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NISSAT

NEWSLETTER

Vol. 13 No. 3 July-Sept. 1994

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NISSAT Newsletter, published quarterly, is the official organ of NISSAT, and is aimed at disseminating information concerning programmes, activities and achievements of NISSAT as also of the various centres functioning under it. Additionally, it attempts to project major developments in the field of information science at national and international levels.

Communications concerning the Newsletter may be addressed to Dr A. Lahiri, Jt. Adviser (NISSAT), Department of Scientific & Industrial Research, Government of India, Technology Bhawan, New Mehrauli Road, New Delhi-110016. Material published in the Newsletter can be reproduced with due acknowledgement to the source.

A Multitude of Choices

As the saying goes 'it never rains but pours'. Hitherto the service hungry telecom consumers have found themselves in more or less a similar situation.

The telecom users are not interested in the intricacies of technologies utilized to generate services. They are least bothered about whether the technology is imported or indigenously developed. They are also not concerned whether it is a government department, a privatized public agency or a private corporation offering the service. The users are happy if reliable and quality service is available on demand and at a price which justifies the value for money.

Whether the general public would accept it or not, there has been a perceptible improvement in voice telephony especially across geographic boundaries (within cities of course, man-behind-the line syndrome still persists).

In the field of data communication there has virtually been a deluge. Some exogenous stimuli (Is it the general process of liberalization and globalization?) have stirred up giants like the DOT, NIC and DOE, and nucleated new endeavours in value-added and new services like e-mail, audiotex and videotex, cellular telephony, radio paging, etc.

Until recently, the concerned government agencies have been following a very restrictive policy. NICNET was available to only government departments, ERNET to selected elite educational and research institutions, and RABMN & INET to only the fortunate few who had put in their applications early. There was no competition, in fact a "market" did not exist. Now private enterprises like ICNET, DART and SPRINT have come in. The users have also become more well-informed and thereby more choosy.

The situation is stimulating for all potential players. The NICENT services have been opened up to include a wide variety of clientele, ERNET to all education and research institutions, and INET has invited subscribers in 89 cities. Not to be daunted, ICNET in private sector has announced its plan for operation in 93 cities. No doubt the service hungry customers will lap it up. However, announcing a service is one thing and providing a service is another.

A cake is not complete without the icing. New entries have been added to the rate schedule of ERNET — the earlier one could conquer even the most fearless. Libraries can now get ERNET facilities at Rs.5000 per year. The head of DOE (ERNET) who was also the head of DOT had verbally announced out-of-turn allotment of telephone connection to institutions having a PC and a modem — the offer is still to be made in black and white. Whereas, NICNET has announced 2000 connections free or on barter basis to education and research institutions.

One would be genuinely apprehensive about any free lunch offers. The basic tenet of any market economy is to allow the market forces to play. The big players should care to promote and develop a market that could be sustained in the long run.

The potential users are now a confused lot — which boat to ride? More because the networks in India as-on-date don't talk to one another. If an institution is on NICNET, how does it communicate with another on ERNET. A private enterprise is on ICNET or SPRINT, How does it access the resources on a public network. This is perhaps the most pressing and immediate problem. Why should we go to INTERNET for such connectivity?

— A. Lahiri

NISSAT

NEWSLETTER

Vol. 13 No. 3 July-Sept. 1994

CONTENTS

CD-ROM/Online Users Meet

The Third National Meet of CD-ROM/Online Users sponsored by NISSAT was organized by National Information Centre for Leather and Allied Industries at CLRI Madras during August 9-10, 1994. The objective was to assess the current national and international situation, the utility of CD-ROM services and to provide a forum for exchange of experiences. The conference was attended by over 200 participants from all over India. There were eight technical sessions wherein 39 presentations were made.

Prof. M. Anandakrishnan Vice-Chancellor Anna University delivering the keynote address. Seated at the dais are (l to r) Dr T. Ramasami, Sr. Dy. Director CLRI, Madras, Dr A. Lahiri Jt. Adviser, NISSAT, New Delhi and Mr S. Subba Rao, Convenor & Asst. Director, CLRI, Madras.

Detailed proceedings of the conference will be published in the next issue of the *Newsletter*.

Our rather poor performance as an exporter in the past is partly because of our failure to develop a reliable information system.

— Finance Minister
Manmohan Singh
in Economic Times

NACID Inaugurated at ATIRA, Ahmedabad

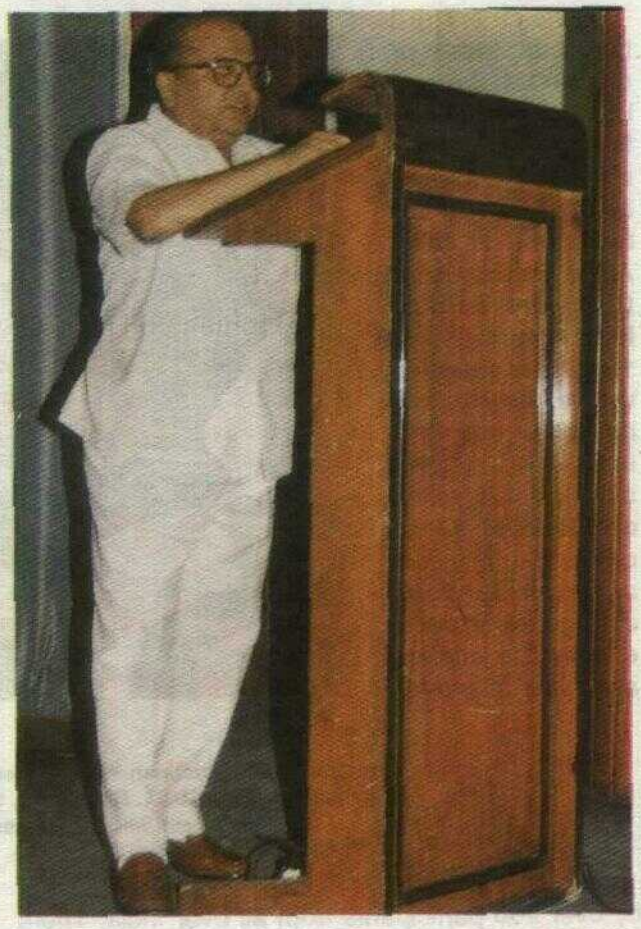
The concept of NISSAT Access Centre to International Database services (NACID) was mooted during the seventh Five Year Plan after several rounds of demonstration and experimentation. Initially, 5 centres were established at CLRI, Madras; IACS, Calcutta; INSDOC, New Delhi; NAL, Bangalore; and NCL, Pune. Encouraged by success of these centres, NISSAT established four more centres during the 8th Five Year Plan — KSIDC, Trivandrum; CCMB, Hyderabad; VJTI, Bombay; apart from the centre at ATIRA, Ahmedabad.

In the inaugural function, Dr. A.R. Garde Director, ATIRA expressed his happiness to see a dream come true. Demonstration of facilities that he had seen at Textile Information Treatment Users Service (TITUS) at Dusseldorf, Germany way back in 1980 had finally come to ATIRA.

Dr. A. Lahiri, Joint Adviser, NISSAT in his introductory remarks elaborated the concept of NACID. He emphasised that the cost of online search might appear to be prohibitive. When such costs are viewed against the cost of time and savings on labour and the potential for comprehensive coverage, the alternative becomes more attractive. However, the NACID has taken ATIRA a little away from its original mandate covering textile and allied industries. The users can now access apart from textiles information the entire spectrum of S&T and social science information, arts, humanities and legal information, newspaper indexes, financial information and so on.

Shri Arvind Lalbhai in his Chairman's remark called the attention of the participants to the achievements of ATIRA in the field of cotton ginning; environment engineering; air conditioning and humidification; energy saving, etc.

He also pointed out the importance of R&D activities in today's industries. He added that Shri I.A. Modi, Managing Director, Cadilla Labs Ltd., was the right person for the job of inaugurating NACID for he is one person who understands the real importance of R&D. He said that the people in



Shri I.A. Modi, M.D. Cadilla Labs, delivering the Inaugural Address

industry are not aware of such facilities available in their very same town. He asked NICTAS and ATIRA to communicate with the industries and make them aware of the availability of such facilities.

Shri I.A. Modi in his inaugural address expressed his happiness to get associated with a venture like NACID, as he felt that it was the need of the day. The pace at which the information is generated, no person can keep track of the same without the help of such a facility.

He highlighted the importance of online information search by giving examples from the

field of drugs and pharmaceuticals. The GATT and IPR issues have forced the industries, large and small, to recognize the value of information.

He requested the ATIRA and the NISSAT to arrange access to greater volume of information at a lesser cost. He emphasised the need of cost-effective online search services and also of generation of information awareness. He expressed happiness that the back-up services such as the Document supply services, Patent services and the Translation services would be provided by the NICTAS.

Shri P.C. Shah, Head NICTAS and NACID/ ATIRA proposed the vote of thanks. Thereafter a demonstration of DIALOG database searches was given by Informatics (India) Ltd.

Information Marketing: Status and Prospects — SIS Convention

The XIV Annual Convention and Conference of SIS to be held at CIMAP, Lucknow during 24-25 January 1995 aims at highlighting the information market scenario for its future prospects and synergic development. The various facets of the subject will include: Changing scenario in India, Customer orientation, Information as marketable commodity, Packaging information, Value added information services, Management of information marketing services, Procedure of marketing, etc.

There will be five Technical Sessions:

1. Marketable and public utilities information: their characteristics, identification and pricing criteria for information products/services.

2. Role of marketable information and information services in economic development especially in key areas like education, industry, transportation, health, agriculture, housing and identical sectors etc.

3. Marketing of information services by public sector enterprises — their strengths & weaknesses. Can they be commercialised?

4. Techniques of marketing of information services by private enterprises; their strengths & weaknesses.

5. Matching the strengths and weaknesses of the public and private enterprises for intergrated market development.

- Last date of submission of abstracts — Nov. 30, 1994
- Last date of submission of papers in camera-ready form — Dec. 25, 1994

Information Services: TIFAC Initiatives

The Technology Information, Forecasting and Assessment Council (TIFAC) has been established as an autonomous organisation under the aegis of the Department of Science and Technology (Government of India) to spearhead the national initiatives in technology information and technology planning. Towards such mandates, TIFAC has undertaken a number of technology status reports and techno-market surveys in the areas of prime importance viz. Biotechnology, Materials, Instrumentation and Process Control, Energy and Environmental Technologies etc. Such value-added specialised technology documents have been prepared under the active guidance of expert groups specific to the technology. *The brochure on TIFAC highlighting its various activities and achievements so far along with the price list and catalogue of TIFAC publications are enclosed.* TIFAC publications have been disseminated widely across the country among various interest groups from business organisations, financial sector and others.

There exists an urgent need for the creation of an efficient system for collection and analysis of technology information including cost and other economic aspects towards technology development efforts in India. A few location specific databases of bibliographic nature are available in the country. After surveying the Indian scenario and assessment of the information needs. TIFAC had taken up an important project for creating the Technology Information System: TIFACLINE.

Information edge — that's precisely what TIFACLINE aims to offer: a standardized package in a structured format with easy accessibility and timely availability. Identifying INFOWARE as one of the key factors towards strategic decision making, TIFACLINE aims to cater to the information needs of the Government Executives, Corporate managers and R&D Planners by identifying business opportunities, emergence or obsolescence of the technology, raw material usage, product profile and market scenario.

TIFACLINE builds on the existing expertise available at various centres of excellence across the country. Thus TIFACLINE inducts partner institutions as data producers on specific technologies equipped with regular technology scanning mechanism and it can deliver timely updated information on a specific technology. So far the creation of databases on Energy, Food Processing Technology, Electronic Materials, Non-Ferrous Materials, Composites and Environmental Technologies has been initiated.

TIFACLINE has also taken up the creation of the supplementary databases on Indian experts (EXPERTSBASE) from fourteen major technology disciplines along with their core area of specialisation identified with information as well on their functional role viz. R&D, Project Engineering, Marketing etc. Improved software package for EXPERTSBASE to accommodate NRI experts and with some enhancement on data retrieval aspects has been developed. The package is due to be released shortly for user accesses. Supplementary database on Standards (Indian and international) in collaboration with the Bureau of Indian Standards has also been created. The Host-Hub centres, located at important cities, would be responsible for marketing of TIFACLINE activities, accounting and general administration for a specific region. While the data production is carried out using PC386, the Host-Hub machines are 486 based EISA systems. The data entry package has been developed in 'C' language and INGRES RDBMS is being used for data storage and retrieval.

TIFAC has entered into an agreement with CMC Ltd., the premier information technology organisation in India, on March 31, 1992, for the operationalisation of TIFACLINE. CMC has mobilised the project teams both at Bangalore and Delhi. TIFACLINE services were formally inaugurated on August 7, 1992 during the annual general meeting of the Indian Society for Materials and Process Engineering (ISAMPE) in Bangalore. Since then technology databases on Composites (created at NAL, Bangalore), Non-Ferrous Material (MRSI/DMRL, Hyderabad), Energy (TERI, New Delhi), Food Technologies (CETRI, Mysore) and

Environmental Technologies (NCL, Pune) have been made operational for user accesses. CMC has been actively involved in operationalising, generating awareness and disseminating TIFACLINE services from Bangalore. A good number of technology and techno-market related queries have been serviced by CMC.

CMC has carried out detailed reviews of databases on Composites, Food Technologies and Energy with the help of area experts. Such initiatives by CMC have resulted in the publication of Directory of Composite Product Fabricators and Raw Material Suppliers and a specialised technology report on 'Pultrusion' in collaboration with NAL, Bangalore. CMC has also been successful in creating a subsidiary database on full-text information in a few technology areas.

Other databases on Coal Technologies (being created at CMPDIL, Ranchi), Ferrous Materials (RDCIS/SAIL, Ranchi), Manufacturing Technologies (CII, New Delhi) and Electronic Materials (C-MET/DOE, New Delhi) have been planned to be released for user accesses in Phase II of TIFACLINE operationalisation.

National Council for Cement and Building Materials (NCB), Ballabhgarh is the latest to join TIFACLINE system as a data producer on Building Materials. (*Annexure* I)

In order to assist in the globalisation efforts of Indian entrepreneurs, a database on 'Overseas Technologies' has been planned to be offered through TIFACLINE. The said database has been structured on main technology options (e.g. Instrumentation and Process Control, Information Technologies, Manufacturing Technologies etc.). Each main area has been further subdivided into specific technology fields. The user would be provided brief description of the technology, the contact address for the overseas organisation and services rendered by them. The database is expected to cater to the user needs for international suppliers of processes, products, engineering services, technology transfers and even identifying joint-venture partners for business opportunities. Embassies/high commissions and overseas trade organisations have been contacted requesting them for the registration of companies in the aforesaid database. The response so far has been quite encouraging and a lot of data has been collected. The necessary software has been developed by CMC and the data entry would be taken up shortly.

Information Retrieval Service (IRS) of the European Space Agency (ESA) would soon be entering into an agreement with TIFAC and CMC Ltd. for offering ESA-IRS databases on-line to Indian users.

ANNEXURE - I

	Data Producers	Technology Area
i.	National Aerospace Laboratories, Bangalore	Composites
ii.	National Chemical Laboratory, Pune	Environmental Technologies
iii.	MRSI/Defence Metallurgical Research Laboratory, Hyderabad	Non-Ferrous Materials
iv.	Central Food Technological Research Institute (CFTRI), Mysore	Food Technologies
v.	Tata Energy Research Institute, New Delhi	Energy
vi.	Confederation of Indian Industry, New Delhi	Manufacturing Tecnology
vii.	Centre for Materials for Electronics (C-MET). Department of Electronics, New Delhi	Electronic Materials
viii.	R & D Centre for Iron & Steel, Steel Authority of India Ltd., Ranchi	Ferrous Materials
ix.	Central Mine Planning & Design Institute Ltd., Ranchi	Coal Technologies
x.	Bureau of Indian Standards, New Delhi	Standards
xi.	TIFAC	EXPERTSBASE

Government of India, Department of Electronics offers network services to all academic and research institutions in the country through the

Education and Research Network (ERNET)

Department of Electronics (DoE) is proud to have the capacity to link the entire academic and research community in India through ERNET - the Education and Research Network. Project ERNET has been implemented by the Government of India with the assistance of United Nations Development Programme (UNDP) and the initial participation of eight premier institutions - five IITs, IISc Bangalore, NCST Bombay and DoE, Delhi. The major aim of the project was to build capability in the country in the area of computer networking and set-up a country wide computer network for the academic and research community to facilitate informal and frequent interactions, sharing of computing resources, and more co-operation in research activities.

As a result of sustained efforts, ERNET provides the most extensive co-operative computer network for the academic and research community. Over 300 institutions in the country representing a cross-section of universities, government societies, R & D organisations, research laboratories are already using it extensively serving over 20000 users throughout the country. The following services are available on the network :

- **Electronic mail**
- **File transfer**
- **Remote log-in**
- **Mailing lists, news groups and bulletin boards**
- **Data-base access**
- **Information retrieval tools (Gopher, WAIS, WWW)**

and in addition to the above, access to computing resources and users across 120 countries through Global Internet.

In line with similar efforts in advanced countries, ERNET has simultaneously addressed the key R & D issues of networking technology in order to provide benefits of the state-of-the-art technology and cost-effective services to the user community. Some of the future areas of work include test-bed for high speed networking and support of applications like, multi-site video conferencing, and other integrated applications, like multimedia mail and multimedia document retrieval.

ERNET programme has its current focus on expanding its reach to the entire academic and research community in the country. Progressively, the infrastructure, range of services and accessible resources are being upgraded in close co-operation with academic and research community. ERNET community will be happy to extend all possible help and advise you on setting up necessary facilities at your premises.

For further information, please contact :

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Quiz on CD-ROM and Online Technologies

A special feature of this year's Users Meet on CD-ROM Technologies was an interesting Quiz organized by Informatics incorporating technical questions related to these technologies.

The Quiz comprised the following 26 questions with multiple choice answers: Tick the word you believe is the right answer to the relevant question. Answers are on page 10.

1. The first online host of the world is
   a) Dialog
   b) BRS
   c) Orbit
   d) Compuserve
2. The first online host to introduce duplicate *detection and removal technique is*
   a) The Dialog
   b) STN
   c) Questel
   d) ESA/IRS
3. The first database that went online through Dialog was
   a) ERIC
   b) Medline
   c) INSPEC
   d) LISA
4. The first online company to introduce Natural Language searching was
   a) DATA-STAR
   b) WEST LAW
   c) DIALOG
   d) LEXIS
5. The natural language searching feature on Dialog is called
   a) Target
   b) Win
   c) PLS
   d) Dial Index
6. Match following locations and online hosts

1. Quertel	A. Switzerland
2. ESA/IRS	B. France
3. DATA-STAR	C. UK
4. Easynet	D. Italy
5. FT Profile	E. US

7. Easynet does not provide access to all Dialog databases
   a) True
   b) *False*
8. CD-ROM standards for the physical file format are described in
   a) *Blue book*
   b) Yellow book
   c) Red book
   d) Green book
9. A double speed CD-ROM drive is Characterised by twice the normal
   a) Data transfer rate
   b) Access time
   c) Retrieval speed of the drive
   d) Response time
10. The first commercial CD-ROM disc was published in
    a) 1982
    b) 1983
    c) 1984
    d) 1985

11. Data recording tracks in CD-ROM are spiral and not concentric.
    a) True
    b) False

12. Multimedia is an extension of CD-ROM technology
    a) True
    b) False

13. Inside Information, a CD-ROM Product from British Library is a full text database of 10,000 journals.
    a) True
    b) False

14. A CD-ROM drive provides faster access to data than a floppy disc
    a) True
    b) False

15. If MS-DOS version 6.0 and above is used, then MS CD extension is not required
    a) True
    b) False

16. Match the following Databases and Producers

1.	Books-in-print	A.	British Library
2.	PTS Prompt	B.	UMI
3.	Information Science Abstracts	C.	Cambridge
4.	Dissertation abstracts	D.	Information access
5.	Inside Information	E.	Bowker

17. Inspect database is produced by
    A. Institute of electrical and electronics engineers (IEEE), USA.
    B. Institution of electrical engineers (IEE), UK.
    C. UMI Inc, USA.
    D. Dialog information services, USA.

18. Online/CD-ROM '94, the major international (annual) event of information users' industry is organised by
    a) Information Industry Association, USA
    b) American Library Association
    c) Publishers of Online Magazine
    d) American Society for Information Science.

19. Online/CD-ROM '94 is scheduled this year from October 24th to 26th at
    a) New York
    b) San Francisco
    c) Boston
    d) Chicago

20. Citation from US Patents Literature is covered by a citation database published by
    a) Derwent Publications
    b) IFI/Plenum
    c) Institute for Scientific Information
    d) US patent office

21. UMI's PROQUEST Software uses the following retrieval engines
    a) K-Ware
    b) Fultrum
    c) PLS (Personal Library Software)
    d) Dial Index

22. Which database can be used to generate a ranked list of top 10 companies in a given industry segment?
    a) D & B
    b) Kompas
    c) Thomas Register

23. Ethernet & Arcnet are LAN software packages
    a) True
    b) False

24. Common Command Language Concept was developed by Easynet
    a) True
    b) False

25. Free-text searching and Full-Text searching are some
    a) True
    b) False

26. Match the following

1.	Credit Rating	A.	PIERS
2.	American manufacturers	B.	Kompass
3.	Export/Import consignments	C.	Reuters
4.	Business News	D.	Thomas Register
5.	Distributors/ Importers/Exporters	E.	TRW

Answers to CD-ROM Quiz

Question	Answers
1	C
2	A
3	A
4	D
5	A
6	B, D, A, E, C
7	A
8	B
9	A
10	C
11	A
12	B
13	B
14	A
15	A
16	E, D, C, B, A
17	B
18	C
19	B
20	B
21	B
22	A
23	B
24	B
25	A
26	E, D, A, C, B

Ratings:

22 or more questions are correct — *Excellent*

21-18 questions are correct — *Good*

17-15 questions are correct — *Fair*

Winners of this Quiz, during 3rd CD-ROM/Online National Users Meet, 1994:

1. Dr. S. Krishnan, National Chemical Laboratory, Pune.
2. Mr. Srinivas Ravi, NCSI, IISc, Bangalore.
3. Mr. M. Koteshwara Rao, IIT, Madras.

Libraries *Versus* Swimming Pools?

The Ministry of Urban Development has accepted a proposal by the Federation of Publishers' and Booksellers' Association of India (FPBAI) for setting up libraries in urban colonies. The FPBAI is now awaiting its implementation.

According to Asang Machwe of FPBAI, the proposal, when executed, will provide a considerable boost to both reading habits and the book trade.

The FPBAI has also urged the ministry not to sanction urban colony projects that did not include plans for libraries and bookshops. The logic is that if swimming pools and golf clubs can be used as baits to *attract buyers, why not libraries?*

Text Retrieval and Library Management Software in India

G.G. Chowdhury and Sudatta Chowdhury

In view of the widespread interest evinced by readers of NISSAT Newsletter amidst the ongoing efforts in automated library management systems, we reproduce here the following paper from Programme (V. 28, No. 3 July 1994). Your valued comments on the views expressed would be most welcome.— Ed.

Abstract

Automated text retrieval and library management systems have not yet taken a desired shape in Indian libraries, though efforts are being made in this direction. A number of software packages for this purpose have come out recently through government and private agencies. Published sources assessing this technology are yet to appear, therefore choosing the right software is difficult. This paper aims to highlight the present Indian scenario by presenting a brief overview of 10 selected indigenous packages, namely CATMAN, CDS/ISIS, LIBRARIAN, LibSys, MAITRAYEE, MECSYS, NIRMALS, SANJAY, TULIPS and WILISYS. The underlying framework and text retrieval and library management facilities in these packages are briefly discussed. Considering the cost aspect, it is concluded that CDS/ISIS, along with SANJAY with some further modifications, might prove to be the most suitable package for most Indian libraries.

Although the world has gone far ahead in different areas of library automation, Indian libraries have yet to catch up. Some areas have been automated in a handful of libraries, but we have yet to have a fully automated library system in the country. However, there has been a growing awareness of library automation and this has been enhanced by measures taken in various sectors *vis-a-vis* development of software packages for library operations by various government and private agencies in the country. Different library network projects, namely the INFLIBNET (Information and Library Network of the University Grants Commission) at the national level, and regional library networks like BONET (Bombay Library Network), CALIBNET (Calcutta Library Network), DELNET (Delhi Library Network), MALIBNET (Madras Library Network), Poona Library Network, etc., are currently in progress and are likely to bring forth significant improvements in the Indian library automation scene. Efforts in automating library catalogues and designing automated text retrieval systems have largely been influenced by the availability of the CDS/ISIS software from UNESCO through the NISSAT (National Information System in Science and Technology, a Government of India organisation). Increasing availability of training facilities in the package has also stimulated the interests of Indian library professionals towards the goal of automation.

Pending any published directory of indigenous text and library management software, it is difficult for library professionals to judge the value of any software that they are going to choose. Software manufacturers and vendors often claim their product as the best in the market and claim that their software can act as a panacea. The present study aims to discuss some common issues in the areas of text and library management software available in India. Although this work cannot be considered as an exclusive of the software packages, it attempts to bring to light some salient features of a few indigenous packages and thus addresses some of the common problems in the areas of library automation.

A number of software packages for handling library-related activities have come out in India in the recent past. Twenty such software packages of Indian origin as shown in Table 1, have come to the notice of the authors. The present study is

The opinions expressed in this paper do not necessarily reflect the views of NISSAT.

based on a subset of these. Altogether 10 packages have been chosen for this study. In addition to the nine chosen packages, CATMAN, LIBRARIAN, LibSys, MAITRAYEE, MECSYS, NIRMALS, SANJAY, TULIPS, and WILISYS, we shall quite often refer to CDS/ISIS (Micro Version). Although CDS/ISIS is not a software of Indian orgin, it is widely available to Indian libraries (earlier it was given free and now at a very nominal charge, 1,500 rupees, to non-profit organisations) and therefore is being used in many libraries in one or more applications. The library management software SANJAY is based on the framework of CDS/ISIS, and the aim of NISSAT is to make this package available to libraries along with CDS/ISIS to achieve an easy solution to the automation of both text retrieval and library housekeeping operations. The present discussion will address some of the major features of the chosen packages and thus will aim to assess their suitability in Indian libraries.

2. Chosen Packages

Out of the 10 packages chosen for this study, the reason for choosing CDS/ISIS has already been mentioned; the other packages were chosen just to present a general idea about the activities going on in this area. Packages like SALIM (Software for Automation of Library and Information Management) and WILISYS (WIPRO Library Information System)[2] were reported relatively earlier comparison to the packages like CATMAN, LIBRARIAN, LibSys, MECSYS, NIRMALS, and TULIPS. The other two packages, MAITRAYEE and SANJAY are of more recent origin and are yet to make their way in the market.

MAITRAYEE has been developed for the CALIBNET regional library network[3], SANJAY has been developed on CDS/ISIS by the DESIDOC software team and has been patronised by NISSAT, a government agency[4,5]. CATMAN has also been developed by another government agency INSDOC, the Indian National Scientific Documentation Centre, a constituent establishment of the Council of Scientific and Industrial Research, Government of India.

CDS/ISIS is also patronised by NISSAT while the other packages, chosen for this study have been developed by commercial organisations.

Table 1 List of software of Indian origin for handling library related activities

Software	Source
Archives (1, 2, 3)	Microfax Electronic Systems, Bombay
ACQUAS, ASCAT, ASCIR, ASIRE, SERAS CATMAN	Ober Information System, Calcutta
Golden LIBRA	INSDOC, New Delhi
LIBRARIAN (2.1 and 3.1)	Golden Age Software Technologies, Bombay
Library Management	Soft-Aid, Pune
Library Manager	Raychan Sysmatics, Bangalore
LibSoft	System Data Control Pvt. Ltd., Bombay
LibSys, Micro-LibSys	ET & T Corpn., New Delhi
Listplus	LibSys Corpn., New Delhi
LoanSoft	Computer Systems, Bangalore
MAITRAYEE	Computek Computer Systems, Hyderabad
MECSYS	(Developed by) CMC, Calcutta (for the CALIBNET Project)
NILIS	MECON, Ranchi
NIRMALS	Asmita Consultants, Bombay
SALIM	Nirmal Institute of Computer
SANJAY	Expertise, Tiruchirapalli
Slim 1.1	Uptron India Ltd., New Delhi
TULIPS	(Developed by) DESIDOC, New Delhi (under a NISSAT Project)
WILISYS	Algorythms, Bombay
	Tata Unisys Ltd., Bombay
	Wipro India, Bangalore

The discussion about the packages will largely be based on the authors' experience in attending demonstrations of these packages by the vendors (except CDS/ISIS, where the authors have practical working experience) and on the brochures and publicity materials, although references to published literature will be made wherever available. Table 2 provides a quick view of some

common features of the chosen packages which are discussed in the following sections.

3. Text and Information Retrieval Features of the Chosen Packages

So far there is no text retrieval system *per se* of Indian origin. Attempts have been made in some cases to develop such systems based on some database management systems, such as dBase IV, but with obvious limitations. Such systems lack, owing to the constraints of the underlying database management system, the versatility in handling and manipulation of textual data, as well as the desired retrieval facilities. CATMAN (Catalogue Management) was developed on dBase IV; it uses fixed length fields for handling textual data, and it does not provide many facilities as far as retrieval aspects are concerned. However, while using dBase as the underlying framework of text and information retrieval systems, some designers have attempted to overcome the problem of fixed length and repeatable fields and claim to achieve better performance (see for example, Mukhopadhayay[6]).

Table 2 A quick view of Some Common Facilities Available in the Chosen Packages

Packages	*Cataloguing*	*OPAC*	*Online help*	*Acquisition*	*Circulation*	*Serials control*
CATMAN	Y	N	Y	N	N	N
CDS/ISIS	Y	Y	N	*	*	*
LIBRARIAN	Y	Y	Y	Y	Y	Y
LibSys	Y	Y	Y	Y	Y	Y
MAITRAYEE	Y	Y	Y	Y	Y	Y
MECSYS	Y	Y	Y	Y	Y	
NIRMALS	Y	Y	Y	Y	Y	Y
SANJAY	Y	Y	Y	Y	Y	Y
TULIPS	Y	Y	Y	Y	Y	Y
WILISYS	Y	Y	Y	Y	Y	Y

(*Note: Could be developed using the Pascal Interface)

Pending the availability of a suitable text retrieval system of Indian origin, libraries have resorted to using CDS/ISIS for text and information retrieval purposes. The features and merits of this package are widely discussed in literature[7-10].

SANJAY has been developed on the top of the CDS/ISIS framework for microcomputers in the MS-DOS environment (using the CDS/ISIS Pascal interface) and therefore it allows users to use the facilities of CDS/ISIS for text retrieval purposes while SANJAY can be used for library housekeeping jobs. However, SANJAY also provides a module for cataloguing which allows normal bibliographic information retrieval.

LibSys has been designed in C and therefore it does not suffer from the shortcomings of the underlying relational database management system (RDBMS) framework for handling textual data, as happens in the case of the other software. This package is available in UNIX, XENIX, MS-DOS, as well as on local area network (LAN) environment. LibSys provides text search and retrieval facilities in its 'Cataloguing' and 'Article indexing and abstracting' modules.

MAITRAYEE, has chosen INGRES as the underlying framework, while TULIPS has been developed on the top of Oracle. Both these systems work in the UNIX environment and have been augmented with some programs written in C. Similarly, MECSYS and WILISYS have been developed on the top of UNIFY and work in the UNIX and XENIX environment. The two other packages, NIRMALS and LIBRARIAN have been

designed for the MS-DOS environment and they have been designed on the top of CLIPPER and FOXBASE respectively. The packages are also available in LAN versions. None of these packages have placed much emphasis on text retrieval operations as such, but they provide facilities for basic search and retrieval operations in the cataloguing module. Some packages also provide additional modules for basic information retrieval purposes, for example, there are separate 'Search and query' and 'Retrospective search' modules in WILSYS, LibSys provides a separate 'Article indexing and abstracting' module, LIBRARIAN provides a separate module for 'Bibliographic services', and MECSYS provides modules for 'Retrospective search' and 'Information dissemination'.

4. Data Input

So far as the data input is concerned, the packages offer facilities for entering data in a desired format. Some packages enable more than one format for data entry, for example, LibSys allows data entry in AACR2, CCF, or MARC format, NIRMALS allows data entry in AACR2 and ISBD format, and so on. However, not all the packages provide adequate facilities for downloading of data and data exchange facilities. SANJAY, being based on CDS/ISIS, allows data exchange via ISO 2709 format; WILISYS also allows data exchange through ISO 2709 format. LibSys allows data conversion from CDS/ISIS and dBase. In other cases, separate program modules are necessary for import of data available in another format.

In relation to the question of nature of fields, packages which are based on a conventional database management framework have some obvious shortcomings. For example, packages based on Oracle use long fields for longer data fields and therefore face some problems in creating index files. Another Major problem relates to the use of repeatable fields which are quite common in bibliographic and text databases. Some designers have resorted to the primitive approaches of using Author 1, Author 2, or Keyword 1, Keyword 2, etc. However, these problems did not arise in the case of SANJAY because these facilities are available in CDS/ISIS LibSys, being developed in the C language has also taken care of variable length and repeatable fields. However, owing to the nature and size of the index files, the chosen packages will vary largely in their performance figures with a large text or bibliographic database.

5. Screen Features and Help

The packages under study have attempted to achieve good qualities of screen display and these have largely been possible because of the available facilities in the underlying RDBMS, except for SANJAY and LibSys where separate subroutines had to be developed for the purpose of screen handling. The chosen packages also provide facilities for producing reports in a number of desired ways and these again have largely been facilitated by the underlying RDBMS frameworks. The chosen packages, except SANJAY and CDS/ISIS as mentioned earlier in this paper, provide good help facilities but none of the packages provide good online tutorial facilities which would have made the packages more user-friendly.

6. Housekeeping Operations

While CATMAN provides facilities only for catalogue management in libraries of small to medium size (with a collection of up to 50,000 documents), all the other packages (except CDS/ISIS) can handle normal library housekeeping operations like acquisition, circulation, and serials control(not available in SANJAY). Each package provides a number of modules for performing the various activities coming under each housekeeping operation. In general, the following facilities are provided by the packages for acquisition, circulation, and serials control:

Acquisition: Request checking vendor selection, processing and generation of orders, order monitoring, budget control, queries and report generation relating to status of an order, issue of reminders, status of fund, etc.

Circulation: Issue, return, and reservation of books, maintenance of membership records, issue of reminders and notices, maintenance of transaction records, circulation queries, etc.

Serials control: Monitoring of journal receipt, issue of reminders, renewal of journals, fund control, circulation of current issues, binding information etc.In addition, some packages provide

facilities for additional information retrieval operations in libraries, like current awareness services or selective dissemination of information (available in MECSYS, NIRMALS, WILISYS; it is also possible in SANJAY not as a module but as part of CDS/ISIS) and OPAC interface (available in LibSys, NIRMALS, etc.) MAITRAYEE, the only package under this study which has been developed for a library network programme, provides specific network and communication facilities using TCP/IP as the communication software with X.25 protocol. Other packages do not provide communication facilities in the same way, but either LAN version or multi-user environment are available, the latter being the case for those which work in the UNIX environment. The only exceptions is SANJAY which has been developed on version 2.3 of CDS/ISIS[4,5]. However, it is believed that the same can be used in a LAN environment provided version 3.0 (onwards) of CDS/ISIS (the formal network version) is used.

7. Conclusion

Major problems of library automation in India can be categorised in three major groups, funds, manpower, and retrospective conversion of databases. Due to economic recession in the country, libraries are hard-pressed in their budgets. For public libraries, with their limited funds, automation is still a dream. However, very few academic and special libraries are affluent enough to afford the huge initial expenditure necessary for total automation. India produces a significantly large number of trained postgraduate librarians every year. However, in most cases the candidates are not conversant with the environment of automation. Measures taken by the government and the employers in the country to alleviate the problem by providing short-term in service training facilities in particular areas of library automation, have proved to be quite successful, but the total workforce is too large in comparison to the facilities available at the present time. Retrospective conversion of databases is a major issue in automation. In most cases, due to shortage of staff, library professionals find it difficult to cope with their normal day-to-day work, and therefore cannot think of devoting much time to retrospective database creation. Availability of ready made databases for downloading could alleviate much of these problems.

The packages under study vary greatly in terms of cost. While the cheapest one is CATMAN costing only Rs.5800 (remember this is only a package for cataloguing books, and does not solve the problems of library automation as a whole), the maximum cost can go up to two million rupees or above (as in the case of MECSYS and TULIPS; of course this includes cost of the software, hardware, network nodes, training and other expertise). Packages which use large RDBMSs as the underlying framework are bound to cost more because end users have to pay for both the library management software as well as for the underlying RDBMS, the latter themselves being quite expensive as far as the Indian market is concerned. In this respect, packages developed from scratch using a 3GL have clear advantages in making their way in the market. Performance of the chosen packages in providing all the facilities, mentioned in the previous sections, in a library of reasonable size is however a question to be considered carefully, and feedback from practising librarians will provide actual figures. A project could be undertaken for detailed comparison of the available packages in order to show the strengths and weaknesses of all the packages.

Keeping in view the economic constraints of the majority of libraries, CDS/ISIS along with SANJAY has a very good prospect for automation of text retrieval and library management operations. However, there are a couple of points of concern. The first one relates to the shortcoming of CDS/SIS itself in relation to the search interface and online help facilities which need to be resolved. The Second point relates to the underlying index file organisation of CDS/ISIS which very much dictates the function of the resulting library management software. The designers of the packages have not clearly outlined how they would handle aspects of the inverted file management (particularly its updating) in CDS/ISIS within the SANJAY software[4,5]. The other point relates to the possibilities of using the software on LAN. All these issues have been addressed by the present authors in their recent works[8,11,12]. If adequate measures are taken, CDS/ISIS together with SANJAY might prove to be the cheapest solution to the problems of library automation in India.

References

1. News and events. *NISSAT Newsletter*, vol. 6, no. 3, July-September 1987, p. 29.

2. WILISYS software for library computerization. *NISSAT Newsletter*, vol. 7, no. 2, April-June 1988, pp. 4-7.

3. Calcutta Library Network (CALIBNET) Software: New Delhi exposition a curtain raiser. *NISSAT Newsletter*, vol. 10, no. 3 July-September 1991, pp. 10-15.

4. DESIDOC Software Team. SANJAY: augmented CDS/ISIS package for library automation. *NISSAT Newsletter*, vol.10, no. 3, July-September 1991, pp. 3-6.

5. J.K. Bhargava, R.K.Srivastava and S.S. Murthy. SANJAY: an Indian library automation package based on CDS/ISIS. *Program*, vol. 27, no. 1, January 1993, pp. 51-66.

6. A. Mukhopadhyay. Experimental design of a bibliographic database with variable structure field length for dBase 3+ applications. *IASLIC Bulletin*, vol. 36, no. 2, 1991, pp. 69-76.

7. S. Chowdhury. *Applicability of the CDS/ISIS package in the automation of university libraries with particular reference to India*. M Phill Thesis, University of Sheffield, 1992.

8. S. Chowdhury and G.G.Chowdhury. Text retrieval systems — an overview. *In*: A Chatterjee, S.K.Sen and S.K. Kapoor (*eds*). *Information Retrieval Models and Techniques. Papers — XV National Seminar of IASLIC Annamalainagar, Tamil Nadu 26-29 Dec. 1992.* Calcutta: IASLIC, 1992, pp. 35-41.

9. M. Pobukovsky. Unesco's integrated documentation network: the CDS/ISIS system. *Journal of Information Science, Librarianship, and Archive Administration*, no. 2, July/September 1980, pp. 195-203.

10. Paul Nieuwenhuysen. Computerised storage and retrieval of structured text information: CDS/ISIS version 2.3. *Program*, vol. 25 no. 1, January 1991, pp. 1-18.

11. S.Chowdhury and G.G. Chowdhury. Development of library management systems using *Micro-CDS/ISIS*. *Annals of Library Science and Documentation*. vol. 39, No. 3, 1992, pp. 113-122.

12. S. Chowdhury and G.G. Chowdhury. CIRC: a prototype circulation control system using Micro-CDS/ISIS. *IASLIC Bulletin*, vol. 37, no. 2, 1992, pp. 73-81.

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UNEP Prize for Dr. Swaminathan

Dr. M.S. Swaminathan has been awarded the 1994 U.N. Environmental Programme Prize for his life long work dedicated to the protection of the environment. He shares the prize with Paul and Anna Ehrlich of the United States.

Getting On-line for Sustainable Development

— Christopher Rearden New York

Barriers to the free flow of information and ideas threaten to derail Agenda 21, the delicate compromise forged at the Earth Summit. The United Nations Development Programme, together with stakeholders in 33 developing countries and territories, have launched an initiative to remove some of these obstacles through the use of computer networks.

Participatory Governance of SDNs is needed to help overcome the tendency in many countries to deny access to information.

Under *Agenda 21*, the ambitious plan of action endorsed in Rio, national governments agreed to consult with other stakeholders — including non-governmental organizations (NGOs), universities, research institutes and commercial enterprises — in drafting national plans for pursuing sustainable development. For this pledge to become a reality, however, these institutions must overcome mutual distrust and the inclination to withhold information. They must also surmount technical, logistical and financial barriers to sharing printed reports and spoken advice. Unless pertinent information can be made widely available, *Agenda 21*'s promise of inclusive decision-making may never come about.

To facilitate the exchange of information, the United Nations Development Programme (UNDP) has been working to establish national computer networks in many developing countries. These Sustainable Development Networks, or SDNs, are now operating in several countries and territories. They provide a timely and cost-efficient medium for individuals, organizations and governments to communicate ideas, share information and relate experiences that bear on the environment and development. In some cases, they may even help to break down antagonisms among users.

A small farmers' cooperative, for example, might tap into the network to get advice on agroforestry from an international agricultural resource centre. Similarly, a business group weighing plans to control pollution through alternative technologies could get pricing information and performance statistics from overseas data bases. Or an island community concerned about storm surges or a rising sea level might obtain geographic and meteorological data to develop appropriate strategies.

With such networks in place, says UNDP's Chuck Lankester, director of the SDN project, development countries can reduce their dependence on foreign donors and make better decisions in their efforts to reach sustainability. Although the primary emphasis is on sharing information within individual nations, Mr. Lankester says, these networks also hold tremendous potential for improving collaboration among countries, by letting users take into consideration what has succeeded or failed elsewhere, and why.

Using computers and telephone lines, SDNs enable individuals and institutions to send electronic mail, hold private electronic conferences and post messages in public electronic forums. The cost for users is the same as a local telephone call, in most cases, and messages can arrive at their destination in seconds. Already hundreds of messages are being exchanged over SDNs each day, and the traffic is picking up.

By the end of this year UNDP will have spent a total of US$5 million on the project. These funds provide local users with computers, modems, software, directories of on-line resources and the training needed to use them. They also pay for a coordinator, a computer technician and a clerical worker to maintain each national network.

A steering committee that represents the various stakeholders within a given country actually governs each network. Participatory governance of SDNs is needed, Mr. Lankester says, to help overcome the tendency in many countries to deny access to information — "not so much on the grounds that it might cause revolution in the streets, but because information is power." Before starting a new network, therefore, UNDP requiries a commitment from the host government that the conceptualization, implementation and operation of the network will be managed by a committee of stakeholders.

These committees are responsible for defining the scope of their network. Some countries have elected to concentrate on environmental issues, while others, adopting a broader view of sustainable development, have taken into consideration trade, health, education and public works. Users can receive development proposals, impact statements and feasibility studies through their SDN. Yet the networks have proven most successful in cases where answers to specific questions were needed.

Shortly after an SDN opened in Pakistan last year, for example, a user trapped in for advice on how to handle a number of barrels containing an unknown chemical substance. Two men who came across the barrels, which had been dumped near a railway station in Karachi, had already died from inhaling toxic fumes. Hoping to avert further deaths, police then rolled the barrels into the nearby Lyari River.

Upon learning of the incident, SDN users in Islamabad sent an appeal for expert advice to Peace Net and Eco Net, a pair of networks operated by the San Francisco-based Association for Progressive Communications. Within 24 hours, more than 50 responses arrived by fax and electronic mail from Brazil, Finland, Germany, New Zealand, Switzerland, the United Kingdom and the United States. The respondents — who included students, scientists, public health experts, Pakistani expatriates and an official at the US Environmental Protection Agency — identified the deadly substance as meta-dinitrobenzene, a highly toxic and potentially explosive chemical. Under expert supervision, the barrels were then removed from the river and safely incinerated.

Formed in January 1993, the SDN in Pakistan has documented other similar accomplishments. Just as important, it has helped sway the government to liberalize its telecommunication policy and consider privatizing the national post, telephone and telegraph authority, whose high tariffs inhibit easy access to communication and thus weaken the prospects for achieving sustainable development. The SDN is also helping the Pakistan Council for Scientific and Industrial Research to compile an electronic directory of scientific and technical experts within the country. The directory, which can be searched by name, location or field of expertise, will allow for greater use of national experts and reduce reliance on foreign consultants.

Through links to the Internet, a massive computer network that connects thousands of universities and research institutes in almost every industrial nation and a few developing countries, SDN users like those in Pakistan can access distant databases and experts. Due to high telecommunications tariffs in many developing countries, however, access to the Internet remains limited and costly.

But Bolivia has shown that sophisticated computer systems are less important than introducing people and institutions to the rewards of sharing information. While waiting for UNDP to deliver the first computers, Juan Pablo Arce, the project coordinator in La Paz devised an ingenious interim solution. Noting that virtually every Bolivian has a transistor radio, Mr. Arce convinced radio stations to development by mail or phone. The radio stations then broadcast the inquiries back to the capital at agreed-upon hours, he and his colleagues found the answers, and the radio stations relayed them back to people listening in the countryside.

People began to call in and say,"We have noticed fish being killed in the river, and we suspect it's the sugarcane factory upstream. We would like to know what we can do to stop this. Are there any rules and regulations that apply? Our welfare is being threatened."

Suddenly the whole of Bolivia became accustomed to asking for information pertaining to sustainable development, says Mr. Lankester. "These were people who previously had no idea that access to information and the power of communication could improve their lives". In effect, they developed an information network without computers. The volume of questions soon overwhelmed Bolivia's radio stations, but by then the computers from UNDP had arrived.

Computer networks, by themselves, cannot remove all of the barriers to the free flow of information. Nevertheless, users in many developing countries are beginning to see their promise. By the end of this year, another eight countries will have drawn on UNDP assistance to set up their own Sustainable Development Networks. Another 50 are on the waiting list.

— *Reprinted from CHOICES*, United Nations, N.Y., June 1994

Tracking Down 'Grey Literature'

The wealth of information found in publications such as scientific reports, doctoral dissertations and conference proceedings — known collectively as 'grey literature' — is often difficult to identify and obtain. This is usually because the research institutes, universities, authorities and firms which publish them see no need to distribute or publicise their research results widely.

However, ever-increasing global competition is fuelling the need to transfer scientific knowledge developed in one country to scientists and industries throughout Europe. Grey literature is often the key to this knowledge transfer. Unfortunately, Europe has been weak in database publishing particularly relating to grey literature, compared with its international competitors. The United States, for example, has long had databases such as those of the National Technical Information Service (NTIS) for technology reports and the UMI for dissertations.

The System for Information on Grey Literature in Europe (SIGLE) was formed to tackle this problem in Europe in 1980, two years after a seminar organised by the European Commission in York (UK). Operated by a network of national information or document supply centres active in collecting and promoting grey literature, SIGLE is an on-line, pan-European electronic database and document delivery system.

SIGLE was funded by the European Commission until 1985, when the members formed the European Association for Grey Literature Exploitation (EAGLE). EAGLE is now self-supporting and growing fast, with members and national SIGLE centres throughout Europe.

A Growing Network

In October 1993 the SIGLE database contained 336,650 records, with around 40,000 new records being added each year. Pure and applied sciences were the first subjects to be covered, with economics, social sciences and humanities added in 1984.

A typical SIGLE record contains the document's title (with an English translation if necessary), plus information on the author(s) the source, the document's length and where it can be obtained. Subject search is possible through 246 subject category codes. In addition, some 15% of the records contain 'added keywords' to clarify the document title, and EAGLE is researching the possibility of adding more.

SIGLE's descriptive cataloguing rules are based on those of the International Nuclear Information System (INIS), and the subject classification scheme is a modified version of that endorsed by the Committee on Scientific and Technical Information (COSATI) of the US Federal Council for Science and Technology.

All the documents listed in the SIGLE database can be obtained from or through the national centre which originally entered the record. Various ways of receiving copies exist, such as through national and international interlibrary loan networks.

International Links

One of EAGLE's overarching aims — to foster international cooperation in grey literature distribution — was reflected by their co-sponsorship of the First International Conference on Grey Literature, held in December 1993 in Amsterdam. Other sponsors included the Japan Information Centre of Science and Technology and the American NTIS.

The conference reinforced the growing recognition of the importance of grey literature, as well as underlining the need for more international, even intercontinental, cooperation in the field. However, the conference also raised a number of questions, ranging from the scientific 'quality' of grey literature to the way it is used. Further research is necessary, but in the meantime EAGLE will continue to improve SIGLE's comprehensiveness and subject access, as well as develop new products.

— *Innovation and Technology Transfer*, June 1994

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Recent Publications

ACRONYMS in Information Science & Technology, by V.K. Rangra. New Delhi, Aditya Prakashan, 1993. x,325 p. Rs.300/- ISBN 81-85689-38-5.

Shortening and combining words to make them easy to say and write is a natural human weakness. Its manifestation is to be found in the acronyms used extensively for identification and representation of associations, organisations, products, services. Composed of the first or first few letters of different words acronym, as a pronounceable word, holds the key to brevity in communication and to lend instant identity to the entities abbreviated.

It is no wonder that acronyms are proliferating fast. In the field of library and information science alone their number has risen to well above 6500 mark. The trend is to be attributed to their being forceful memory aid and to the human penchant for brevity.

But all is not that rosy about acronyms. They also have their share in causing confusion in information flow. Acronyms are coined the world over and in all disciplines of knowledge. As such an acronym may not always turn out unique. It may as well stand for more than one expansion. For example SDI may mean selective dissemination of information to specialists in information science but to specialists in international politics it is to stand for strategic defence initiative.

Under the circumstances a reference tool that lists acronyms and their expansions has become a fundamental necessity. Shri Rangra's work is surely going to fill the void.

It lists over 6500 acronyms alphabetically on almost all subjects and subsubjects falling under information science and technology: processes, techniques, systems, institutions, library and archive associations, information centres, computerisations, databases, online systems, networks, management. He has also tried to expand the scope of the subject by providing coverage to acronyms on allied topics such as book publishing, translation, reprography, computer hardware and software, programming languages, communication, etc. Its coverage is international but gives exhaustive coverage to Indian scene. As such one finds acronyms in foreign languages as well.

Shri Rangra has tried to provide comprehensive coverage in his cross disciplinary, multinational dictionary of acronyms. Given his experience and depth of knowledge in the subject one should take it as an authentic piece of work.

This outstanding work should be of great use and relevance to librarians, information specialists, computer experts, teachers and students in library and information science. — *S. M. Dhawan*

Information Management for Rural Development Eds. P.C. Bose & H.C. Jain, New Delhi, Shipra Publications 159 p. Rs. 200/- ISBN 81-85402-39-6, 1994.

The book brings together papers presented at the 12th Annual convention and conference of the Society for Information Science held at IICT, Hyderabad during 28-30 January 1993.

Rural development is the current rage among planning experts and policy makers as a solution to the problem of poverty. The task of rural development and modernisation is not possible without effective, efficient impartial and stable administrative support. So for not much could be achieved due to lack of information support to these programmes.

Due to lack of education and non-availability of vital statistics and technical guidance, rural development has not been rapidly progressing.

Keeping in view the complexity of rural development programmes the Society for Information Science organized this convention at the Indian Institute of Chemical Technology (CSIR), Hyderabad. The theme of the conference was aimed at building up of an information bank for rural development and working out strategies on how to exploit the available resources for the benefit of rural masses.

The theme was discussed under 5 sessions chaired by eminent Directors of Information and Extension Managements. The need for building up of an information bank for the benefit of rural population has been emphasized in view of the multi-faceted activities covering agriculture, education, wealth and sanitation infrastructure development, social and organizational structures.

The publication of this compendium will prove useful to those who are interested in rural development and reconstruction with particular reference to communication and information management. The book contains a wealth of valuable information which should facilitate the task of setting up information network for rural development and upliftment. — *RDT*

Visiting Workshops for Librarians on User Education

A series of visiting workshops on user education were organised under the Trainer Development Project funded jointly by the Training Division, Department of Personnel & Training, Government of India and British Council Division, New Delhi (British Council, U.K.) from 2 to 19 Aug., 1994 in two circuits: Lucknow, Calcutta, Guwahati, Delhi and Gurgaon, Ahmedabad, Hyderabad, for the librarians from the catchment area of the regions. The object of the workshops was to improve knowledge and skills of the librarians in the field of user education leading to better utilization of the resources and services available in their libraries.

The workshops were conducted by Mr Mike Freeman, U.K., Mr Peter Maltby, U.K., Mrs Sudha Saxena, Librarian, HCM State Institute of Public Administration, Jaipur and Mrs Sunita Gulati, IIPA, Delhi. About two hundreds librarians participated in these workshops.

Emerging Trends in Knowledge Explosion

Interaction with people from other disciplines is the most useful means of discovering the emerging trends in knowledge explosion. The capacity to observe, to listen and to discuss intellectual and social concerns with others should be developed: and communication skills both oral and written are essential to 'communicate' and not merely disseminate information.

Although the number of conferences, seminars and workshops has increased they are generally restricted to a single subject. They are rarely inter-disciplinary in discussion or in action. Working in isolated groups has largely prevented cross fertilisation of ideas which is so necessary for speedy growth in every area of work.

Information professionals therefore need to continuously observe and study the information needs and information seeking pattern of user groups. A regular scanning of specialised journals in selected areas and a wider study of general interest ones is a must for everyone.

Output Depends on Input

Steeped as we are in computer culture, we are well aware that only good input can produce good output! Creative work can result only if there is a continuing intellectual recharging through wide reading, writing, discussing and above all interacting with other professions.

— *MALA*, July 1994

News and Events

International Conference on Scientometrics and Informetrics

Sponsored by the International Society for Scientometrics and Informetrics, this is the fifth in a series of biennial conferences to be held at Rosary College, River Forest, Illinois, USA from 7 June–10 June 1995.

Scope: The scope can be broadly defined as those topics which treat in quantitative fashion the creation, flow, dissemination, and use of scholarly or substantive information. Representative, but by no means inclusive, topics are : Informetrics "laws" and distributions; mathematical models of communication; citation analysis; theory of document, text, and information retrieval; information and productivity; the quantitative sociology and psychology of science and of other substantive information based activities; application of informetrics—file design, data compression, etc.; informetric applications to policy analysis, R & D management, etc.

The Conference will be hosted by and held at the Graduate School of Library and Information Science of Rosary College in River Forest, Illinois.

For general information write to Conference Organizer Michael Koeing, Dean, Graduate School of Library and Information Science, Rosary College, River Forest, Illinois-60305.

NISSAT—DRTC Short Course on Library Automation, Information Retrieval and Networking

The course is designed for persons qualified for performing technical and house-keeping activities in any kind of information service system or centre, including libraries of all kinds.

The objective of the Course is to provide an opportunity to the course participants to acquire professional knowledge and skills specially in using computers to perform information work and to render information services. Normally 12 to 15 candidates will be selected for each course. The duration of the course is six weeks.

The teaching method consists of lectures, lecture-cum-demonstration, case studies, assignments, and intensive practice of the use of computers for library and information work and services. Besides the DRTC faculty, a few experts, having experience in handling machine-readable bibliographic databases, would be involved in teaching.

Course Fee

The sponsoring agency of the short-term course has prescribed the course fee at the rate of Rs. 3000/- (Rupees Three Thousand) without accommodation, for a duration of six weeks.

Please send the filled-in application form to:

The Professor and Head
Documentation Research and Training Centre
Indian Statistical Institute
8th Mile, Mysore Road
Bangalore-560 059.

Course Content

Introduction: Computer Technology: Overview of flow charting and decision tables with library/information examples. Historical development of computers and their application with emphasis on library information activities. Basics of communication technology with the emphasis on library and information network.

Programming: Programming techniques, functions of operating systems with emphasis on MS-DOS. Programming Language: PASCAL or C.

Library Automation

A study of how computers are used to automate various house keeping activities. This involves a study of data requirements, file structure etc. for acquisition, cataloguing, circulation and serials control. Specifically, the design and development of document acquisition, serials control, circulation control, in-house documentation and management information system, will be dealt with.

Information Retrieval

Data structure: Linear and non-linear structures. File Organisation, Data models: hierarchical, network and relational models. Search strategies, evaluation of IRS, and on-line information systems (use of simulation packages)

Data-exchange and Networking

Communication formats: Switching formats, bilateral formats, standard formats (MARC, CCF and other bibliographic

formats). Library networks: INFLIBNET, CALIBNET, DELNET. Communication networks:

NICNET, INDONET, ERNET. Network Protocols and Standards, LAN, WAN. E-Mail, Telnet, FTP and INTERNET, etc.

Software Packages

CDS/ISIS and its applications, Wordstar, Chi-Writer, dBASE IV, Lotus 1-2-3, Statistical packages.

Management of Computerised Systems

Selection of hardware/software, maintenance, manpower requirements and other resources.

Last Date for Receipt of Applications: 20th Oct. 1994

Course Duration: 7th November to 16th December, 1994

STA Fellowships in Science and Technology

The Science and Technology Agency (STA) established the STA Fellowship Program in 1988 in order to offer opportunities for promising young foreign researchers in the fields of science and technology at national laboratories and public research organization in Japan (excluding universities and university-affiliated institutes).

Since October 1st, 1989, the Programme has been managed by the Research Development Corporation of Japan (JRDC), a statutory organization under the supervision of STA, in cooperation with the Japan International Science and Technology Exchange Center (JISTEC).

Fellowship Awards

Fellowships include round-trip air tickets (economy class, not available for dependants) and the following allowances; (1) Monthly living allowance: ¥ 270,000 (2) Monthly family allowance: ¥ 50,000 (3) Initial international setting-in allowance: ¥ 200,00 (4) Annual allowance for travel within Japan related to research activities: ¥ 115,000 (5) Housing: Apartments will normally be provided to awardees (6) Medical insurance (not available for dependants)

Application Procedure

The STA Fellowship Program is open to young PhD holders of under 35 in principle in any science or engineering discipline. Applicants will be required to obtain a letter of acceptance from their Japanese host institutes (the responsible organizations provide help in contacting suitable host institutes), and to file an application to the responsible organizations of their countries (only those with nationality, citizenship, or permanent resident status in the countries below). Research Development Corporation of Japan (JRDC) Screens the Fellowship candidates recommended by the responsible organizations. —*Source STA Today*, June 1994.

NICTAS-ACS Online Search Workshop

Organising information and information technology related workshops forms a crucial part of the multifarious activities of NICTAS at ATIRA.

Recently, NICTAS, in association with American Chemical Society (ACS), convened a one-day Workshop on "On-line Database Searching for Chemists", at ATIRA on 8th August 1994.

Shri A.R. Garde, Director ATIRA and Chairman, NICTAS, inaugurated the workshop. While addressing the participants, Shri Garde emphasized the present-day relevance of core information facilities like NICTAS. He pointed out that NICTAS is diversifying to provide prompty access to pinpointed, latest and specialised knowledge to industries, other than textiles through establishment of NACID. This, he observed, was particularly pertinent for gaining the much needed competitive edge in all fields, globally. Dr. Anish Mohindru of ACS, who was the chief resource person of the workshop, made exhaustive presentations of how to conduct online searches for acquiring chemical information.

Instant access to the world's scientific literature on computer was made possible using a modem and VSNL Access. Broad search topics included were chemistry; pharmacology; dyestuffs; material data; bio-science, etc. The different search options available, viz. chemical names, molecular formulas, author, title, trade names, keyterms (subjects), company names, journal titles and a combination of these options were explained in detail.

Dr. Mohindru followed this up with a live demonstration by encouraging participants to raise queries and then conducting successful on-line searches to provide the requisite information.

Summing up the workshop proceedings, Shri M. Ratna Prabhu, Sr. Deputy Director, ATIRA dwelt upon the enormous potential of on-line searches in obtaining information. At the same time, he also hoped that information professionals were taking precautions to tackle the possible problem of

information glut, which could arise from this new solution to the problem of information searching.

The workshop was attended by about 35 participants from industry, academic institutions and research organisations. From ATIRA, apart from the NICTAS staff, Dr. S. Rahman and Shri S.K. Tiwari from Chemistry, while Shri R. Venkata Kesavan from Library were present.

The Exclusive Indian Database

VANS. COM: 1.5-Floppy service and printed format. A monthly compilation of several hundred concise reports on business developments in India, accompained by a powerful text retrieval software. *VANS* is the only information service of it's kind in India.

(Annual subscriptions to *VANS* [inclusive of courier service] — Overseas US $ 960. In India: Rs. 15,000)

SNAPSHOT:1.0 - WEEKLY Floppy service, of business news of the current *week* in "Snapshot" form (Add-on price Rs. 5000 annually)

FOR DETAILS CONTACT: TYRONE CABRAL— Marketing Manager, Vans Information and Investor Services Linited, 7/10 Botawala Building, 2nd Floor, 8, Horniman Circle, Bombay-400 023.

Network Services

RENNIC, the Research & Education Network of National Informatics Centre offers free E-Mail & News Services to:

- Academic and Research Institutions recognized by UGC, CSIR, MHRD, ICMR, AICTE, DAE, DOS, DST, ICSSR, Central & State Governments
- Universities and Public Libraries listed by UGC for INFLIBNET support
- Public Hospitals and Medical Institutions recognized by the Ministry of Health & Family Welfare of Government of India or the Health Ministries of State/Union Territory Governments
- Selection of 3000 institutions in the first phase upto March 1995 & Free Internet Services to select Institutions according to the criteria laid down in the Brochure

Other Services offered on Cost-sharing Basis are

- Internet Services consisting of
  - — E-mail
  - — File Transfer
  - — Remote Login
  - — Bulletin Board
  - — Conference & Seminar News
  - — Papers & reports submission to journals
  - — Database & Information Access through GOPHER, ARCHIE, WWW, Hytelnet, WAIS etc.
- X.400 and X.500 Services
- Database access
  - — Public domain Databases
  - — Medical Databases, MEDLARS etc.
  - — Patent Databases
  - — Bibliographic Databases (Scientific, Technical, Agricultural & Social Sciences) including full text search
  - — International databases

RENNIC has access to the wide reach of NICNET

- 500 cities & towns in India
- 150 countries worldwide
- With speeds of upto 2.2 Mbps made possible through the NICNET National Info Highway and Direct High Speed International Gateway

For further information and copy of RENNIC Brochure Write to RENNIC Division, National Informative Centre, A-Block, CGO Complex, Lodi Road, New Delhi-110 003.

Natural Resources Data Management Systems

The project is aimed at developing and demonstrating spatial data management technologies to facilitate operationalizaton of the concept of decentralized planning. Under this project data on natural resources in the form of thematic maps at the scale of 1:50,000 and collateral information on socio and agro-economic parameters at the village level are collated with spatial connotation for a few selected districts. The methodology is based on the modern concept of geographical Information System (GIS).

GIS Centres—GIS centres have been established in different geo-environmental settings in the country in collaboration with an R&D institute located close to the district. With the acceptance of NRDMS methodology by the state user agencies, a number of state governments/agencies have

come forward to share part of the cost of setting up and maintaining GIS centres. During 1993-94 new GIS centres have been initiated in collaboration with the state government at Mau and Varanasi districts of Uttar Pradesh, Kurnool and Mahabubnagar districts of Andhra Pradesh.

The effort initiated last year to set up NRDMS GIS centres in all the districts of Karnataka made considerable progress with the establishment of centres at Gulbarga, Bijapur, and Uttarkannada districts. A state NRDMS centre has been set up in Bangalore that will serve as the nodal executing agency of the project in all the districts. Application projects in consultation with the local institutions have also been initiated.

Application Project—In order to evolve methodologies for solving location specific problems relevant to decentralized planning, NRDMS encourages R&D projects in the area of Land & Water System Analysis and Natural Disaster Mitigation, Indigenous software development forms an integrated part of this activity. The highlights of progress made in this regard is given below

- Techniques were developed for processing Air borne Synthetic Aperture Radar (ASAR) images in an effort to build up natural resources database for areas which remain opaque to optical sensors due to clouds. As a part of this exercise SAR data covering a part of Godavari basin of Andhra Pradesh and the Andaman & Nicobar islands has been integrated with Landsat thematic mapper and Indian Remote Sensing Satellite LISS II data. A few Geologic structures hitherto unreported have been identified using SAR images.

- Resource mapping at cadastral level for 25 panchayats of Kerala State has been carried out with the participation of local volunteers by the Centre of Earth Science Studies (CESS) and Integrated Rural Technology Centre (IRTC). A comprehensive Action Plan for the sustainable development of Kaliasseri panchayat has been prepared as part of this project. The state government has decided to replicate this methodology to cover the entire state as panchayat level with its own resources.

- A systematic analysis of data available at the Bankura database centre was carried out to bring out a Local Area Management and Planning (LAMP) document for the Teghari Gram Panchayat in Bankura district. The Plan considers existing infrastructure and proposes optimal locations for additional facilities in the panchayat.

- An optimal Biomass Management Plan for a cluster of villages in the Irgad micro watershed of Pauri District (UP) has been formulated taking into account the factors that cause stress on local biomass resources. A decision support module has been developed and is being field tested for use by the district planners in order to perceive the biomass scenario at the village level.

- Surveys and remote sensing data interpretation for landslide hazard zonation mapping for parts of Sutlej-Beas valley. Garhwal Himalayas, Kumaon Himalayas, parts of Sikkim and Western ghats have been carried out. Pawari landslide (Himachal Pradesh) located on NH-22 has been identified for intensive studies. A dense network of piezometers and rain gauges have been installed in the slide area to monitor ground water fluctuations and rain fall variations to model their effect on slope stability.

GIS-Gram—The second version of the software has been installed in all the NRDMS database centres to computerise the relevant thematic maps. This software is being marketed by DST. A project has been initiated to bring out a UNIX version of this software.

User Interaction and Training—NRDMS continued to conduct training/workshops on NRDMS methodology and GRAM/GIS in the current year in order to disseminate the methodology to the district officials. A five day training workshop was conducted for state and district level officials in and around Pauri where the participants were informed about the methodologies evolved by different NRDMS groups. User interaction workshops were also conducted in Dakshin *Kannada in Karnataka and Sultanpur, in Uttar Pradesh.* A UNESCO sponsored four week training programme on GIS for Natural Resources Management was organised at IIT, Bombay. —*DST Anual Report* 1993-94

Biotechnology Information System (BTIS)

The Biotechnology information network has emerged as one of the major networks in the country on scientific and technical information in Biotechnology. The network now spans a subject oriented scientific grid covering several scientific institutions from different agencies such as CSIR, ICMR, ICAR, UGC, Biotech Industries, Planning Commission, Department of Electronics for providing a single reference for the Biotechnology information needs in the country.

The Biotechnology Information System Network (BTISnet) covers 10 specialised centres which constitute the main repository of information and 21 distributed information sub-centres which are helping in the diffusion of information

across the network to scientists working at various R&D institutions and laboratories in the country.

The Apex Centre BTIC at the Department of Biotechnology coordinates the activities of the network and provides a mechanism for networking and access to national and international network resources in Biotechnology.

BTISNET Activities During 1993-94

The Network has geared up to promote the rapid sharing of information and collaboration among the scientists through the computer link, electronic bulletin boards, e-mail services and a host of freely available VMS and PC based softwares. The BTIS centres provide computerised assistance to scientists working in the frontier areas of Biotechnology and biology in planning experiments as well as analysing protein and nucleic acid sequence and to provide online access to the major bibliographic databases e.g. DIALOG, MEDLAR and off-line information retrieval through CD-ROM databases. Access to EMBL Nucleic acid sequence databank which is updated on a daily basis is available on BTISnet through ICGEBnet, Trieste, Italy.

E-mail (Electronic mail)

The e-mail facility has been introduced on BTISnet through the Education & Research Network (ERNET) of the Department of Electronics. The BTIC and DBT has applied for a leased communication line to ERNET, DoE which will enable the BTIC to act as INTERNET node for accessing to worldwide biological information resources by the BTIS Centres.

National Graphics Facility

Three high resolution graphics facilities were set up at three DICs namely, Madurai Kamaraj University, Madurai; University of Poona, Pune; and Centre for Cellular and Molecular Biology, Hyderabad, as part of the Bioinformatics programme. Silicon graphics Crimson/ELAN machines alongwith the required molecular dynamics and visualisation software package BIOSYM have been installed at all the three centres. These facilities have been declared as National Facilities for making use of by the researchers interested in structural aspects of molecules. The other National facility at IISc., Bangalore on Interactive Graphics based Molecular Modeling is being used extensively for visualisation in connection with various research projects involving macromolecular crystallography, molecular modeling, and molecular dynamics. The facility is also being used for software developmental activities. A software package (IMPAC) has been developed for the generation and visualisation of the 3-D structures of carbohydrates.

Database Developmental Activities

Several general as well as programme specific value added databases have been developed under the programme and many are under development. The Apex Centre at DBT has developed a database on "Research Profile of Biotechnology Activities in India" and the same was published as a Directory by the Publications & Information Directorate (CSIR), New Delhi. The database was well received by the experts and scientists in the country. The update of the database is under process at the centre. Yet another database namely "The International Biotechnology Database" (TIBD), which will contain information on Government bodies, Institutions, and Industries engaged in Biotechnology activities is under preparation.

The University of Poona DIC has completed a major database on "Animal Virus Databank" which covers information of more than 800 animal viruses. This is the first databank in India which is available online and is the largest computerised databank in the world in the area of animal viruses. The Madurai Kamaraj University DIC has developed and marketed a bibliographic database on "Rotifera".

—*Annu. Rep. Dept of Biotechnology* 1993-94

Electronics Industry Information System

The data pertaining to licensing, approvals, production, exports, foreign collaborations, manufacturers and product and other macro level statistics relating to electronic industry are maintained in a information system called *LIPS Information System* by the DBID of Department of Electronics. The data bank has up-to-date licensing and foreign collaboration information. The itemwise and unitwise production and export data is available since 1981. The manufacturer and product directory provide up-to-date and reliable information and serve as a Buyer/Seller Guide. It provides manufacturer's information such as address (both office/factory), telephone, telex, gram, name and office of top executive, year of establishment, brand, manpower employed, sector, product range and export product range etc. It also provides manufacturers and exporters for a product.

The information system is available to public and the government through LAN Network of the Department of Electronics. To meet the user community demand for a intelligent and user-friendly information system, DBID has developed and made available to the industry an user interactive PC-based package called 'Electronics Industry Information System (EIIS)'. The user guide for EIIS provides complete instruction for its installation and use. A revised and updated version of EIIS was made available to the industry.

Guide to Electronics Industry in India

Electronics has become one of the major areas of interest for the foreign investment in India. Large number of queries were being received from potential investors requesting for the government policies, infrastructure facilities and basic data pertaining to Indian electronic industry.

To cater to the information needs in the field of electronics, *Data Bank and Information Division (DBID)* of Department of Electronics brought out for the first time in 1992, Guide to Electronics Industry in India. The publication, being first of its kind, was well received and was sold out within just tow months. In spite of the stupendous task involved and the limited resources available the 1993 edition of the Guide has been brought out.

The guide covers a wide range of information such as:

— Manufacturers Directory

— Product Directory

— Export Product Directory

— Time Series Data on Production and Exports

— Production Trends in 1993

— Electronics Units in States

In this edition, all the changes such as address, phone, telex, fax, product range, etc., has been incorporated and made it up-to-date. In addition, an effort has been made to provide a brief but comprehensive description of the policies and infrastructural facilities that are relevant to the electronics sector. For the facilitation of the users, ITC Harmonised code has been provided alongwith the product classification being followed by DBID of DOE. There was overwhelming response for the publication from Indian Embassies in various countries, the industry and the users. —*Annu. Rep. DoE* 1993-94.

Technology Development for Indian Languages (TDIL)

Projects initiated by Dept. of Electronics during 1993-94 under the above programme include:

- Development of Corpora of text of Indian Languages in machine readable form
- Computer Assisted Learning and Teaching (CALT)
- Teachers Training Programme in the area of Natural Language Processing
- Development of Human Machine Interfaces (HUMIS)

During the year 1993-94, the achievements made in each of the above area are summarised below:

Development of Corpora: Corpora of texts for Kannada, Tamil, Telugu, Malayalam, Gujarati, Marathi and Sanskrit have been developed and about 22 lakh words have been entered in each of these languages. About 17 lakh words have also been entered in respect of Bengali and Oriya. Approximately 60 per cent tagging work in terms of different morphological categories like noun, pronoun, adjective, verbs-finite and non-finite, adverbs and indeclinable have also been completed. Similar effort in respect of English, Hindi, Punjabi. Assamese, Urdu, Sindhi and Kashmiri is also underway.

Computer Assisted Learning and Teaching (CALT): Under this thrust area, software packages have been developed for Hindi and Sanskrit. These packages are being evaluated currently.

Teachers Training Programme in the Area of Natural Language Processing (NLP): Teachers Training Programmes for Language Teachers and Linguists in the area of Natural Language Processing are being conducted at seven centres.

Development of Human Machine Interface System: Under this area two research oriented projects are progressing smoothly. These are: i) Development of OCR for Handprinted Devanagari Text and ii) Creation of Speech data base for spoken Hindi.

In addition, a Kannada-Hindi Anusaraka System developed earlier on Sun platform is being ported on 486 platform for wider acceptance and field testing. Simultaneously, the Anusaraka Technology is being extended to other three South Indian Languages, viz., Telugu, Malayalam and Tamil.

TDIL Meet 93 was also organised during this year with a view to develop interaction between various TDIL Centres. —*Annu. Rep. ERNET* 1993-94.

High Speed Value Added Network (HSVAN)

In view of the fast growing world market for Computer Software and our country's advantages in this field, the Government of India had identified computer software and services export as one of the major thrust areas. Perceiving the weak datacom infrastructure as a hindrance to our export performance in this area, providing trouble-free High Speed Data Communication facilities to the software exporters is a priority for the DOE. As a part of its effort in this direction, DOE has taken the initiative to set-up a High Speed Value Added Network (HSVAN) to be implemented by Satcomm

services (India)—an autonomous society under the administrative control of DOE—for which a grant of Rs. 191.5 million has been given by the DOE.

During the year, the society has set-up three centres at Bombay, Delhi and Madras, and has completed the installation and commissioning of the equipment. The network uses Point-to-Multipoint radio systems working in TDM/TDMA mode and directly connects the customer's computers to the international gateways. The existing gateways of Videsh Sanchar Nigam Limited (VSNL) are used for up-linking to the satellite.

The network provides international datacom links at speeds of 64KBPS, 19.2KBPS and 9.6KBPS. In addition, switched services to meet the needs of the smaller firms and other value-added services will also be provided. Some of the outstanding features of the network and services to be offered are as follows:

- Fully digital end-to-end connectivity.
- No last mile problem as network uses point-to-multipoint microwave systems for local access upto the international gateways.
- Flexibility to start with any speed and have upgrades/downgrades according to requirement.
- Additional bandwidth possible for applications like video conferencing —*Annu Rep. DOE* 1993-94.

Advanced Technology Programme in Computer Networking (ERNET) 1993-94 Highlights

ERNET which was originally conceived as an experimental one, has now established itself as a major operational facility and is being extensively used by more than 250 academic and research \organisations in the country predominantly E-mail. Within a subset of ERNET community, a fuller range of services such as network bulletin board service, X.500 based directory service, file transfer, remote login, Information Retrieval through tools such as gopher, archie, WAIS and database access are available. List servers and anonymous ftp servers are also installed. More than 15,000 users are estimated to benefit from the network currently and the number is doubling every year. ERNET traffic constituting E-mail, news, remote computing and file transfer is currently over 120 Mb/day. Range of services is steadily growing in response to user demands and in tune with those coming up in advanced countries.

The tangible benefits of international connectivity can be seen in increased collaborative efforts (access to over 20 million users all over the world), access to remote resources, availability of a large number of software packages in the public domain and in enhanced access to general information and databases.

R & D and Engineering Issues

- An SNMP based network management system, has been configured and installed. However, population of the management information base is yet to be completed.
- SNMP manager on a PC-386 AT platform using BSD UNIX was developed at IIT Kanpur. Some SNMP agents for routers are under development. User configuration and display interface is being implemented.
- The backbone infra-structure, currently supported through terrestrial leased lines, is in the process of upgradation through a 64/128 kbps VSAT network for which a dedicated hub is being installed at Bangalore.
- Multimedia mail is being tested across different sites of ERNET. A VARTALAAP system has been developed as a multimedia conferencing package and supports limited image transfer in addition to text. Audio and video are expected to be incorporated into the software in near future.
- A key tool called two segment LAN traffic generator is being improved upon with better user interface for traffic and filtering measurements.

LAN Developments

- An ethernet LAN based on optical fibre was established.
- The development of an FDDI interface for IBM PC/AT class of machines was taken up.
- A campus packet radio network is proposed to be set up for which terminal controller and modem have already been developed.
- IP level routers were developed by a site, nine of which are in operation at the campus LAN of the site.
- An E-mail package, X-mail, for LAN environment with external gateway was completed and installed at six ERNET user sites.

Other Activities

— An International Teletraffic Congress ITC 93 was held at IISC, Bangalore co-sponsored by ERNET to present current research work being done at some of the sites on teletraffic engineering issues for current and future networks as well as to share international developments in the field.

— *DST Annu. Rep.* 1993-94.

Information Imperatives for Global Competitiveness

This one day seminar, the first of its kind, was organised by the Ranganathan Centre for Information Studies on the 6 June at the M.S. Swaminathan Research Foundation. The aim was to focus attention on the rapidly growing importance of access to information in a global economy which is becoming more and more information-based and more specifically in the context of the recent national policy of economic liberalisation. Dr Manmohan Singh, Union Finance Minister, who inaugurated the seminar, stressed that competitiveness of Indian industry was critically dependent upon designing appropriate and adequate information systems for technology scanning, forecasting and dissemination. There is a great need for uptodate information about change in tastes and demand patterns in our markets as well as the likely strategy of our competitors. The relevant data must be made available on a real-time basis to enable speedy decision making. Dr. Athreya's keynote address on 'Information for Globalisation' set out a plan of action for various sections of society — industry, laboratory, intellectuals, governments, citizens and libraries. He drew attention to the need for more and more interactive platforms to enable information professionals to function effectively as 'information trustees'. In his presidential address Shri C. Subramaniam pointed out the urgent need for collaboration among universities, research laboratories and industries. He felt that the greatest challenge was to develop the ability to cope with change.

— *Mala Newsletter*, July 1994.

On-line System to Network Farm Institutes

The Indian Council of Agricultural Research (ICAR) would be setting up a network link to provide information to 25000 agricultural scientists in 75 research institutes, 27 agricultural universities and about 1000 research stations. This programme is with the support of the International Service for National Agricultural Research (ISNAR), The Hague.

This ambitious 10 year project funded by World Bank is expected to provide the national agricultural research system with three broad types of informations:

1. Research data pertaining to pest attacks and disease outbreaks, fish catches and genetic resources.
2. Bibliographic information on published data.
3. Management information concerning, planning, evaluation and administering research.

ISNAR and ICAR are considering separate but compatible systems for the three categories to ensure easy information exchange.

NIC to Translate Russian Science and Technology Information

The National Informatics Centre (NIC) has initiated a project to translate the vast information on Science and Technology Developments available with Russian Research Institutes into English for use by the rest of the world.

To Transmit the information available NIC proposes to set up a Satellite link with the concerned databases in Russia. Also NIC proposes to set up a cell in Moscow which will cater to the needs of other countries seeking the information in their desired language.

Under the agreement India will receive the service charges whereas Russia is entitled to get the royalties.

—*AIS Tech News V.* 5 No. 2, 1994.

ET and T to Market Multimedia Products

The ET & T Corporation Ltd., a government undertaking would by launching a service of sophisticated applications in multimedia along with matching hardware, in collaboration with Divergent Technologies Ltd., USA.

The four thrust areas selected for multimedia applications are: Office automation, Journalism, Security, and education and training. The office automation packages along with the associated hardware would allow data, audio and video transfer through ordinary telephone lines between remote offices or through LAN using arenet/ethernet cards. The facilities provided by this service are: Video conferencing, Video phones, logging into any E-Mail, Network, etc.

In the package designed for journalists and news reporters, they get the benefit of transmitting their reports annotated with any sound file and along with video clip, or a still frame picture to their office within seconds of an event taking place through ordinary telephone lines. Television clips can also be sent by this package. The software designed for this purpose uses software integration high compression and object linking and embedding (OLE) techniques.

Multimedia applications are ideally suited for education and training. ET & T's packages in this area provide unlimited

scope for creating video-based instructions for different users. The files thus created can be edited and recreated by anyone.

— *AIS Tech News*, April-June 1994.

UNESCO Grant for Asiatic Society

The Asiatic Society, Calcutta a participant in CALIBNET Network has been selected as one of the resource bases by UNESCO for the 'Prestigious Memory of the World' programme. Under the programme the society will receive about Rs. 3 crore for scientific conservation of books, journals and manuscripts.

UGC Sponsored Refresher Programme in LIS

The UGC is sponsoring Programmes in Library and Information Science according to the following proposed schedule. Interested participants are advised to write to the Coordinator Academic Staff College or Head of the Department of Library and Information Science of the Concerned University. The Schedule:

Name of Univ.	*Proposed Schedule*	*Catchment Area/Region*
Aligarh	12.09.'94–08.10.'94 02.01.'95–31.01.'95	UP, Rajasthan, Haryana J&K, HP, Bihar, WB, Assam Orissa & Eastern States
Gujarat Vidyapeeth	22.09.'94–12.10.'94	Gujarat
Mysore	14.11.'94–10.12.'94 06.03.'95–31.03.'95	Andhra, Kerala, Karnataka, Tamil Nadu
Nagpur	12.09.'94–05.10.'94 10.02.'95–05.03.'95	Eastern Maharashtra, Madhya Pradesh
Poona	06.09.'94–03.10.'94 16.11.'94–13.12.'94	Maharashtra (Excluding Eastern part)
Bombay	Dates to be confirmed from Univ.	

—*ILA Newsletter* No. 8, 1994.

NICNET for Educational Survey

For the first time, the facilities of the National Informatics Centre (NIC) are being used for an educational survey, which will assess the availability of schooling facilities at different stages. The sixth all-India educational survey, now in full swing, is using a satellite-based computer communication network, NICNET. The use of NICNET facilities is expected to help in efficient processing, tabulation of data and dissemination of information. The survey is jointly being conducted by the Union Ministry of Human Resource Development, NCERT, NIC and the state and the Union governments. The data required will consist of information relating to every primary unit—the village, the town and the schools.

— *Computers Today*, July 1994.

Birla Centre Develops Translator Software

The Hyderabad-based B.M. Birla Science Centre has developed a prototype of machine translator software to translate Hindi texts into English for the first time in the country. The software translates both simple and compound sentences. The software comprising two dictionaries of words and phrases and verbs, nouns, adverbs, adjectives and conjunctions translates sentence by sentence. The translation process is carried out with two phases called sentence analyser and sentence generation. The sentence analyser performs lexical, morphological and syntax analysis to produce an intermediate knowledge representation framework. The syntax analyser identifies the noun and verb objects besides identifying the subject, object, and other cases of noun objects and tense, voice, essence aspect of the verb object. The Birla Science Centre had earlier developed a software called 'Birlatrans' which using the GIST card translates Hindi correspondence into Telugu.

— *Computers Today*, July 1994.

CD-ROM Publishing

What is the value of one paisa today? At current costs of data storage, it can buy more than four pages of data storage space on a CD-ROM disc. No other data storage medium can beat CD on its recording cost-capacity ratio (See chart I for comparison). Among its many virtues, it is incorruptible even by virus making it the most reliable medium of distribution for software. With standards and technology available for compression and recording of full motion video in digital format, CD-ROM is the cheapest storage bet for multi-media developers.

CD-ROM's only disadvantage, Read Only Memory—(You can neither erase nor re-write) has proved to be a virtue for publishing. As the cost of publishing started declining the number of titles being published started going up, now reaching a staggering number of 9000 plus titles. The recording process has moved from factory to desktop, making it affordable for in-house archiving and publishing. (The blank recording disc, which can record upto 660 MB costs less than Rs. 1000). The complete recording and retrieval solution (the equipment and software for PC environment) is available today for less than US$ 8000. You can produce a master disc on your desk-top using a recording machine, called CD-R, and send it to a factory for producing multiple copies. This process is called replication and two

factories are coming up in India, which will roll-out discs very soon. Cost of replication depends on numbers and may range from Rs. 300 to Rs. 100 per disc.

While the process of recording and reproduction is inexpensive, the real publishing involves much more than *desk-top recording and is really the most expensive part of* CD-Publishing. Converting your data into electronic format, making your data interactive and an easily searchable database, transfering the data into a CD-ROM format, finding or writing a software that makes searching on CDs *efficient (CDs are 20 times slower when compared to* Hard-Discs), building appropriate user-interfaces, etc., are the major cost burdens, which may account for as much as 75 to 85 per cent of the total CD publishing cost (see Chart II). The data management needs more attention than the *recording process.*

Chart I

A Cost Comparison of Information Publishing and Distribution Media

MEDIA	Cost/Mega Byte US $
Removable Hard disk	15.00
Hard disk	10.00
Paper	4.00
Floppy Disk	1.70
Microfiche	*0.75*
Magnetic Tape	0.25
WORM Disk	0.13
CD-ROM	0.02

Source: CD Chronicles, Meridian's Newsletter on CD-ROM Volume 6, Number 2

The basic infrastructure needed for desk-top CD Publishing are

1. A 486 machine with minimum 1-2 GB hard-disk
2. CD-R (CD-Recorder)
3. Authoring software
4. A retrieval engine, efficient and powerful enough for searching large volume data with a slow speed device like CD-ROM.

The first item is available locally. The complete publishing system which includes items 2, 3 & 4 is priced between $5,000 and $8,000 depending on the models.

Chart II

Costing A CD-ROM Publishing Project

	Cost variables	Project cost US $	%
1.	Data preparation	12,000	57
2.	Indexing/premastering	6,000	29
3.	Mastering	2,000	9
4.	Replication	1,000	5
	Total	21,000	100

Source: CD-ROM Professional, March 93.

— *U & I*, August 1994

Modern Library and Information Techniques—ACC Training Programme

The Research and Consultancy Directorate of Associated Cement Companies organised a training programme on Modern Library and Information Techniques during 10-12 October 1994 at their CRS Complex, Thane, Bombay. Senior Library and information professionals from industry, information centres and research and academic organizations participated in the programme which discussed among other things latest trends in librarianship, effective library management, computerisation in library and information services and effective communication.

A detailed report on the programme will be published in the next issue of the *Newsletter.*

NIC Gives India a New Ku-band Info Highway in the Sky

After the tremendous success of NICNET in providing vital information and connectivity to and from every corner of India, NIC has another first to its credit. This time by setting up the nation's first Ku-band satellite network as an overlay on NICNET.

Now time variable data rates upto 2.2 Mbps per location is a reality. A Ku-band network opens up new vistas in information technology. Real time multimedia, high quality video conferencing, bulk data transfers and satellite news gathering are but a few of the applications possible on this network.

ITI Equatorial Satcom Ltd. (IESL) Bangalore has technically supported NIC in the installation and integration of the entire Ku-band network in a record time. Its engineering resources has helped overcome vital barriers like rain

attenuation by providing a dynamic Uplink power control and inclined orbit operation by devising a cost-effective tracking mechanism. And finally, the development of a customised Intelligent Network Management System software, in collaboration with NIC.

IESL is proud to be associated with the Ku-band NICNET highway and congratulates NIC on this trend setting achievement.

Software Pirates, Beware!

National Association of Software and Service Companies (NASSCOM) has launched a campaign for awareness against the software piracy with the inauguration of Anti-Piracy Hotline (011-6114971) in Delhi. This Hotline would provide callers with information on legal use of software to prevent software piracy by individuals or users organisations. It will also make them aware of the various aspects of Copyright Laws in India, about sources and retail outlets from where the user could buy the licensed software in the country, and pass on the information about the suspected piracy to the concerned member company. Apart from the Hotline launch, the campaign will include anti-piracy advertisements, seminars on Copyright Laws, training of police officers, etc. As Vittal wishes and expects, it can only be hoped—giving the pirates their credit for craftmanship—that the Hotline will remain hot.

— *Computers Today*, September 1994.

IIT Kanpur to Set up Software Park

Striving to stay independent even after cuts in its budget allocation, Indian Institute of Technology (IIT), Kanpur plans to build a technology park. The IIT aims to provide infrastructure to various industries, mainly in areas in which its strength lies like software and hightech fields.

The scheme envisages a software technology park and an interface for organisations for small- and medium-sized industries, high-tech small companies likely to develop collaborative research industrial projects, with IITs in areas like environment, electronics, communication, prototyping and design, medical instruments, special materials and technology development companies likely to commercialise technologies developed in IIT's special consultancy and design/training organisation.

In the first phase, IIT-K has tied with Uttar Pradesh State Industrial Corporation (UPSIDC) for the development of its STP. In the second phase, it plans to develop it at its own land. The aim is to have 100 IIT professionals working in the park. — *Computers Today*, September 1994

National Conference on Communication (NCC 95)

The Conference is sponsored by the Joint Telemetrics Group of the Five IITS and IISc at IIT Kanpur during 13-14 March 1995.

Papers are solicited on research and development work in the general area of communications. Topics of interest include; Base band transmission and modulation theory including detection, estimation and equalization. Information and rate distortion theory; Channel coding, spread spectrum and line codes; Source coding, voice, video and data encoding, compression and encryption; Telecommunication and computer networks; ISDN and broadband integrated networks; Telecommunications switching: message, circuit and packet switching, photonic switching and fibre optic networks; Signal processing, optical signal processing; Neural networks, artificial intelligence and expert systems in communications; Radio, microwave, millimetre wave and optical communications; Satellite communications; Mobile and personal communications; Telecommunication devices and circuits; Telematics including audio and video conferencing Network architectures, planning and management; National telecommunication policies, standards, regulation and planning and Future telecommunication technologies.

The conference will be preceded by a few tutorials on topics of current technical interest. Suggestions for tutorials are also solicited. The tutorials will be organized on March 11-12, 1995.

Address for Correspondence and Submission of Papers:

Prof. Sanjay K. Bose
Dept. of Electrical Engineering,
I.I.T., Kanpur – 208 016, INDIA

National Symposium on GIS

Gis is the most powerful information technology currently available for planning and decision making processes for land and water resources management.

Continuous upgradation of remote sensing technology and data processing methodologies by the computer software have been strengthening and improving the capabilities of GIS. Use of GIS is quite widespread in developed countries in various fields like resource management, environmental planning, sustainable development and regional planning. In India there has been a widespread awareness about GIS capabilities and applications.

A series of workshops on GIS and Image Processing has been organised to develop research in the fields of GIS applications and to make GIS as an integral part of geographic educational system. The International Symposium organised by these two in the Department of Geography with the aid of CIDA aims to sharpen our focus on applications of GIS in resources management and issues associated with handling the data for computer mapping and resource analysis.

To facilitate participation and interaction among a very large cross section of the user community, the symposium will deliberate on the following sub themes.

Survey and Information Technology; Hardware and Software Components of GIS; Data Base and Resource Management; GIS for Resource Development; GIS for Sustainable Development; GIS and Environmental Management; GIS and Regional Planning; GIS and Computer Cartography; Remote Sensing and a Data Input for GIS; Status of GIS in Developed and Developing Countries; Automated Mapping and Facilities Management.

Venue

Department of Geography
University of Madras
Chepauk, Madras-600 005, India.

Dates

February 22-14, 1995

ISBNs Go Alpha

The Standard Book Numbering Agency in UK has announced changes to the present operation of the ISBN. In the first phase of the change, the agency will from 1 September phase out the use of numbers as check digits—the last digit in the SBN sequence which is used to validate the rest of the number—and replace them with letters of the alphabet. Until now the only Alpha check digit in use has been X . In the second phase, beginning in 1996, numbers will be replaced entirely by letters. Reason for this change seems to be that numerical check digits must exhaust themselves at some point. When ISBN was first developed in the 1960s it was thought that numerical digits would suffice until well into the next century. However, based on the most recent UK output statistics, it is estimated that numerical check digits will be exhausted in 1997 or 1998.

—*MALA Newsletter*, May 1994

MLAI – 94

The National Convention of the Medical Library Association of India will be held in the third week of December 1994 at Bangalore Medical College, Bangalore.

The Karnataka Health Science Library Association (KHSLA) (Regd.) shall be the host. Shri R. Ram Raj Urs, Senior Librarian, Bangalore Medical College. Bangalore will be the local Organising Secretary.

The members of MLAI and others interested in theory and practice of Medical Librarianship are cordially invited to participate in the convention. The participants will get an opportunity of enjoying the warm hospitality and having a glimpse of this garden city.

Themes of the Convention

1. Performance Standards for Medical Libraries and Information Centres in India.
2. Medical Libraries and Information Centres in India by 2001 A.D.

Time Schedule for Papers

Submission of abstracts of the paper to the Organising Secretary (MLAI-94)	31st August 1994
Intimation of the Acceptance of paper by the Organising Secretary	15th September 1994
Submission of full text of the paper to the Organising Secretary	30th October 1994

For further information contact Dr. R.P. Kumar, Secretary MLAI, K-43 Kailash Colony, New Delhi 110048.

Calender of Events for the F.Y.1994 - 1995 (Updated subset)

Topic	*Venue*	*Date*
University of Poona		
* AACR - II & CCF	Pune Univ, Pune	17-10-94 to 22-10-94 #
* Computer Applications in Libraries & Information Centres	- do -	08-11-94 to 21-11-94
* Management techniques as applied to Libraries & Information Centres	- do -	09-01-95 to 14-01-95
IASLIC		
* UDC	Jadavpur Univ, Calcutta	2 Weeks (Feb'95) #
* AACR - II & CCF-ISBD	Jadavpur Univ, Calcutta	14-11-94 to 26-11-94 #
* Computer Aided Library & Information System and Use of CDS/ISIS	Annamalai Univ	2nd week of Feb'95 #
* - do -	TTTI, Calcutta	01-12-94 to 15-12-94
* - do -	IIAS, Shimla	20-03-95 to 31-03-95
* - do -	Vidyasagar Univ,Midnapore	1st Quarter ot 1995
Bengal Library Association		
* Application of Computers in Library Services		14-06-94 to 29-06-94
* - do -		12-09-94 to 30-09-94 #
Indian Library Association		
* Application of CDS/ISIS in Library & Information Activities	Patiala	25-07-94 to 29-07-94
* - do -	Ankushpur	03-10-94 to 07-10-94 #
* - do -	Amravati	15-01-95 to 20.01.95 #
* - do -	Anantpur	16-05-94 to 25-05-94
* - do -	Bhopal	10-05-94 to 14-05-94
* - do -	Vijaywada	21-03-94 to 25-03-94
* - do - (2nd course)	Guwahati	25-07-94 to 29-07-94
* - do -	Delhi	04-07-94 to 15-07-94
* - do -	Patna	1 Week
* - do -	Manipur	1 Week
* - do - (3rd course)	Guwahati	1 Week
* Advance CDS/ISIS with Pascal	Gwalior	03-10-94 to 28-10-94
* - do -	Delhi	4 Weeks
Dr. YS Parmar University of Horticulture and Forestry		
* Computer Applications in Library & Information Centres	Solan	06-03-95 to 18-03-95
NICDROM / NAL		
* CD-ROM Technology	NAL, Bangalore	19-10-94 to 21-10-94
DELNET		
* CDS/ISIS (version 3.0)	IIC, Delhi	05-12-94 to 16-12-94
* DELNET E-mail Users	- do -	26-12-94 to 30-12-94
Society for Information Science		
* Eighth Technical Communication	NISTADS, New Delhi	22-11-94 to 26-11-94

 # Rescheduled dates

Dr. MB Knonnur
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Tel 033-349651

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Bengal Library Association
P-134, CIT Scheme 52
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Mr. AP Gakhar
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For information on other items vide NISSAT NEWSLETTER VOL. 13 No. 2 APRIL-JUNE 1994 pp 43-44

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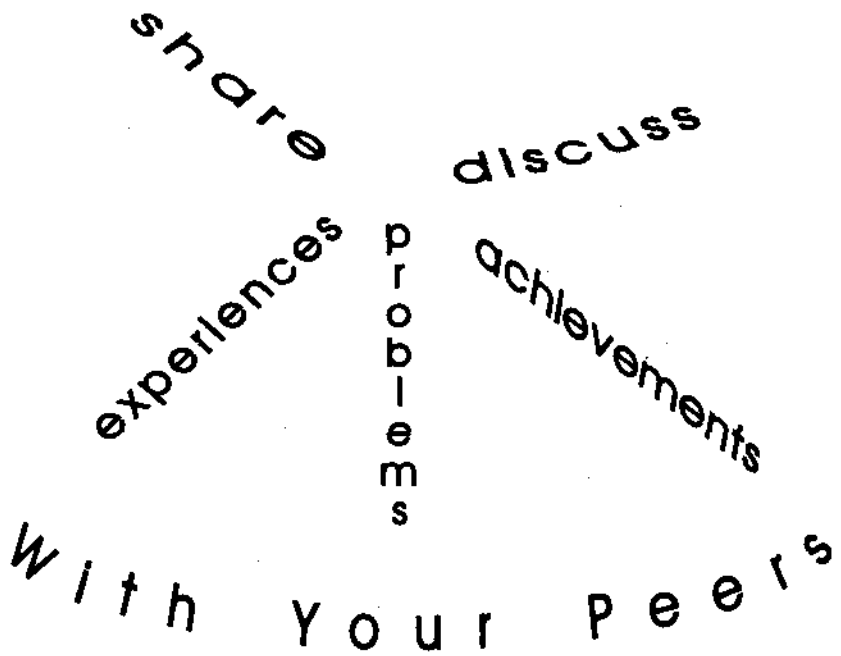

6th CDS/ISIS Users Group Meet

January 10-13, 1995

MADURAI

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