† TOXLINE	BLAISE	14	0.04				45			
	DIMDI									
*† World Alum.Abstr.	SDS	-	-	?	28		30			
	Lockheed				25		50			

Column *a* - Royalty per connect hour to the producer

" *b* - Royalty per off-line printed reference to the producer

" *c* - Licence/lease fee for the current year tape

" *d* - Assumed base cost for the operator

" *e* - Sum of *a* + *c* per accession hour + *d* (license etc. fees [*c*] are allocated over assumed connect-hours).

" *f* - Connect-hour charge by the operator

" *g* - Connect-hour charge divided by (total return to the producer + base cost) = price/cost factor

" *h* - Producer's return *(a + c)* as percentage of connect-hour price *(f)*

" *i* - Royalty *(a)* as percentage of connect-hour price *(f)*.

* End-user price data obtained

† Database price data to operator obtained.

No superscript - no on-line price data available yet, but non-quantitative data on charging policy or system exists.

Price/Cost Factor

Table 20 below shows, for each of the three major operators, the mean price/cost factor, averaged over all fixed price databases and its variance.

TABLE 20

MEAN PRICE/COST FACTOR

Operator	Number of Databases	Mean Factor	Variance
Lockheed	12	1.46	0.36
SDC	7	1.34	0.35
SDS	10	1.03	0.19

The price/cost factor is not very sensitive to the assumptions made on the number of connect-hours per year for each operator, nor to the averaging of the access hour per year over all databases. For example, if Lockheeds' share of the on-line market has been underestimated by 30%, the factor only changes by about 0.05.

BRS was excluded in these claculations because this operator charges the royalties separately and the hourly on-line charge is the same for all databases. It may be noted that, in cases in which we can check BRS' published royalty figures with those for the same database offered by SDS, BRS royalties are usually higher; this is probably due to inclusion of an averaged element of off-line print royalties and possibly license fees. BRS "royalties" may therefore represent that operator's view of the total database price element reduced to a per-hour rate.

If operators priced their connect-hour charges by simply adding royalty and license fee elements to their base cost, the price/cost factor would be approximately one, and its variance would be small, depending on the volume of use of the database as compared with the mean over all databases. Taking first the fact that the factor is well above one in the case of the vast majority of databases operated by Lockheed and SDC, several explanations suggest themselves.

(i) The base cost derived from the price of no-charge databases may be too low: if so, it may be that these databases are offered below cost as a public service or even as "loss-leaders". The latter alternative seems unlikely, in view of the rather limited audience to which they appeal.

(ii) The operating costs of fixed price databases as a class are uniformly higher than those of no-charge databases. While this might be true in respect of storage costs for some of the very large databases, these are those which command high utilisation volumes, and storage costs per unit of use will therefore reduce. However operators may incur more overheads in the shape of marketing and training costs.

(iii) The increase of the mean base price shown by the mean factor is a business decision on the part of the operator, i.e. he considers that, in the light of the likely volume of use he expects, and the potential users' willingness to pay higher prices, additional revenue can be obtained over and above that provided by the base price.

Of these possibilities, the first two seem the least likely, except to the extent that operators may allocate a greater proportion of their overheads marketing costs to fixed-price than to no-charge databases.

It may be noted that the mean factor for SDS is one; SDS allocates all its costs to the basic elements of its operation, except for those not subject to the cost recovery policy, which form a separate cost centre (e.g. input to NASA). Thus, the assumed base price of about $28, in

proportion to the prices charged for other databases is a relatively accurate measure of operational costs alone. In absolute rather than relative terms, this base cost is probably lower than it should be to reach break-even at the present volume of use, since the service is still partly subsidised from ESA funds. Taking into account the higher annual utilisation of the two U.S. services, the base prices of $25 or $35 assumed for them seem correct in the light of the known SDS cost structure.

The rather large variance in the calculation of the mean factor for Lockheed and SDC is partly a consequence of averaging, but also could be due to business decisions in respect of prices to be charged for particular databases. For databases offered by both operators, competition will tend to equalise end-user prices; SDC cannot charge more than Lockheed for such databases even though its base price is higher. SDS prices on the other hand have a smaller variance about the mean factor (0.19) as would be expected from their pricing policy based on relative costs; this however is not rigid, and the last version of prices contained a business decision element, in particular the need to meet competition from US operators.

In summary, the mean price/cost factor, while admittedly suffering all the defects of the averaging techniques used and the assumptions about usage made, does provide a guide to the proportion of the end-user price which is retained by the operator, an essential step in determining the proportion of the return to the producer.

Average Database Price Element in Connect-hour Prices

To obtain some indication of the return to the producer for fixed price databases, we consider only those operated by three of the four major distributors: if all fixed-price databases were to be included, the average figures for each operator would have been distorted by individual high-cost databases operated by a single operator. Consequently the

averages obtained are those for the "popular" databases. No-charge databases have been excluded.

If we consider only connect-hour royalty payments, the database element in connect-hour prices is on the average 22.3% for Lockheed, 17.4% for SDC and 24.8% for SDS.

We can however obtain a very approximate indication of the *total* return to the producer as a percentage of connect-hour price by including an element for license fees (Table 19). In this case the average database price elements would be 31.3% for Lockheed, 29.4% for SDC and 35.5% for SDS. These figures are probably on the high side, since the averaging process used to convert license fees to a per-hour basis in Table 19 was spread over all databases; the "popular" databases are likely to be those with high utilisation rates. Probably therefore these figures should be reduced by 3 - 4%.

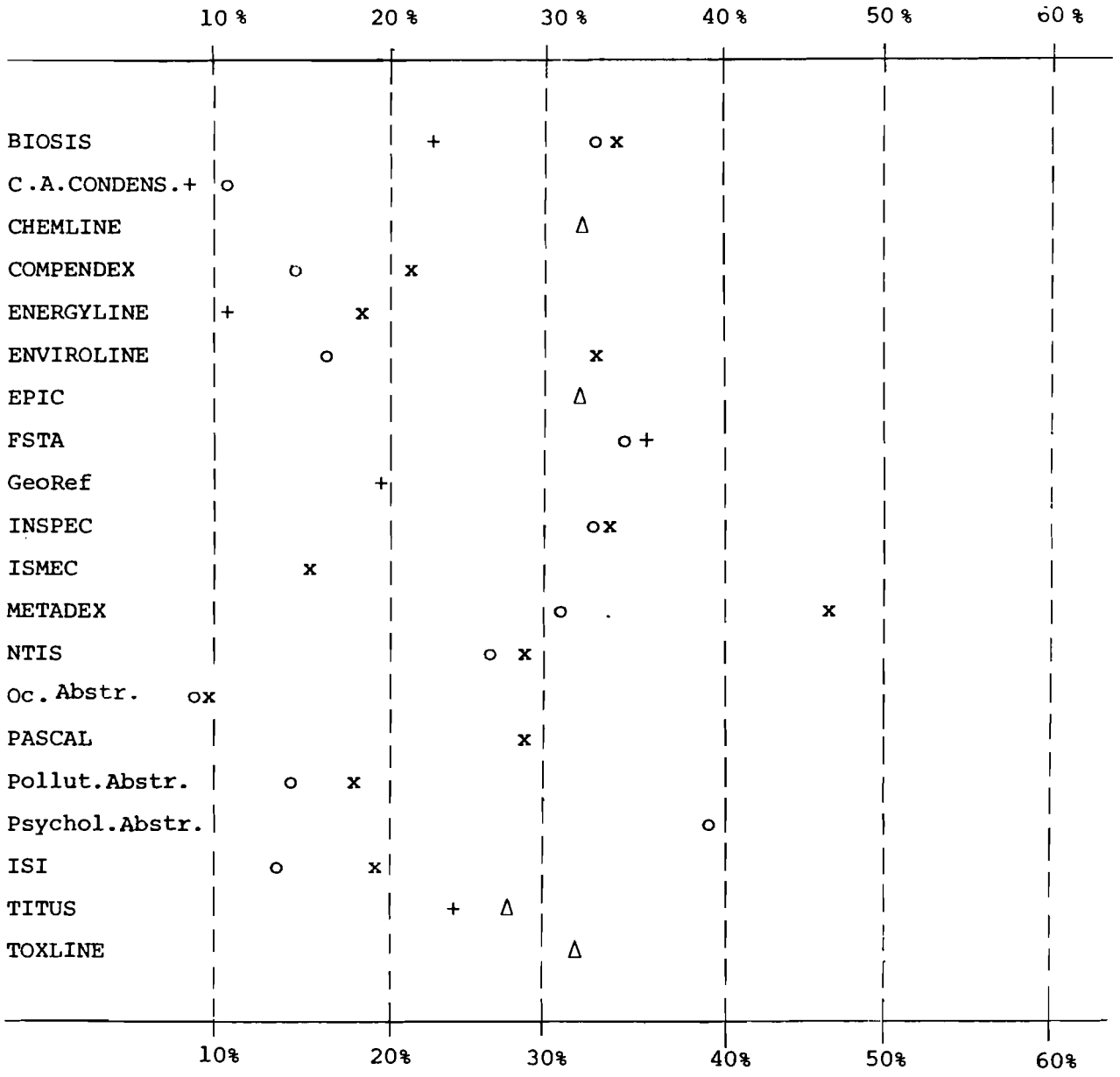
Thus we see that the database price element for popular fixed-price databases is about one-fifth of the connect-hour price to the user, considering only royalties, or between one-quarter and one third if we take all charges into account. (Off-line print and telecommunication charges are excluded).

The percentage of the end-user price returned to the producer for all fixed-price databases is plotted in Figure 2 overleaf (excluding license fees). While the plots are rather scattered, there is some concentration at the 25% - 30% level. The horizontal displacement of plots for the same database is an illustration of the effects of the different pricing strategies adopted by the different operators in respect of their operating charges, as discussed above.

FIGURE 2

PERCENT OF END-USER PRICE RETURNED TO PRODUCER

(FIXED-PRICE DATABASES)



SDS x

SDC ..... +

Lockheed ... o

other ..... Δ

CONFIDENTIAL BUSINESS ARRANGEMENTS

Twenty-seven databases are in this category, of which thirteen are confirmed, eleven are highly probable and three are doubtful, available information being inadequate (Chapter III, Table 7). In all these cases, we do not know for certain the nature of the arrangement between operator and producer, i.e. whether a file leasing fee is involved, etc. From other evidence however, it can be inferred that the most probable arrangement is a straight split of the connect hour prices, with or without a cash payment in the form of a guaranteed minimum.

Assumptions

We have seen in the previous section of this chapter that in the case of the fixed price databases, it is the practice of the major US operators to add an amount to the base price. This cannot be ignored in any estimation of the split of end-user prices in the confidential databases. It would, for example, be incorrect to merely subtract the base price for a particular operator from the published connect-hour prices for each confidential database, and allocate the balance to the producer element: the result would clearly be to exaggerate the database element in the price of this class.

Two possible assumptions suggest themselves: either that the operator element in the price follows approximately the same pattern as noted for the fixed-price class, or that the operator's element is in some way proportional to the published connect-hour price. To make the latter assumption would mean that operators increased their proportion for no sound reason, and would presuppose a somewhat nonsensical negotiation between producer and operator. The first assumption is therefore preferred, i.e., that on the average the operator tries to maintain the same price/cost factor as for the fixed price category.

This assumption may also be criticized on many grounds: we have already noted the defects in the averaging techniques used to calculate the mean factor, and applying the factor to a relatively large number of other databases with very divergent prices could introduce further possibilities of error. However there is no indirect data which would suggest an alternative procedure, and so this has been adopted.

Estimation of Database Element in Confidential Arrangements

For a fixed price database, if

h_t is the total connect-hour price,

h_p is the producers' share of the connect-hour price, including a license fee element,

h_{ob} is the assumed base price for the operator concerned,

and f is the price/cost factor,

then $f = \dfrac{h_t}{h_p + h_{ob}}$; then f^* was the mean price/cost factor for all fixed price databases.

We assume that f for any confidential database approximates to f^*. For any confidential database, therefore

$$h_t = f^*(h_p + h_{ob}) \quad , \text{ i.e.}$$

$$f^*h_p = h_t - f^*h_{ob} \quad \text{and therefore}$$

$$h_p = \frac{h_t - f^*h_{ob}}{f^*} \quad .$$

That is, the producers' element in the price of a confidential database approximates to:-

$$\frac{\text{connect-hour price - (mean factor X base price)}}{\text{mean factor}} \quad .$$

The results of the calculation are shown in Table 21.

The final column of Table 21 gives an approximate indication of the probable division of the total connect-hour price between producer and operator. There is a possibility of testing these results in the case of one database for which the amount of the connect-hour price required by the producer in one negotiation was known, and this was identical with the amount obtained by the producer in a prior agreement with another operator. Using this figure, the proportional split of the total connect-hour price in the already existing contract came to 40% to the producer and 60% to the operator; the result given by the mean price/cost factor method produces figures of 30% - 70% respectively. Certainly an accuracy of greater than 10% cannot be expected in the calculated division of end-user prices given in Table 21; there are some further indications that for a database priced at about $65 - $80 per hour the return to the producer is about 40%, depending on exclusivity to a particular operator. The element of error by the method of calculation adopted may therefore tend to artificially increase the operator's share, i.e., the producers element may be slightly too low. To the extent that the accuracy of the data allows, it appears that while the majority of the confidential arrangements result in a producer's proportion of the on-line price of between 20% and 40%, there are a substantial number in which the producer takes 40% of the on-line price or over (9 out of 26 databases). For the fixed-price category only two plots in Figure 2 were at the 40% level or over, one of which resulted from an abnormally low connect-hour price (METADEX by SDS). It might therefore be inferred that there is some tendency for "confidential" arrangements to result in a higher producer's share of the end-user price.

TABLE 21

APPROXIMATE DIVISION OF ON-LINE PRICES FOR CONFIDENTIAL DATABASES

NAME OF DATABASE	OPERATOR	Factor	calculated return to the producer $/hour	base cost $/hour	charge/ hour $	Approximate split of connect hour charge	
						Producer %	Operator %
Accountant Index	SDC	1.34	14	35	65.00	20	80
American History and Life	Lockheed	1.46	20	25	65.00	30	70
APILIT	SDC	1.34	14	35	65.00	20	80
APIPAT	SDC	1.34	14	35	65.00	20	80
Arts Bibliogr.Modern	Lockheed	1.46	20	25	65.00	30	70
ASI	SDC	1.34	55	35	120.00	50	50
CAB	Lockheed	1.46	20	25	65.00	30	70
CLAIMS/CHEM	Lockheed	1.46	78	25	150.00	50	50
CLAIMS/CLASS	Lockheed	1.46	37	25	90.00	40	60
CLAIMS/GEM	Lockheed	1.46	37	25	90.00	40	60
Comp.Diss.Ind.(CDI)	Lockheed	1.46	13	25	55.00	20	80
Crecord	SDC	1.34	25	35	80.00	30	70

NAME OF DATABASE	OPERATOR	Factor	calculated return to the producer $/hour	base cost $/hr.	charge/ hour $	Approximate split of connect hour charge	
						Producer %	Operator %
ENVIROBIB (EPB)	Lockheed	1.46	20	25	65.00	30	70
Foundation Directory	Lockheed	1.46	16	25	60.00	30	70
Foundation Grants Index	Lockheed	1.46	16	25	60.00	30	70
Grants	SDC	1.34	10	35	60.00	20	80
Historical Abstr.	Lockheed	1.46	20	25	65.00	30	70
Language & Language Behaviour Abstracts	Lockheed	1.46	13	25	55.00	20	80
Meteorological and Geographical Abstr.	Lockheed	1.46	10	25	50.00	20	80
NICEM	Lockheed	1.46	23	25	70.00	30	70
P/E News	SDC	1.34	51	35	115.00	40	60
PAPERCHEM	SDC	1.34	47	35	110.00	40	60
PREDICAST	Lockheed	1.46	37	25	90.00	40	60
Sociological Abstr.	Lockheed	1.46	13	25	55.00	20	80
SSIE	SDC	1.39	47	35	110.00	40	60
TULSA	SDC	1.34	58	35	125.00	50	50

Other Characteristics of "Confidential" Databases

This class of databases tend to be more expensive in terms of end-user prices than the fixed-price category. The average connect-hour price for Lockheed confidential databases is $72 per hour, and for SDC $92 per hour as compared with the general overall average of $60 (Lockheed) and $81 (SDC).

It may also be noted that many of the "confidential" databases are in the general subject area of business and economic information (the PREDICASTS series of databases), patents (the CLAIMS series), and specialised industrial services (APILIT) etc.

Operator as Contractor to Producer

The single positively identified case of this kind is the DERWENT series of patent information databases. The details of the arrangement are regarded as confidential by both producer and operator (SDC). However, it is known that the producer controls all access to the database, allocating passwords and billing users direct. Prices to the end-user vary according to the class of subscription to the printed products, but it is understood that some revision of these arrangements is contemplated. As with other patent information systems, prices are high ($120 per hour and $0.25 per reference via SDC). The costs of access to the DERWENT databases via INFOLINE in Europe are not yet known: DERWENT is a member organisation of INFOLINE, but it seems probable that a similar arrangement will be negotiated as with SDC, DERWENT retaining control of use of the database.

OFF-LINE PRINT CHARGES

Element due to the Operator

Not all operators charge by reference. BRS, for example, charges per page printed. It is difficult to compare BRS with

the other operators since the number of references per page is entirely dependent on the database, obviously a database with abstracts results in fewer references per page than one without.

Referring to Annex II, one can determine a base price per reference for each of the other major operators, which appears to be about $0.06 to $0.08 for SDC, $0.05 to $0.10 for Lockheed and $0.06 for SDS. (The latter is a standard price for most SDS databases, while the Lockheed and SDC figures are those appropriate to the ERIC, CRIS and AGRICOLA databases). There are of course higher figures in the off-line print price column. Some apply to the "confidential" class of databases in which one may expect that the arrangement between producer and operator also includes an element for dividing off-line print charges between them in the same way that connect-hour prices are divided. Other charges higher than the base price reflect print royalties for the fixed price class.

Off-line Print Royalties

These can be regarded as the database element in total off-line printing charges. Not all database producers request such payments, but where they do, the level of royalties varies quite widely, from $0.02 to $0.20 per reference.* BIOSIS is an exceptional case, requiring half the amount by which the operator's print charge exceeds $0.10 per reference. High royalty levels are not necessarily correlated with high on-line charges. This might be accounted for by different views taken by producers on the relative weight they attach to charges for inspecting a database and actually copying portions of it.

Division of Total Off-line Print Charges

From the material in Annex II, it appears that roughly one third of the total print charges are returned to the

*With some higher charges, see next page.

producer, either in the shape of openly published royalties per item printed, or otherwise. The majority of the databases considered in this study are associated with total off-line print charges of $0.10 to $0.20, but a few are significantly higher, for example TULSA ($0.5), GRANTS ($0.35), Foundation Directory and Foundation Grants Index ($0.3). These are all in the confidential class and it may be expected that these charges embody a substantial return to the producer per item printed.

In summary, it seems clear that print-out charges which embody a substantial royalty element could influence very considerably the total cost of a search to the end-user, and provide a significant source of additional revenue to the producer. It is difficult to determine the effect precisely, but if we take the figure given in the Belgian study discussed on page 59 (300 items printed per hour's search as an upper limit), the extra cost might range from about $18 - $25 per hour to $80 - $90 per hour (with high royalties). The minimum increase is zero, since the end-user can dispense with print-out altogether, if he so wishes.

PRICE TRENDS

Only a minority of the database producers involved in the study were able to provide an answer to the questions on price trends of their products over the last three years. In fact, only 25 answers to this question were obtained. The reasons are however fairly clear since the majority of all databases in the study have only a recent on-line history: the great expansion in the number of databases available on-line via US services took place in 1975 - 1976. The databases with a substantial on-line history are mainly no-charge or old-established institutional products.

The replies obtained cover most of the databases with a substantial on-line history, so that these replies can be taken as presenting a reasonably complete picture of changes in price levels which have occurred.

Databases Recording a Price Increase

Of the twenty-five in the sub-sample answering this question, twelve have increased one or more elements of their on-line prices at some time during the last three years. These are listed in Table 22 below; one database, EPIC, records a reduction in the price per connect-hour, and this is also included in the table. It will be recalled that EPIC is a scientific databank, recently on-line in Belgium on a strictly non-commercial basis. It is understood that the reason for reduction is a reduction in the standard rates charged by the computer centre operating the database on behalf of the EPIC management. It may be noted that GeoRef has reduced its license etc. fees for 1978; royalties remain unchanged.

TABLE 22

DATABASE PRICE CHANGES

NAME OF DATABASE	Royalties		Tapes/Lease/Licence (current year)		other
	previous $	1978 $	previous $	1978 $	
CA Condensates	-	4	2500	4000	
COMPENDEX	8	10	6900	7400	
DOMA		increased		increased	
ENVIROLINE	11	15			
EPIC					- 40% per connect-hour
GeoRef				reduced	
INSPEC	10	15			
METADEX	1	25		increased	
NTIS	2	12			
PASCAL	9	13			
Oceanic Abstr.			1250	2500	
Pollution Abstr.			1250	2500	
Psychological Abstracts	From 1975 charges modified to differentiate batch and on-line use.				
TITUS		increased			

Increases in Royalty Levels

Most of the increases in on-line royalties have only occurred recently, during 1977/78, with one notable exception, that of METADEX, where the increase occurred in 1976. Previously, during the first years' European on-line operation, METADEX had charged a nominal $1 per connect hour royalty, but the Metals Abstracts management regarded this as a purely temporary measure, while they assessed on-line use in both the USA and Europe. They regard the 1976/77 figure of $25 per connect hour as representing the value to the user of being able to access this database on-line. They state that the price increase has had no deterrent effect on the volume of on-line interrogation; no further increases have been proposed for 1978. It may be noted that METADEX was the first database to make a radical increase in royalties.

The recent steep increase in NTIS royalties (1977 - 1978) is said to be due to the further development of the cost recovery policy which governs the operations of this agency.

Changes in Lease/Licensing Fees

With the exception of GeoRef, most database producers in Table 22 have increased their basic charges for leasing or licensing. Aside from the particular cases of royalty increases already discussed, the change-over from the purely leasing arrangements, carried over from the pre-on-line era to more expensive licensing arrangements seems so far to have been a more or less universal reaction of institutional database producers. CAS introduced licensing arrangements from 1977 onwards for all users of its tape services, increasing the basic annual charge from $2500 to $4000, and adding a royalty for on-line access. Psychological Abstracts also changed from a lease-basis to a license fee plus royalty arrangement in 1975.

Fixed price database producers have therefore mostly reacted to the growth of on-line services by changing their

charging system, and this has meant an increase in cost to operators by some thousands of dollars per year; this cost increase has been typically from the $2000 to the $4000 level, but some very expensive licensing fees can also be noted, for example, COMPENDEX at $7400. At the same time, they have introduced connect-hour royalty payments, having a direct influence on end-user prices, while increased annual fees as a result of the licensing system have only an indirect influence, not necessarily very large if the database is used intensively. What has happened therefore is an increase in the database element of the end-user price for fixed price databases from virtually insignificant levels to 20 - 30%. For the few databases which established a licensing system for on-line use early on, there has been a second round of price increases in royalties (e.g. INSPEC) but part of this may be due to an increase in the growth rate of the database itself. CAS, on the other hand has so far left its initial royalty rates unchanged.

It may be noted that several database producers responding to the question on price increases have positively stated that no price changes have occured since 1975. These include some in the confidential arrangement class. Most of the confidential databases do not yet have a long on-line history and consequently the arrangements which have been negotiated have taken place against the background of the exponential growth of on-line services in the USA between 1974 and 1976. The extent to which the price changes for confidential databases have influenced the older established institutional producers in their recent price changes is not known.

Future trends are very uncertain; producers and operators interviewed during the course of the study considered that where the producer's proportion of the on-line price was still at the 10 - 20% level, prices would be increased to the 20 - 30% level of return, but beyond that they considered no reasonable predictions were possible. The market for on-line services has yet to settle down, and its impacts on sales of

the printed version are not yet clear. All producers interviewed pointed out that even with price increases, the revenue obtained from on-line at present usage volumes was not very significant, either in terms of their total costs or their total revenue.

While total on-line hours for the databases forming the sample for this study are not disclosed by producers, all those interviewed including notably METADEX stated that increased prices had in no way halted expansion of on-line use; over all, including North American users were apparently prepared to pay increased prices. On the other hand, there are some grounds for believing that users react to high prices by shortening the time taken per search. Whether this means that the more complicated in-depth search across a number of databases is less frequently attempted, or whether preparation of the search by use of printed Thesauri etc. is more carefully done beforehand, is not clear. If there is a causal connection between higher prices and shortening of search times it is presumably motivated by a desire on the part of intermediaries to quote a more or less uniform price per search to end-users.

Note on Price Elasticity

A.D.J. Flowerdew et al., in "Demand for On-line Information Systems as a Function of the Charges" (January 1976) indicated that, above about the 20% level of price increases, demand might be reduced. The question therefore arises whether, and to what extent, a continuation of the price trend in the database element of the total end-user price discussed in the preceding paragraphs could slow the increase in demand for on-line services. Flowerdew and his co-workers collected their data in 1975 when the average price of a database in Europe was probably only a few percent of the total charges; moreover, the total charge was then dominated (as now) by high telecommunications costs, a situation which will presumably be changed once EURONET goes into operation. Thus, the price

increases in the database element which have occurred in the last three years for those databases operated in Europe, may not yet be so great that they have resulted in an increase in total price above the limits suggested by Flowerdew.

A better indication of the influence of price on demand should theoretically be available from experience in the U.S.A., first because U.S. on-line history has generally been longer, and second because cheap and effective networking facilities have existed for several years; use of on-line services is therefore more widespread, with greater user exposure, the operating and database elements in price to users being a more significant proportion of total costs. One might therefore expect that increases in the database price elasticity relationship similar to that suggested by Flowerdew existed under conditions of the American market. Unfortunately, so far as is known, there is no U.S. counterpart to the Flowerdew study and we do not know, for example, the way in which demand has reacted to the introduction of the relatively expensive data bases, not yet directly available in Europe.

However, it seems clear that, over all databases, use of on-line services continues to increase in the U.S.A.; the competition between services has not only occurred in prices (discount schemes), but has also been for exclusive exploitation rights for relatively expensive databases. On the face of it, however, the major U.S. operators seem to have found that the strategy of increasing the number of expensive databases in their collections has been successful as a means of increasing revenue; this would suggest that under the conditions of the American market, price may not be a determinant factor in demand, at least at present levels; enough clients for high-price databases seem to exist to make their operation a viable business enterprise. How far these conditions apply in Europe must unfortunately remain a matter of conjecture: we do not know, for example, who are the users of US services in Europe, nor the extent to which they are

prepared to pay high prices for particular databases or services. It may however be noted that there have been insufficient users of the relatively expensive ISI database over the SDS network during 1977 to render its operation viable. The decision to remove this database from the SDS collection was taken on several grounds, including the high storage requirements and the high cost (leasing fees and connect-hour price); the prices of such databases are by and large established in the American market and it may well be that such levels are not an accurate reflection of price - demand relationships in Europe.

CHAPTER V

CONCLUSIONS: SUMMARY RESULTS

These conclusions follow roughly the order of the terms of reference for the study quoted in Chapter I. In some instances, for example the form of contracts which users sign with operators, there is relatively little to be said: the general case is simple and straightforward, the user agreeing to pay the prices listed and undertaking to respect the intellectual property rights of the owners of the database. Special provisions, e.g., the requirement for users of the NASA database to provide input, are mentioned as they arise.

While the terms of reference emphasise the charging systems and levels of charging applied by database producers, the user only sees these in the context of operators' charging systems: in this chapter, therefore the latter are discussed first.

OPERATORS' CHARGING SYSTEMS AND LEVELS OF CHARGING

Three main charging systems have been identified as follows:

Connect-hour Systems, at Levels dependent on Database

These are by far the most wide-spread; both major US operators, Lockheed and SDC, and the major European operator, SDS, charge the user in this way. The total price is made up of components, approximately related to the costs incurred by the operator for:-

(1) charges levied by the database producers

(2) operator costs, including file update and maintenance, marketing, training, and other overhead activities.

(3) communication charges incurred by the operator.

Of these, a single connect-hour price is quoted by both major American operators and SDS; for Lockheed and SDC, separation of charges levied by the database producer and those associated with operating costs, is not directly possible except in cases in which the database producer publically announces his scale of charges. SDS, on the other hand, while from January 1, 1978 lists a single connect hour price for convenience of accounting, continues its former practice of disclosing all royalty payments required by producers. Communications charges incurred by the operator are always charged separately by operators in this category, whether they operate their own network (SDS), or whether they use other networks such as value added carriers (TELENET and US TYMNET) or those of common carriers including the PTTs.

A further charge for off-line prints is also levied by all operators in this category. These charges cover two additional cost elements, first the costs incurred by the operator in providing an off-line print service and second, (in some cases only) a royalty or hit charge imposed by the producer. In almost all cases, however, these two elements are not separated in bills sent to clients.

It should be noted that charges incurred by the user himself have not been included in this study. In addition to payment for on-line access, communications, and print-out charges, the end-user of an on-line service will normally have to pay for his own communication charges to access the network. He may also be required to pay terminal rentals or their equivalent, and if the service is operated through a documentation centre as third party, he may be required to pay for the costs of intermediary services in making an on-line search. These user charges clearly depend on individual circumstances and they have therefore been ignored in this study.

Flat-rate Connect-hour Price Systems, Independent of Database

Operators with this type of pricing policy include BRS in the USA, FIZ-4 in Germany and BLAISE in the UK. It should be noted that, while BRS has a fixed connect-hour price ($25 per hour) for all its other databases, it offers MEDLARS exceptionally at $10 per connect hour. These operators normally quote royalties to the producer as a separate item, outside the basic connect-hour price, and these royalties may include elements for the leasing charge imposed by the producers, and for print-out royalties on an average basis. The connect hour royalties quoted by BRS for example, may not therefore agree with those published by producers in respect of a pure connect hour royalty. Also in this category may be included certain producer-operators who also include a substantial subscription charge for access to their database, in addition to a connect hour rate; an example is DOMA who charge a monthly subscription of DM 500.

As with database dependent connect hour price systems, these flat-rate systems do not include network or communications charges, which are quoted separately. It is understood however that FIZ-4 may in future quote prices to foreign users in terms of a total package, including communications charges within Germany.

Systems Based on Computer Costs

DIMDI operates a charging system based on the actual use of the computer, in terms of CPU seconds and input/output operations for its paying customers. Additionally, charges are made for the intellectual work in running questions for clients.

Levels of Charging by Operators

Taking the connect-hour charges of the database-dependent systems as a guideline, we find that these can vary very widely according to the database. For example, the minimum cost in Lockheed is $25 per hour with a maximum of $150 per hour; for SDC the figures are respectively $35 an hour and $125 per hour, while for SDS the spread is from about $28 an hour to about $60 per hour. The difference between maximum and minimum per hourly charges is, at least in part, accounted for by the database element in these on-line costs. This will be discussed in more detail later, but it may be noted that, for each of these three operators, it is possible to relate the minimum to the pure operational cost which the operator incurs in handling a database, i.e. file storage, convertion to inverted file structure, updating and maintaining the database, and some element for overhead costs of the operation as a whole. These minima are associated with "no-charge" databases. These are databases for which the producer levies no charges either on the operator or the user. Examples are ERIC for Lockheed and SDC, and NASA STAR/IAA for SDS. The on-line prices are respectively $25, $35 and $28. To a first approximation these base prices form a base line from which information about the database price element may be derived, but practices differ markedly between the three major operators. SDS, in arriving at its connect hour price for other files, maintains this base price to within $3 or $4 per hour, so that in general, the excess access price may be equated with the total database price element in the connect hour charge. Lockheed and SDC, on the other hand,

appear to increase the element for their operating costs for databases for which higher charges (royalties etc.) are required by the producers. This is shown by calculations in respect of databases for which all payments to producers are known and those which are not connect hour royalties can be allocated to the connect hour price by simple averaging techniques. The increase of operator charges does not however seem to be proportional to either total connect hour price or to the database element in that price. Most probably it represents a business decision by the operator, taking into account extra marketing costs, his estimate of usage which he can achieve, prices charged by competitors, and the like.

For BRS and BLAISE, representing the flat-rate connect-hour price, irrespective of database class, the charges run from as low as $10 an hour (in the case of MEDLARS from BRS) to $25 per hour (all other BRS databases), to $45 an hour (all BLAISE databases). These charges are exclusive of royalties and other producer charges. Each distributor bills separately for royalties, probably averaging the charges between the original producers of the material making up the database (CHEMLINE and TOXLINE) or including an element for lease fees and print-out royalties (BRS). These fixed prices independent of database systems clearly result from a calculation of average costs on the part of the operators concerned, and the relatively low figures of BRS, as compared with other operators offering the same databases may be due to the smaller backfiles employed. It may be noted that both distributors have rather homogeneous collections, all the databases being in the middle price range (of other operators); the relatively high cost of MEDLARS via BLAISE as compared with other distributors such as BRS and DIMDI may be due in part to the possible need to recover part of the UK input costs to this database. The FIZ-4 databases are offered at a standard price of about $46 per connect hour, closely approximating to SDS price figures for common databases.

To summarise, operator connect-hour prices are by no means uniform, except in those cases in which the pricing policy is to charge a flat rate irrespective of databases. It seems clear that most operators do not use finely tuned accounting methods in deciding on the prices they charge for their part in the provision of on-line services. The exception is DIMDI whose pricing system allows for separate accounting for storage, CPU utilisation and input/output operations. We do not know however, how the particular price elements concerned were calculated, but the average figure in terms of cost per hour of about $17 is very low, indicating perhaps that marginal- cost techniques were used, DIMDI's main mission being to provide virtually free biomedical information services to academic and non-industrial medical users in Germany. SDS employs an accounting system in which all costs incurred by the service are allocated by proportions to each database (except those which constitute cost centres of their own, e.g., input to NASA, and which are therefore not charged). Bearing in mind SDS's cost recovery policy, the relative division of operating costs between databases is probably reasonably accurate. We have no direct information on the price-cost relationships for other operators.

PRODUCER'S CHARGING SYSTEMS AND LEVELS OF CHARGING

Four types of charging systems were identified; these and the levels of charging for each category are discussed below.

No-Charge Databases

In this class, no actual cash transaction takes place between producer and operator. Often, however, these arrangements include a requirement to provide input to the database (e.g. MEDLARS, STAR/IAA); in others (e.g. ERIC) the database is made available without such requirements. There may be geographic or other restrictions on access to no-charge databases; partners in bilateral or multilateral agreements are

granted exclusive rights to exploit the database within their own territory. Examples are provided by the INIS and AGRIS systems. Where there is a bilateral agreement on input, financial provisions may be included in the arrangement. That is, input up to a particular cash value may be required. In all these cases, however, the end-user price is set by the operator and the database element in these prices is virtually zero, although some operators may seek to recover a proportion of their input costs in the prices charged.

Fixed, Published-price databases

A majority of the producers contributing price data to the study openly publish prices and conditions of access for operators wishing to provide an on-line service from these databases. (Different price levels etc. may be set for in-house use, but as the study was essentially concerned with prices for public access, prices for in-house use have been disregarded.) The charging systems for fixed price databases include an annual licensing fee with additional payments for backfiles, a royalty per connect hour and often a print-out royalty. The leasing fee may amount to several thousands of dollars (the range was from about $2000 to about $7000). Connect-hour royalties are now typically at the $15 per connect-hour level, although charges as low as $4 and as high as $25 were also noted. In at least one case, no royalty charge is demanded. Royalties for print-out are not always required by all database producers in the fixed price category. The range is commonly between $.02 to $.10 per reference.

Confidential Business Arrangements

During the course of the study it became apparent that a number of database producers, particularly in the economic, business and patent information areas, made special arrangements with operators for the on-line use of their databases. Prices and other conditions of these arrangements were regarded as confidential, and so details were not directly obtainable.

It appears that the most usual arrangement is an agreement to divide the on-line price per connect hour between the parties concerned, the price per reference printed may also be divided in the same ratio. The producer may also require a guaranteed minimum annual return from the operator. In a few cases in which some information on these arrangements was available or could be deduced, the split of the end-user connect-hour price was 40% to the producer and 60% to the operator. These however were associated with on-line prices of about $65 per connect-hour and it is noted that many of the "confidential" databases are priced at levels considerably above this figure. $90 per hour is not uncommon in this class, and no information is available on the type of arrangement made in these cases. Many "confidential" arrangements are associated with exclusive rights for the operator to exploit the database in particular regions. The majority of confidential arrangements are in respect of US-produced databases, operated by Lockheed and SDC.

Operator as Contractor to Producer

One case of this kind was positively identified; the DERWENT series of patent databases are operated by SDC under an arrangement in which the producer retains all rights, allocating passwords, setting the on-line price, billing users direct. The operator is in this case a contractor who provides on-line service, but the details of the contract are regarded as confidential. It may of course be that other arrangements in the "confidential" class follow this pattern to some extent, but so far as is known, DERWENT is the only case in which the user deals directly with producer, rather than with the operator.

Other Producer Charging Systems

A few cases were noted in which different charging rates applied, depending on whether users were members of an association. Some producers are also operators of their own databases, e.g. Electronic Components Databank, EPIC, Thermodata, and several others. No general inference on the database price

element can however be derived from these cases, because no information was available on the division of operating and production costs. In the case of EPIC however, the producer considered that about 30% of the connect hour price was associated with production costs; the database is small and highly specialised, however.

PROPORTION OF END-USER PRICES REPRESENTED BY DATABASE CHARGES

In the case of the no-charge databases, this is clearly zero, but as already noted, some operators may allocate some of their operating revenue to offset input costs. In the case of fixed published price databases, about 20% of the connect-hour price is returned to the producer in the form of royalties, the percentage varying slightly between operators since their operating charges differ. However, if we include an element for licence fees as an addition to the connect-hour royalties, the percentage returned to the producer could increase to 25 to 30%. Licence fees are substantial in a few cases (e.g. COMPENDEX and CA Condensates) and the degree to which they are significant in both end-user prices and the proportion returned to the producer depends on the volume of use achieved by a particular operator. If an operator obtaining 1000 connect hours per year from COMPENDEX wishes to recover the lease fee, he must add an extra $7 to $8 to the price he charges for each connect-hour. The above data result from averaging over all databases in this category, and there is naturally some degree of scatter; several cases of a return of more than 30%, without taking into account licence fees, were noted (see Figure 2, Chapter IV). Calculations in this respect are further complicated by an uncertainty in the level of operating costs for these databases, particularly those of Lockheed and SDC. As already mentioned in this chapter, it appears that these two operators charge more for operating fixed price databases than they do for no-charge databases. If we assume that the price of a no-charge database represents an operator's basic costs to which should be added royalty and

a licence fee element for fixed price databases, the ratio of price to costs should be approximately 1 in all cases, assuming that overheads and profit are allocated evenly across all databases. For Lockheed, the price/cost factor for fixed price databases is on the average 1.46 with a variance of 0.36 and for SDC 1.34 with a variance of 0.35. Some possible explanations for these results have been discussed in Chapter IV.

In the confidential arrangement cases, while little direct information on the producer's share of the end-user price is available, but using of the price/cost factor derived for fixed price databases and making an assumption that the mean factor for a particular operator applies also to confidential databases, it is estimated that the producer's share is a minimum of 20% and a maximum of 50%. The majority of cases are in the 30% to 40% range. (These estimates are of course approximate; their accuracy is no better than 10%.)

TRENDS IN THE DATABASE PRICE ELEMENT

The early history of on-line services was dominated by access policies formulated by the producers of what have been called in this study no-charge databases and prices to users therefore reflected only operating costs. Operators supplying on-line services soon added a number of institutional databases in the main areas of chemistry, physics, and applied science and technology. Prior to 1975, most such institutional databases were available on leasing arrangements and these were in general designed for in-house use; leasing arrangements without royalty payments were therefore the general rule in the beginning of the on-line era. From the end of 1974 onwards, most institutional database producers began to offer licensing agreements to replace leasing arrangements for on-line services offered to third parties. At this stage, connect hour and print royalties were small, but associated with licensing fees considerably in excess of the previous

lease charges. All databases in the fixed published price category are now operated under licensing arrangements and royalties have in most cases considerably increased since 1975. In some cases the initial royalty was negligible, at the level of a dollar or two per connect hour. This was seen by the producers concerned as a purely notional figure, to be revised as soon as the initial experimental period was concluded. Thus, the royalty increase in the case of METADEX, from $1 to $25 in 1976, is probably to be viewed in this light, reflecting the value which the producer places upon on-line access. The substantial jump in NTIS royalties, from $2 to $12 per hour in 1977/78 is probably due to the further development of cost recovery policies on the part of the government agency concerned. Outside these cases, the general trend has been to arrive at royalty levels between $10 and $20 per connect hour with associated print-out royalties in many cases. A very few institutional databases with a long on-line history have had two royalty increases, but this is exceptional. The confidential class of databases are comparatively recent additions to the on-line market, and it would appear that few increases have occured in this sector; they are in any case probably priced above the general level of the fixed price category, both in terms of the end-user connect hour price and the percentage returned to the producer.

It is evident that database producers in general are still assessing the consequences of extensive on-line use of their products. It is claimed that increases up to the present level of charges have not had any deterrent effect on the growth of on-line use. At present however, on-line use accounts for a rather small portion of the total revenue to database producers, and contributes to only a small proportion of their costs.

Taking into account the comparatively short on-line history of most of the databases contributing price information to this study, and a general level of uncertainty on future pricing policies, it would be unwise to make any extrapolations

from the short term trends. One could perhaps foresee a further round of increases to bring royalty levels in a fixed price database to something approaching the returns already apparently achieved by databases in the confidential class, perhaps to a level between $20 and $30 per connect hour. Probably however, everything will depend on the view taken by producers on the longer term effects of on-line services on the economics of their operations.

DISCOUNT SCHEMES

The four major operators of substantial numbers of databases have introduced discount schemes which reduced the connect hour price for the end-user according to the volume of use and in two cases according to the guaranteed volume of use. Some of these discount schemes are complex and need careful study by individual users to assess the probable results of the various options. They have been analysed in Chapter III to which reference should be made on their detailed effects. Maximum discount rates amount to 32% of the connect hour price for Lockheed users, 19% in the SDC system and 35% and 31% in the cases of SDS and BRS respectively. Probably, however, these maximum rates can only be achieved by user groups and a more realistic comparison is given by discounts at 120 hours per month, appropriate to a documentation centre operating a single terminal at a rate of 6 hours per day. An average for Lockheed is 27% or 32%, depending on the option, for SDC 18%, for SDS 30%, and for BRS 25% or 31%. For individual users (Libraries or small information centres who can achieve an utilisation of 20 hours per month) Lockheed offers 25% if this use is guaranteed, or 12% if not; SDC offers 9% and SDS 15% with no guaranteed minimum. With BRS, only 7% discount is possible at this level.

Discount schemes only apply to connect hour prices. If royalties are billed as an extra, discounts do not apply to these payments.

OTHER IMPORTANT ELEMENTS IN END-USER PRICES

The study has mainly been directed towards estimates of the database element and its proportion of the end-user price per connect hour. However, the total price to end-users includes two other elements which must be treated separately, communication charges and the cost of printed references. Communication charges are user location dependent with respect to that of the operator, and on the means by which the user accesses the host computer, i.e. the network used. It is understood that prices for using EURONET have not yet been established, so that little can be said on this element of future costs. However, at present, European users can access SDS databases through ESANET at rates varying from $22 per hour to $29 per hour, dependent on the speed of the terminal. (Telephone charges to access ESANET are not included). Costs for accessing Lockheed and SDC from Europe via nodes of TYMNET and TELENET established in collaboration with the PTTs have recently been published for a number of countries. They include a per character transmitting charge, so that a total per hour cost is not easily arrived at. The probable cost level is however at least $40 to $50 per hour making reasonable assumptions about characters transmitted. It is evident that at present levels, network costs are a substantial element in end-user prices.

The cost per printed reference also makes a substantial contribution to the total end-user price. One study suggests that an hour's searching produces on the average 300 references for which prints are required, and at 10 cents a reference this adds $30 to the user's bill. However, 300 prints per hour's interrogation may not be typical. In any case, the user can avoid these charges by use of the printed version of the database for the full bibliographic details and abstracts provided.

ANNEX I

DATABASES INCLUDED IN THE STUDY

ABI/INFORM, August 1971 - present, 50,000 records, monthly updates (Data Courier, Inc., Louisville, KY)

ABI/INFORM includes references to significant articles of interest to management and administration from approximately 300 publications in the business and related fields. Representative publications are Harvard Business Review, Duns Review, Sloan Management Review, Fortune, Wall Street Reports, Journal of Marketing Research.

OFFERED BY: LOCKHEED
SDC
BRS

ACCOUNTANTS INDEX

Provides access to the literature related to accounting, auditing, taxation, data processing, investments, financial management, financial reporting, and management. The coverage is international in scope including English-language books, speeches, pamphlets, government documents and journals from the U.S., Canada, England, Australia, South Africa, and Japan, etc.

OFFERED BY: SDC

PREPARED BY: American Institute of Certified Public Accountants

File Size: Approximately 12,000 citations per year

Coverage: 1974 to present

Updating: Quarterly, approximately 3,000 citations

AGRICOLA (CAIN), 1970 - present, 900,000 records, monthly updates (National Agricultural Library, Beltsville, MD)

AGRICOLA (former CAIN) is the cataloging and indexing data-base of the National Agricultural Library (NAL). This massive file provides comprehensive coverage of worldwide journal and monographic literature on agriculture and related subjects. Since AGRICOLA represents the actual holdings of the National Agricultural Library, there is substantial coverage of all subject matter normally contained in a very large library.

OFFERED BY: LOCKHEED
SDC
BRS

AGRIS, 1975 to present 225,000 records, monthly updates (FAO Rome, computer version IAEA Vienna).

Worldwide coverage of agricultural literature from 70 countries including fisheries.

AIM/ARM (also see ERIC), September 1967 - present, 17,500 citations, bimonthly updates (The Center for Vocational Education, The Ohio State University, Columbus, OH)

AIM/ARM is a specialized index for locating materials on vocational and technical education as well as the related areas of manpower economics and development, employment, job training, and vocational guidance.

AIM/ARM provides subject and author indexes to the abstracts of the following: instructional materials developed by local school districts, state departments of education, curriculum development laboratories, and industrial organizations, research from U.S. Office of Education, Department of Labor, Office of Economic Opportunity, private foundations, and other organizations.

OFFERED BY: LOCKHEED

AMERICA: HISTORY AND LIFE, 1964 - present, 40,000 records, quarterly updates (ABC-Clio Inc., Santa Barbara, CA)

AMERICA: HISTORY AND LIFE (AHL), covering the full range of U.S. and Canadian history, area studies, and current affairs, is a comprehensive and current aid to bibliographic affairs, is a comprehensive and current aid to bibliographic research. The on-line data-base corresponds to the printed American History and Life, Part A (Article Abstracts and Citations), Part B (index to Book Reviews), and Part C (American History Bibliography).

AHL includes coverage for the following typical areas: American studies, ethnic studies, folklore, history, historiography and methodology, international relations, local history, oral history, prehistory, politics and government, popular culture, teaching of history, and urban affairs.

OFFERED BY: LOCKHEED

APILIT

Covers worldwide refining literature, including petroleum refining, petro-chemicals, air and water conservation, transportation and storage, and petroleum substitutes. Source documents include trade magazines, technical journals, meeting papers, and government reports. Available only to subscribers of the Central Abstracting and Indexing Service of the American Petroleum Institute.

OFFERED BY: SDC

PREPARED BY: American Petroleum Institute

FILE SIZE: Approximately 18,000 records per year

COVERAGE: January, 1964 to present

UPDATING: Monthly, approximately 1,500 citations.

APIPAT

Contains citations to refining patents from the U.S. and nine other countries: Belgium, Canada, France, Germany,

Great Britain, Holland, Italy, Japan, and South Africa. Subject coverage include the same areas covered by APILIT. Available only to subscribers of the Central Abstracting and Indexing Service of the American Petroleum Institute. *Available on-line exclusively on the ORBIT system.*

OFFERED BY: SDC

PREPARED BY: American Petroleum Institute

FILE SIZE: Approximately 8,400 records per year

COVERAGE: January, 1964 to present

UPDATING: Monthly, approximately 600 citations.

APTIC, 1966 to present, 82,000 records, quarterly updates. (Manpower and Technical Information Branch, U.S. Environmental Protection Agency, Research Triangle Park, NC).

APTIC is a comprehensive resource on all aspects of air pollution, its effects, prevention, and control. This data-base includes but is not limited to all abstracts in Air Pollution Abstracts (no longer published).

APTIC covers the field of air pollution in the broadest sense, including the social, political, legal, and administrative aspects of the field. Subjects treated in this data-base include: atmospheric interaction, control methods, economic aspects, effects on human health, effects on materials, effects on plants and livestock, emission sources, government participation (legal and administrative), measurement methods, pollution data (air quality and emission inventories), and social aspects and public involvement.

OFFERED BY: LOCKHEED

ARIANE

An interlinked series of databanks on all aspects of the building and construction industry, including technical characteristics of materials, manufacturer data and regulatory and legislative matters. The scope of the bank is limited to products etc. available in France, and its size is variable: a 50% turnover of records per annum is expected.

PREPARED BY: CATED (Féd.Nat.du Bâtiment), Paris.

ART BIBLIOGRAPHIES MODERN, 1974 to present, 21,000 records, quarterly updates (ABC-Clio, Inc., Santa Barbara, CA)

ART MODERN contains references to all modern art and design literature in books, and to references in dissertations, exhibition catalogs, and some 300 periodicals. The initial file will have approximately 21,000 records, including abstracts covering the fields of art history, biographies of artists, and artistic media such as sculpture, ceramics, printing, etc., since the onset of the nineteenth century.

OFFERED BY: LOCKHEED

ASI

American Statistics Index, covering statistical publications of the U.S. Government; periodicals, annuals, biennials, surveys, analytical reports, statistical compilations, continuing serials, and special publications. Subject coverage is as broad as the Government's national and international interest including the entire spectrum of social, economic, and demographic data (e.g., employment, governmental finances, industry-specific data, transportation, housing, and health).

OFFERED BY: SDC

PREPARED BY: Congressional Information Service, Inc.

FILE SIZE: Approximately 9,600 records per year

COVERAGE: January, 1973 to present (and selected coverage of publications issued during the 1960's)

UPDATING: Monthly

BIAM

BIAM (Banque d'Informations Automatisée sur les Medicaments) [Drug Automated Databank) provides general information on drugs, oriented to practical use - two logical files: Active Principles and Pharmaceutical Specialities.

FILE SIZE: October 77: 3,000 active principles and 8,500 specialities (presently: 25 mill. characters)

GROWTH RATE: 40 active principles and 200 specialities per year.

PREPARED BY: Association Biam, Paris.

BIOSIS PREVIEWS, January 1972 to present, 1.230,000 records, monthly updates (BioSciences Information Service of Biological Abstracts, Philadelphia, PA).

BIOSIS PREVIEWS contains citations from both BIOLOGICAL ABSTRACTS and BIORESEARCH INDEX, the major publications of BioSciences Information Service of BIOLOGICAL ABSTRACTS. Together, these publications constitute the major English language service providing comprehensive worldwide coverage of research in the life sciences. Nearly 8,000 primary journals as well as symposia, reviews, preliminary reports, semi-popular journals, selected institutional and government reports, research communications, and other secondary sources provide citations on all aspects of the biosciences and medical research.

OFFERED BY: DIMDI
SDS
LOCKHEED
SDC
BRS

CAB ABSTRACTS, January 1973 to present, 450,000 records, monthly updates (The Commonwealth Agricultural Bureaux, Farnham, Farnham Royal, Slough, U.K.)

CAB ABSTRACTS is a comprehensive file of agricultural and biological information containing all records in the 22 journals published by Commonwealth Agricultural Bureaus. Over 8,500 journals in 37 languages are scanned, as well as books, reports, and other publications. In some instances less accessible literature is abstracted by scientists working in other countries. About 130,000 items are selected for publication yearly; significant papers are abstracted, while less important works are reported with bibliographic details only.

The following journals are included in CAB ABSTRACTS: Animal Breeding Abstracts, Apicultural Abstracts, Dairy Science Abstracts, Field Crop Abstracts, Forestry Abstracts, Holminthological Abstracts (A & B), Herbage Abstracts, Horticultural Abstracts, Index Veterinarius, Nutrition Abstracts and Reviews (A & B), Plant Breeding Abstracts, Protozoological Abstracts, Review of Applied Entomology (A & B), Review of Medical and Veterinary Mycology, Review of Plant Pathology, Soils and Fertilizers, Veterinary Bulletin, Wood Abstracts, World Agricultural Economics and Rural Sociology Abstracts.

OFFERED BY: LOCKHEED
SDS (1978)

CANCERLIT, 1973 to present, 80,000 records, quarterly updates (The National Library of Medicine and the National Cancer Institute - USA).

CANCERLIT covers the whole field of Oncology, especially therapy, experimental clinical studies, epidemological, pathogenetic and immunological aspects of cancer research.

OFFERED BY: DIMDI

CANCERPROJECT, 1975 to present, 16,000 records, quarterly updates (The National Library of Medicine and the Current Cancer Research Project Analysis Center in collaboration with the National Cancer Institute - USA)

CANCERPROJECT covers cancer research projects of the current three-year period.

OFFERED BY: DIMDI

CANCERNET,

covers cancer and related sciences (Immunology, Virology...)

SIZE: 110,000 records

ANNUAL GROWTH RATE: 15,000 .

PREPARED BY: Institut Gustave Roussy, Villejuif, France.

CA CONDENSATES, 1970 to present, 2.420,000 records, monthly updates (Chemical Abstracts SErvice, Columbus, Ohio).

CA CONDENSATES is the computer readable file corresponding to the printed *Chemical Abstracts (CA)*, "Key to the World's Chemical Literature." CA CONDENSATES provides access to what is new and significant in the world's scientific and technical literature for chemistry, chemical engineering, and chemical aspects of the life sciences. Coverage includes journal articles, patent specifications, reviews, technical reports, monographs, conference proceedings, symposia, dissertations and books. The treatment of patents is quite thorough and allows searching through a variety of points of access.

The literature of chemistry and its applications are divided among the following principal divisions: Applied Chemistry and Chemical Engineering, Biochemistry, Macromolecular Chemistry, Organic Chemistry, Physical and Analytical Chemistry.

OFFERED BY: SDS
LOCKHEED
BRS
INFOLINE

Note: There are several other specialized databases produced by CAS which are available from Lockheed and SDC, but CA CONDENSATES has been included in this study as representing the basic database of CAS.

CDIUPA

CDIUPA/IALINE covers food science, technology and economics.

PREPARED BY: C.D.I.U.P.A. (Centre de Documentation des Industries Utilisatrices de Produits Agricoles), Massy, France.

SIZE: 100.000 references

GROWTH RATE: 12.000 ref. per year

CHEMLINE

is an on-line chemical dictionary file, with CAS Registry numbers, preferred names, synonyms etc. File size is about 250,000 words.

It is prepared by the U.S. National Library of Medicine.

Available from BLAISE.

CIS INDEX

Covers U.S. Congress publications: hearings; committee prints; House and Senate Reports, Documents, and special publications; Senate Executive Reports and Documents. Public Laws are added on an annual basis. Subject coverage is multi-disciplinary and topical including public service programs, raw materials and consumer products, and legal policies and events. Non-subscribers must purchase one Annual Index from CIS, Inc.

OFFERED BY: SDC

PREPARED BY: Congressional Information Service, Inc.

FILE SIZE: Approximately 12,000 records per year

COVERAGE: January, 1970 to present

UPDATING: Monthly, approximately 1,000 citations

CLAIMS/CHEM, 1950 to present, 360,000 citations, quarterly updates (IFI/Plenum Data Company, Arlington, VA)

CLAIMS/CHEM contains over 360,000 US chemical and chemically related patents issued since 1950, plus foreign equivalents from Belgium, France, Great Britain, Germany and The Netherlands. This database is the result of a 1972 purchase by the IFI/Plenum Company of the E.I. du Pont de Nemours patent indexing system and merging of the IFI/Plenum index with the du Pont database in response to chemical industry need for a more highly controlled indexing system incorporating a chemical structure search capability and a more selective index to polymer chemistry.

OFFERED BY: LOCKHEED

CLAIMS/GEM, 1975 to present, 50,000 citations, quarterly updates (IFI/Plenum Data Co., Arlington, VA)

CLAIMS/GEM is an analogous file to CLAIMS/CHEM, containing information about 50,000 general, electrical and mechanical U.S. patents.

OFFERED BY: LOCKHEED

CLAIMS/CLASS

gives indexed information pertaining to the U.S. Patent classification system as detailed in the U.S.P.O. Manual of Classification.

PREPARED BY: IFI/Plenum Data Company, Arlington, Virginia, USA.

SIZE: Oct. 77: 23,000 records

GROWTH RATE: anticipated growth by July 78: to 90,000 records.

COMPENDEX, January 1970 to present, monthly updates
(Engineering, Index, Inc., New York, N.Y.)
638,000 references.

The COMPENDEX database is the machine-readable version of the Engineering Index (Monthly/Annual), which provides the engineering and information communities with abstracted information from the world's significant engineering and technological literature. The database provides worldwide coverage of approximately 3500 journals, publications of engineering societies and organizations, papers from the proceedings of conferences, and selected government reports and books.

OFFERED BY: SDC
LOCKHEED
FIZ 4
SDS

COMPREHENSIVE DISSERTATION ABSTRACTS, 1861 to present,
550,000 citations, monthly updates
(University Microfilms International,
Ann Arbor, MI)

COMPREHENSIVE DISSERTATION ABSTRACTS is a definitive subject, title, and author guide to virtually every American dissertation accepted at an accredited institution since 1861, when academic doctoral degrees were first granted in the United States. In addition, CDA serves to disseminate citations for thousands of Canadian dissertations and an increasing number of papers accepted in institutions abroad. Professional (e.g., M.D., L.L.D.) and honorary degrees are not included. All subject areas are covered.

Individual, degree-granting institutions submit copies of dissertations or lists of dissertations completed to University Microfilm International (UMI). Citations for these dissertations are included in the database and in University Microfilms International printed publications: Dissertation Abstracts International (DAI), American Doctoral Dissertations (ADD), and Comprehensive Dissertation Index (CDI).

DAI lists abstracts of dissertations from American, Canadian, and foreign universities, (copies of most of these dissertations are available from University Microfilms International); ADD supplements DAI by adding citations for other American dissertations written each year; CDI is a comprehensive index for

both DAI and ADD. A complete listing of sources consulted in compiling this database can be found in the preface to any volume of Comprehensive Dissertation Index.

OFFERED BY: LOCKHEED
SDC

CRECORD

provides comprehensive, highly current coverage of the *Congressional Record*, the official journal of proceedings of the U.S. Congress, including the House, Senate, Extension of Remarks, and Digest sections. Contains references to bills and resolutions, committee and subcommittee reports, legislation schedules of committee and floor activities, executive communications, and speeches, participation in debates, and inserted materials by members of Congress. References are indexed and cross-referenced in 275 legislative areas.

OFFERED BY: SDC

PREPARED BY: Capitol Services, Inc.

FILE SIZE: Approximately 40,000 records per year

COVERAGE: 1976 to present (beginning with the second session of the 94th Congress)

UPDATING: Weekly, approximately 1,750 citations.

CURRENT RESEARCH INFORMATION SYSTEM (CRIS), July 1974 to present, 24,000 citations, monthly updates (USDA Cooperative State Research Service, Washington, DC)

CRIS is a valuable current-awareness database for agriculturally related research projects. The projects described in CRIS cover current research in agriculture and related sciences, sponsored or conducted by USDA research agencies, State agricultural experiment stations, State forestry schools, and other cooperating State institutions.

OFFERED BY: LOCKHEED

DECHEMA (Chemische Technik)

DECHEMA (Chemische Technik) covers technological chemistry, chemical process technique.

PREPARED BY: DECHEMA (Deutsche Gesellschaft f. chemisches Apparatewesen e.V.), Frankfurt/Main, FRG

SIZE: 10,000 records (since 2 years)

DERWENT

Comprehensive and authoritative World Patent Index file contains documents relating to patent specifications issued by the Patent Offices of the major industrial nations. The countries covered since 1963 include Belgium, France, Japan, the Netherlands, South Africa, West Germany, Canada, East Germany, the Soviet Union, Switzerland, the United Kingdom, and the U.S., Portugal, Sweden, Austria, Brazil, Czechoslovakia, Hungary, Israel, and Rumania were introduced during 1975. Corresponds in coverage to *Central Patents Index* and the *World Patent Index*.

OFFERED BY: SDC

PREPARED BY: Derwent Publications, Ltd.

FILE SIZE: Approximately 234,000 new inventions and 264,000 "equivalent" filings per year

COVERAGE: Variable by subject matter: pharmaceuticals, 1963; agricultural chemicals, 1965; plastics, 1966; all chemistry, 1970; mechanical, electrical, and general, 1974 to present.

UPDATING: Monthly, approximately 19,500 new inventions and 22,000 "equivalent" filings.

DOMA (Dokumentation Maschinenbau)

covers mechanical engineering.

PREPARED BY: DOMA-Inform GmbH (Gesellschaft zur Literaturinformation des Maschinenbaues m.b.H.), Frankfurt/M.,FRG

SIZE: 1972 to 1976: 90,000 records

GROWTH RATE: 2.500 records per month

EIDB

EIDB (Energy Information Database) covers the literature of energy resources and environment related publications.

PREPARED BY: U.S. Department of Energy.

SIZE: about 150,000 items

GROWTH RATE: 5,000 items per year.

ELECTRONIC COMPONENTS DATABANK

The Electronic Components Databank, produced by ESA is arranged in two (2) files. The first file contains 12,000 records of passive components, 40,000 records of particular transistors, diodes, thyristors and FETs, and 15,000 records on integrated circuits, and names, addresses etc. of 200 manufacturers and suppliers. The second file contains lists of components used in satellites, consolidated preferred parts lists, construction analysis reports, failure analysis reports, quality analysis reports, manufacturers' test reports, radiation sensitivity reports, and internationally qualified components lists.

OFFERED BY: SDS

ENERGYLINE

Comprehensive coverage of over 200 core journals and selected coverage of 2,000 other journals, as well as reports and surveys, monographs, conference proceedings, irregular serials, and newspaper articles. Subject-area coverage includes energy economics; U.S. policy and planning; international political and economic issues; research and development; resources and reserves; environmental impact; electric power transmission and storage; fuel production; fuel transport; nuclear power; and industrial, transportation, and residential consumption.

OFFERED BY: SDS (1978)
SDC

PREPARED BY: Environment Information Center, Inc.

FILE SIZE: Approximately 4,800 records per year

COVERAGE: January, 1971 to present

UPDATING: Bi-monthly, approximately 800 citations.

EPB On-line, formerly ENVIROBIB

EPB On-line, the Environmental Periodicals Bibliography, covers the fields of general human ecology, atmospheric studies, energy, land resources, water resources, and nutrition and health. Almost 250 periodicals are indexed in ENVIROBIB, thereby providing quick-and-easy access to article references for every environment research need. Librarians, chemists, land-use planners, government officials, and corporate executives, among others, will find this database a functional asset to their work.

OFFERED BY: LOCKHEED

PREPARED BY: Environmental Studies Institute, Santa Barbara, CA

FILE SIZE: 50,000 records

COVERAGE: 1973 to present

UPDATES: bimonthly.

ENVIRONMENTAL SCIENCE INDEX - ENVIROLINE

The Environmental Science Index provides interdisciplinary coverage of citations in 2000 of the world's most significant environmental publications, including periodicals, books, reports, conference proceedings, patents and speeches.

Citations are classified into a system of twenty-one main entry categories of environmental affairs and provide title, source, data and volume, page number and page length.

The following categories are covered: air pollution, chemical and biological contamination; energy; environmental education; environmental design; food and drugs; general; international; land use and misuse; noise pollution; non-renewable resources; oceans and estuaries;

population planning and control; radiological contamination; renewable resources - water; renewable resources - terrestrial; solid waste; transportation; water pollution, weather modification and geophysical change; wildlife.

OFFERED BY: SDS
LOCKHEED

PRESENT SIZE: 61,000 references.

ENVIRONMENT - CNUCE Pisa

an experimental database, not yet ready for use.

EPIC (Estimation de propriétés pour l'ingénieur chimiste = Properties estimation for chemical engineers)

EPIC covers physical and thermodynamic properties of pure chemical components and their mixtures, including phase and chemical equilibria.

PREPARED BY: L.A.S.S.C. - University of Liege, Belgium.

SIZE: references for 240 components.

GROWTH RATE: expected growth to 400 components within one year.

ERIC - 1966 to present, 265,000 citations, monthly updates (National Institute of Education, Washington, D.C., and ERIC Processing and Reference Facility, Bethesda, MD)

ERIC is the complete database on educational materials from the Educational Resources Information Center. It consists of two main files: *Research in Education*, which is concerned with identifying the most significant and timely education research reports and projects; and *Current Index to Journals in Education*, an index of more than 350 publications of interest to every segment of the educational profession. Many items (aside from journal articles) can be purchased from the ERIC Document Reproduction Service in paper copy or microfiche. There are approximately 550 locations throughout the country having complete collections of the ERIC microfiche, and most are open to the general public.

OFFERED BY: LOCKHEED
SDC
BRS

EXCEPTIONAL CHILD EDUCATION ABSTRACTS, 1966 to present, 23,500 citations, quarterly updates (The Council for Exceptional Children, Reston, VA)

EXCEPTIONAL CHILD EDUCATION ABSTRACTS (CEC) is a comprehensive database concerned with published and unpublished literature on the education of handicapped and gifted children. More than 23,000 citations are included in the CEC database, covering such sources as books, journal articles, teaching materials, and reports. CEC is a valuable supplement to the Educational Resources Information Center database (ERIC) since only about one-fourth of the CEC citations are duplicated in ERIC (Dialog's File 1). All aspects of the education of handicapped and gifted children are included.

OFFERED BY: LOCKHEED

EXCERPTA MEDICA

consists of 2 files: a) EXCERPTA MEDICA "EMBASE"
b) EXCERPTA MEDICA "DRUGDOC"

and covers the field of biomedicine.

PREPARED BY: EXCERPTA MEDICA, Amsterdam, Netherlands.

SIZE: a) 2.250,000 records b) 540,000 records

GROWTH RATE: a) 250,000 " /yr. b) 60 to 70,000 records/yr.

OPERATED BY: HOECHST A.G.

FINE ARTS CATALOGUE - CNUCE, Pisa

an experimental database, probably, consisting of 200,000 records of Italian paintings, sculptures, architecture, etc., by the end of 1978.

FOUNDATION DIRECTORY - Current year's data, 2,500 listings, semiannual updates (The Foundation Center, New York, NY)

FOUNDATION DIRECTORY provides descriptions of more than 2500 foundations which have assets of $ 1 million or more or which make grants of $ 500,000 or more annually. Each foundation conforms to the general description of a "nongovernmental, nonprofit organization, with funds and program managed by its own trustees or directors, and

established to maintain or aid social, educational, charitable, religious, or other activities serving the common welfare, primarily through the making of grants." The foundations which qualify for inclusion account for nearly 90 percent of the assets of all foundations in the United States and 80 percent of all foundation giving. Grants are given primarily in the fields of education, health, welfare, sciences, international activities, and religion, in that order. Principal sources of information are voluntary reports by many foundations directly to The Foundation Center and information obtained from public information returns filed each year with the Internal Revenue Service by private foundations.

OFFERED BY: LOCKHEED

FOUNDATION GRANTS INDEX - January 1973 to present, 35,000 records, bimonthly updates (The Foundation Center, New York, NY)

FOUNDATION GRANTS INDEX contains information on grants awarded by more than 400 major American philanthropic foundations, representing all records from the *Foundation Grants Index* section of the bimonthly *Foundation News*. Information on grants given by foundations is useful in determining types and amounts of grants awarded, since foundations seldom announce the availability of funds for specific purposes. Each foundation conforms to the description of a "nongovernmental, nonprofit organization, with funds and program managed by its own trustees or directors, and established to maintain or aid social, educational, charitable, religious, or other activities serving the common welfare, primarily through the making of grants," as defined in *The Foundation Directory*, Edition 5. Approximately 10,000 new grant records are added to the file each year. Grants are given primarily in the field of education, health, welfare, sciences, international activities, humanities, and religion with education as the most favored field for foundation giving. Grants to individuals and grants of less than $5,000 are not included.

OFFERED BY: LOCKHEED

FSTA (Food Science and Technology Abstracts)

corresponds to the printed *Food Science and Technology Abstracts*, produced by the International Food Information Service. Covers the literature related to all human food commodities and aspects of food processing, except the production of raw foods. Subject areas covered include basic food science; microbiology, hygiene and toxiology; food economics and statistics; food engineering; food packaging; commodity techniques; alcoholic and non-alcoholic beverages; fruits, vegetables and nuts; fish and marine products; food additives, spices and condiments; and food laws, regulations and standards; and more. Source documents gathered worldwide include patents, books, standards, and journal articles.

OFFERED BY: ZMD, SDC

PREPARED BY: International Food Information Service

FILE SIZE: Approximately 17,000 records per year

COVERAGE: 1969 to present

UPDATING: Monthly, approximately 1500 records

GEOLOGICAL DATABASE - CSATA BARI

No information but believed to be still in the experimental stage.

GeoRef

Geological Reference file, covering geosciences literature from 3000 journals, plus conferences and major symposia and monographs, in such areas as geology, economic geology, engineering-environment geology, geo-chemistry, geo-chronology, geomorphology, igneous and metamorphic petrology, solid earth geophysics, and stratigraphy; a total of some 29 different geoscience areas. Includes citations from Bibliography and Index of Geology and more.

OFFERED BY: SDC

PREPARED BY: The American Geological Institute

FILE SIZE: Approximately 36,000 records per year

COVERAGE: January, 1967

UPDATING: Monthly, approximately 4,000 citations.

GEOTHERMAL DATABASE - CNUCE Pisa

An experimental database.

GRANTS

Complete, single source reference to more than 1500 grant programs offered by federal, state, and local governments, commercial organizations, associations and private foundations in over 88 disciplines, including adult education, agriculture, social sciences, fine arts, architecture, natural sciences, and law.

OFFERED BY: SDC

PREPARED BY: Oryx Press

FILE SIZE: 1500 records per update

COVERAGE: Currently available grants

UPDATING: Monthly, full file replaced with current programs.

HISTORICAL ABSTRACTS, 1973 to present, 35,000 citations, quarterly updates (American Bibliographical Center, Santa Barbara, CA)

HISTORICAL ABSTRACTS is a reference service that abstracts and indexes the world's periodical literature in history and the related social sciences and humanities. The database corresponds to the two companion publications, *Historical Abstracts; Part A, Modern History Abstracts; Part B, Twentieth-Century Abstracts* (1914 to the present).

HISTORICAL ABSTRACTS covers the history of the world from 1450 to the present, excluding the U.S. and Canada, which are covered by AMERICA: HISTORY AND LIFE.
Articles are abstracted from more than 2,000 journals published in 90 countries in some 30 languages.

OFFERED BY: LOCKHEED

INIS

Subject, Scope and Coverage: Atomic Energy and related science and technology.

FILE SIZE: 420.000 records

GROWTH RATE: 60.000 to 80.000 records per year

PRODUCER: IAEA Vienna

OPERATOR: Each member country of IAEA may operate the databases within its geographical limits. In addition IAEA will operate INIS over its own network for those countries requiring it. In EURONET INIS is also operated by the CTI of the Belgian Ministry of Economic Affairs.

INRA - Zoologie

covers Anthropology and Invertebrate Physiology.

PRODUCER: INRA

FILE SIZE: 15,000 records (since 2 years)

GROWTH RATE: 5,000 to 6,000 records per year

INSPEC

The INSPEC database contains bibliographic references from the world's published literature in physics, electrical and electronics engineering, computer science and control engineering.

It is recognized as being the only comprehensive English-language database covering the above-mentioned subject fields. Developed by the Institution of Electrical Engineers as from the end of the last century under the name of Science Abstracts, this service became computer based as from 1969, when INSPEC came into being. The INSPEC database includes a citation of every item published in Physics Abstracts, Electrical and Electronic Abstracts, and Computer and Control Abstracts. More than 2,000 journals are regularly scanned; some 210 journals are abstracted completely; conference papers are covered in depth; and reports, books, theses and important US and UK patents are also included.

The INSPEC file contains references from:

*A = Physics Abstracts
*B = Electrical and Electronics Abstracts
*C = Computer and Control Abstracts

TIME COVERAGE: 1971 to present

PRESENT SIZE: 888,000 references

OFFERED BY: Lockheed, SDC, SDS, INFOLINE, BRS, FIZ-4.

INTERNATIONAL PHARMACEUTICAL ABSTRACTS (IPA Informations Systems)

covers worldwide literature of pharmacy, medical and health-related publications for all articles relating to pharmacy or pharmaceuticals.

PRODUCER: ASHP (American Society of Hospital Pharmacists), Washington D.C., USA

FILE SIZE: 1977: 50,000 records

GROWTH RATE: 6500 to 7000 records per year.

OPERATED BY: HOECHST A.G.

IRRD - IRRD/International Road Research Documentation.

PRODUCER:

1. Transport and Road Research Laboratory, Crowthorne, U.K.
2. Laboratoire Central des Ponts et Chaussées, Paris, France
3. Bundesanstalt f. Strassenwesen, Forschungsgesellschaft für das Strassenwesen, Köln, FRG

Note: Each of these centres produces one language version of the database. The coordination organization for the service as a whole is OECD, Paris, France.

SCOPE, COVERAGE AND SIZE: Database covers worldwide literature and reports on all aspects of road transport. It contains about 80,000 items with an estimated growth rate of 10,000 items per year.

PRODUCT: Machine-readable database.

DATABASE SERVICES: Off-line searches are processed by the three producing centres and others who are members of IRRD.

ISMEC - 1973 to present, 55,000 citations, monthly updates (Data Courier Inc., Louisville, KY)

Information Service in Mechanical Engineering (ISMEC) abstracts significant articles of interest in mechanical engineering from approximately 250 journals published throughout the world. Those journals are further supplemented by relevant material from more than 2,000 periodicals in physics and engineering received by INSPEC. In addition, books, reports and conference proceedings are also abstracted.

OFFERED BY: SDC
LOCKHEED

KKF (Kunststoffe, Kautschuk, Fasern)

covers journals in polymeres chemistry, -physic and -technology, plastics and rubber.

PRODUCER: Deutsches Kunststoffinstitut, Darmstadt, FRG

FILE SIZE: (since 1976) - about 24,000 documents

GROWTH RATE: 12,000 documents per year

LANGUAGE AND LANGUAGE BEHAVIOR ABSTRACTS (LLBA)

1973 to present, 20,000 records, quarterly updates (Sociological Abstracts, Inc., San Diego, CA)

LANGUAGE AND LANGUAGE BEHAVIOR ABSTRACTS (LLBA) provides current selective access to the world's literature on language and language behavior as a service to all researchers and practitioners in disciplines concerned with the nature and use of language. Articles abstracted in LLBA are drawn from approximately 1000 domestic and foreign journals.

OFFERED BY: LOCKHEED

LIBCON/E

provides extensive coverage of the monographic literature and some non-print materials cataloged by the U.S. Library of Congress (LC). Includes MARC records distributed by LC and MET (main/entry/title) records keyed by 3-M from the LC depository card set. Covers English-language materials in all subject areas. *Available on-line exclusively on the ORBIT system.*

OFFERED BY: SDC

PREPARED BY: 3-M , now SDC

FILE SIZE: Approximately 102,000 records per year

COVERAGE: 1868 entry year coverage for MARC;
1969 for MET records
Publication year includes pre-20th Century materials

UPDATING: Weekly, approximately 2,100 ciations.

LIBCON/F

provides coverage of the monographic literature and some non-print materials cataloged by the U.S. Library of Congress (LC). Includes MARC records distributed by LC and MET (main/entry/title) records keyed by 3-M from the LC depository card set.
Includes MARC records of the French, German, Portugese, and Spanish literature, and MET records of all Roman-alphabet languages (and transliterated items).

OFFERED BY: SDC , now SDC

PREPARED BY: 3-M

FILE SIZE: Approximately 72,000 records per year

COVERAGE: 1968 entry year coverage for MARC;
1969 for MET records
Publication year includes pre-20th Century materials

UPDATING: Monthly, approximately 6,000 citations

LISA

Based on the printed *Library & Information Science Abstracts*, provides worldwide coverage of the field of library and information science, including technical processes and services; promotion of use of libraries and library materials; organization and administration; library stock and materials; use of libraries and library materials; institutional libraries (e.g., hospital libraries, children's libraries); librarianship; publishing; bookselling; reading; and reprography. Primary materials are gathered in over 20 languages from 300 periodicals, papers in conference proceedings, books and reports.

OFFERED BY: SDC

PREPARED BY: Library Association, England

FILE SIZE: Approximately 4,000 records per year

COVERAGE: 1969 to present

UPDATING: Bi-monthly, approximately 700 records

MEDLARS

The MEDLARS (MEDical *L*iterature *A*nalysis and *R*etrieval System) database, produced by the National Library of Medicine, contains citations from over 3,000 English and major foreign language journals in all the basic and clinical biomedical sciences.

All citations from the printed *Index Medicus*, *International Nursing Index*, and *Index to Dental Literature* are included in this comprehensive database, which now totals in excess of 2 million citations.

OFFERED BY: DIMDI
BRS
BLAISE

METADEX

METADEX is the magnetic tape version of Metals Abstracts jointly published monthly by the American Society for Metals and the Metals Society. It provides a comprehensive coverage of journals, books, conferences and symposia in applied and theoretical metallurgy and related aspects of physics and chemistry. In the main Metals Abstracts deals with the properties of metals and alloys and those processes which affect the properties. Engineering aspects which do not affect the properties of metals are excluded.

The file covers the following subjects:

Constitution, crystal properties, physics of metals; metallography, testing, analysis mechnical, physical, electrical and chemical properties, corrosion; ores, raw materials, extraction, smelting, refining, purification, ferrous & nonferrous production; foundry, working, machining, powder technique, joining, finishing, coating, thermal treatment; engineering components and structures, composites, electronic devices.

OFFERED BY: SDS
LOCKHEED

PRESENT SIZE: 242,000 reference

METEOROLOGICAL AND GEOASTROPHYSICAL ABSTRACTS (MGA)

1972 to present, 28,000 citations, irregular updates (American Meteorological Society, Boston, MA. The machine-readable file is made available through the Environmental Sciences Information Center, Oceanic and Atmospheric Administration (NOAA), Washington, DC).

Meteorological and Geoastrophysical Abstracts (MGA) provides current citations in English for the most important meteorological and geoastrophysical research published in both foreign and domestic literature. More than 7000 citations taken from approximately 200 primary sources, including technical journals, monographs in series, proceedings, reviews, and annual publications, are added yearly.

Subjects include the following and related subjects: Meteorology, Astrophysics, Physical Oceanography, Hydrosphere/Hydrology, Environmental Sciences, and Glaciology.

OFFERED BY: LOCKHEED

MTS Databases, Naples University

No information.

NCC-Database (NCC's Information Services on Computing Information)

covers computer hardware, computer software, services, literature.

PRODUCER: NCC Ltd., Manchester, U.K.

FILE SIZE: Literature--22,000 abstracts; Installations--30,000 Others 9,000

GROWTH RATE: Literature--3,000/yr.; Installations--1,500/yr, Others--small; plus 39,000 are revised every year.

NICEM, January 1964 to present, 400,000 records, monthly updates (National Information Center for Educational Media, Univ. of Southern California, Los Angeles, CA)

The NICEM database offers comprehensive coverage of non-print educational material. NICEM covers the entire spectrum of the educational field from pre-school to professional and graduate school levels. Librarians, media specialists, curriculum planners, and researchers who search NICEM will gain references to all types of educational media - 16 mm films, 35 mm filmstrips, overhead transparencies, audio tapes, video tapes, phonograph records, motion picture cartridges, and slides.

OFFERED BY: LOCKHEED

NTIS

This file is based on the semi-monthly Government Reports Announcements published by the National Technical Information Service (NTIS).

It announces information released to the public by US Government Agencies and Departments and includes business and economic data as well as scientific and technical report literature. US Government-sponsored translations and some reports written in foreign languages are included. Announcements are arranged in 22 subject categories.

The following broad subject fields are covered:

Aeronautics; agriculture; astronomy and astrophysics; atmospheric sciences; behavioral and social sciences; chemistry; earth sciences & oceanography; electronics and electrical engineering; energy conversion;

materials; mathematics; mechanical, civil & marine eng.; methods; military sciences; missile technology; navigation and communication; nuclear science; ordnance; physics; propulsion; space technology.

OFFERED BY: SDS
LOCKHEED
SDC
BRS, FIZ-4

PRESENT SIZE: 390,000 references

NUCLEAR POOL

This is a merged database, prepared and operated by FIZ-4. The main components are INIS and NSA, with IKK (Information Kernforschung und Kerntechnik). A collection of conference papers is also included.

OCEANIC ABSTRACTS

OCEANIC ABSTRACTS organizes and indexes worldwide technical literature on the seas of the world. It is designed to help researchers find out about published materials on many marine-related subjects.

The major subjects covered by this database include: Biology, Fisheries, Geology, Meteorology, Oceanography, Acoustics, Optics, Positioning, Remote Sensing, Desalination, Pollution, Coastal Resources, Engineering, Materials, Diving, Offshore, Deep Sea, Ships, Submorsibles, Buoys, and Governmental and Legal aspects.

OFFERED BY: SDS
LOCKHEED

PRESENT SIZE: 94,000 references

OCEANOGRAPHY - CNUCE Pisa

No information.

PAPERCHEM

covers the scientific and technical literature, including patents, of the pulp-, paper-, and board-manufacturing and utilizing industries gathered from all industrialized countries. Source documents include nearly 1,000 periodicals published in over 20 languages, patent gazettes of six major countries, symposium proceedings, and selected secondary sources.

OFFERED BY: SDC

PREPARED BY: Institute of Paper Chemistry

FILE SIZE: Approximately 12,000 records per year

COVERAGE: January, 1968 to present

UPDATING: Monthly, approximately 1,000 citations.

PASCAL

PASCAL is the machine-readable version of the French abstract journal Bulletin Signalétique which is composed of 51 subject sections. World-wide literature of all types is entered into the file normally in its original language with a French translated title and abstracts.

Some sections only offered by SDS, i.e.:

101-information science, 110-computer science, automation theory, operations research and management, 120-astronomy, space sciences and geophysics, 130-physics, optics, acoustics, 140-electrotechnology, 145-electronics and telecommunications, 160-solid state physics, 161-crystallography, 165-atomic, molecular, plasma physics, 220-mineralogy, geochemistry, 221-mining, mining economics, 222-crystalline rocks, 223-sedimentary rocks, marine geology, 224-stratigraphy, regional and general geology, 225-tectonics, 226-hydrology, 227-palaeontology, 730-fuels and energy, 740-metallurgy, 745-metal bonding, welding, 890-mechanical and civil engineering, transportation.

OFFERED BY: SDS

PRESENT SIZE: 905,000 references

PE/NEWS

Covers five major publications in the pretroleum and energy fields: Platts Oilgram News Service; Middle East Economic Survey; Petroleum Intelligance Weekly; Petroleum Economist; and Oil Daily. Extensive indexing by company and individual names, as well as location, and subject.

OFFERED BY: SDC

PREPARED BY: Central Abstracting Indexing Service of the American Petroleum Institute

FILE SIZE: Approximately 26,000 records per year

COVERAGE: January, 1975

UPDATING: Weekly, approximately 500 citations.

PHARMACEUTICAL NEWS INDEX (PNI), December 1975 to present, 15,000 citations, monthly updates (Data Courier, Inc., Louisville, KY)

PHARMACEUTICAL NEWS INDEX (PNI) is the on-line source of current information about the drug and cosmetic industries, with emphasis on the following subjects: Drug and Cosmetic Industry Management News, Health Legislation, Government Relations, Industry Financial News and Reports, and Pharmaceutical Research.

Citations in PNI are drawn from the four major newsletters: Drug Research Reports, (The Blue Sheet), FDC Reports, (The Pink Sheet), PMA Newsletter, and Washington Drug and Device Letter.

OFFERED BY: LOCKHEED
SDC
BRS

PLURIDATA

The main database generated by this organisation is a databank on Nuclear Magnetic Resonance (Carbon 13). A software package (DARC) has been developed for the databank with an interactive graphics capability. The operating host will be selected during 1978. Other databases which may be included are the Cambridge Crystallographic databank, and a Mass Spectrometry databank.

POLLUTION ABSTRACTS, 1970 to present, 45,000 citations, bi-monthly updates (Data Courier Inc., Louisville, KY)

Pollution Abstracts is a leading resource for references to environmentally related literature on pollution, its sources and its control.

The following subjects are covered by the Pollution Abstracts databases:

Air Pollution, Environmental Quality, Noise Pollution, Pesticides, Radiation, Solid Wastes, and Water Pollution.

OFFERED BY: SDS
LOCKHEED
SDC
BRS

PREDICASTS (PTS) Databases

The Predicast system consists of some seven separate databases, all offered by Lockheed. They are:

PTS DOMESTIC STATISTICS, July 1971 to present, 150,000 citations, updates vary with subfile. (PREDICASTS, Inc., Cleveland, OH)

PREDICASTS, Inc. abstracts all significant information appearing in annual reports of government agencies, statistical reports and reviews of industry, handbooks and yearbooks of trade associations, census reports, statistical bulletins of the U.S. government, and thousands of business magazines and trade journals.

PREDICASTS *Statistical Abstracts.* More than 70,000 abstracts of published forecasts with historical data for U.S.; coverage includes general economics, all industries, detailed products, and end-use data.

PREDICASTS *Composites.* Annual historical data (since 1958) and consensus of published forecasts through 1984 for more than 500 key economic, demographic, industrial, and product time series.

PREDICASTS *Basebook.* Annual data for more than 20,000 time series (1960-1974) on U.S. production, value of shipments, wages, prices, materials, consumption, foreign trade, and end-use distribution for all different types of industries, products, and services.

METROCASTS. Historical and projected (to 1990) data on population, income, employment, earnings, and distribution of industrial activity for states, standard business economic areas, and standard metropolitan areas.

PREDICASTS *Domestic Statistics* covers every area of industry and product statistics, government and services statistics, and social economic statistics for the U.S.A.

OFFERED BY: LOCKHEED

PTS EIS INDUSTRIAL PLANTS, current, 117,000 citations, quarterly updates (Economic Information Systems, Inc., New York, NY)

Access to the EIS Plants database offers immediate answers to a broad range of questions concerning the U.S. industrial economy. The EIS Plants database includes current information on some 117,000 establishments operated by 67,000 firms with current annual sales of more than $500,000. This total accounts for more than 90 percent of total U.S. industrial activity. Data are generated from business magazines, trade journals, state and industrial directories, corporate financial reports, and Census Bureau statistics. Also included are thousands of inputs received directly from companies and corporations.

OFFERED BY: LOCKHEED

PTS F&S INDEXES (FUNK & SCOTT), 1972 to present, 725,000 citations, monthly updates (PREDICASTS, Inc., Cleveland,OH)

The F&S Indexes cover both domestic and international company, product, and industry information. It contains information on corporate acquisitions and mergers, new products, technological developments, and sociopolitical factors. It summarizes analyses of companies by securities firms, contains forecasts of company sales and profits by company officers, and reports on factors influencing future sales and earnings (such as price changes, government antitrust actions, sales and licensing agreements, and joint venture agreements).

In addition, the F&S provides on-line access to a comprehensive bibliography of more than 5,000 publications cited in PREDICASTS publications. A complete abstract display from this bibliography includes title, publisher, and address, annotation terms describing the publication, frequency, and cost, and the PREDICAST codes for product, country, and event. This portion of the data base is known as the Source Directory. (See also PTS Weekly).

OFFERED BY: LOCKHEED

PTS FEDERAL INDEX, January 1977 to present, new database, monthly updates (PREDICASTS, Inc., Cleveland, OH).

The Federal Index provides coverage of such Federal actions as proposed rules, regulations, bill introductions, speeches, hearings, roll calls, reports, vetoes, court decisions, executive orders, and contract awards. The

Washington Post and federal documents such as the Congressional Record, Federal Register, Presidential documents, and Commerce Business daily, are indexed on a regular basis. Source documents can be ordered from PREDICASTS at a nominal charge.

OFFERED BY: LOCKHEED

PTS INTERNATIONAL STATISTICS, 1972 to present, 155,000 citations, updates vary with subfile. (PREDICASTS, Inc., Cleveland, OH)

PREDICASTS, Inc., abstracts information from more than 1,000 international sources. Included are annual reports of foreign governments, statistical reports of industries and trade associations of foreign countries, publications of the United Nations and other international agencies, bank letters, newspapers, and business and trade journals.

This essential database for market development, sales analysis, operations research, information retrieval, executive decisions, economic forecasting, long-range planning, diversification study, security analysis, and market research includes the following subtitles:

Worldcasts Statistical Abstracts. Abstracts of published forecasts with historical data for all countries of the world (excluding the United States). Coverage includes general economics, all industries, detailed products, and end-use data.

Worldcasts Composites. Annual historical data, SIC codes, and consensus of published forecasts through 1985 for 2,500 economic, demographic, industrial, and product series for key countries.

Worldcasts Basebook. Annual data for 20,000 time series (1960-1974) for all countries of the world on production, consumption, price, foreign trade, and usage statistics for agriculture, mining, manufacturing, and services as well as demography and national income.

OFFERED BY: LOCKHEED

PTS MARKET ABSTRACTS, 1972 to present, 125.000 citations, monthly updates (PREDICASTS, Inc., Cleveland, OH)

PREDICASTS Inc. abstracts all significant information appearing in thousands of newspapers, business magazines, government reports, trade journals, bank letters, and special reports throughout the world, The PREDICASTS Market Abstracts database provides the following kind of information: Acquisitions, Capacities, End Uses, Environment, Foreign Trade, Market Data, New Products, Production, Regulations, and Technology. This information covers

products and services of the following industries: Chemical, Communications, Computers, Electronics, Energy, Fibers, Food, Instruments and Equipment, Metals, Paper, Plastics, and Rubber. (See alseo PTS WEEKLY).

OFFERED BY: LOCKHEED

PTS WEEKLY, Current month, 15,000 citations, weekly updates. (PREDICASTS, Inc., Cleveland, OH)

PREDICASTS WEEKLY includes weekly records, which, after more complete indexing, are incorporated into either PTS CMA-EMA (File 16) or PTS F&S (File 18). This database combines the coverage of PTS CMA-EMA and PTS F&S.

OFFERED BY: LOCKHEED

PSYCHOLOGICAL ABSTRACTS, 1967 to present, 250,000 citations, monthly updates (American Psychological Association, Washington, DC)

PSYCHOLOGICAL ABSTRACTS covers the world's literature in psychology and related disciplines in the behavioral sciences. Over 900 periodicals and 1500 books, technical reports, and monographs are scanned each year to provide coverage of original research, reviews, discussions, theory, conference reports, panel discussions, case studies, and descriptions of apparatus.

OFFERED BY: LOCKHEED
SDC
BRS
DIMDI

SCIENCE CITATION INDEX (SCISEARCH)

The ISI - Physical, Chemical and Engineering Sciences file includes the complete contents of the 1,700 journals covered by Current Contents Physical and Chemical Sciences and Current Contents Engineering and Technology, both published by ISI. It is thus in fact the Science Citation Index itself excluding the Life Sciences journals.

The Science Citation Index takes advantage of the concept that authors' references to previously published material indicate subject relationships between the two. Applying these relationships the Index shows, for the time period covered, which previously published items are being referred to (cited) in the current literature, who is doing the citing and in what journals they are being cited.

Among the major subject categories covered are:

Acoustics; Aeronautics; Aerospace Science; Astronomy; Astrophysics; Biochemistry; Ceramics; Chemistry - analytical, organic, physical; Computer applications and Cybernetics; Construction and Building technology; Crystallography; Electricity; Electrochemistry; Electronics; Engineering - biomedical, chemical, civil, electrical and electronic, mechanical; Environment; Fuels; Geography; Geology; Geophysics; Geosciences and Earth Sciences; Instruments and Instrumentation; Machinery; Materials Science; Mathematics; Mechanics; Metallurgy and Mining; Meteorology; Microscopy; Mineralogy; Nuclear Science and Technology; Oceanography; Optics; Paper; Photography; Physics; Polymer Science; Sciences, multidisciplinary; Soil Sciences; Solid State Physics; Spectroscopy; Telecommunications; Welding Technology.

OFFERED BY: SDS
LOCKHEED

PRESENT SIZE: 889,000 references

SCIENCE CITATION INDEX - SOCIAL SCIENCES, 1972 to present, 400,000 monthly updates (The Institute for Scientific Information, Philadelphia, PA)

The SSCI is a multidisciplinary database indexing every significant item from the 1,000 most important social sciences journals throughout the world and social sciences articles selected from 2,200 additional journals in the natural, physical, and biomedical sciences. The SSCI includes many important monographs as well. The SSCI covers every area of the social and behavioral sciences.

SOCIAL SCISEARCH offers a unique information retrieval technique. In addition to more conventional retrieval by title words of phrases. source authors, journal names, corporate source, etc., it is also possible to search by way of the author's cited references.

OFFERED BY: DIMDI
LOCKHEED

SOCIOLOGICAL ABSTRACTS, 1963 to present, 75,000 citations, quarterly updates (Sociological Abstracts, Inc., San Diego, CA)

SOCIOLOGICAL ABSTRACTS covers the world's literature in sociology and related disciplines in the social and behavioral sciences. Over 1200 journals and other serial publications are scanned each year to provide coverage of original research, reviews, discussions, monographic publications theory, conference reports, panel discussions and case studies. The following fields are covered: Methodology and Research Technology, History and Theory of Sociology, Social Psychology and Group Interaction, Culture and Social Structure, Management and Complex Organization, Social Change and Economic Development, Mass Phenomena and Political Interactions, Social Differentiation, Rural and Urban Sociology, Sociology of the Arts, Education, Religion, Science, Health and Knowledge, Demography and Human Biology, The Family and Social Welfare, Community Development, Policy, Planning, Forecasting and Speculation, Radical Sociology, Studies in Violence and Poverty and Feminism, Environmental Interaction.

OFFERED BY: LOCKHEED

SSIE

Covers on-going and recently completed research in the agricultural sciences, behavioral sciences, biological sciences, earth sciences, chemistry and chemical engineering, materials, mathematics, medical sciences, physics, and social sciences--both basic and applied research projects. Research in progress is included from over 1,300 funding organizations, such as Federal, state, and local government; non-profit associations; colleges and universities; nonaffiliated investigators; and some non-U.S. organizations and private industry.

OFFERED BY: SDC

PREPARED BY: Smithsonian Science Information Exchange, Inc.

FILE SIZE: Approximately 108,000 projects per fiscal year

COVERAGE: Fiscal Year 1974 to date

UPDATING: Monthly, approximately 9,000 records

STANDARDS - CNUCE PISA

An experimental database which will cover Italian and ISO-standards.

STAR/IAA

The NASA Aerospace file contains references to both the reports in the NASA STAR Abstract Journal and the journal articles in the IAA Abstract Journal.

The following broad subject areas are covered by this file: Aeronautics; Astronautics; Chemistry and Materials; Engineering; Geosciences; Life Sciences; Mathematical and Computer Sciences; Physics; Social Sciences; Space Sciences; General.

Each of these broad areas is broken down into a number of categories. The total number of categories is 99.

OFFERED BY: SDS

PRESENT SIZE: 883,000 references

THERMODATA

covers numerical data on thermodynamic behaviour of 2500 chemical compounds with literature references to 12,000 documents.

PRODUCER: Centre Interuniversitaire de Calcul de Grenoble (CICG), Grenoble.

FILE SIZE: 12,000 documents

GROWTH RATE: 1,500 documents per year

TITUS

A comprehensive file of information related to the textile industry, designed to be useful to textile managers, engineers, and technicians. Citations for TITUS are

gathered from more than 800 periodicals (scientific journals and technical magazines), technical reports, patents, standards, scientific theses, manufacturers; technical data-sheets, conference reports, and legal and administrative regulations. Subject coverage includes fibres, bonding, analysis, agents, polymerization, properties, testing, treatments, weave, and chemical composition.

OFFERED BY: SDC, Institut Textile, ZTDI

PREPARED BY: Institut Textile de France

FILE SIZE: Approximately 18,000 records per year

UPDATING: Monthly, approximately 1,500 records.

TOXLINE

TOXLINE is a bibliographic database made up of some ten sub-files, taking material from Index Medicus, BIOSIS, etc.

It covers human and animal toxicity studies, environmental effects of chemicals, pollutants, adverse drug reactions and methods of analysis.

The present size is 470,000, with an annual growth rate of about 15,000.

It is prepared by the U.S. National Library of Medicine.

Available from BLAISE.

TULSA

Covers worldwide literature and patents related to oil and natural gas exploration, development, and production in such areas as petroleum geology, exploration geophysics and geochemistry; well drilling; well logging, well completion and servicing; oil and gas production; reservoir studies and recovery methods; pollution; alternative fuels and energy sources; and petroleum transportation and storage. Corresponds in coverage to *Petroleum Abstracts*.

OFFERED BY: SDC

PREPARED BY: University of Tulsa, Information Services Dept.

FILE SIZE: Approximately 18,000 records per year.

COVERAGE: 1965 to present

UPDATING: Monthly, approximately 1,500 citations.

WAA (WORLD ALUMINIUM ABSTRACTS)

WORLD ALUMINIUM ABSTRACTS is a monthly service covering the world's technical literature on aluminium, from ore processing (exclusive of mining) through end uses such as transportation, building, etc.

References are taken from more than 1600 scientific and technical journals, patents, government reports, conference proceedings, dissertations and books. The overlap with METADEX is of the order of 20%, and the file specification corresponds exactly to METADEX.

Broad subject categories are: Aluminium Industry; Ores; Alumina Production Extraction; Melting, Casting, Foundry; Metalworking, Fabrication, Finishing; Physical and Mechanical Properties; Engineering Properties and Tests; Quality Control and Tests; End Uses.

OFFERED BY: SDS, LOCKHEED.

PRESENT SIZE: 55,000 references

ZDE - Datenbasis

ZDE covers the field of electro technology.

PRODUCER: Zentralstelle Dokumentation Elektrotechnik e.V. beim VDE, Offenbach/Main, FRG.

FILE SIZE: 278.000 references

GROWTH RATE: 60,000 references per year.

ANNEX II

PRICE DATA

NAME OF DATABASE	PRODUCER	OPERATOR	LEASE / LICENCE FEE	ROYALTIES	TOTAL OFF-LINE PRINT CHARGE PER REFERENCE	CONNECT-CHARGE PER HOUR
* ABI/INFORM	Data Courier	Lockheed SDC BRS		$30/hour	$.10 $.10	$65 $65
* ACCOUNTANTS INDEX	Am.Inst.C.P.A.	SDC			$.10	$65
* AGRICOLA (CAIN)	N.A.L.	Lockheed SDC BRS	$840/year	free	$.05 $.06	$25 $35
AGRIS	F.A.O.	Lockheed				
* AMERICAN HISTORY AND LIFE	Am.Bibl.Cen.	Lockheed	$1200 new $3000 old		$.15	$65
*† AIM/ARM	C.Voc.Ed.Ohio Un.	Lockheed	free	free	$.10	$25
* APILIT	A.P.I.	SDC			$.11	$65
* APIPAT	A.P.I.	SDC			$.11	$65
*† APTIC	E.P.A.	Lockheed	$1800 (not USA)	none	$.10	$35
* ARIANE	CATED	CATED				$100
* ART BIBL.MODERN	Am.Bibl.Cen.	Lockheed	$1200 new $3000 old		$.10	$60

	NAME OF DATABASE	PRODUCER	OPERATOR	LEASE/ LICENCE FEE	ROYALTIES	TOTAL OFF-LINE PRINT CHARGE PER REFERENCE	CONNECT-CHARGE PER HOUR
*	ASI	Cong. I.S.	SDC			$.25	$120
	BIAM	Banque d'Inf. automatisee s.l.Medicaments	Bancque d'I.aut. s.l. M.				
*†	BIOSIS	B.A.	DIMDI SDS Lockheed SDC BRS	Back: $8180 all new: $3540	$15/hour 50% of > $.10/ ref.	 $.15 $.15 $.10	 $44 $45 $65
*†	CAB	C.A.B.	Lockheed SDS	free	$26/hour + .06/ref (40% of hour + ref.)	$.15 $.06	$65 $61
*†	CANCERLINE/ CANCERLIT	N.L.M.	DIMDI		free		$17.5
*†	CANCERPROJECT	N.L.M.	DIMDI		free		$17.5
*†	C.A.CONDENSATES	C.A.	INFOLINE SDS LOCKHEED SDC BRS	$4000	$4/hour $.02/ref.	 $.08 $.08	 $37 $35 $60
	CDIUPA						

NAME OF DATABASE	PRODUCER	OPERATOR	LEASE / LICENCE FEE	ROYALTIES	TOTAL OFF-LINE PRINT CHARGE PER REFERENCE	CONNECT-CHARGE PER HOUR
*† CHEMLINE	CA/MEDLARS	BLAISE		$14.35/hour $.04/ref		$36 - 45
* CLAIMS/CHEM	I.F.I.	Lockheed		confidential	$.10	$150
* CLAIMS/CLASS = CLAIMS/GEM	I.F.I.	Lockheed		confidential	$.10	$90
*† COMPENDEX	Eng. Index	Lockheed SDC SDS	License $7400 + 300	$10/hour $.03/ref.	$.10 $.10 $.09	$65 $65 $45
* CIS INDEX	Cong. I.S.	SDC			$.25	$120
* COMP.DISS.INDEX	U.Mic.Int.	Lockheed BRS SDC	special agreement	special agreement	$.12	$55
* CRECORD	Capitol Serv.Inc.	SDC			$.15	$80
* CRIS	U.S.D.A.	Lockheed	free	free	$.10	$40
DECHEMA (Chem. Technik)	DECHEMA	DECHEMA				
* DERWENT	DERWENT	INFOLINE SDC		$50 ID/year	$.25	$120

NAME OF DATABASE	PRODUCER	OPERATOR	LEASE / LICENCE FEE	ROYALTIES	TOTAL OFF-LINE PRINT CHARGE PER REFERENCE	CONNECT-CHARGE PER HOUR
* DOMA	DOMA	ZDE FIZ-4		$.17/min $220/month		
*† EIDB	ERDA		free			
* ELECTRONIC COMPONENTS	SDS	SDS			$.06	$43
*† ENERGYLINE	E.I.C.	SDC SDS		$10/hour	$.25 $.06	$95 $52
* ENVIROBIB/EPB on-line	Env.St.Inst.	Lockheed		confidential	$.15	$65
*† ENVIRONMENTAL SCIENCE INDEX (ENVIROLINE)	E.I.C.	Lockheed SDS	$2000 old $6500 new	$15/hour	$.20 $.06	$90 $45
*† EPIC	Belg.Min.Econ. Affairs		$8750	1/3 of on-line		≈$25
*† ERIC	N.I.E.	Lockheed SDC BRS	free	free	$.10 $.08	$25 $35
*† EXCEPT.CHILD ED. RESOURCES	Counc.Except. Children	Lockheed	free	free	$.10	$25

NAME OF DATABASE	PRODUCER	OPERATOR	LEASE / LICENCE FEE	ROYALTIES	TOTAL OFF-LINE PRINT CHARGE PER REFERENCE	CONNECT-CHARGE PER HOUR
EXCERPTA MEDICA	EXCERPTA MEDICA					—
* FOUNDATION DIRECTORY	Foundation Center	Lockheed		% of hour and ref.	$.30	$60
* FOUNDATION GRANTS INDEX	Foundation Center	Lockheed		% of hour and ref.	$.30	$60
*† FSTA	IFIS	ZMD Lockheed SDC	$3060 new	35% of hour and ref.	$.10	$65
*† GEOREF	Am.Geol.Inst.	SDC	$1222 new $1100 old	$15/hour $.10/ref.	$.20	$75
* GRANTS	Oryx Press	SDC			$.35	$60
* HISTORICAL ABSTRACTS	Am.Bibl.Cen.	Lockheed	$1200 new $3000 old		$.15	$65
* IKK	FIZ-4	FIZ-4				
*† INSPEC	IEE	Lockheed SDC SDS INFOLINE BRS FIZ-4	$6750 new $3900 old $4550 (74-76)	$15/hour	$.10 $.06	$45 $44 $47?

NAME OF DATABASE	PRODUCER	OPERATOR	LEASE/ LICENCE FEE	ROYALTIES	TOTAL OFF-LINE PRINT CHARGE PER REFERENCE	CONNECT-CHARGE PER HOUR
*† INIS	IAEA	C.T.I. of Belg.Min. of Econ. Aff.	free	free	$.12	$62.5
INT.PHARM. ABSTRACTS	Am.Soc.Hosp. Pharm.					
*† ISMEC	IEE	SDS Lockheed		$.03/ref. $10/hour	$.09 $.12	$61 $65
* LANGUAGE & LAN-GUAGE BEHAVIOUR ABSTRACTS	Soc.Abstracts	Lockheed			$.15	$55
* LIBCON E & F	SDC	SDC			$.25	$120
* LIBRARY and IN-FORMATION SCI. ABSTRACTS	Libr.Assoc. England	SDC			$.10	$50
* MARC U.K.	Brit.Library	BLAISE				$36-45/hr +$45/yr
*† MEDLARS	N.L.M.	DIMDI BLAISE BRS				$52.50/search $36-45/hr. plus $45/yr.

NAME OF DATABASE	PRODUCER	OPERATOR	LEASE/ LICENSE FEE	ROYALTIES	TOTAL OFF-LINE PRINT CHARGE PER REFERENCE	CONNECT-CHARGE PER HOUR
*† METADEX	Metals Abstr.	Lockheed	$1600/yr	$25/hour	$.12	$80
		SDS	plus old	$.04/ref.	$.10	$53
* METEOROLOGICAL and GEOPHYSICAL ABSTRACTS	Am.Met.Soc. & NOAA	Lockheed		in negotiation	$.10	$50
* NCC Databases	NCC Manchester	NCC Man.				
* NICEM	Nat.Inf.Cent. Educ.Media	Lockheed			$.20	$70
*† NTIS	NTIS	Lockheed		$12/hour	$.10	$45
		SDC	$4000 ... new		$.08	$45
		SDS	$ 500 ... old		$.06	$41
		BRS				
		FIZ-4				$47
* NUCLEAR POOL	FIZ-4	FIZ-4		free		$47
*† OCEANIC ABSTR.	Data Courier	Lockheed	$2500/year new	$5/hour	$.10	$55
		SDS	$1000/year old	+ $.03/ref.	$.09	$52
*† PAPERCHEM	Inst.Paper Chem.	SDC			$.15	$110
* PASCAL	CNRS	SDS	$4075/year	$13/hour	$.06	$45
* P/E News	API	SDC			$.11	$115

NAME OF DATABASE	PRODUCER	OPERATOR	LEASE / LICENCE FEE	ROYALTIES	TOTAL OFF-LINE PRINT-CHARGE PER REFERENCE	CONNECT-CHARGE PER HOUR
*† Pollution Abstr.	Data Courier Inc.	Lockheed SDC SDS BRS	$2000/year new $1000/year old	$10/hour	$.10 $.15 $.06	$65 $65 $52
* Pharm. News Index	Data Courier	Lockheed SDC BRS		$30/hour	$.15 $.15	$65 $65
* PREDICASTS	PREDICASTS	Lockheed			$.20	$90
*† PSYCHOLOGICAL ABSTRACTS	Am.Psych.Ass.	Lockheed SDC	$800/year	$20/hour	$.10	$50
		DIMDI BRS				$37.5
*† SCIENCE CITATION INDEX	ISI	Lockheed DIMDI SDS (discontinued '78)	$ 20000/year	$10/hour	$.10 $.09	$70 $47.5 $51
* SOCIOLOGICAL ABSTRACT	Soc.Abstr.	Lockheed			$.15	$55
* SSIE	Smithsonian Sc.Int.Exch.	SDC	$25000/year	$35/hour $.12/ref.	$.15	$110
* STAR/IAA	NASA	SDS	free	free	$.06	$28

NAME OF DATABASE	PRODUCER	OPERATOR	LEASE / LICENCE FEE	ROYALTIES	TOTAL OFF-LINE PRINT CHARGE PER REFERENCE	CONNECT-CHARGE PER HOUR
*† THERMODYNAMIC DATA	Thermodynamic Grenoble	Thermo-data Gr.	free	free		$51
*† TITUS	Inst.Textile	Inst.Tex. ZTDI SDC		$20/hour	$.21 $.20	$71 $80
*† TOXLINE	NLM	DIMDI BLAISE		$.04/page $14.35		$32 $36-45
* TULSA	Univ.Tulsa	SDC			$.50	$125
*† World Aluminium Abstr.	WAA	SDS LOCKHEED		free	$.06 $.10	$30.5 $50
* ZDE (Electrotechnik)	ZDE	ZDE	$4340/yr.		$.44	$44

* End-user price data obtained

† Database price data to operator obtained.

No superscript - no on-line price data available yet, but non-quantitative data on charging policy or system exists.