Information Services & Use 8 (1988) 273–286
Elsevier Science Publishers B.V., Amsterdam – Printed in The Netherlands

News, Trends, and Comments

BUSINESS

Associated Knowledge Systems

Robin Clough led a management buyout from ICI in December 1988 to form a new company as named above. Scottish American Investment Trust have a 20% interest in the business. It is believed that about £500,000 changed hands. The principal product then, as now, is the successful ASSASSIN database system.

ASSASSIN was formerly a database management software package mainly of interest to librarians and information scientists. The latest version, ASSASSIN 6, is business oriented and is designed for use on a host computer with online access (full-text) from terminals.

Text creation and retrieval, and database functions are provided with the bold claim that "anyone can quickly learn to file, organise, edit, annotate and send and receive documents within any office environment....no prior training is necessary".

It is unusual among "Office Systems" to find one that takes account of meaning. The Indexing Problem rarely gets a mention from the office system salesmen. In ASSASSIN some thought has been given to help the user to index his material. New words are automatically queried and provision is made for entering retrieval aids. For example words may be added to a synonym list, or may be treated as indexing term strings such as DOWN'S SYNDROME or BATTERIES, LEAD ACID.

Another useful aid is the provision for "meaning-links". It's no good searching for JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, when it's equally likely to be called J AM CHEM SOC, J AMER CHEM SOC, J AMERICAN CHEM SOCIETY etc., etc.

BRS

BRS, the US online host computer services company, was acquired by Maxwell in December 1988 for an undisclosed sum. BRS

Europe went with it, since although the directors owned 51% they sold to Thyssen in September 1988. VNU/Audet owned 44%. Both sold to Maxwell. BRS, strong in medical information, is being combined with Pergamon Orbit Infoline under the direction of Jim Terragno, the President.

Dialog

Dialog, largest US online host, was acquired in December 1988 from Lockheed by Knight-Ridder the newspaper group for $353M, Roger Summit continuing as President. Knight-Ridder's best known publication is the **Philadelphia Enquirer** as I well know having been a frequent visitor to that city. However it also runs a substantial Business Information Services Division and was a US Videotex pioneer in the days when it was called Viewdata. It still runs a unique newspaper called Vutext.

Elsevier-Pearson

In September 1988 Pearson acquired 15.4% of Elsevier and Elsevier acquired 8.7% of Pearson. Rupert Murdoch has a holding of nearly 20% in Pearson and Robert Maxwell about 10% of Elsevier. According to the Financial Times (incidentally owned by Pearson) this may be the first step in a friendly alliance between Elsevier's Pierre Vinken and Pearson's Lord Blakenham, partly to fend off Murdoch and Maxwell and partly to embark on various joint ventures.

Pearson own the well known book publishers, Addison-Wesley-Longman, Penguin and others, and several newspapers including the FT and Les Echos. Elsevier publish a large number of scientific journals, books, conference proceedings etc., including of course Information Services & Use, and also some trade journals, newspapers and magazines.

Inmos

Inmos was the product of an unlikely 1978 alliance between the UK Labour Government, the US entrepreneurs Richard Petritz and Paul Schroeder, founders of Mostek, and Ian Barron from the UK minicomputer company Computer Technology. The National Enterprise Board and the Department of Industry put £100M into it so its early progress was determined by political considerations.

Inmos soon switched its efforts from 64K RAMs, belatedly realising that it was competing against everyone else, to a unique product, the Transputer. This chip uses an on-board memory and is controlled by its own Occam software originated by C.A.R.Hoare at Oxford University and named after the 14th century William of Occam whose philosophy was (roughly) that the simplest solutions are the

best. The Transputer operates with other transputers as a parallel processor in contrast to the conventional long-standing Von Neumann "one processor at a time" architecture. Consequently it is quick. Very quick. For instance a complex airflow calculation which takes 2 minutes on a monster Cray XMP-48 supercomputer costing around £10M admittedly takes a little longer on a Meiko transputer-based machine. About 10 minutes in fact, but the Meiko costs £80,000.

In 1984 Thorn EMI bought Inmos from the government, paying £125M for it. It has since invested a further £300M. Inmos and the transputer are now a success. In 1987 it made a profit. Thorn has made numerous attempts to sell it and it needs at least another £200M for new plant at Newport in Wales.

It now looks as if Inmos will be merged with a group itself formed from a merger between the French Thomson Semiconductors and the Italian SGS. Thomson-SGS-Inmos would then be the largest European semiconductor manufacturer with sales of around $1.2 billion and the only one making both processors and memories.

Maxwell

Maxwell Communication Corporation (1987 sales £884M, Pre-tax Profits £166M) is into Publishing, Communications, and Printing. Robert Maxwell has tried hard to break into the US market. His bids for Bell & Howell and Harcourt Brace Jovanovich were frustrated, but in the first week of November 1988 two successful bids were announced. Maxwell paid $750M for Dun & Bradstreet's Official Airline Guides and $2.6 Billion for Macmillan. In January 1989 Maxwell took over BRS Europe (see above).

Maxwell is expected to sell off Macmillan's book publishing business, retaining its more successful advertising rate service Standard Rate and Data, and other information services. He has already sold Michie, which publishes state legal codes, for around $225M to Mead. The San Francisco store chain Gumps will also probably be sold.

Evidently Maxwell intends to concentrate on Publishing & Communications and is expected to dispose of parts of the Printing Division which includes BPCC, a printing company equipped with new colour presses, Oyez Press, Alco, and Diversified Printing Corporation.

FROM THE LITERATURE

Who needs knowledge? The Aslib annual lecture. Peter Benton. Aslib Proceedings 41(1), 1-10, 1989.

Peter Benton is now Director General of the British Institute

of Management, and was at one time Managing Director of British Telecom. Benton's theme is information in the new age of uncertainty and change which he thinks started about 30 years ago.

As an example of the old introverted world of perceived certainty he talks about the situation when he joined Telecoms at what was then the Post Office:- "I found 16 edge feet of Telecommunication Instructions to guide every action of 240,000 people....the power to command information was related to status....it was really rather impertinent, if not revolutionary, for somebody lower down the organisation to seek to know more than was proper for his or her station....it is now possible to devolve to perhaps hundreds of people the freedom to develop their own systems and their own databases".

In the discussion The Chairman (Dennis Lewis) quoted a colleague who asked "why, if information is power, all those people who have all that information, i.e. the librarians, are so powerless? Why is it that the people who have the power don't have it by reason of the information that they acquire?"

Ending the discussion, Benton said: "Some American organisations have increased their spending on information systems from about three percent of sales to almost seven percent.....if the Chief Executives and the leaders of the business units are not so convinced, you (i.e. the information staff), instead of being treated as an important part of the wealth creating sinews of the business, will be treated as an overhead to be cut back by 10 percent each year".

Unfortunately Dennis did not get an answer, nor did Benton suggest how the information people could set about up-rating the value of information in the minds of their management.

Efficiency of text scanning in bibliographic databases using microprocessor based multiprocessor networks. J.K.Cringean, G.A.Manson, Peter Willett, and G.A.Wilson. Journal of Information Science 14(1988), 333-345.

The idea of serially searching through a large database was set aside in favour of the faster "inverted file" approach many years ago. A relatively small directory of keys from records - for instance words in titles - is searched, not the large record file. Each key contains pointers to all records containing that key. As new records are added fewer new keys are found, until eventually the key directory grows hardly at all no matter how many new records are added. The disadvantage of the arrangement is that computer processing time is required whenever new records are added, and key directories require considerable extra storage space.

When the design of Primate was being considered (See the NEWS section) I decided to use a serial searching system in which a highly

compressed version of each record was matched against a highly compressed version of the search question. It then became possible to keep a large part of the database in compressed form in memory for searching, so fewer disc accesses were needed. When a match was obtained the full matching records were retrieved from disc and displayed. The advantages were high speed searching so long as the database was not too large, and smaller storage requirements (very important in those days). Compressed versions of each new record were created as the record was added without any noticeable delay.

It now appears that this technique may become feasible for much larger databases. Cringean et al discuss "Text Signatures" (the "compressed versions") just mentioned, and review existing methods of pattern matching - that is matching the signature of a query against a large number of record signatures. One new development reported by another research team is a "chip which implements a modified version of the Aho-Corasick pattern matching algorithm, forming the basis for high performance search engines which can be linked together to form a highly parallel text scanning machine".

Cringean decided to go for a bit of chip one-upmanship - and where better to go for parallel processing than to a transputer network? (See under BUSINESS: Inmos). They describe experimental work and it appears that the speed in this application increases more or less directly with the number of transputers provided that it is possible to saturate the network with useful work.

Cringean et al conclude: "If future work supports our conclusions, serial retrieval systems may become much more widely used than is currently the case with a consequent increase in the ability of such systems to cope with rapidly changing files of data".

Bell breakup plus five: mixed reviews. Trudy.E.Bell. IEEE Spectrum 25(13), December 1988. 26-31.
The re-education of AT&T. Laton McCartney. Information Quarterly December 1988, 48-61.

Information Services depend more and more upon efficient telecommunications so what have been the effects of the breaking up of AT&T? Some opinions about the situation in the United States five years after the event are provided in these articles. Incidentally AT&T, which has been operating both in its original and new truncated form for 103 years, had its first loss ever in the fourth quarter of 1988 giving a full-year loss of $1.67 billion. However there were special circumstances - conversion to fibreoptic transmission required a write-off of $6.7 billion of old equipment.

The 1984 consequence of the anti-trust trial conducted by Judge Greene was that AT&T was split up into seven regional regulated monopolies ("Baby Bells" or "Belcos") whose primary activity is the provision of POTS - Plain Old Telephone Services. Each now earns

between eight and twelve billion dollars per annum and employs between 67,000 and 100,000 people. The remaining product of the split was AT&T (in two divisions - Information Services and Communications), a manufacturing and long-distance services company permitted to offer PANS - Pretty Amazing New Services - if it could think of any. Its annual revenue is now around $34 Billion and it has over 300,000 employees.

AT&T retained the Bell Laboratories re-named AT&T Bell Laboratories with an annual budget of about $2.3 Billion. A new establishment - Bell Communications Research (Bellcore) - carries out applied research for the Belcos by whom it is financed with about $940M annually. Some Belcos have also started up their own small applied technology centres with up to about 500 employees.

Judge Greene's objective was "the establishment of fair competition freed from the heavy hand of monopoly" and "the encouragement of innovation to make the full benefits of a sophisticated telecommunications industry available to the American public...in this Information Age".

The result, according to the article by Bell (presumably no relation) is that on balance these objectives are being more or less realised "notwithstanding a few twists and turns on the way....open competition is greater....hundreds of companies are providing long-distance services, customer premises equipment, and information services....local rates have risen by about 35%, and long-distance rates have dropped by about the same amount".

According to the McCartney article "Dazed and disoriented from the antitrust settlement which would end up by costing the company about $100 Billion - three quarters of its entire assets - AT&T spent 1982 and 1983 frantically assessing what divestiture would mean to its earning power and its ability to remain financially viable".

A turning point was the development of the 5ESS digital telephone exchange switch, brought out in 1984. Orders came in rapidly - for 2.5 million lines by 1985. This was followed by the draconian but necessary actions of Jim Olsen the President. In 1986 Olsen merged the two divisions, reduced the workforce by 32,000, slashed telecom prices, and initiated a new marketing strategy. Since then there has been some progress in several different fields but AT&T has had a hard time and has been far less profitable than its Baby Bell offsprings. PANS have been elusive.

INFORMATION SERVICES

IEPRC EPMAP Project

The International Electronic Publishing Centre Ltd (IEPRC) provides a service called The Electronic Publishing Mapping Project (EPMAP) which presents summary information and expert evaluation of Electronic Publishing technology. Phase I of the project is supported by the CEC section DGXIII. It consists of the setting up of a database for IEPRC by Pira, the UK printing research centre. The first subscription year started in September 1988.

More information from IEPRC, Pira House, Randalls Rd., Leatherhead, Surrey KT22 7RU, UK.

* Classified Valentines

The Daily Telegraph's St. Valentine's day Information Service accepts messages which are duly published on February 14th. Here are some examples:-

The Anonymously Adoring
Nag nag nag nag nag nag but I'll love you always.

The Dangerously Adventurous
Claire - I would like to introduce you to my world of adventures in Bournemouth. Andy.
Love you lots in Putney (Anon.)

The Endearing Names
Nellie and Whoops keep Toad very happy. Big big Snozzle.

The Humourously Disgusting
Miss Snufflepagus. I'd walk round a sewage farm with you anytime. Your squashy friend.

The Humourously Romantic
Michael. May I be the mustard in your sausage sandwich? D.

The Pubs We Have Known
Kathryn - too sleepy in the morning, remembering all the good times and looking forward to many more in your Devonshire arms. (He must mean the Devonshire Arms in Plymouth. Ed)

The Rupert Brooke
Jan - Remember the summer of 1958? Green grass, lemonade and chocolate biscuits. Happy Valentines. (And was there honey still for tea? Ed.)

The Sheer Nonsense
Love to pink ice jumbyform bromby. Your hot wafer.

The Utterly Improbable
Jill. Miss you. See you in Khatmandu next month. Love Nick (bring more fruit gums).

NEWS

* CD-ROMs - the future.

The CD idea started in 1969 in the mind of Klaas Compaan, a physicist working at Philips, Eindhoven, Holland. He managed to raise the interest of Piet Kramer, head of optical R&D, and the project continued informally until 1972 when another company demonstrated a magnetic videodisc. This encouraged the two to find better alternative methods and in 1971 they demonstrated the feasibility of recording variable length impressions representing a frequency modulated signal, using a borrowed gas-laser four feet long, with a servo-controlled mechanism for keeping the laser on track.

By 1974 the project had moved on to a system in which the audio signal was sampled and a digital representation of its value was periodically recorded as small pits on the disc surface; this was the basis of today's CD systems. Compact Disc Read Only Memories (CD-ROMs) followed using similar recording principles.

Philips received an order for 5000 PCs (its IBM PC XT compatible model) with built-in CD-ROM drives from Kronos, an Italian publisher, in January 1989 - its biggest single order yet. Also in January a consortium led by Extel decided to launch a service into the most successful information services sector - financial - with CD-ROMs covering about 25,000 European companies up-dated monthly at an annual subscription of £18,000.

In spite of this, CD-ROM growth has not been up to expectations. The total number shipped in 1987 is estimated at 100,000 drives. Disk/Trend, a US forecasting agency, estimates 1991 shipments of all types of optical disc drives at 1.4 million. Link Resources estimates that in 1988 the CD-ROM installed base in Europe was 25,000 drives. Link thinks that the 1991 total European installed base will be 182,000. This increase from 1988 represents a compound growth rate of over 90% per annum which would be considered sensational in many industries. However it is lower then expected.

Even if these numbers are simply the result of projecting curves (as they probably are) and are 100% out - not an unreasonable amount in technology forecasting - they represent quite a nice customer base. It is certainly large enough to ensure the success of quite a number of "niche" information products.

But like all new technology, CD-ROMs will be further developed. Reliability and life expectancy (see the TECHNOLOGY section) will probably be improved. In November 1988 double density CD-ROMs were announced by Nimbus, providing 1.2 Gbytes (1200 Mbytes) per disc, with 2.4 Gbytes expected. It is not yet clear what the repercussions on existing computers and players will be. Data

compression ratios, enabled by the real-time processing power of today's chips, are increasing by amounts which were not anticipated. Clearly these developments will remove some of the restrictions on the CD-ROM storage of graphics and halftone or colour illustrations. They will also increase the potential of other CD variants - for instance for including more motion video.

Although erasable - that is "read/write" - discs are not yet available, prototypes are working. Tandy claimed that they were ready to introduce a machine in July 1988, and announcements are awaited from Thomson, Philips, and Sony. There may be some delays pending agreement about standards - it does appear if some of the new technology players (people not CD that is) have learnt their lesson; standards are a pre-requisite to commercial take-off.

These developments must mean that even larger grains of salt should be taken with comments from the forecasting pundits.

*** Copyright**

President Reagan signed the legislation bringing the United States into the Berne Union in November 1988.

*** Expert Systems in Law**

The Consiglio Nationale delle Ricerche is organizing a conference on "Expert Systems in Law" in Florence, November 2nd-5th, 1989. It is expecting at least as good an attendance as at the last conference in 1985 when there were 226 delegates from 22 different countries. Simultaneous English-Italian translation will be provided. This is the third international conference on "Logica, Informatica, Diritto". More information from Organising Secretariat ENIC, Via S.Caterina d'Alessandria 12, 50129 Florence, Italy.

*** IBM and the CEC**

The CEC started an anti-trust enquiry against IBM in 1980 alleging that it was withholding information needed by its competitors to build compatible machines. They suspended the action in 1984 when IBM agreed to supply the necessary interface information. As from January 1st 1989 IBM had the right to give one year's notice of termination of the agreement. Following CEC/IBM discussions in 1988, IBM will continue to supply information.

*** IIS Conference**

The theme of the annual conference of the Institute of Information Scientists, to be held in Harrogate, UK, 4th-7th July, 1989, will be "The Legal Dimensions of Information". There will be

sessions on intellectual property rights, transborder data flow, and public and private sector liability. The Data Protection Registrar, Eric Howe, will provide an overview of the working of the Data Protection Act. More from IIS, 44-45 Museum St., London WC1A 1LY. (Tel: 01 831 8003).

*** ISI/PBS Co-operation**

Personal Bibliographic Software (PBS) Inc., Ann Arbour, is acquiring the exclusive rights to **Scimate**, personal database and telecommunications software, produced by the Institute for Scientific Information (ISI), Philadelphia. **Scimate** is a more comprehensive version of **Primate**, developed by the writer in England in conjunction with Triad Ltd back in 1978 using one of the first effective micromputers with disk drives - the Sol, manufactured by Processor Technology.

PBS, which produces a range of related products such as **Pro-cite**, **Biblio-link**, and **Pro-search**, is developing an interface between **Scimate** and **Pro-Cite** with ISI for **Current Contents on Diskette.**

*** Library Technology**

Library Trends 37(3) 1989 will carry nine articles covering the subject "Contemporary Technology in Libraries" with the objective of removing some of the doubt in the question "Are librarians as knowledgeable and comfortable with technology as they think they are?". Orders, including a payment of $15, may be sent to The University of Illinois Press, Journals Dept., 54 E. Gregory Drive, Champaign, ILL 61820.

SHORT REVIEWS

Books very recently received include :-

SGML: An Author's Guide to the Standard Generalized Markup Language. Martin Bryan. Addison-Wesley 1988. 364 pages. £21.95. ISBN 0-201-17535-5.

The author says that "SGML is the internationally recognized standard for identifying text, enabling the different parts of the text's structure to be identified and described so that each part can be handled and accessed as appropriate....the work that has gone into it is colossal and complex, but the demands on the user are relatively simple and straightforward".

Actually if the user is an average Author, the demands on him

or her are colossal and complex and it isn't simple and straighforward. Having had a chat with the book's author I think he really goes along with me at least part of the way, and we parted the best of friends.

Don't take my rude comments to mean that this is not a good book. It is. It classifies different types of documents, explains their structure, and then describes how the different parts may be tagged with SGML codes. The author says "If inter-machine communication of electronically prepared information is to be possible on a world-wide basis, it is essential that a standard method of defining document structures be adopted by authors".

The people who attended an SGML conference in Ottawa in May 1988 were either from software companies, computer companies, large publishers, universities, or government departments. The list included Queens's University, Kingston, Ontario, Softquad, AITRC Columbus, Chemical Abstracts, Hewlett Packard, Xerox, and the Swedish Defence Dept. It seems that authors using SGML are likely to be Corporate Authors.

Many authors use word processing machines and, Corporate Authors possibly excepted, they are reasonably content (having gone through a lengthy WP system learning period) to see their text represented on the screen laid out as intended, with margins, justification, headings, paragraphs, etc., more or less to their satisfaction. The manuscript then goes to the publisher as camera-ready copy (like this text does) or the publisher may wish to re-key and re-set the text. If he decides to accept a disk the author doesn't have to mark up anything to preserve his format - the publisher's machine reads the embedded codes placed there automatically by the author's WP software as he sets out his text.

Perhaps some Corporate Authors - for instance those who produce complex government publications - are now required to use SGML. One day magazine and book publisher may insist on disks marked up with SGML, having become fed up with the incompatibilities and limitations of WP codes. Until that time it's hard to understand why authors should want to learn SGML. It really is not very simple and it's bound to take longer to complete a piece of text.

The purveyors of software for SGML authors take a different view. Thus Sobemap (Brussels Tel: (32) 2 512 59 90) say "Building on the excitement and market education associated with desktop publishing, SoftQuad Author/Editor (their software price is $715, plus $995 for the "Rules Builder")....is built on the principle that a user can be most productive by taking advantage of the structure that every document has". The user can "compose an outline of a document as the first step in the creative process ...work with others to create composite documents ....etc. etc. 5 day SGML tutorials are offered to show them how to do it.

So for the time being authors have a choice. They may

continue independently with their steam-driven WP software, or they may take on a number of the functions currently assumed by the publisher. The question is, in the second event, will they get paid for it?

Excellence in Information Systems. Peter C. Pirow. Woodacres Publishers, Walkerville, South Africa. 1988. 271 pages. Price about $30. ISBN 0 620 11769 9

This book was written in an attempt to quantify the effect that computer-based information systems were having on organisations. It contains chapters on Social Aspects, Measuring the Effects of Computers, Defining and Selecting Information Systems, Analysis, Testing Hypotheses, Modelling, Automation and Job Creation, Organisational Structure and Information, Databases used in Mining, Computeracy, How to Build Effective Systems, and Excellent Systems. It concludes with a bibliography of about 250 references and an index.

The book amounts to a report of work extending over 40 years using case studies from over 2000 organisations. A wealth of information is contained in it. For example Pirow estimates that in 1987 about 1.2 million computer-based information systems were installed in the world and that a total of about 9 million systems were in use. You may also like to know that the Incas used knots in coloured strings to send coded management information to their colleagues in other parts of their empire. As Michael Caine would say "most people don't know that".

Pirow's method of examining the objectives of establishing a data base is by applying propositions put forward by Groobey in a 1972 article in **Data Management** called "Golub's Laws". For instance Golub's Law No.1 is "No major computer project is ever installed on time, within budget, with the same staff that started it, nor does the project do what it is supposed to do". No.7 is "The greater the project's technical complexity the less one needs a technician to manage it". No 4., which is even more attractive, is "If the user does not believe the system he will develop a parallel system and neither system will work very well". These amusing headings are followed by some serious analysis.

In the Chapter "How to build information systems", Pirow offers the following down to earth advice about buying a microcomputer:-

Analyse the advertisements for hardware and software
Browse through popular literature
Talk to colleagues
Purchase a system
Try out what you have bought

Try to implement what you have bought in your business
Assess if it works and throw it out if it doesn't

This advice follows what appears to be a much more reasonable business-like supposedly "tried and tested" method of purchase based on business objectives, feasibility studies, and the like which Pirow rejects on the grounds that "the total bill for your hardware and software is likely to be less than a year's salary for the person who runs the system".

He cites a case history of a car service centre in support of the abandonment of the "tried and tested" approach. The centre invested in a microcomputer and inventory package during 1984. "They had disk crash after disk crash and currently have no idea of their stock....the exercise of buying a system for around $10,000 has cost them hundreds of thousands of dollars".

It's not often that you get so much commonsense packed into a computer systems book. I commend it to your attention.

Towards a Policy for Pricing. Proceedings of a Seminar, London, September 1988. Cathy Smith (Ed.). Effective Technology Marketing Ltd., Hitchin, UK. 1988. 44 pages. Price £22. ISBN 0 9513670 1 3.

This Proceedings contains six papers on the topic with advice about Information Audits, Public and Commercial Sector Pricing, and Marketing.

D.M. King from the British Library discusses collection management funded from taxation, paid-for competitive value added services, and in between them "Services which exploit the "public good" asset for the widest benefit, typically in support of the national library and information network".

The conclusions of a working party set up to consider charged information services were "Direct cost recovery should be the basis for charging for non-basic manual and automated information services. Once this has been reached, and a service well established, consideration should be given to charging what the market would bear. New initiatives should be phased in gradually. Information services with the best prospects of cost recovery need to be introduced selectively and with adequate resourcing. This strategy will enhance the British Library's public image in terms of user satisfaction".

Phil Holmes (Jordans), having discussed the "break-even" analysis, provides some informative graphs to show how you can immediately see that "development of information services is a costly and risky business". He continues "The first few years (up to 4 years) involves growing costs with little or no return. Hopefully the revenue begins to take off. At the bottom of the curve one can feel very exposed and it is frequently at this point where management gets cold feet.

Eventually revenue begins to outstrip expenditure and profits rise. The whole economics is affected by the cost of borrowing. If the original development costs are not written off in some way then the cost of financing these sums will have to be added cumulatively each year. The total losses have to be paid with interest - in reality it could take 5 or 6 years to reach solvency."

This solid basic stuff is followed by some equally useful advice about pricing policies. Curiously enough Discounted Cash Flow considerations - important for long life cycles - are not mentioned. Perhaps the author thinks we should know all about it. I find that most people do not.

This is a useful publication containing important information. Although it only contains 44 pages it's still worth £22.

TECHNOLOGY

The life of Optical Discs.

A scare about the life of CDs was started by an article in the **New Scientist** in June 1988, alleging that they might last only a few years. That seemed to be a sweeping statement because CDs have now become an established part of the recorded audio entertainment business and competition has set in. UK prices range from about £11.50 - about the same as when they were introduced - down to about £3.75. This may be because the cheaper ones consist mainly of digitized old titles which have already made a profit in analogue form (and the lower quality may well be noticeable), or may be because the CDs are of lower quality, or some combination of both.

Presumably a standard will eventually be introduced covering the base polycarbonate, the reflective layer, the protective layer, and the labelling inks. A major supplier, Nimbus Records, was quoted in the Guardian newspaper as saying that its own discs were guaranteed for 100 years but it was doubtful about the ageing properties of discs from some other suppliers.

For discs manufactured in a similar manner which may be priced much higher because of their content such as CD-ROMs, or Write Once Read Many (WORM) discs which use a different technology and about which no suspicions have been raised, quality control is more important. It seems less likely that competitive pressures will drive manufacturers into cutting corners, but why shouldn't some guarantee be printed on the discs?

The British Library has been conducting experiments with Plasmon on long term WORM changes. It is also considering the rationale of sponsoring some work on accelerated ageing to be conducted at Essex University.

A.E.Cawkell