

News, Trends and Comments

NEWS

Health and the VDU

The *ACCIS Newsletter*, 9(2) July 1991, has picked up two items which will not please the vociferous "VDU's ruin your health" brigade. In a study of 2430 women published in the *New England Journal of Medicine* (March 1991), no difference in the risk of a miscarriage was found between those who used a VDU for more than 25 hours a week, and those who did not use one.

The New York Times for April 21st 1991, reports on a study conducted by an independent laboratory in the United States. Some manufacturers are cashing in on radiation fears. One company claims that all radiation above 50 KHz is blocked, although there have been no claims that VDU radiation at this frequency causes any ill-effects.

Advances in PCs

In a press release dated August 12th 1991 devoted to the 10th anniversary of the PC, IBM points out that "Customers in 1981 were impressed by the original PC's 4.77 MHz 8088 processor, its 16 Kbytes of memory and 160 Kbytes of floppy diskette storage".

Referring to their PS/2s the note continues "Systems configured with the new 50 MHz card benchmark at over 57 times the performance of the original PC, offer over 1000 times the memory capacity (64 Mbytes) and 10 thousand times the storage (1.6 Gbytes)".

IBM then make some forecasts - a most dangerous business as you will see in a later section. "In the next few years... using verbal commands as though entered from the keyboard, PCs will be able to "type" documents by dictating into the microphone and the words will appear on the screen". Other forecasts include pen-based computers and video conferencing on the desktop.

UMI/Data Courier

UMI/Data Courier (Louisville, Ky., Tel: 502 583 41110) ensures its visibility with frequent news releases. It announced in July that its Dialog file 484 "Newspaper & Periodical Abstracts" will include (by agreement with Journal Graphics) citations to the weekly transcripts of more than 30 TV programs. It also announced that it can supply the Microcomputer Index from Learned Information on tape.

In August, UMI/Data Courier listed 19 journals which have been added to its ABI/Inform online database. This database covers 800 business and management journals. The journals covered in all its databases are listed in its new free Source Book.

Royal Society of Chemistry

The RSC (Cambridge, UK. Tel: 0223 420066) announces the publication in the autumn of its 7000 page 4th edition of the "Eight peak index of mass spectra". The new printed edition will be available at £1350 if ordered before November 30th.

RSC have issued a reminder that it offers a service which "can be less expensive than regular online searching" - its Chemscan/Bioscan fortnightly customised searches on Chemical Abstracts or Biological Abstracts.

Tinlib

Tinlib, supplier of the integrated library automation system of the same name, announce that they have moved to larger premises with twice as much space in Clerkenwell, London (Tel: 071 253 1177). With over 1000 installations, Tinlib claims the largest installed base for this type of system. The Tinlib system has recently been chosen by the British Council for installation at its sites around the world.

TRENDS & COMMENTS

Will it take off and if so when? 1. OSI

The Standards model "Open Systems Interconnection" has been discussed countless times with the aid of a diagram representing its seven "layers". Explanations are almost invariably boring and incomprehensible. If this material could be made more interesting, readers would see that eventually OSI really will bring about the relatively easy networked interconnection and operation of two pieces of electronic information-conveying equipment made by different suppliers. Currently the situation is chaotic.

This subject will be given an extended airing shortly in a manner which attempts to make this rather difficult topic interesting (In Cawkell, A.E., *Critique* 4(2/3) 1991. Aslib, London, to be published), but for on-going progress a publication calls *SPAG* keeps you up to date. *SPAG* (Standards Publications and Applications Group) is published in Brussels at Avenue Louise 149, Box 7, 1050 Brussels, Belgium (010 3225 350830). *SPAG* is an association of product suppliers and users, from which comes a publication of the same name.

SPAG makes valiant attempts to break "the chicken and egg situation, often quoted in the press and by users, where vendors are portrayed as being reluctant to sell OSI products as there is not sufficient market demand for OSI, and users are unable to purchase OSI products due to their non-availability".

This quotation comes from the Summer 1991 issue of *SPAG* where their Service Implementation Statement (SIS) is introduced. It also introduces a new tongue-twister "interoperability". That word means just what it says and what users want to know about. If I buy a turboencabulator from the Dynamic Orthodontics Company and connect it to my Ethernet Local Area Network will I be able to send output to a four-barelled rumbler at Silent Printers Ltd., via IPSS and Silent's Arcnet system?

This question is less frivolous than it sounds. The number of rules which would need to be available to cover each type of system in the question, and to which each would have to conform, is so enormous that, as explained by Bernard Delcourt (in *Telecommunications*, 39-44, May 1990 "Towards OSI conformance testing"):-

"The inherent complexity of OSI protocol machines makes them practically and economically impossible to test exhaustively". There is a "combinational explosion in the number of allowable situations which should be theoretically explored in order to carry out a complete conformance assessment. Clearly, conformance testing has to stop where testing costs become prohibitive. Hence, there is a broad requirement for a scheme which makes "one-stop testing" possible and acceptable to all parties".

SPAG is quite frank about OSI. It points out that the only OSI products on the market are for message handling and file access, and it quotes those relevant Standards covering them which can be accommodated within the OSI model. It also points out that many options available in that theoretical model are irrelevant or even incompatible. "Functional standards, or profiles, were developed to address this problem by providing practical combinations of OSI standards for practical real-life situations".

SPAG proposes to alleviate this problem with something called "Process to Support Interoperability" (PSI) plus a "Service Implementation Statement" (SIS). PSI is a multi-vendor code of conduct for interoperability by design. SIS is a "blueprint for a workable conciliation process" between an equipment vendor and a buyer.

PSI says that it should work, SIS says this is the testing procedure and how the vendor will sort it out if it doesn't. A vendor who enters a product for the PSI trademark has to sign a legal agreement to participate in conciliation.

In view of all this it seems likely that attention will be focused in the near future on the "OSification" of particular widely-used cases of interoperability, particularly in government departments where the use of OSI equipment is becoming mandatory. Having been made to work, and being seen to work, they will lend strength to the extension of OSI.

Large commercial users of information systems are no doubt thinking about OSI with a view to getting their feet wet. Implementation will be very slow. It is hard to say when the average user will notice any difference. Perhaps within the next 5 years.

Will it take-off and if so when? 2. Multimedia.

Following my own advice (given in the later section "Names titles and superlativising"), for the purposes of this section "multimedia" means the manipulation of data representing text, graphics, sound, colour, animation, and motion video, together with appropriate peripherals for delivering or receiving that data.

Multimedia has advanced with Apple's announcement that Quicktime, for any Mac with a 68020, or later, processor, has arrived. A "multimedia control architecture" was announced at Apple's 1989 Boston gala and, at last, this is it in useable form. It should make the problem of cobbling together a multimedia outfit that much easier. Apple's new operating

system 7.0 suffered a series of delays, delaying Quicktime which is an extension of it.

The main ingredients are an inexpensive video capture board and software (including high-ratio compression), probably to be supplied free with each Mac computer. One consequence of the compression is that 24-bit motion video can be displayed in a window at up to 30 frames per second. "24-bit video" means 3 x 8-bit Red, Blue, and Green - that is a displayed colour may be produced from any combination of one out of 256 Red levels x one out of 256 Blue levels x one out of 256 Green levels. Very few people will require a higher colour quality than this.

The standard type of file in this system - called "Movie" - may contain text, colour graphics and illustrations, sound, animation, and motion video. The next version of a number of well known multimedia packages such as Macromind Director, Mediamaker, and Authorware will support Quicktime.

The July 1991 issue, Volume 2(4), of *IEEE Computer Graphics and Applications* is a special issue about multimedia. The guest editors, Jack Grimes and Mike Potel, contribute a short piece entitled "Guest editor's introduction: multimedia - it's actually useful!"

A feature of this article is an important new definition (actually more of a pithy comment). Multimedia is "useful stuff". I like that - it's better than most other definitions. But it turns out that Grimes & Potel don't really know how useful. In trying to answer the question "Will multimedia become mainstream? They reply "It depends".

Their scenarios are well chosen. In the "user-model... consumers will take up their recorders and camcorders and produce music and home videos not necessarily of the highest quality... providing a new outlet for the creative talents of many current personal computer users... will we use multimedia products in business? In the "traditional-model", relatively few producers, having specialised creative and production skills, will "exercise their craft for the rest of us to consume".

They conclude that both models could spawn a very large industry and a very large use of the technology. "User-model" growth will be slow - 5 to 10 years for it to become pervasive, but for the "traditional-model... multimedia could become an overnight success, like the Nintendo phenomenon... alternatively it might remain a niche capability".

In the absence of the usual IT growth curves with a 45° gradient, and a good deal of uncertainty in the forecast, Grimes and Potel do not encourage us to make any bets on success.

Critical mass, pervasiveness, and forecasting

Grimes and Potel were wisely vague in their multimedia forecast.

After a new kind of machine for the IT market is conceived, prototypes will be made and it will go into small-batch production. It may become so successful that volume production is introduced and "critical mass" is achieved. This is the take-off point at which demand suddenly accelerates. It is reached when the machine is being purchased in sufficient numbers both for the price to be substantially reduced and for its presence to become widely noticed. Some time later its presence may become pervasive.

It is difficult to define conception, takeoff, and pervasiveness well enough to establish their dates in any particular case. For instance, we

might say that pervasiveness is usage by 20% of the total number of potential users in a particular category.

The progression usually follows a sigmoid curve - gradual rise to start with, sudden rise at take-off, and a flattening out as the market becomes saturated.

It seems that the interval between conception and pervasiveness is likely to be at least ten years. It was probably about ten to twelve years for microcomputers and fax machines. Forecasting such events is very difficult. The strength of the driving forces is hard to assess.

Facsimile is an interesting case. The single-mindedness of the Japanese to mitigate their character transmission problems, to drive world standards, and to take over virtually 100% of world production was quite extraordinary. How can you anticipate such events, except in a forecast which is made too late to be useful?

I was reminded of fax progression by an advertisement this week (August 1991) for Olivetti fax machines (that is with an Olivetti label on them) priced at £249. Admittedly this is excluding tax and at a discount, but the cheapest machine available in the UK four years ago was an NEC Nefax 10 listed at £1695. You could haggle and get one for £1400.

Having done some work for the British Library on fax machines I remember that the minimum UK price for a Group 3 machine fell from £3600 in 1984 to below £2000 in 1987 - a fall of about 50% in real terms. Performance had substantially improved. This drop seemed amazing at the time. But if anyone had suggested that I might purchase a similar fax four years later for £249 there could have been only one reply - "impossible!".

But hear this. The forecast in an August 1981 article in *Computer Decisions* for fax in the United States was that 16,000 machines would be in use by 1985, each having cost \$15,000. The actual number was 100,000 at \$4000 each.

Moral. Never look one of those 45° predicted growth curves in the face again.

Names, titles, and superlativising

What's in a name? That which we call a rose
By any other name would smell as sweet.
Romeo and Juliet.

Names have interested me ever since reading John Train's article entitled "Remarkable names of real people" in the magazine *New York* (October 31st 1977). It would be a mistake to include extracts from this piece anywhere but at the end of this section, so that is where you will find it. It's an impossible act to follow.

The other day I wrote a letter to *Aslib Proceedings* commenting on a remark made earlier in an article in that journal about work-stations by Peter Brophy:- "The word work-station has been in common useage for many years, but every time you take your eye off it, it changes meaning".

I suggested that if IT had not arrived some time after Humpty Dumpty's time, Humpty might have said "When I use *an IT word* today it means just what I choose it to mean - neither more nor less".

In view of IT's chameleon words it is my practice, when in doubt,

to start with a definition thus:- "for the purposes of this article a turboencabulator is...".

Continuing the letter to Aslib with a quotation from Robert Fairthorne:- "Names or descriptions cannot be discovered by examining the things named or described. They are not discovered; they are bestowed", I pointed out that bestowal of the extraordinary upon the ordinary has become an established marketing technique. For instance quite ordinary software is hyped-up by including the words "expert system" in its title. This trend is everywhere evident. You go to get your watch mended at the "Watch Repair" shop only to find it has changed its name to "The "Horological Laboratory".

However when sound was added to text and graphics, the superlativisation of "multimedia" into "hypermedia" occurred much too early. The marketing people were unable to think up anything better when animation, motion video, "genlocking" etc., were added (Smell, presumably, comes next). "Ultrahypermedia" perhaps?

Having just despatched my letter to Aslib, I came across the title "The demise of multimedia" while scanning the August 5th issue of Current Contents. What a relief! At last the agony of trying to keep up with it would be no more.

The author, David Clarke, from the audio-visual centre, University of London, kindly sent me a reprint of his article (which appeared in *IEEE Computer Graphics and Applications* 11(4), July, 1991). But things are not what they seem. The article's opening words are "The naming of things is of prime importance... we must therefore delete the term "multimedia" from our language". Clarke gives various reasons. Continuing, he suggests a new name "Interactive Electronic Presentation (IEP)".

In other words "demise" in the title meant the demise of a name, not of an IT extravaganza. It is extraordinary that I should have written about that very same word a day or two earlier, but a pity that my agony will not, after all, be diminished. It's a pity too about "IEP" - it's nothing like as good as "ultrahypermedia" or "useful stuff".

Returning to Train's article "Remarkable names of real people", S.J.Pereleman, in an editorial comment, "notes with regret that the chronicler has seen fit to omit a heroine of my youth, Ming Toy Epstein, whose name had the sweet tinkling purity of temple bells".

After certifying that all the bizarre names listed belonged to real people, Train included the following in his piece:-

Katz Meow	Hoquiam, Washington.
Dr. Zoltan Ovary	Gynecologist, New York Hospital.
Humberdink Fangboner	Lumber dealer, Sandusky, Ohio.
Virginia May Sweatt-Strong	Memphis, Tennessee.
Carborundum Petroleum Dobbs	Mayor of Wilmette, Illinois.
Cigar Stubbs	Florida Bureau of Statistics.
Mrs. Screech	Singing teacher, Victoria, B.C.
A. Moron	Education Commissioner, Virgin Isles
Adolphe Faux-Pas Bidet	Commissaire de Police, Paris.
Mrs Belcher Wack Wack	(married Mr. Wack, and later his brother).
Gisella Werbersech-Piffel*	Actress, Hollywood, Ca.

*Perennial victim of pre-war Hollywood jokers who liked to telephone from poolside to ask if she was the Gisella Werberserch-Piffel they had met in (say) Monte-Carlo the previous summer. When she assured them that she was not, they would pronounce grandly "Ah! then that must have been another Gisella Werberserch-Piffel".

BOOKS

Virtual Reality 91. Proceedings of the first annual conference on virtual reality, London. June 1991

Anon. Published by Meckler, London. 1991. ISBN 0-88736-781 X. 48 pages.

"There can be no doubt that within the next few years virtual reality systems are going to have a tremendous impact on many aspects of our personal, professional, and business lives".

"When it comes to the buzzword of the year, Intelligence is out and Reality is in. In 1990 the forefront of our industry was multimedia, to day it is virtual reality"

So there you have it - the in-thing is Virtual Reality (VR). Of course you could avoid it and await next year's buzzword, but only you can judge whether that would be wise.

For fun, ingenuity, and maybe some applications, VR will take some beating as testified by the 10 short papers delivered at this conference. I have been trying to read some significance into the 33 references appended to 6 of the papers. Although the life of VR has been short, only two papers have a reference in common. In one paper Wittgenstein's *Tractatus logico-philosophicus* is cited but I can't make out why. But away with these carping comments; let us accentuate the positive.

Virtual reality is a computer-generated environment within which the human user appears to reside and with which he or she interacts.

Dr. Bricken (University of Washington) is very positive indeed. He says that the "potential for VR... suggests an economic impact that rivals the Gross National Product". He mentions two applications with which he is engaged - the simulation of aircraft cockpits in design studies for Boeing, and "the implementation of multiple participant worlds for an application in telecommunications". After translation perhaps that means "teleconferencing".

Florian Brody (Austrian National Library, Vienna and The Voyager Company, Santa Monica) points out that different manifestations of VR have been around for many years. The designers of the gothic cathedral at Rheims, for instance, had "very clear concepts of how to achieve the desired effects of an "out of this world "virtual" reality... Drama has always been the very place of altered reality... trompe d'oeil architecture creates fake space", and so on.

You can buy the system described by Dr.J.D.Waldern (W.Industries, Leicester), inclusive of computer and software, visor embodying head tracking device and LCD stereo colour display, joystick control, feedback exo-skeletal glove etc., for about £40,000. The system provides the necessary real-time graphics, sound for instructions and effects, motion and tracking data, and connection point to a LAN enabling users to "meet" each other.

Robert Stone (UK Advanced Robotics Research Centre) sounds some cautionary notes. As he discovered at NASA "VR is a compelling experience, there's no doubt about that. But VR is an illusion - currently a poorly implemented one at that. With today's levels of technology it's also a form of sensory deprivation... despite claims to the contrary it is glaringly obvious to most human factors or ergonomics practitioners that VR equipment... is not yet ready for ordinary people".

Stone says that VR will not be driven by sales to leisure arcades and he discusses several areas of possible applications. They include simulations in connection with undersea diving operations, spaceflight simulations, and in certain military operations. In particular he believes that "VR might broaden the horizons of mentally and physically disabled people". He is already engaged with a wheelchair system controlled by the tongue of a severely disabled supine person.

Bricken would probably take issue with Stone about human acceptability. He says "There is a tremendous compression ratio between digital information and human experience. Very approximately it takes a hundred million polygons to simulate what we see in one scene... computation will not come close to this bandwidth for a long time". However "Our cognitive plasticity permits even simple cartoon worlds of 500 polygons to be experientially satisfying".

Grimsdale (Division Ltd) describes a system for controlling VR devices which his company has developed. It embodies individual transputers each dedicated to controlling a VR device, together with an appropriate operating system. "Rapid sampling and interpretation of data and the generation of realistic displays" are needed for VR and Grimsdale says that VR systems are "dogged by inadequate update rates, poor synchronisation, and high latency controls... the long term solution is massive parallelism". Division has developed a parallel architecture which starts to address some of these issues.

In a second paper Dr.Bricken discusses training for VR. "VR input is coupled to natural behaviour" he says. "The rule of thumb is that a child should be able to command the system. No command lines or mouse clicks, rather simple walking and pointing and speaking and grasping... the challenge in the design of training materials is to place learning in a natural (although virtual) context". If VR is that simple, it will be unique among computer systems and its progress will be greatly assisted.

Virtual reality will certainly turn out to be a fascinating expensive (for the time being) toy and will be used in several specialised applications. Who can say whether or not it will go much further than that?

Annual Review of Information Science & Technology. Volume 24, 1989. Edited by M.E.Williams. Published by Elsevier Science Publishers, Amsterdam. ISBN 0-444-87418-6. 458 pages. Price \$US 91.00 .

Annual Review of Information Science & Technology. Volume 25, 1990. Edited by M.E.Williams. Published by Elsevier Science Publishers, Amsterdam. ISBN 0-444-88531-5. 492 pages. Price \$US 105.50 .

Both books are published on behalf of the American Society for Information Science (ASIS) and as stated in their prefaces, "ARIST chapters are scholarly reviews of specific topics as substantiated by the published literature... the reviews aim to be critical in that they provide the author's expert opinion regarding developments and activities within the chapter's subject area".

ARIST has been going for many years. The standard of the reviews is high and it works reasonably well. By "reasonably well" I mean that different topics are chosen each year so if you want to up-date yourself about a particular topic, the latest information about it will be contained in the most recent review which could be several years old. For instance "Environmental information" was last reviewed in 1986.

Space permits only snapshots of the large amount of information contained in these two volumes. Although three out of the seventeen chapters are by foreign authors, the title really means "Annual Review of American Information Science and Technology". However the ratio of US to foreign authors probably no more than reflects the amount of activity in this field where the US predominates.

In the 1989 volume, the chapters and authors are as follows:-

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| 1. International information issues. | Beth.K.Eres |
| 2. Subject Analysis. | F.W.Lancaster, C.Elliker et al |
| 3. Computer-readable dictionaries | Martha Evens |
| 4. Bibliometrics. | Howard White, Katherine McCain |
| 5. Chemical structure processing. | K.J.Lipscomb, M.F.Lynch, P. Willett |
| 6. Engineering information systems. | Elizabeth N. Mailloux |
| 7. Social Science Information. | Barbara Preschel, Lawrence Woods |
| 8. Education and training of the information professional. | Marianne Cooper, Lois F.Lunin |
| 9. Foundations of information science re-examined. | Laurence B. Heilprin |

And in the 1990 volume:-

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|---|------------------------------------|
| 1. Federal statistical policies and programs. | Karen J. Sy, Alice Robbin |
| 2. Information services and downstream productivity. | Michael E.D.Koenig |
| 3. Marketing electronic information: theory, practice, and challenges, 1980-1990. | Stephen E. Arnold |
| 4. Information need & user studies. | Elizabeth T.Hewins |
| 5. Information models & modeling techniques for information systems. | Patricia V.Burt, Mark T. Kinnucan |
| 6. Connectionist models and information retrieval. | Tamas Doszkocs, J.A.Reggia, X.Lin |
| 7. Internet access to information resources. | Clifford Lynch, Cecilia M. Preston |
| 8. Medical databases and health information systems. | Carolyn B.Tilley |

In the 1989 volume, Chapter 1, Eres includes economics in her review of international issues. This, of course, includes the vexed question of the value of information. Not unexpectedly there has been little progress.

On automatic indexing in Chapter 2, Lancaster includes "citation relationships" - the first time I have ever seen it included under this heading which is where it should be. Lancaster et al. say that for "more than 30 years, investigators have sought ways to replace human intellectual processing of text". Success has been modest but now "expert systems" have arrived and although there are several references to work in this area, there do not seem to be any impressive results.

The review by Evens (3) covers the period from Amsler's review in ARIST 1985. Amsler is a major pioneer in this field. Evens describes a number of research applications using computer-readable dictionaries and continues with methods of building them. This is followed by a list of significant published dictionaries. Design, CD-ROM, hypertext approaches, and problems are also discussed.

White (4) says that "including citation analysis, bibliometrics constitutes about half of information science". The most productive first authors and the number of their articles included in the 327 references provided with this chapter are:-

Henry Small	18
B.C. Brookes	14
Eugene Garfield	10
Howard White	8
Katherine McCain	7
Belver Griffith	6
Maurice Line	5
Francis Narin	5

If you include in the count papers in which any of the above were co-authors, Narin increases to 12 and Griffith to 8. Henry Small works at ISI, Philadelphia, and has been responsible for a number of projects involving applications of ISI's citation index databases.

"Chemical structure handling is a burgeoning field" says Lipscomb (5). Its most important commercial application is the synthesis of molecules from available starting material to create new compounds in the search for new drugs.

Information for engineers tends to be relatively tangible so its value is more easily measured. Mailloux (6) gives an example in computer integrated manufacturing (CIM) where a 25% reduction in the costs of production resulting in \$1.2M sales, more than doubles the profit. She considers that "Quantifiable payouts... will continue to provide the impetus for improving and integrating engineering information systems.

Cooper (7) summarises the major issues and requirements in education and training as the need to broaden issues, converge with associated disciplines, examine the reasons for being "low on the academic totem pole", and promote dialogue with industry.

With regard to the Social Sciences, Preschel (8) feels that the main activity is still "the computerization of tasks that were done manually in the past" perhaps because "the academic social sciences are not at the leading edge of information dissemination technology".

In the "Foundations of information science re-examined" Heilprin divides information systems into the "B" view which does not distinguish between living and non-living systems, and the "N" (narrow) view which

considers that information is "manufactured" only in living bodies. The task ahead is to "bring into focus the limits of modulation - that is of what humans can and cannot become informed or transmit".

Turning to the 1990 volume, Sy (1) is critical of US statistical information. We "take for granted statistical indicators", but they are produced by "a poorly functioning infrastructure with staff who lacked state-of-the-art skills, managers who were not competent... etc". In short "the federal statistical system is in serious trouble... a longer term outlook... was non-existent". Sy recommends increased funding and more political support.

Koenig's (2) chapter is about evaluating the effects of information services. He concludes "much has been written... but only modest accomplishments have been made... classic economies and econometric calculations have thus far been of little help... but the work should be continued".

Arnold's chapter (3) contains some sound advice about marketing. For people trying to determine the size of a target audience, market size is a problem because the industry is hard to define. The latest market size estimate is \$6 billion for North America and \$2.4 billion for Europe.

Hewins (4) detects "changing paradigms and approaches" for information needs and use. They are becoming "user centred - i.e. based on cognitive processes - rather than system centred". This includes categorization techniques, long and short term memory, learning styles, motivation, personality types, and semantic factors..."

Chapters 5 and 6, by Burt and Doszkocs respectively are about modeling. Burt says "an information model means any representation of a human being or an information system related to the acquisition, organization, or manipulation of information" and concludes that "IS models are moving closer to cognitive models and away from pure data structures". In Doszkocs' connectionist models "documents, index terms, and queries are all represented as patterns of inter-connected nodes whose dynamic structure is manifested in weights associated with the connected links". They are expected to provide a better understanding of matters like coping with fuzziness and combining computer power with human-like intelligence.

In Chapter 7 Lynch describes the development and use of a national computer network. Internet consists of over 500 networks composed of wide-area networks connecting local area networks. The backbone WAN is ARPANET and the network protocol is TCP/IP. Incidentally the ubiquity of TCP/IP is one reason why OSI is so slow to appear - human conservatism dictates that the possession of a tried and tested system is a good reason for not rocking the boat. However "application level" protocols known as Z39.50 are expected to become compatible with an ISO standard and so can be accommodated within the OSI model.

Internet is claimed to be the largest network in the world "providing connectivity among perhaps half a million computers and over a million people". It is devoted to supplying information for research, but is not intended for the general public or commercial use.

In 1990 a Bill passed a Senate committee directing the National Science Foundation to "promote development of information services over the National Research and Education Network..." The proposal includes the provision of about \$400M to develop a network operating at a data rate of

3 gigabits/second". This is rather quick - about 600,000 pages of A4 text per second.

The main point of interest in Tilley's chapter (8) is the development of UMLS - The Unified Medical Language System supported by the three year effort of five contractors. This is a National Library of Medicine project which "must understand meaning... so that automated systems can accurately access cases, facts, and medical procedures".

Library Trends

Quarterly journal, published by the Graduate School of Library and Information Science, University of Illinois.

Although this is a journal, I consider that a note about it is in order because some kind person sends me each issue gratis, and it is a very good journal. The editor is F.W.Lancaster. Like the *Journal of Documentation* it does things *thoroughly*. Issues follow a theme. Library Trends brought together a set of articles about indexing images recently. The current issue contains 13 articles on 366 pages about "Information Literacy". "An information literate person" says Mary Huston in an introduction "must be able to recognize when information is needed and have the ability to effectively locate, evaluate, and employ the needed information". The scope of this theme has resulted in some very interesting articles.

Libraries, Networks, and OSI

by Lorcan Dempsey. Published by the UK Office for Library Networking, University of Bath, 1991. ISBN 0-9516856-0-0. 232 pages.

This report was commissioned by the British Library R&D department as the result of its commitment to the "Glenerin Declaration" following a conference at the Glenerin Inn, Mississauga, Ontario in May 1987. The objectives are to foster an improved understanding of the role of information and to develop an agenda of public policy aimed at maximising the benefits of information. The author toured the United States and Canada for 25 days and draws extensively on that experience.

Dempsey was helped when writing this report by listening to a variety of records including the "transatlantic sweetness and bleakness of Nancy Griffith and the Cowboy Junkies" among others. Judging by the excellence of the report this seems to be a good idea. For real inspiration my choice would be Richard Strauss's *Don Juan* - magnificent stuff! Dempsey dwells at some length on protocols - particularly the problem of dealing with TCP/IP and OSI, a subject discussed by Lynch in ARIST as already mentioned. He provides a review of OSI's progress and provides a list (after Boss) of potential library network applications which include record transfers between libraries, dealing with loans, ordering, financial data, and address data (to avoid re-keying), also the searching of various kinds of remote databases (The question of OSI's possible take-off was discussed earlier).

In a chapter on general network applications, Dempsey covers X.400 and EDI, X.500, FTAM and virtual terminal protocols. He quotes a *Byte* article which says "with the maturity of X.400 e-mail may become the dominant force in business communications".

Dempsey describes the "Linked Systems Project" (LSP) at some length. This project links the Library of Congress, Research Libraries Group, the Western Library Network (which fell out later) and OCLC. The project paid a penalty for adopting OSI too early and there have been some political problems. It appears to have been very useful for the accumulation of experience, if not for getting the expected results. One commentator (Lynch) says "The relative lack of involvement by the library community... is, to me, inexplicable... the intensive focus on the OSI protocols... has been completely out of step with the reality of inter-institutional networking in the United States".

The report includes a list of acronyms, a very useful list of the relevant standards, a first rate bibliography of several hundred references, and a computer generated index.

The message seems to be, although such message is not included in the short concluding section "A UK Perspective" in the report, that if OSI is adopted in library networks, progress may be slow and expensive, and problems may be can expected. A reasonable compromise might be to investigate any OSI standards which are used and tested in similar applications, and see whether they can be used in conjunction with those parts of the system for which the adoption of OSI is premature or unavailable. There may be political reasons for OSI gestures. If the investment is to be large and OSI is ignored but becomes widely adopted during the life of the network, expansion problems might arise later.