

# NACSIS, Bibliographic Control, and Standardization\*

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## 1. NACSIS

The National Center for Science Information System(NACSIS) is one of the National Inter-University Research Institutes, whose purpose is "to gather, organize and provide scholarly information, as well as to carry out research and development(R&D) of scholarly information and a science information system(SIS)," as defined by Article 7 of the National University Charte-ring Law.

Mission rendered and R&D activities by NACSIS are as follows.

1) planning and coordination of the Science Information System Program for Japan ;

2) R&D of scholarly information and a SIS to carry out the Program ;

3) developing a union catalog database of library materials, and efficiently providing inf-ormation from it, as comprehensive university library collections in Japan are built up ;

4) services to provide secondary information such as bibliographic, numeric, and graphic types

5) promoting systematic database construction for the nation ; and

6) education and training of personnel to provide nation-wide services with such inform-ation system.

### 1-1. Background of NACSIS

As of May 1988, 1,084 libraries including branch libraries are in operation among Japanese universities. Library activities carried out in Japanese universities are summarized statistically by the Ministry of Education, Science and Culture(MESC). According to the MESC Sur-vey, the total number of private universities is 3.7 times to that of national universities, however the total number of monograph holdings of private universities is only 1.2 times to that of

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national universities. Average holding of monographs of the national university is 702,000 and that of the private university is 231,000. This is because many of private universities are established recently, and developed independently. Stock of monographs exceeded 157 million volumes and serials 2.1 million in volume. Annual increment of monographs is 7 million volumes in total and serials 1.2 million in number.

Library automation reflects the institutional background of universities in Japan. Library automation among national university libraries are being led by the policy of the MESC. During 1970s, hardware and software for Japanese character handling were not efficient nor economic enough for library use. In parallel to the development of Japanese character handling by computer, library applications had been changed and improved by the end of 1970s, and became feasible technically and economically, and adapted accordingly. It was 1971 when the first dedicated computer was installed at the Osaka University Library, which implemented circulation control for the start. Until 1979, installation of dedicated computer to libraries in national universities had been carried out every year and more than ten national university libraries had acquired a small-scale computer mainly for circulation control.

Establishment of the Center for Bibliographic Information was took place in on April 1, 1983 at the University of Tokyo by transforming the RCLIS, as a joint education and development facility within the University, which was subs-

equently made on April 1, 1984, an Inter-University facility, then it was in turn made on April 5, 1986, into NACSIS as one of the National Inter-University Research Institutes directly under the MESC.

## 1-2. Science Information System(SIS)

The SIS is a nation-wide, comprehensive information system with NACSIS as its nucleus, encompassing natural and social sciences and humanities. It links university libraries, computer centers, information processing centers, national university research institutions and the like under MESC, through computer and telecommunication networks, joining national, municipal, and private universities ; and provides scholarly information requested by university researchers. In the future, the System will extend its links to include information systems of the private sector and also those overseas.

Major functions and services of SIS are as follows :

- 1) all-inclusive collection of, and search for, primary information on sciences from various journals throughout the world ;
- 2) construction of, and search service on, online catalog databases universities and research institutions throughout the nations ;
- 3) construction of, and search service on, databases of various types such as numeric and graphic / image type, reflecting the latest research activities at universities and institutions ;
- 4) R&D of specialized computer hardware and software, methodology of information

management and of database construction, and an electronic library for efficient dissemination of scholarly information ;

5) promotion of pioneering and creative information exchange among universities and research institution of both the private and the public sectors through connections with other information systems ; and

6) international dissemination of achievements of Japanese researchers through links with foreign information networks.

### 1-3. Science Information Network(SIN)

A four year plan is under way since 1986 for constructing a nation-wide high speed digital line among universities based on a leased line. The nodes provide packet switching facility and multiplexing of lower speed data communication. It is planned to install 25 nodes by 1989 over the country.

Special requirements for the NACSIS network system was to connect computers of different make by the varieties of manufacturers. In addition to linking the different make-computer, a screen mode communication was required to implement for the convenience of cataloging data handling with Japanese characters in part as well as to provide a better user interface. For this requirement, a network protocol and a virtual screen handler are designed as 'UIP / SUA'. The UIP specification was opened to the manufactures concerned and HITACHI, FUJITSU, and NEC were agreed to develop it during 1984 / 85. IBM also undertook the SUA development

during 1985.

NACSIS is constructing a nation-wide Science Information Network as a part of the SIS in order to circulate information among researchers. The SIN is a privately operated packet switching network employing high-speed digital circuits to interconnect packet switching nodes. The network has already expanded to cover major research sites in the nation which are under the MESC. It is also interconnected with computing and information processing facilities located in universities and national research insitutes. Most researchers belonging to universities and national research insitutes are eligible to send their research-related information through the network, as well as to exchange electronic mail with others. The entire facilities of the SIS are accessible through the network. The network will serve as fundamental communication facility for the Inter-University Computer Network(N-1 Network), 1 and the University Library Network, in which NACSIS is facilitating interconnections among local area networks on university campuses, and other data communication services in Japan and abroad. The SIN supports interconnections, closed group services, and virtual network operations. Network protocols for the service will be by OSI(Open Systems Interconnection), an internationally standardized scheme. It is also planned to incorporate an intergrated communication service into the SIN that will include full-text, graphics, voice, and 1 N-1 feasibility study was started in 1974 and the service was started in 1981.

images.

#### 1-4. Services for and by Libraries

The NACSIS online cataloging system (NACSIS-CAT), based on a shared cataloging concept, maintains a union catalog database through cooperative efforts of participating libraries which are about one hundred in number in Summer 1989. It achieves nation-wide bibliographic control and contributes to efficient library services, combined with the inter-library loan (ILL) system and information retrieval (IR) system.

Online cataloging is a process to create and maintain the NACSIS central database for union catalogs (See Table 1). Libraries of more than 100 universities with prominent collections are connected as of September 1989. Naturally, data elements specified are MARC-compatible. At present a few national MARCs such as the LC MARC, UK MARC as well as Japan MARC are online to provide derived cataloging and reference use. But the types of MARC records at present are limited only for monographs and serials. Further loading is under schedule of other national MARCs and MARCs for other forms of materials. Efficient construction of the union catalog and individual catalogs is enabled by expanding referral files such as JAPAN MARC. This database will be gradually extended by introducing the source data, such as the national MARCs of other nations and the MARC of the publishing field, there by improving the performance of the online general cataloging.

Compilation of the Union List of Periodicals (ULP) has been carried out since the time of RCLIS at the University of Tokyo. It has a long history since 1947 when the MESC funded its project with seven national universities. Computer compilation of the ULP was introduced when the task was transferred to the RCLIS at its inception. One of by-products of the ULP compilation is a Title Change Map, i.e. title changes are traced and printed out: Archival Tapes for individual libraries; Online retrieval service at the Computing Center, University of Tokyo, started in 1981 as an experimental service based on a Supplement part of Western language serials as part of TOOL-ULP (Tokyo university Online Union List of Periodicals). This IR service was transferred to NACSIS-IR. For controlling the title change data, a data structure based on the binary relation is incorporated in the ULP database. A graphic display "Title Change Map" generated from the database enables users to trace data in particular journals.

Information retrieval service (NACSIS-IR) is offered for researchers and reference librarians. The main databases currently serviced are listed in Table 1. These databases will be successively expanded from the current ones of abstracts and indexes to numeric, graphic, and other advanced databases. An integrated services is planned to provide researchers with primary documents through the ILL function, combined with the IR system services. Users of NACSIS-IR are faculty members from national, municipal and private universities and colleges, junior colleges,

**Table 1 Databases at NACSIS (as of September 1989)**

<b>SECONDARY INFORMATION DATABASE</b>		
<b>IMPORTED DATABASES</b>		
	<b>Number of Record</b>	<b>Starting Date in NACSIS Database</b>
Life Science Collection	690,000	1982-
MathSci	610,000	1973-
Compendex	1,500,000	1976-
Ei Engineering Meetings	430,000	1984-
Harvard Business Review	2,300	1927-
ISTP&B (Index to Sci. & Tech. Proceedings)	1,240,000	1982-
EMBASE	740,000	1986-
SciSearch	1,400,000	1987-
Social SciSearch	240,000	1987-
A & H Search	220,000	1987-
<b>DATABASES CREATED BY NACSIS</b>		
Grant-in-Aid Research Reports	25,400	1985-
Index to Dissertations	31,000	1984-
<b>DATABASES CREATED BY NACSIS WITH COLLABORATION OF ACADEMIC ASSOCIATIONS &amp; SOCIETIES</b>		
<b>Conference Papers of Academic Societies and Associations</b>		
Series 1 (Electricity, Information Processing and Control)	18,500	1987-
Series 2 (Chemistry)	2,000	1988-
Chemistry Fulltext	1,400	1983-
<b>CATALOGING DATABASE</b>		
<b>MARC DATABASE</b>		
Japan MARC (Monographs)	880,000	1969-
LC MARC (Books)	3,100,000	1968-
LC MARC (Serials)	445,000	1973-
LC MARC (Author)	2,040,000	1968-
UK MARC (Books)	1,100,000	1950-
<b>UNION CATALOG DATABASE (as of September 1989)</b>		
Japanese Books	Bibliography	300,000
Japanese Books	Holdings	1,100,000
Foreign Books	Bibliography	630,000
Foreign Books	Holding	1,050,000
Japanese Serials	Bibliography	48,000
Japanese Serials	Holdings	1,030,000
Foreign Serials	Bibliography	103,000
Foreign Serials	Holdings	854,000
Author Authority		305,000
Title Change Map	Japanese	5,844
Title Change Map	Foreign	12,778

technical colleges, and National Inter-University Research Institutes, as well as library staff members, graduate students and researchers, and library staff members of the institutes with the jurisdiction of the MESC. The use is limited for scientific research and for reference work

required in their library, with a fee scale that is substantially lower than comparable commercial services.

#### 1-5. Databases Construction by NACSIS

NACSIS has undertaken the construction of

its original databases in cooperation with researchers and institution, in a wide range of fields such as humanities, social sciences, and natural sciences. During 1989, the following four categories of the secondary databases are being actively constructed: "MESC Grantin-Aid Research Reports", "Index to Dissertations", "Conference Papers of Academic Societies and Associations", and "Chemistry Full-Text". A plan is underway to increase the number of participating fields, such as to architecture, linguistics, etc. Chemistry Full-Text is put to service in September 1989. This is a database covering scholarly papers from these societies in full format including not only text but also graphs, images and tables. However, graphs, images and tables are stored on optical disks as raster graphics. Construction of databases is in its preparation stage also for medicine, economics, and other fields.

#### 1-6. Electronic Mail and Global Information Services

NACSIS electronic mail(NACSIS-MAIL) is a part of information and communication service of Science Information Network, SIN. It is the realization of a mail delivery and storage service using telecommunication technology on behalf of researchers and staff of universities nationwide. With electronic mail, information may be exchanged at any time of the day. NACSIS-MAIL is to be extended to science information networks overseas, which will allow exchange of mail with foreign researchers at will. Work is underway to line NACSIS-MAIL to CREN

network(Corporation of Research and Education Networking, the successor or of CSNET and BITBET combined).

The SIN, for which configuration was started in our fiscal year 1986, initiated an international connection to U.S.A. in January 1989(FY 1988) to establish a base for international distribution of scientific information and to allow communication with foreign countries.

The first objective of the international link is to offer the use of various databases owned by NACSIS to researchers in overseas countries, and the second is to allow exchange of electronic mail. The first overseas node of the SIN was established in NSF(National Science Foundation), Washington, D.C., U.S.A. to allow the query of NACSIS databases from U.S.A. The connection is being extended to the Library of Congress during FY 1989.

As the second step, the SIN will be connected with BL(British Library) within FY 1989, and it is planned to be further connected with scientific research networks in the United Kingdom. NACSIS-MAIL will be further extended to continental Europe and other regions of the world in due time for the same objectives.

## 2. Bibliographic Control

### 2-1. Academic Institutions—background of bibliographic control

There are 490 universities in Japan, and 571 junior colleges with nearly two million university students. In 1989, the number of graduate stu-

dents is about 80,000 and the number of undergraduate students is 1.8 million. There are nearly a half million students in junior colleges as

**Table 2.1 : Number of institutions**

	University	Junior College	College of Technology
National	95	40	54
Local/Public/Municipal	38	54	4
Private	357	477	4
TOTAL	490	571	62

**Table 2.2 : Number of Students**

	University	Junior College	College of Technology
National	491,539	19,110	43,486
Local/Public/Municipal	59,216	22,024	4,145
Private	1,540,175	430,098	3,303
TOTAL	2,090,930	471,232	50,934
(Number of graduate students	82,000)		
(Number of under graduate students	1,861,000)		

Teachers are educator and researcher as those in any country. About 140,000 teachers or researchers are working in universities and junior colleges. Furthermore, there are many more

shown Tables 2s. They are the researchers of the coming generation.

researchers employed by government research institutions other than those of Monbusho. Of course, there are another sections of researchers of excellence among private sectors.

**Table 2.3: Number of Teachers (Researchers)**

	University	Junior College	College of Technology
National	52,735	1,251	3,356
Local/Public/Municipal	6,258	1,982	344
Private	59,543	16,047	181
TOTAL	118,536	19,280	3,881

#### 2-1-1. MITI Database Directory

MITI, the Japanese Ministry of International Trade and Industries, started to compile the "Database Directory" in 1982. In the 1988 annual volume, there is a total of 2,858 databases registered with duplications, which are served by

194 organizations, most of them are private companies. "Database White Paper, 1988" published in July 1989 reported the number of unique databases available through online search services in Japan.

**Table 3 : Number of Unique Databases in Online Search Services in Japan.**

	1982	1983	1984	1985	1986	1987
Foreign Database	334	552	725	1,008	1,187	1,370
Japanese Database	122	157	199	281	296	425
TOTAL	456	679	924	1,289	1,483	1,795

In 1987, there are 1,370 database originated abroad and accessible in or from Japan. Datab-

ases served by foreign IR services such as DIA-LOG are included because agents / vendors

registered their scope of service. Steady increase is shown in the number. The number of Japanese databases (425) does not include the most of those produced in Japanese university community.

Annual survey has been conducted by NAC-SIS since 1987 on database construction / creation among university community in Japan. As of January 1989, about 850 databases are being constructed in 518 universities.

## 2-2. Scholarly Database Construction

**Table 3.1: Questionnaires returned**

	No. of Institution	DB Created
National university	95	549
Municipal university	38	17
Private university	358	162
Inter-university research institutes	14	66
Other institutions	14	54
<b>TOTAL</b>	<b>518</b>	<b>848</b>

Information retrieval service is provided by 67 organizations in total of 518 universities.

67 organizations provide 91 services from which 346 databases are available.

**Table 3.2: Number of IR Services and Number of Databases Provided**

	No. of Institutes	No. of Organ.	No. of Services	Database Provided
National university	95	30	40	242
Municipal university	38	0	0	0
Private university	358	27	29	54
Inter-university research institutes	14	6	9	34
Other institutions	14	4	4	16
<b>TOTAL</b>	<b>518</b>	<b>67</b>	<b>91</b>	<b>346</b>

**Table 3.3: Subject Fields of Database**

HUMANITIES & SOCIAL SCIENCES	
Literature	131 ( 15.4)
Law	14 ( 1.7)
Economics	43 ( 5.1)
multi-fields	26 ( 3.1)
SCIENCE	
Physics	143 ( 16.7)
Engineering	58 ( 6.8)
Agriculture	31 ( 3.7)
Medicine	135 ( 15.9)
multi-fields	73 ( 8.6)
Compound Fields	48 ( 5.7)
Multi-Fields	98 ( 11.6)
Other	17 ( 3.8)
N.A.	32 ( 3.8)
<b>TOTAL</b>	<b>848 (100.0)</b>



JIS X 0304-1988 Codes for the Representation of Names of Countries  
JIS X 0305-1988 International Standard Book Numbering (ISBN)  
JIS X 0306-1988 International Standard Serials Numbering (ISSN)

**Standards for Information Science and Technology (SIST) as of October 1989.**

SIST01-1980: Abstracts and Abstracting  
SIST02-1984: Description of Bibliographic References  
SIST03-1980: Common Format for Bibliographic Information Interchange on Magnetic Tape (Carrier)  
SIST04-1983: Implementation Format for Bibliographic Information Interchange on Magnetic Tape  
SIST05-1981: Abbreviation of Titles of Periodicals  
SIST06-1981: Description of Name of Corporate Body  
SIST07-1985: Presentation of Periodicals  
SIST08-1986: Presentation of Scientific Papers  
SIST09-1987: Presentation of Scientific and Technical Reports  
SIST10-1985: Data Description for Bibliographic Information  
SIST11-1987: Data Assignment on Record Format for Numerical Information (draft)  
SIST12-1988: Presentation of Preprints (draft)  
SIST13-1989: Index and Indexing (draft)

Subject areas covered are : Physics 143 databases (16.7%); Medicine 135 (15.9%); Literature 131 databases (15.4%).

Among 848 databases being constructed, the most popular form of content is Literary Data (358 databases (42.4%) including full-text; bibliographic data; abstracts; dictionary, directory, etc. Combined Data by literary data and other forms such as numeric, graphic and image data are also constructed as many as 203 (23.9%), Numerical database alone is 209 (24.6).

Languages of data contents of 848 databases are divided into: Japanese & English 222 databases (26.2%); English only 206 databases (24.3%); and Japanese only 196 (23.1%). It is interesting to see that there are a small number of databases that include German, Russian and other languages, and 5% of non-Japanese and non-English databases are in production. Nearly a half of the databases use Sino-Japanese and 36% of the databases use Latin alphabet. There still remains 7% of databases to use Kana only.

### 2-3. Transition from Printed Books to Database

Bibliographic control is, in short, to prepare bibliographic information for utilization by users of all sorts. Thus, libraries and information centers are able to provide free access to holding materials of interest as well as to provide referral service to information seekers. Bibliographic control is one of the core activities of library community. In the days of printed books, bibliographic control was synonymous to "card cataloguing". It is the time of computer, network, and database, then the connotation of the term "bibliographic control" will change. For example, "non-book materials" are increasing in publishing activities, not only by publishers but also by authors. Machine-readable or computer processable documents are increasing as an end-products of computerized typo setting or as fulltext database. Computerization of manuscripts preparation, and promotion of database creation including word processing are a trend to 1990s. Main body of text is beginning to be electronic.

ed.

Encoding, data capture have been focused on bibliographic information within library community. Much of work for library automation has been devoted for handling bibliographic information that are taken from preliminary (e.g. title page) and or tail matters (e.g. colophon). However, as range of data encoding expands, library functions for accommodating user access will be expanded and extended. Scope of bibliographic control should be expanded and transformed. Here is the future role of librarianship in the age of database.

### 3. Standardization

#### 3-1. Present Situation

ISO / IEC Joint Technical Committee One (JTC1) superseded ISO / TC97 in 1987. The Japanese office to JTC1 is maintained mainly by the Information Standard Research Committee (ISRC) of the Information Processing Society of Japan (IPSJ) since 1961 under the Japanese Industrial Standard Committee (JISC). The JTC1 currently has over 600 work items to be standardized to which IPSJ assigns about 1,300 experts who are appointed on a voluntary basis from computer manufacturers, software houses and universities. Nearly one quarter of the budget is allocated for publication, document reproduction for activities of seventy working groups.

Japan is a P-member since 1970 to ISO / TC 46 Information and Documentation of which the

Secretariat is maintained by the DIN, and the Japanese national committee was housed at the Information Science and Technology Association (INFOSTA). The national committee and Working Groups are being reorganized under the Japan Industrial Standard Committee (JISC) and JEIDA. Most of the members are representatives from varieties of libraries or academic staffs from universities. Participation of private sector is few. Budget is nominal because of weak organization of library services in Japan. Information industries are not yet fully represented in the national committee.

Three Japanese national standards in information and documentation field were issued in April 1988 in the field of information and documentation. They are:

JIS X 0304-1988 Codes for the Representation of Names of Countries

JIS X 0305-1988 International Standard Book Numbering (ISBN)

JIS X 0306-1988 International Standard Serials Numbering (ISSN)

ISBN is translated from ISO 2108 1978 and ISSN from ISO 3297-1986.

Maintenance agencies of these codes are required for updating, and ISSN has been maintained by the National Diet Library since 1976, ISBN by the Japan ISBN Administration Committee since 1981. There exists an ISO for Country Codes (ISO 3166-1981). However, there is no Japanese agency for maintaining country codes, thus, JIS X 0304 is categorized as a non-translation from ISO. All three JISs were dra-

fted under a committee organized by Japan Electronic Industry Development Association (JEIDA) who acts and promotes industrial coordination for standardization.

There are draft JISs within the scope of library and information service, such as Vocabulary of Information & Documentation, UDC (Universal Decimal Classification), and an SGML-application standard for full-text database. The drafting activities are organized by INFOSTA and JEIDA respectively.

Standards for Information Science and Technology (SIST) is 20 years old Japanese professional standards for library, abstracting and indexing and other information services administered by the Agency for Science and Technology and published by the JICST. There are 13 SISTs as of October 1989.

SIST01-1980: Abstracts and Abstracting

SIST02-1984: Description of Bibliographic References

SIST03-1980: Common Format for Bibliographic Information Interchange on Magnetic Tape (Carrier)

SIST04-1983: Implementation Format for Bibliographic Information Interchange on Magnetic Tape

SIST05-1981: Abbreviation of Titles of Periodicals

SIST06-1981: Description of Name of Corporate Body

SIST07-1985: Presentation of Periodicals

SIST08-1986: Presentation of Scientific Papers

SIST09-1987: Presentation of Scientific and

Technical Reports

SIST10-1985: Data Description for Bibliographic Information

SIST11-1987: Data Assignment on Record Format for Numerical Information (draft)

SIST12-1988: Presentation of Preprints (draft)

SIST13-1989: Index and Indexing (draft)

Although the target field of SISTs is Japanese database where Japanese (Sino-Japanese) scripts play a central role as medium of information, the design principle of SIST is to keep conformity as far as possible with international standards such as those set by the ISO, UNESCO/UNISIST, and IFLA, etc. AST (Agency for Science and Technology Agency of the Ministry of International Trade and Industry responsible to JISs and ISO) are discussing during 1988/89 on the possibilities to establish a formal relationship between SISTs to JISs.

The Nippon Cataloging Rules is revised in 1987 and published by the Japan Library Association (JLA) to conform internationally with the Anglo-American Cataloging Rules Two (AACR2). Both cataloging rules, which are widely used or being used in Japan, intend for manual cataloging as well as for online shared cataloging. Nearly 3,000 public libraries and 1,000 university libraries among 500 universities are now in the process of changing from NCR 1965 to NCR 1987 for cataloging their acquisitions. The new NCR incorporated a concept of "Bibliographic Level" which is also a basis structure of a national union catalog database maintained at NACSIS.

It is in the middle of experimental stage of full-text database in Japan. For example, the SGML Forum was established in 1988 at the Information Technology Research & Standardization Center (INSTAC). More than 50 companies are participating from computer industry, printing industry, and software houses. With collaboration of academic associations and societies, NACSIS is experimenting to apply SGML : 1) for inputting (writing) articles into a machine-readable form through word processing machine (WPs of PCs) by authors; 2) for editing these articles into a bulletin of an academic society; 3) for publishing the bulletin in a traditional printed form as it is or in a form of CD-ROM for local access; 4) for loading the database to provide online access.

Search keys of vernacular scripts are primarily for native speakers, and those in romanized or transliterated access keys are for foreigners. Romanization or transliteration of search keys have to meet international demands, and are required universality in their principle(s). It is not important in Japan to specify types of romanization in case of Japanese bibliographic data where either the Hepburn or the Kunrei method are used, because softwares can assimilate differences and produce the same effect. However, it may be required in systems to indicate the type / scheme of romanization employed to transcribe data since it is well known fact that various romanization schemes exist in East Asian countries. Translated search keys are being provided by IR services such as JICST or

NACSIS. Machine held dictionaries of translated access keys will play important roles in IR or database constructions where rapid development of machine translation will support processing. There may be a need for standardizing machine-held dictionaries of access keys.

### 3-2. International Exchange of East Asian Databases

Although there are national standards of Kanji or Chinese character set / code in GB2312-1980 (China), KS5619-1987 (Korea), and JIS X 0208-1983 (Japan), and all of them are in two bytes, ANSI Z39.64-1988, an American national standard, of East Asian character set / code was established in 1988 including Chinese, Korean and Japanese scripts in three bytes.

International Conference on Scholarly Information Network was held in December 1987 by NACSIS concerning to character sets and codes among East Asian countries as well as North America and European countries. One of the outcome of the conference is the understanding "not-to-have-one-universal East Asian character set / code, such as between Chinese GB and JIS, between Korean KSC and JIS, etc.

Demands by scholars on East Asian databases including bibliographic data are increasing in Japan, and technical feasibility of handling East Asian scripts of Chinese, Korean and Japanese languages has been looked at in response. Communication networking of research libraries in East Asian countries is emerging. Library automation in public libraries in the region is being

rapidly developed as well. National standardizations on character set / code in the region have been progressing since late 1970s. Huge number of scripts of Chinese origin presents itself as an obstacle to the mechanization and the standardizations. However, there are many more characters outside the standards which are arbitray mechanized by necessity in library automation without regards to the standards. The coordination among regional standards in the field of automation, computer, documentation, information, and library, among East Asian counties, is the key issue for promoting international scholarly communication, as well as regional one.

Thus, NACSIS started, on April 1989, a three year international joint research on a feasibility study on "International Exchange of East Asian Databases" in collaboration of research institutions in Korea, as well as those in China. It is an International Joint Research with Grant-in-Aid of Ministry of Education, Science and Culture, Japan for 1989-1991.

Mission of the Project is to pursue ways of promoting scholarly information exchange in East Asian scripts by applying new technology. The most viable approach to attain the objectives is through human exchange of experts on scholarly communication, bibliographic information, computer and character set / code, telecommunication network, and database construction, in Korea and China as well as in Japn. This joint reseach is to pursue a feasibility of transborder dataflow of scholarly information, in East Asian languages and scripts, in collaboration with

research institutions and libraries in Korea and China. Project is headed by Dr. Hisao YAMADA, Director of R & D.

In parallel with the International Joint Research, a domestic research project, "Feasibility Study on International Bibliographic Control in Japan", is under way also at NACSIS. Members of the project are specialists on bibliographic information, bibliographic networking, databases construction, etc.

#### 4. In Conclusion

##### 4-1. Future Tasks in Database Construction

Problems surrounding the database construction in Japan are numerous and yet unseen, but can be summarized as follows:

1) Continuity of database creation is depending on (research) purposes so that it may be stopped to construct by any reason.

2) Professional manpower for database creation, if they exist, is not employed in general, that causes the poor quality of current database. Systematic training and social approval should be established.

3) Quality control with universality (or authority control) is not yet fully implemented on database construction and guidelines are expected to be established.

4) Standardization for database construction, maintenance, and exchange should be sought in national, regional and international levels. Standardization in Japan in the field of information and documentation has been supported

in ad hoc and disorganized manner. Activities of this purpose have been promoted by international organizations and attentions should be paid to their promotion.

5) Financial background is not yet matured and not permanent yet. Many of database production are carried out by the fund of one-time subsidiary such as grant-in-aids of government, and need continuous financial support.

6) Copyright or legal aspects of database is not fully cleared, and new techniques to utilize databases will be developed. In relation to legal aspects, pricing of database or accounting aspects of database construction and distribution should be established.

7) International equality of access and/or pricing may be sought. International accounting mechanism for database usage with relation to copyright will soon be an international issue.

#### 4-2. Future Trends in Database Construction and Scholarly Communication

Importance of informal communication will be re-viewed by the rise of electronic mail transaction, which is indirect via telecommunication media. Direct communication such as scholarly conferences and gatherings should be analyzed before telecommunication means become to play a substantial part because of its capability to overcome distance and shortage of travel expenses. The analysis may produce further requirements on mail and conference via telecommunication, and traditional primary communication means and traditional library services may also

be reorganized to meet the technical and financial needs that may become visible in the near future.

Resource sharing for promoting scholarly communication has been sought by the community as a whole. One example is the Universal Bibliographic Control promoted by the International Federation of Library Associations and Institutions (IFLA) such as MARC, ISBDs (International Standard Bibliographic Descriptions). Further resource sharing on manpower and technology should be sought in the field of information management, systems application in library and information services in regional and international levels.

International representation by the countries of database creation such as Korea and Japan will increasingly important to international organizations such as ISO, IFLA, etc., since database will become key-resources and will be seriously required for industrial, economical and cultural development. For example, multiscripts situations, common to Asian countries, have not yet been fully represented by users of databases. This has been mistakenly taken as an indication of satisfaction towards currently available hardware and software, so that the development is delayed or ignored by developers and providers in many occasions. Also, users have lacked a capability to organize themselves for representing their potential demands. A standing organization backed by financial stability of vital not only for the potential users but also for providers of information resources, to achieve coordinated

advance in the future.

Transition of forms of data is currently taking place from bibliographic data or data of linearity to full-text and images with dimensions. Digitization of every kind of records are in process. Increasing volume of data, in other word, increase of the speed of access and transmission of data shall be matched by the development of hardware and software. Information technology, in this case, value adding technology to information such as indexing, should be re-invented to match the mass of database. Forms of service shall be refined, of which an example is pursued in user-friendliness of systems.

International flow of information by the form of database and mail, either online or in batch, will surely be increased in the next decade. For this end, international collaboration of database development is essential. International view, at least, is required not only for the intended creators of database but also for potential users in another country of different culture.

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