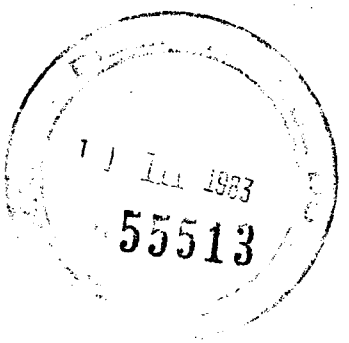


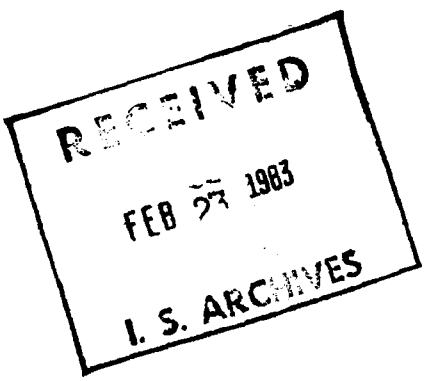


TABLE OF CONTENTS

Table of Contents - continued

Table of Contents - continued

Table of Contents - continued

RESOURCE GUIDE

FOR COURSE ON

MANAGEMENT OF INFORMATION CENTERS (CHINA)

F O R E W O R D

Even though travel to China has now become more commonplace, a trip there is still a challenging and unique experience for most persons. It is prudent to prepare as thoroughly as possible. No single source can be adequate for all contingencies; the pages that follow are designed to assist in answering basic questions and to provide tips for those who have not visited China before.

Living in China can be difficult and frustrating at times, but it can also be an exhilarating experience as well as very intellectually rewarding. A lot of the general background and notes on Chinese culture will be superfluous to those of you who are already familiar with these matters, and your indulgence is therefore requested. For those of you who are going for the first time, it is hoped it will minimize difficulties, help avoid mistakes and generally enrich your trip.

The Chinese are an hospitable people, eager to learn and hard working. Go planning to learn more than you teach, expecting a challenge and above all expect to enjoy China and its people and you won't be disappointed!

MANAGEMENT OF INFORMATION CENTERS (CHINA)

I.D.R.C. Course

6 - 18 December, 1982

Kunming
Yunnan Province
People's Republic of China

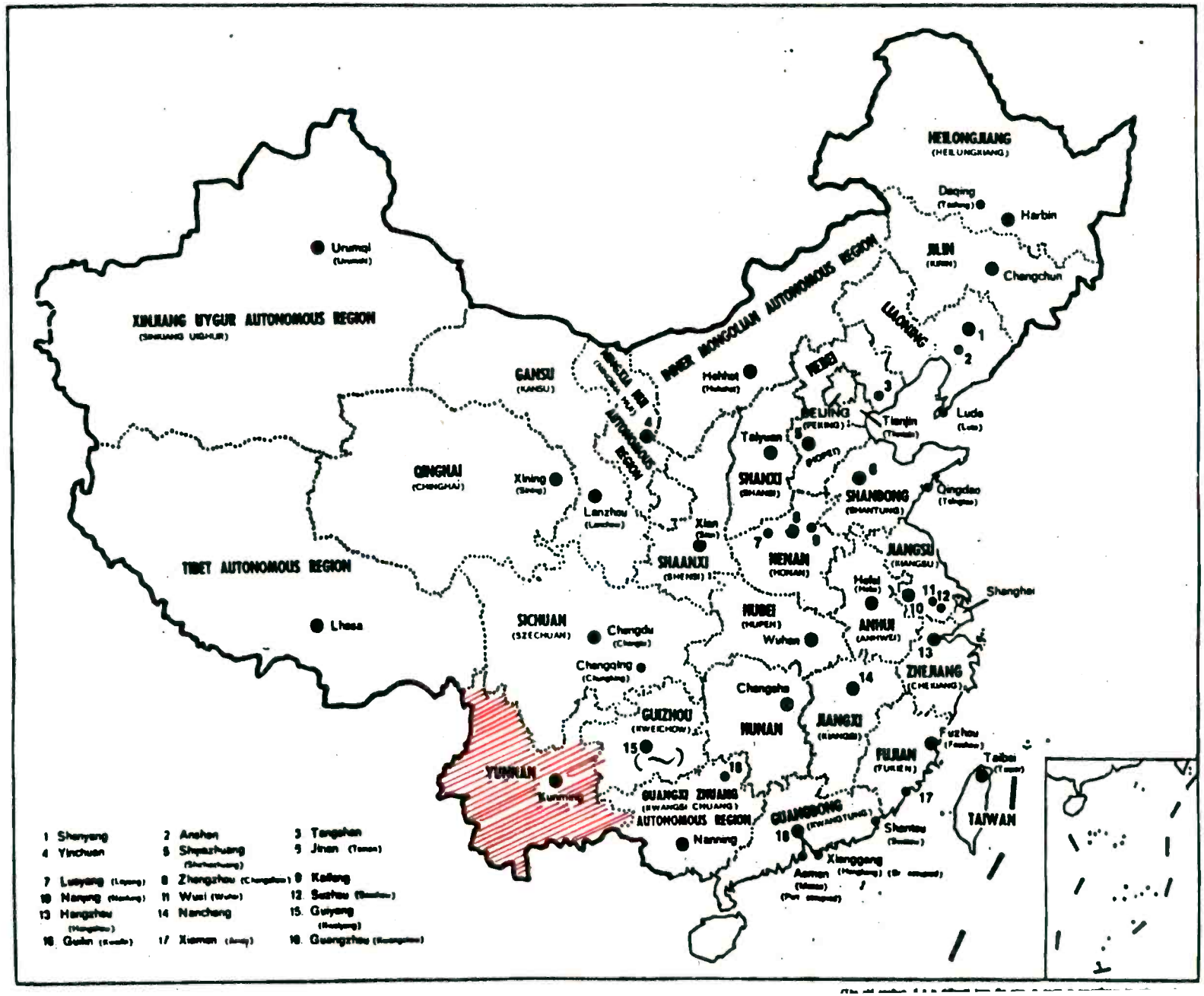
IDRC Personnel	Kieran P. Broadbent	Course Administrator
	Olga Lendvay	Coordinator
	Sally Tan	Secretary
	Olive Charnell	Secretary
Lecturers	Margaret Beckman	Chief Librarian University of Guelph
	Hwa-Wei Lee	Director of Libraries Ohio University
	T.C. Ting	Department of Computer Science Worcester Polytechnic Institute
	J. Brian Wills	Information Services Unit International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
ISTIC Personnel	Lin Zi Xin	Director Institute of Scientific and Technical Information of China (ISTIC)
	Liu Zhao Dong	Foreign Affairs (ISTIC)
Embassy of the People's Republic of China, Ottawa	Liu Dong Sheng	Second Secretary

Arrival date (Kunming)

Saturday, December 4, 1982 - 1455 hours
(via CA342 from Hongkong)

Departure date (Kunming)

Sunday, December 19, 1982 - 0915 hours
(via CA4327 to Guangzhou)


HEILONGJIANG
(HEILUNGKIANG)
Daqing
Harbin
JILIN
(KIRIN)
Changchun
LIAONING
XINJIANG UYGUR AUTONOMOUS REGION
(SINKIANG UIGHUR)
Urumqi
INNER MONGOLIAN AUTONOMOUS REGION
GANSU
(KANSU)
Hohhot
HEBEI
BEIJING
(PEKING)
Tianjin
Lüda
Taiyuan
SHANXI
(SHANSI)
SHANDONG
(SHANTUNG)
Qingdao
NINGXIA HUI AUTONOMOUS REGION
QINGHAI
(CHINGHAI)
Xining
Lanzhou
Xian
SHAANXI
(SHENSI)
HENAN
(HONAN)
JIANGSU
(KIANGSU)
Hefei
Shanghai
TIBET AUTONOMOUS REGION
Lhasa
SICHUAN
(SZECHUAN)
Chengdu
HUBEI
(HUPEH)
Wuhan
ANHUI
(ANHWEI)
Chongqing
ZHEJIANG
(CHEKIANG)
Changsha
GUIZHOU
(KWEICHOW)
HUNAN
JIANGXI
(KIANGSI)
Fuzhou
FUJIAN
(FUKIEN)
Taibei
YUNNAN
Kunming
GUANGXI ZHUANG
(KWANGSI CHUANG)
AUTONOMOUS REGION
Nanning
GUANGDONG
(KWANGTUNG)
Shantou
TAIWAN
Xianggang
Aomen
1 Shenyang
2 Anshan
3 Tangshan
4 Yinchuan
5 Shijiazhuang
6 Jinan
7 Luoyang
8 Zhengzhou
9 Kaifeng
10 Nanjing
11 Wuxi
12 Suzhou
13 Hangzhou
14 Nanchang
15 Guiyang
16 Guilin
17 Xiamen
18 Guangzhou

GENERAL INFORMATION

China covers an area of about 3 750 000 square miles, roughly a twelfth of the world's surface. It is very mountainous. The great plain is triangular, with its base line running roughly along the Yangtse River and its apex at Beijing. The two rivers, the Yangtse and Huangho (Yellow River), split the country into three horizontal bands. The northern bands are wheat-producing; the southern sub-tropical regions below the Yangtse are rice-producing. There are twenty-one provinces (twenty-two if Taiwan is included), five autonomous regions and three municipalities (Beijing, Shanghai and Tianjin) which are centrally controlled.

Approximately 10.7 percent of the land is cultivated, 12.7 percent is forest and 43.0 percent is grassland. Of the total workforce of some 443 million, approximately 75 percent work in agriculture and 25 percent in industry and government services.

GNP at constant (1978) prices was U.S.$352 billion (35 percent services, 37 percent industry and 28 percent agriculture). GNP at market prices (1978 figures) was U.S.$414 billion.

Population

At the National People's Congress, June 1979, a total population of 970 million, including Taiwan, was claimed, but until the next census figures are available (China is doing a new census and has bought several computers specifically for this) the true figure will not be known. Many believe the true figure to be one billion. Well over 80 percent live in rural areas and 60 percent are concentrated in the eastern third of the country. Population growth is reported to be 1.2 percent but a vigorous family-planning campaign aims to reduce this to 0.5 percent by 1985 and zero by 2000. Approximately 6 percent of the population is made up of 60 ethnic minorities, living mainly in the Western parts of the country where Islam is still the only really viable religion. China, with an estimated 10 million Muslims, out-weighs the Gulf States in this respect.

Historical perspective

To understand modern China it is necessary to have some knowledge of China's past. The Chinese name for China is Zhonghua 中华 or, more simply, Zhongguo 中国, i.e. the flower at the centre or the 'middle' or central country. The Chinese first appeared as one of the earliest river-basin civilizations and the name signifies the origin of the tribe located around the Middle Yellow River. For several centuries, they were an isolated civilization gradually radiating outwards. The Han dynasty (206 BC - 220 AD), from which the modern Chinese take their name, made them the most advanced and powerful country in the area and China came to regard themselves as the only outpost of civilization, surrounded by barbarians and the name Zhongguo took on a more significant meaning. The Han dynasty officially adopted the teachings of Confucius, which taught virtue and morality amongst the leadership, order amongst the masses and filial piety in the home.

China's fortunes and development ebbed and flowed under successive dynasties but may be said to have reached the apex of its progress under the Tang dynasty (618 - 907 AD). Each era revealed something of particular note; for instance: Tang (poetry), Song (paintings) and Ming (pottery). The Song dynasty (960 - 1279) was sacked by the Golden Horde of Genghis Khan until ousted by the Ming dynasty in 1386, who, in turn, were deposed by the Manchus (Qing dynasty) in 1644. In spite of the external pressures, China remained a remarkably intact and homogeneous civilization for so long when other historical empires, i.e. Greek, Roman, etc. collapsed in relatively short periods of time. What sparked the technological revolution that made China of the twelfth century the most advanced nation on earth at the time is not clear, but is probably explained by the ability of the Chinese to keep ahead of their immediate neighbours in the most vital skills in the economic, technical and military spheres. The reasons for China's relative stagnation after 1350 and the failure to produce the equivalent of an Industrial Revolution such as occurred in the West have never been adequately explained but have tantalized historians for generations. Probably the best explanation has been attempted by the Oxford historian, Mark Elvin, who has suggested that China's very technical excellence at the time acted as a brake on further development, i.e. farming, water engineering and machines were so perfected in traditional terms that demand fell off and investments in further improvements were discouraged.

China continued to flourish in specific areas but politically fell into turmoil until in 1911 the Qing dynasty was overthrown by forces supporting Dr. Sun Yat-sen and confusion followed with warlords and bandits holding large pockets of the country and foreign powers holding the treaty ports and other concessions. In 1931 Japan invaded Manchuria and engulfed China in full-scale warfare until 1945. The extreme political factions in China united for a time to combat the Japanese threat but after Japan was defeated, the Communists, led by Mao Zedong, established themselves in the north and gradually extended their control, forcing the nationalist leader, Chiang Kai-shek, to flee the mainland to Taiwan. The People's Republic of China was proclaimed on 1 October 1949. In September 1965, at a meeting of the Communist Party Central Committee, Mao Zedong launched the so-called Cultural Revolution, which lasted effectively until his death on 6 September 1976. The period immediately following Mao's death has marked an abrupt change in the policies of the previous twenty-seven years since the revolution, and China is embarking on an entirely new era of development which is marked by a desire to modernize as rapidly as possible.

The capital city, Beijing (Peking), means literally 'northern' capital. The seat of government has changed several times in history as well as in modern times. Peking was first made the capital by Kublai Khan in 1267 AD. The Ming dynasty later established Nanking as the capital but in 1421 re-established the seat of government in Peking. The National Government of Chang Kai-shek made the capital Nanjing (Nanking), i.e. 'southern' capital, until the sacking of the city by the Japanese in 1938 forced him to flee to Chongqing (Chungking), the 'central' capital. The original name for Peking was Peiping meaning 'northern peace'. The nationalists in Taiwan still regard Nanjing as the capital of China and refer to Beijing as Peiping.

A Note on the Chinese Language

Chinese, with its idiophonographic script, is considered one of the oldest written languages. The earliest characters (pictographs) have been found cut into tortoise shells or burnt into animal bones. Over the past three millennia, chinese characters have changed enormously. Chinese is a tonal language. Each character represents one syllable in sound, each sound having though several different meanings. The growth of vocabulary over the centuries increased the numbers of characters to about 60,000, though only about 5,000 or so are actually of use in modern writing and, of these, about 3,000 are the most frequently used. The problems with a complex script, such as Chinese, is that although precise in meaning it presents enormous difficulties in terms of modern communication, especially telecommunication and computing.

To overcome this, a numerical code was developed but this has involved time-consuming transcriptions before and after a message. Early this century China sought to reform the language. The position was futher complicated, however, by the problem of dialects. China has several major dialects or languages within the one classification, Chinese, e.g. "Mandarin", now referred to in China as "common speech" spoken more in the north, and "Cantonese" mainly in the South. The difference between the two is roughly the difference between "English and French". The written script is the common base. In 1954 the Government established a language reform committee. It concentrated on: (1) getting everyone to speak one "language" i.e. Mandarin (putonghua); (2) simplication of characters (reducing the number of strokes) and (3) gradually adopting a latin form (pinyin). Romanization of Chinese has been on the ISO program for many years now and recent discussions make it likely that pinyin will be adopted as the international standard form of latinization. Meanwhile, the visitor may be excused from being confused. Pinyin was adopted officially in China in 1975 but the situation is not without problems. As the personal level some Chinese are still unsure how to render their names correctly for a visitor. You think you visited a person named so and so on the program but didn't his name appear different afterwards? Chou En-lai or Zhou En-lai, Teng Hsiao-p'ing or Deng Xiao-ping?

Although Pinyin is now written everywhere Chinese characters still remain and are expected to do so for a many years to come. The intricate relationship of the spoken and written word is much more intense than in other languages but to illustrate what I mean, the chinese symbol for "well", "jing" (井) is a key word in agricultural terminology since it denotes "fields" traditionally laid out along the lines of the drawn characters, Each "jing" was divided up into nine plots, to eight families were assigned the eight exterior plots, the one in the centre containing the well with four paths leading to it from the other fields, being reserved for work jointly on behalf of the landlord or state. Thus, is the basis for China's equalized system of land and taxation. The word for "earth" is denoted by the character "tu"(土) of which the upper horizontal stroke represents the surface of the soil, the lower line the sub-structure and the vertical stroke the vegetation. The word "field", "tian"(田) unmistakeably portrays a rice paddy. The character for "male" is a combination of this pictograph "field" with that of "strength" "li"(力) thus (男) literally, "labour in the Fields".

The character for "rice" "mi"(米) is derived from the idea of grains separated by threshing(十)

The traditional way of writing Chinese characters is from the top right hand corner down and then up again in vertical columns. Reading a book in this manner would be like starting at the back for Westerners. Newspapers have, until recently, used this method and variations of horizontal columns left to right or right to left. It is all very confusing. Politics has dictated, however, that the People's Republic have opted for *left* to right and, as one would expct, Taiwan has chosen to write *right* to left.

It is not easy or, often, advantageous to try to learn the rudiments of any language in the usually limited time prior to a trip of this sort, also one has to take into account the well-known complexity of the Chinese language. However, the Chinese, probably more than any other nation, tend to warm to those able to utter just a few simple phrases. As pointed out above, Chinese is a tonal language, so any attempt to master tones at this stage would be a waste of time, but the following basic phrases will be instantly comprehended and acknowledged.

Good morning: *Zao* (spoken with a Tz sound 'tzao').
How are you? (Standard form of greeting): *Ni Hao ma?* to which the reply is: *Hao Xiexie* (pronounced shieh-shieh) - I am well, thank you.

It is as well to remember *xiexie* as you will find you need to keep uttering it in response to various friendly gestures. At banquets it is usual also to 'clink' glasses and say *ganbei* which means, roughly, 'bottoms up'.

Finally, Goodbye is *Zaijian* (pronounced Tsaijian). It is usually repeated twice: *Zaijian, zaijian.* It means 'See you again'.

Economy

The establishment of the Chinese People's Republic on 1 October 1949 heralded a new social order in urban and rural areas. Agrarian reform was a major task and this was achieved rather rapidly, though by stages, beginning with promulgation of the Agrarian Reform Law in June 1950. Land confiscated from land-owners was redistributed to the poor peasants, who were first organized into mutual aid teams by communist cadres. In December 1953 Elementary Producer Cooperatives (EPC) were organized. In the EPC the peasants still retained right to land and livestock with only part given over to the cooperative in the form of a share on joining the cooperative. This was followed by Advanced Cooperatives (APC) in 1955. By 1956 some one million peasant households were organized into 750 000 APCs. In the APCs all land rights except for a small private plot, were abrogated and payment for use of tools or livestock was abolished. In 1958 the gradual process of merging APCs into larger units (communes) was started. The commune was a new unit of rural administration consisting of about 50 - 100 villages and upwards of 20 000 persons. This unit was split for productive purposes into brigades, teams and units. By 1959 some 750 000 APCs had been merged into 26 000 communes. In 1963 some 74 000 communes were in operation comprising some 700 000 brigades and 5 million

teams. On average there would be about seven to eight teams in a brigade and nine or ten brigades in a commune. The major priorities of the rural economy were rapid mechanization and self-sufficiency. The number of communes is now about 50 000.

The most troublesome sector since 1949 has been Chinese industry. The urban sector was never regimented to the same extent as its rural counterpart and for a time State and commercial enterprises flourished, first side by side, then in concert, until 1958 and the Great Leap Forward (GLF) called for a drastic reorganization of the industrial sector. The GLF was conceived to resolve, in one heroic effort, China's basic economic deficiencies and to sweep a nineteenth century China into the mid-twentieth century. Mao's personal contention was that a combination of ideological incentives, human willpower and improved management would resolve China's economic weaknesses. Small-scale rural industries were stressed and backyard iron smelting was promoted to augment China's steel deficiency. Irrational prices, the intricate system of wage rates, excessive political interference, lack of incentives and poor management resulted in a lagging industrial sector. By the late 1970s China's industrial capacity was badly out of tune. A fear of a leftist revival after Mao's death, lack of effective bonus schemes, and old management methods have taken a negative toll.

A new economic policy has recently emerged aimed at shaking up the economy and awakening the nation to its relative backwardness, symbolized by a GNP of less than $400 000, less than half Japan's, which only has about one-ninth of China's population. Policies have now been changed to encourage foreign capital and foreign advice.

The most important economic reorganization has been the readjustment of urban and rural incomes through the raising of food prices. The Chinese farmer is now getting 20 - 50 percent more for his grain, with the Government paying subsidies to avoid price rises for urban consumers. Urban workers received large wage rises recently to offset increases in meat and fish. Unemployment, especially amongst urban youth and youth returned from the countryside, is a major problem. The Government's response has been to encourage youth to set up cooperative ventures in small manufacturing industries and service trades.

China has large reserves of oil, coal and minerals. In the past, China has not exploited these resources for foreign currency, preferring to utilize its agricultural surplus to generate foreign exchange. This policy may now be reversed.

Canada-China trade is as follows:

Canadian exports to China ($ millions)		Canadian imports from China ($ millions)		Trade Balance	
1978	1979	1978	1979	1978	1979
503	461	92	131	411	330

Overview of Canada-China Relations

Building on the unofficial relationship which centred on wheat sales beginning in 1960 and on Canada's early recognition of Peking in 1970, Canada and China have developed over the past ten years a close, dynamic bilateral relationship. Canada has played as important a role as any smaller country in prodding China in the direction of a more outward-looking foreign policy and closer ties with the West.

At the political level, there have been a number of high-level visits, including Prime Minister Trudeau's visit to China in 1973, Secretaries of State for External Affairs Sharp, in 1972, and Jamieson, in 1978, Foreign Minister Huang Hua's visit to Canada in 1977 and an exchange of visits by our respective trade ministers, Mr. Horner and Mr. Li Quang, in 1979. Vice Premier Bo Yibo will visit Canada August 21-31, 1980. He is the highest ranking Chinese leader to visit this country. There have been increasingly frank and useful exchanges between our leaders on political, international and bilateral subjects.

Other recent visits have included delegations of the National People's Congress of China and the Canadian Parliamentary Association in 1978 and 1979 respectively; an official delegation which visited China in 1979 to help commemorate the fortieth anniversary of the death of Dr. Norman Bethune; and a 65-member delegation from the Canadian Institute of International Affairs, consisting mainly of a large number of prominent businessmen and a few academics, which visited China in April and May of this year.

Exchanges and bilateral programmes have grown substantially and have encompassed almost every area; besides economic contacts, these areas have included science and technology, music, painting, dance, sports, medicine, the media and education. To mention but a few, the Canadian Brass, the Toronto Symphony Orchestra, Frank Augustyn and Karen Kain, and Celia Franca have visited China in often precedent-setting tours, while Chinese acrobatic troupes and the Peking Opera have visited Canada.

In education, as China's modernization drive has led its leaders to look to the West for expertise, an arrangement to place Chinese mid-career scientists in Canadian institutions of higher learning brought some 190 Chinese scholars to Canada in 1979/80 and a renewal of the arrangement is expected to bring at least 100 more in 1980/81.

A highly successfull programme of family reunification has since 1973 been in effect, up to the end of 1979 reuniting some 5,600 Chinese with their relatives in Canada.

Scientific Research

Since 1949 the Chinese have tended to adopt the Soviet research structure which places a 'supreme academic organ' the Academy of Sciences, at the head of the national research structure. The Chinese Academy of Sciences as it was called, was generally formed out of the old pre-1949 Academia Sinica. The traditional Academia Sinica transferred to Taiwan, along with some of the professional scientists. Later several other 'Academies' were formed. In 1957, the Chinese Academy of Agricultural Sciences was formed from elements of the Ministry of Agriculture. This was followed in 1958 by the Chinese Academy of Medical Sciences. Under the aegis of these Academies of Science were numerous research institutes in various scientific branches, and at Provincial level there were branch academies, e.g. in Shanghai and Guangzhou.

The Academies of Science have not remained isolated from politics and during the brief twenty-year span both the organizations and the scientists themselves have been subject to change. The first such interruption came shortly after their foundation, with the 'Great Leap Forward' and the 'Hundred Flowers' movements; the former, typified by a massive drive to transform labour into physical capital, had massive repercussions on the scientific

establishment, and the latter attempted to 'free' intellectual discussion but led to harassment and imprisonment of some scientists. The creation of the State Scientific and Technology Commission in November 1958 confirmed the absolute political control of scientific research in China. All sciences became subservient to political planners and party representatives were visible at all levels in the research ladder. Scientific studies were integrated with the 'needs of production'. It is generally thought that very little theoretical research was initiated as a result. University research has traditionally received less emphasis in China; however, the work of some of the better institutions has been linked to work being done in the Academies. The universities come under the Ministry of Higher Education.

The Academies of Science received a further jolt in the mid-sixties with the onset of the Cultural Revolution. Internally, this meant many shake-ups; externally, the Academies split responsibilities and were supposed to relocate closer to the 'research needs of industry and agriculture'. The Chinese Academy of Agricultural Sciences became known as the Chinese Academy of Agriculture and Forestry Sciences and remained as such until 1978, when Forestry split off to form its own Academy, the Chinese Academy of Forestry Sciences. A new Chinese Academy of Traditional Medicine was also formed to reflect the importance of Chinese, as opposed to Western, medicine.

During the Cultural Revolution many scientists fell foul of the authorities for their supposedly 'revisionist' views and were either imprisoned or displaced to the countryside. The so-called 'May 7th Directive' was a key reform in this respect, in that it specifically required every male professional under the age of 60 and every female under 55 to indulge in physical labour for varying intervals. In addition, a minimum of 2.5 out of 6 working days in scientific institutions were to be spent on 'political study'. The emphasis of 'foreign science' in China was downplayed.

Since 1978 we can say there has been some normalization of scientific research. In spite of the swing of the political pendulum, the Academies of Science have survived and remain the most prestigious scientific centres of excellence.

China/Canada Scientific Exchanges

Significant advances have been made in scientific and technological cooperation with the PRC since Madame Sauvé led a delegation of Canadian scientists to China in 1973. Canadian scientific and technological missions have visited China with interests in such fields as agriculture, forestry, fisheries, seismology, metrology, economics, and veterinary medicine. Chinese delegations to Canada have also covered fields as diverse as petroleum, seismology, surface coal mining, laser research, forestry, fisheries, permafrost, biological insect control, surveying and mapping and engineering.

Scientific exchanges are an important component in our relationship with China. There is considerable interest in the Canadian scientific community in developing new areas of cooperation with the PRC and in gaining increased knowledge about the "state of the art" in China. Science is moreover an urgent priority in the PRC's modernization programme and the importance for China of increased SANDT exchanges with the industrialized world was recognized at a National Conference on Science held in Peking in March 1978. Scientific exchanges also complement and promote other Canadian programmes, in particular in the fields of General Relations, by increasing mutual knowledge and people-to-people contacts, and Trade Promotion, by exposing visitors to Canada to our expertise in the various fields where Canada has a reputation for excellence.

In this regard, the Chinese have expressed the view that SANDT exchanges play a role in our overall commercial relationship. While China is not at present in a position to sell to Canada as much as it buys, cooperation in Science and Technology goes some way towards establishing a more balanced relationship. Commercial ventures may at times appear more attractive to the Chinese side if they also provide for SANDT cooperation, such as the training of Chinese experts or the exchange of technical information. It has moreover been our experience that Chinese scientific and technical delegations visiting Canada are often attentive to commercial prospects in their field of expertise.

Canadian proposals for exchanges are submitted to the Chinese authorities at the end of each calendar year by our Embassy in Peking. Each side examines the list presented by the other and a bilateral package is thus agreed upon. While trade delegations pay for their own costs, it is the practice for the host country to pay the expenses (except for international travel) incurred by science and technological missions travelling to and from China. Because our scientific community is less integrated than that of a state-controlled economy, Canadian university groups or professional associations which operate under different budgetary conditions

than the government have found this formula prohibitive. The Chinese authorities have, however, accepted a suggestion made by the Secretary of State for External Affairs in January 1978, that exchanges which do not fall under the official exchange programme operate on a self-paying basis.

The present emphasis in the area of SANDT exchanges is to explore new areas of cooperation (such as transport and communications), to send smaller groups for more in-depth scientific discussions, and to facilitate a more regular exchange of information and material between Chinese and Canadian scientists.

Government

Mr. Deng Xiaoping, the dominant force in post-Mao China, opened the recent Chinese Communist Party's 12th Congress with a strong appeal for stepped-up efforts for economic development, reunification with Taiwan and the fight against "hegemonism."

In a speech that could be one of his last major public acts, the 78-year-old party Vice-Chairman explicitly mentioned for the first time the procedure for naming his successors as China's top ruler.

He also said that his policy of opening China to the outside world would continue. But he stressed China's socialist orientation and desire to be independent and rejected the introduction of a "bourgeois way of life" in the country.

"No foreign country can expect China to be its vassal," Mr. Deng told the 1,600 delegates to the congress in the Great Hall of the People. "Nor can it expect China to swallow any bitter fruit detrimental to China's interests."

The expression "bitter fruit" has been frequently used by the Chinese in their attacks on the United States for interfering in their internal affairs through military aid to Taiwan, over which Peking claims sovereignty.

Mr. Deng said in his opening speech that reunification of the nationalist-ruled island with the mainland was one of the regime's primary tasks this decade.

He also emphatically stressed the need for China to combat "hegemonism", an expression generally used by the Chinese to mean the activities of the Soviet Union.

The congress put Mr. Deng into a sort of semi-retirement and confirmed two close allies as his successors. The two - the 67-year-old party Chairman, Mr. Hu Yaobang, and the Prime Minister, Mr. Zhao Ziyang (63) - are to head a powerful General Secretariat. Mr. Deng is to give up his post as Vice-Chairman and head a new party body, the Central Advisory Commission.

Mr. Deng had put China on a pragmatic track as opposed to the leftist regime of the stormy decade-long cultural revolution that ended in late 1976 with the death of Chairman Mao Tsetung and the arrest of his widow, Jiang Quing, and her gang of four.

Mr. Deng, sacked and disgraced twice by Chairman Mao during the cultural revolution, listed the major agenda items of the first party congress to be held in China in five years.

- Review of a report presented by Mr. Hu on the work of the 11th Central Committee set up by the congress in August 1977, and adoption of a party programme aimed at creating "a new situation in all fields of socialist modernisation."

- Adoption of a new party constitution.

- Election of a new Central Committee, a new Commission for Discipline Inspection and the Central Advisory Commission.

"Our party will have a more clear-cut guiding ideology for socialist modernisation," Mr. Deng said, insisting on the need to bring in younger people to rejuvenate the ageing ranks of the Chinese leadership. He stressed that a priority would be put on economic development, which is "at the core of these tasks as it is the basis for the solution of China's external and domestic problems." "We should learn from foreign countries and draw on their experience," he said. "But mechanical copying and application of foreign experience and models will get us nowhere."

He emphasized that the Chinese must "blaze our own path and build socialism with Chinese characteristics."

"We will keep a clear head (and) firmly resist corrosion by decadent ideas from abroad and never permit the bourgeois way of life to spread in our country," Mr. Deng said.

Useful Telephone Numbers

Beijing (Peking)

Canadian Embassy
10 Sanlitun Lu, Sanlitun, N.
Telephone: 52 - 1475, - 1571, - 1684, - 1724, - 1741

British Embassy
10 Guanghua Lu, Jianguomenwai
Telephone: 52 - 1961, -2, -3, -4.

U.S. Embassy
17 Guanghua Lu, Jianguomenwai
Telephone: 52 - 2033

Kunming (see map)

Airline:	CAAC 146 Dongfeng Doughu	4270
Friendship Store	99 Dongfeng Xi Lu	4698 7188
Overseas Chinese Store	98 Zhengyi Lu	7188
Taxi	17 Xi Lu	3405 4461
Kunming Hotel	123 Dongfeng Doughu	3921
Kunming Research Institute of Botany (Chinese Academy of Sciences)	Heilongtan Beijiao	4197
Science and Technology Association of Yunnan		7489
University of Yunnan	175 Qinqyunjie	3901
Agricultural University of Yunnan	Heilongtan	6578

ITINERARY

Tuesday, November 30, 1982				
Depart	Ottawa	0630 hours	Flt AC441	
Arrive	Toronto	0725 hours		
Depart	Toronto	0920 hours	Flt AC757	
Arrive	San Francisco	1140 hours		Gateway point
Depart	San Francisco	2345 hours	Flt SQ001C	Beckman, Lee, Ting
Thursday, December 2, 1982				
Arrive	Hongkong	0805 hours		Gateway point Tan, Wills
Saturday, December 4, 1982				
Depart	Hongkong	1255 hours	Flt CA342	
Arrive	Kunming	1455 hours		
Sunday, December 19, 1982				
Depart	Kunming	0915 hours	Flt CA4327	
Arrive	Guangzhou	1130 hours		
Depart	Guangzhou for Hongkong - Train or Hydrofoil			
Monday, December 20, 1982				
Depart	Hongkong	1900 hours	Flt SQ002C	
Arrive	San Francisco	2020 hours		
Depart	San Francisco	2330 hours	Flt AC758C	
Tuesday, December 21, 1982				
Arrive	Toronto	0705 hours		
Depart	Toronto	0805 hours	Flt AC442	
Arrive	Ottawa	0858 hours		

Before departure

All tickets will be sent by air courier prior to departure, along with a cheque for individual expenses which is to be exchanged at your local bank for travellers' cheques. Brian Wills, alone, will be sent a Prepaid Ticket Advice to the local Air Canada office in Delhi.

Arrangements have been made with ISTIC to help speed up the process of visa applications. Applications can be made at any time after October 1, 1982. Visa applications in the US can be obtained from the Embassy of the People's Republic of China, 2330 Connecticut Avenue N.W., Washington, D.C. 20008 - Telephone: (202) 328-2571. Visa applications in India are available from the Embassy of the People's Republic of China in New Delhi.

The visa applications must be filled out in duplicate and a charge of $7.00 is made. Two passport photographs of the applicant are required. The expenses incurred may be charged to IDRC.

In the case of Margaret Beckman, application for a visa will be handled by IDRC itself. Contact: Lydia Debanné, Visa Clerk, Travel Services - Telephone: 996-2321 (Ext. 134).

Arrival

All lecturers will convene in Hongkong on or by December 2, 1982 where rooms have been booked at the Sheraton Hotel, 20 Nathan Road, Kowloon - Telephone: 3-691111, 800-334-8484; Telex: (780) 75813. Transport from the airport to the hotel will be by hotel limousine, charged to your bill. Brian Wills and Sally Tan, the only two members arriving alone, should on clearing Hongkong Immigration go in the marked direction to connect with the hotel cars.

N.B. December 3 will be set aside for a pre-course planning meeting.

We all leave Hongkong together on Saturday, December 4, 1982 at 1255 hours for Kunming by direct flight, CA342, arriving in Kunming at 1455 hours local time.

It is the responsibility of ISTIC, the host institution, to meet us at Kunming airport and transfer us to the hotel and course locale. They will help with all details of settling in, selection of rooms, baggage, etc.

After a brief rest, we will combine with our hosts to go over final preparations for the course, view the facilities and identify any difficulties. It is at this point we can expect to have to make some hasty changes or new decisions, if, for example, we find some of the equipment has failed to arrive.

It will be advisable to meet with each other fairly early each day, and with our ISTIC counterparts, in order to discuss the day's work.

ISTIC will provide back-up equipment, a staff of ten helpers who will also sit in on the course when they are not required for other duties. A janitor, handyman, will also be available to deal with equipment problems.

Departure

The course concludes at 1700 hours on December 18. For those travelling home directly, the flight leaves Kunming for Guangzhou (Canton) the next day, Sunday, December 19, at 0915 hours (Flight CA4327). The journey from Guangzhou to Hongkong will be by train or hydrofoil down the Pearl River. Those among us who will be making their own arrangements for the return journey should inform ISTIC of their intentions as soon as possible in order that bookings can be made. Chinese transportation authorities are not geared to accepting last-minute bookings and aircraft and trains are usually booked several weeks in advance, though it is normally possible for foreigners to be squeezed in at the last moment. Although the air tickets provide for full economy open booking arrangements after the course, any deviations that go beyond the normal mileage charge will not be the responsibility of IDRC. All accommodation in connection with personal trips on the way home is the responsibility of the individual.

Immunization

China does not require proof of vaccinations, except for someone entering from a yellow fever or cholera area. However, certain immunizations are to be recommended. Tetanus remains an important health problem in China and you may want to receive a booster prior to departure, if you have not had one within the past ten years. Typhoid fever still occurs in China and even those vaccinated should not consider themselves immune. Viral hepatitis, type A, is widespread, but in the hotels and for the length of time we intend to be there, there is little risk. If, however, you plan to eat out a lot at local restaurants, Immunoglobulin (gamma globulin) offers effective protection for up to 3 months, depending on dose.

Health, Medication & Toiletries

Malaria Prophylaxis and first aid kit

1. Malaria Prophylaxis - in the Province of Yunnan, there is a risk of malaria during this time of the year, therefore, you will be getting Paludrine (Proquanil) from our Health Services for this trip.

2. First Aid Kit (*Items with an asterisk will be supplied by IDRC Health Services)

Antimalarials	*Paludrine
Antidiarrheal	*Lomotil
Analgesics	*Aspirin
	*222's (do not take if allergic to codeine)
Antacids	*Maolox or Diovol
Antiemetic	*Gravol
Anti histamine	Benadryl
Decongestant	*Sinutab
Throat lozenges	*Bradosol
Skin care	Phisohex or any other disinfectant soap
	*Zephiran disinfectant
	Calamine lotion
	Polysporin ointment
	Tinactin powder and cream (fungicides)
Vitamins	Vitamin compound
Eye/Ear Infections	Polysporin (eye/ear drops)
Water decontamination supplies	Halazone tablets
	Rubbing alcohol
	Elastocrepe bandage
	*Absorbent cotton
	*Absorbent gauze
	*Adhesive tape
	*Bandaids

[illegible] TABLE
(for oral thermometer)
Fahrenheit/Centigrade Temperature Conversion

F°	C°	F°	C°	F°	C°
90 = 32.2	95 = 35.0	100 = 37.8	105 = 40.6
91 = 32.8	96 = 35.6	101 = 38.3	106 = 41.1
92 = 33.3	97 = 36.1	102 = 38.9	107 = 41.7
93 = 33.9	98 = 36.7	103 = 39.4	108 = 42.2
94 = 34.4	99 = 37.2	104 = 40.0	109 = 42.8

Health, Medication & Toiletries (contd.)

If one is not feeling too well at any time during the Course, unless it is serious, it is probably just as well not to mention it since our Chinese hosts will go to extraordinary lengths to rectify the problem. It is not uncommon to find oneself hospitalized for even minor complaints. On the other hand, should one fall ill, excellent care is the rule. Although health costs are relatively minor in China, in Hongkong they are not. Extra medical insurance should be considered. For instance, OHIP (Ontario Health Insurance Plan) charges only 50 cents a day to cover a person's medical expenses over and above the in-province scale of fees incurred outside of Canada.

You should plan to take along any prescription drugs you need. Taking care of your own health problems will relieve the anxiety of our Chinese hosts and save you time, energy and worry. People with allergies should take note that these can sometimes flare up in China because of the change in climate, etc. One researcher in Nanjing recently came up with the evidence that colds and influenza are particularly endemic in China. Take cold remedies that work for you if you believe you may be susceptible - cough drops, 'Contact C'm throat lozenges, cough medicines, etc. Men should be aware that shaving soap is in short supply, ladies' personal hygiene articles non-existent. Such items as contact lens fluids are unobtainable. Selection of common items such as shampoo, moisture cream, is also scant.

Accommodation

It is not known at this point in time in which hotel we will be housed in Kunming. Hotel standards vary in China. There has been an extensive building program to upgrade tourist accommodation. However, the unexpected is the norm. Be prepared for Chinese eccentricities. A private bathroom is unlikely and, depending on local conditions, we may be asked to share rooms, though we do not expect this to be the case at present. Hotels usually provide a western as well as Chinese type breakfast. Chinese breakfasts (which you may want to try) consist largely of a rice gruel (congee), tea and sweet cakes. A western breakfast is simply toast and eggs. Apart from breakfast, it will be wise to avoid eating western food if available and opt for Chinese lunch and dinners. Meal-times begin promptly like everything else in China, and the hotels like to have all guests seated at the stated time.

You should settle the hotel bill in China personally before leaving. The daily rate has been requested.

The quality of Chinese food offered to visitors in hotels is often not of the high standard one is now accustomed to expect of the Chinese. This is because, with so many visitors now arriving in China, establishments which cater for them have tended to develop a rather bland menu which will be acceptable to most palates yet give a dash of the exotic. It is always nice to branch out independently on the odd occasion and there are a few worthwhile places. Our hosts and guides will be able to advise and make arrangements, given adequate notice.

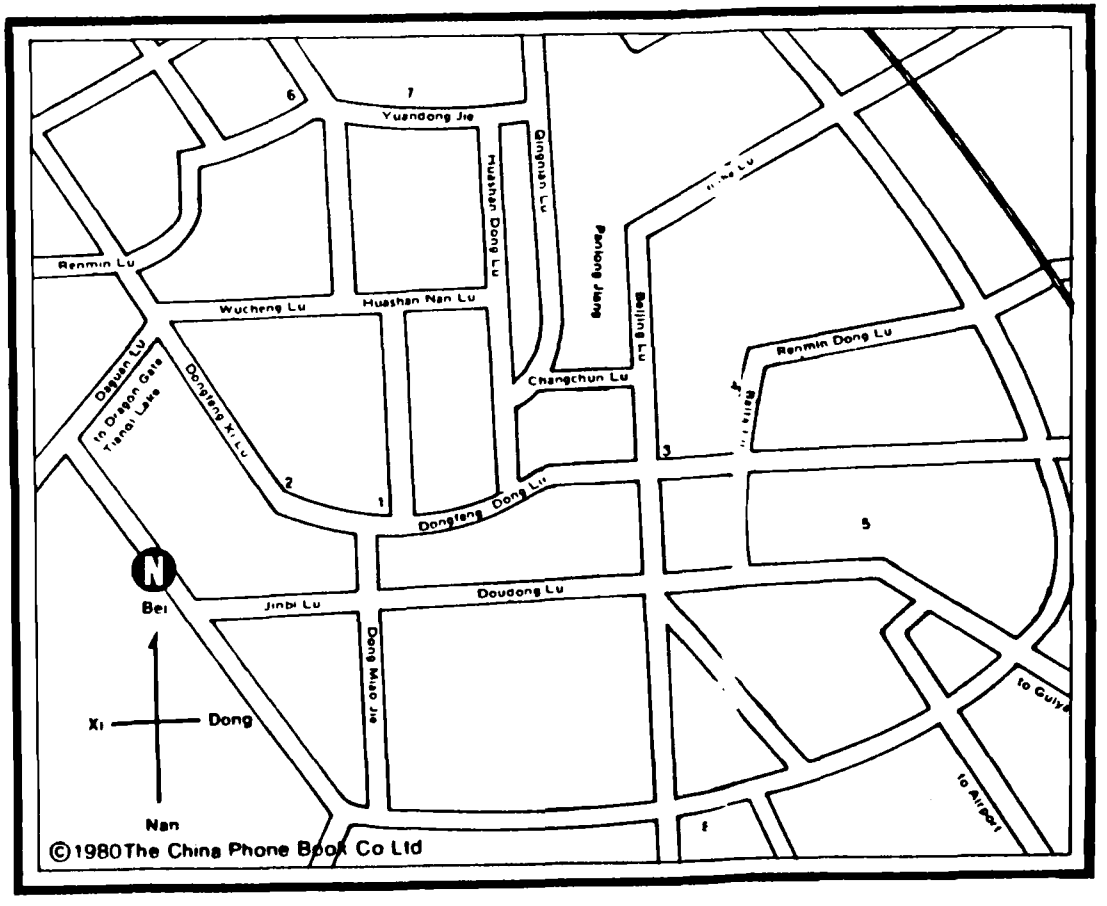
Liquor

China produces its own wines but these are taken slightly warm at meals. The Shaoxing has a sherry-like taste and is usually ordered at banquets. Grape wine is called 'sour' wine by the Chinese and is not popular. Imported spirits, such as brandy and whiskey, are very expensive. It is advisable to take in duty-free whiskey or brandy. The Chinese are fond of brandy and it is a good ploy to have some available to put on the table for the return banquet. Chinese beer is very good and available everywhere. It is usually drunk at meals in preference to soft drinks, which are not well manufactured in China. Since flasks of hot water are available everywhere, including on aircraft, it is worth taking a jar of instant coffee.

In and around Kunming

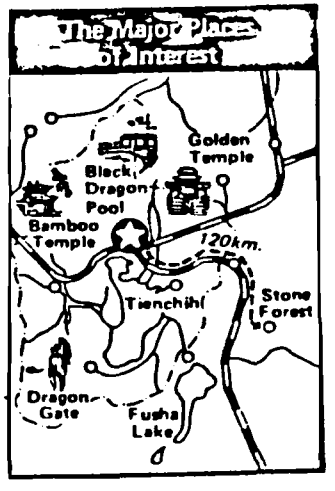
Kunming is a city in Southwest China, and is the provincial capital of Yunnan. The population is approximately 1.8 million of which a significantly large proportion are minorities, i.e. non "Han" groups.* The city lies on a flat, fertile plain at an elevation of 6,200 ft. in the center of the province. It is encircled by mountains and a large lake dominates the landscape. The Chinese proverb says of Kunming "the four seasons are like spring". Winters are short, mild and sunny, with little rain. The temperature in December is expected to be in the low to mid sixties Fahrenheit though nights can be quite chilly (48^{o}F).

*DESSAINT, A. Minorities of Southwest China. New Haven : CT. HKAF Press, 1981 373 pp.



Kunming

1 Department Store
2 Museum
3 Post and Telegraph Office
4 Kunming Hotel
5 Gymnasium
6 Green Lake Park
7 Kunming Zoo
8 Kunming Railway Station



The guide books tell us it is a modern, industrial city, but it has several attractions in and around for spare time investigation. The host institution is expected to provide some sightseeing as part of their hospitality, but some wandering around the city alone or with the group should be possible. There is a zoo that is worth seeing and a monastery with 500 rather unique statues of Buddha's Chinese disciples. The Golden Temple is reported to be one of the most outstanding in China. The Stone Forest, some 100km. distant, will probably be on our itinerary. This is an interesting geological formation of limestone outcrops said to resemble a forest of pine trees. The local Friendship Store specializes in local minority crafts, pewter, silver decorative arts, embroidery, etc. The local cuisine is said to be good, the most famous dish being called "Across the bridge noodles". A whole meal is built around this dish. The Gao chao noodle shop has been making the original dish for over 120 years. There is a local opera company.

Shopping

When it comes to window gazing China is not the best place, as one soon discovers. Few streets are devoted to consumer needs, other than the more basic shops. The Number One Department Store will be worth a stroll if one has time. Bookstores give one a feel of the literature China is reading. A massive number of titles are published on science and technology topics each year and these bookstores always draw large crowds.

Antiques are of interest, but forget the idea of picking up something of value cheap. After the Revolution, many treasures were taken to Taiwan or sold to merchants in Hongkong, and museums have picked up the most valuable items. The remaining artifacts the Chinese Government is now willing to sell fetch astronomical prices and dealers in Hongkong can usually provide objects at more modest prices. Any notions of haggling for a Song landscape or Ming vase can be dashed.

The Friendship Stores, reserved for visitors and diplomats, provide the only source of reasonably priced articles. Chinese silks and brocades are good buys, as are fur hats for men and women. Locally manufactured down-filled ski jackets are good value at about CAD$25. Some articles which are very expensive elsewhere are often excellent value in China, e.g. a set of drafting instruments can be had for only CAN$2.00 - 5.00.

Dress

The Chinese tend to be informal and during the warmer months will often attend meetings, etc., in white open-necked short-sleeved shirts. The dark suit and tie demanded by the Japanese is not necessary, except for very formal occasions. Shorts and open sandals do tend to be frowned on, as do sleeveless blouses and off-the-shoulder dresses. The local climate will be mild so heavy clothes should be unnecessary, but woollens for evenings are advisable, as will be a light overcoat. Hongkong enters its coldest period of the year towards mid-December until the end of February. It can be both rainy and windy.

Manners

Chinese tend to be very courteous to visitors. Sometimes this approaches deference, with whole swathes of shoppers parting to let a visitor through to the counter, or even offering places to sit in a crowded room.

Punctuality is highly regarded. Classes can be expected to start on time and finish on the dot. If students or persons at meetings applaud, it is polite to return the gesture. Do not be affronted if people stare a lot. The local people are very curious and do not often see foreigners. Your clothes, complexion and composure will come under close scrutiny.

Voicing complaints

Although we will be aware of the need to keep on our best behaviour, nevertheless, do not forget that individuals should not be chastized or complained to openly. If any problems about the arrangements do arise, they should always be broached first in private and only later in person with our hosts, and then only through the course administrator. The Chinese find public displays of emotion very unseemly. It is, therefore, best if all keep a pleasant demeanour as much as possible and not show hostility or anger in public either towards our host, students or colleagues, at all times. It is almost impossible to expect things to go just right all the time, given the nature of our task and the location. A brave face kept at least until we leave will pay most dividends.

Film Supplies

Colour film is not widely available in China so photography enthusiasts should take plenty in with them. Please note, however, many Chinese do not like to be photographed without giving their permission, especially older persons, though anyone taking a Polaroid camera will be engulfed with people seeking 'demonstrations'.

Forms of Address

Chinese names usually consist of three characters, though a few people only have two, e.g., Fang Yi, Minister of Science and Technology. The surname comes first, the diminutive name second, thus Mao Zedong. It was common practice, until the introduction of pinyin, to hyphenize the two diminutives, i.e. Mao Tse-tung. Like other languages, Chinese tends to have a lot of common surnames, Wang, Li, etc. This is because there were, it is said, in ancient China originally a "hundred common surnames - "Lao Baixing" - this term is now commonly used to refer to the masses in general. Unless one is meeting with hard core party officials, the term "comrade" is rarely used. Forms of address like "Prof. Li", "Mr. Wang", are used. Friends and colleagues address each other as "old" ("lao") so-and-so, i.e. Lao Wang.

In any reference to China one should avoid terms like 'Red' China, 'Communist' China, or 'Mainland' China. It is best to simply say 'China' or the more formal 'People's Republic of China'.

Currency

China's currency is called the Renminbi (RMB) - 'people's cash'; the unit is the Yuan (dollar), divided into 100 Fen (cents). Ten fen is known as Jiao. There are notes of ten, five and two yuan and one jiao. Coins come in five, two and one fen denominations. All currency has to be declared on entry but there is no limit to the amount taken in; any left over will be changed on exit, provided it agrees with the statement made on the entry form, so, keep the original. (One yuan equals CAN$.6673).

Credit cards are not widely accepted outside Beijing and some form of Travellers' cheques can be difficult to change. However, at the time of writing, Thomas Cook and Citibank are acceptable, as are Barclay's Bank cheques.

Hours of the Course

Government offices open from 0800 hours until noon and 1400 hours to 1700 hours, though some operate 0700 hours to 1800 hours Monday to Saturday. Sunday is a holiday in China. Appointments usually begin at 0830 hours or 0900 hours but it is not usual to request appointments after noon on Saturday.

The course, accordingly, will follow Government hours, except after the first day classes will begin at 0830 hours and finish at 1700 hours. However, expect to be involved in some "after hours" tuition/discussions.

Shops stay open to about 1900 hours, including Sundays.

Laundry

Dry cleaning is not recommended. In the hotels, unless otherwise stated, all laundry is washed with soap in very hot water and is subjected to very vigorous handling. Anyone with delicates, synthetics, etc., will be well advised to specify to room service any special handling, or that lukewarm or cold water be used.

Hospitality

There is no tipping in China, but an old Chinese saying 'Returning a peach for a plum' indicates that it is not inappropriate to offer your guides, hosts, or others who have been helpful, something in return for their efforts on your behalf. Guides are not averse to taking small gifts in this way. Hotel staff do not expect tips, but do accept expressions of thanks.

Do not be offended, however, if Chinese colleagues refuse to eat with you. There are good reasons for not doing so; the Chinese are very warm and thoughtful people and they genuinely will not wish to burden you with their presence when you may have been with them all day. It is polite to refuse. There is also the question of expense. Foreigners are charged excessive prices for meals by local standards and the Chinese will not wish to put you to any extra expense on their behalf. Grain is rationed in China, and even though you may pay the bill, Chinese guests at hotels and restaurants often are faced with having to discreetly surrender valuable ration coupons to the management.

Because the Chinese like to offer banquets as a traditional form of welcome, it is usually a good gesture to offer such courtesy ourselves. Ten to twelve courses are what you can expect; because politeness requires that the guest samples every dish, it is wise to 'pace' oneself since it is customary to replenish empty dishes. The same holds true of liquor. There is usually a variety: sweet Chinese wine, beer and the mandatory Mao tai - a clear, fiery drink made from sorghum (Gaoliang) - it is one of the strongest liquors in the world - 65/70 percent alcohol. Tea is available everywhere and on every occasion and should be preferred.

The host will usually present a toast. Often this means emptying glasses several times. The effects of the Mao tai are not always immediately apparent.

It is planned to offer all participants hospitality on the first evening. This will not, I hope, be too elaborate but is intended to 'break the ice' and help lecturers and students get to know each other. A general film on Canada will be shown, followed by Chinese snacks (dianshin) and drinks.

Transportation

All your flights will be firmed up and tickets will be sent in advance, as previously stated, with the exception of Mr. Wills in India. Onward confirmations are very important because it is almost impossible to reconfirm return flights within China. Chinese aircraft do not have smoking and non-smoking sections, and tend to be lax on safety measures. Chinese aircraft operate without navigation lights, as does most ground transportation. Lights are only switched on to signal other drivers and pedestrians. Pedestrians do not have right of way, so, be careful crossing the street.

Be prepared for unexpected changes in the itinerary because of last-minute changes in airline schedules.

The flight from Hongkong to Kunming takes approximately 55 minutes.

Customs Regulations

We can expect assistance in clearing customs, but for personal articles, be advised that the Chinese authorities are quite reasonable. Duty free imports of 400 cigarettes and up to three bottles of liquor, even these rules are flexibly enforced. Availability of international brands of such items is limited, so, you are advised to take along your maximum entitlement of your favourite poison ! A reasonable amount of personal items is allowed, i.e. camera, roll film, radio, etc., but these must be declared on entry and departure. Be extra careful about importing articles which may be politically sensitive to the Chinese. All movies must be declared on entry and departure. Be sure to keep receipts for all transactions.

Personal Expenses

You should be aware that the Chinese expect to be paid for any service rendered. In order to avoid embarrassing situations at the port of departure, please ensure that any personal requests you make to our hosts, i.e. hire of car, meals, or trips are paid for or make certain that you are aware of the arrangements you made in advance. It is not uncommon for previous visitors to accept what they think is Chinese hospitality only to be presented with an unexpected bill at the end of their tour. Those remaining in China after the course will be wholly responsible for any expenses incurred. Any group trips suggested during the course will be carefully checked beforehand to ascertain who will be responsible for expenses. It is understood that the Chinese will arrange at least one official excursion at their expense.

Secretariat

IDRC will maintain its own "Secretariat" for the duration of the course. Sally Tan, from our regional office in Singapore, will be in charge. ISTIC have also agreed to supply secretarial support, so, we should have sufficient staff on hand locally to handle most needs which arise during the course. Sally will be our mainstay and it would be appreciated if all lecturers go first to Sally with any office request; she can then deal with or pass on your secretarial requirements for appropriate action.

Equipment

All equipment is expected to be in place by the time of our arrival, but we will need to check this very carefully before we leave. Hong Kong may be the last chance to find substitutes.

List of Equipment

1 Bell & Howell Ringmaster Sound/Slide Projector
2 Slide Trays
1 Vinyl Storage Cover
1 Heavy Duty Shipping Case
1 Extra Lamp
1 Bell & Howell TQ III 16mm Film Projector
1 Exciter Lamp
1 Projector Lamp
1 Dust Cover
1 Remote Control
1 Anamorphic Lens
1 3M Transparency making machine and Transparencies
1 Screen, glass beaded, 70" x 70"
1 Canon Copier, with consumables and spare parts, service manual
1 Bell & Howell Overhead Projector
1 35' acetate roll
1 Roll film attachment
Dust cover and lamp

Display

It is hoped to be able to mount a small display of outputs, etc., of interest, during the course. It is the responsibility of each lecturer to bring what is deemed appropriate, i.e. posters, photographs, documents, etc.

Hotel Security

Do not be surprised to find your hotel door continually unlocked or to find hotel staff appear at inconvenient times to do dusting and re-filling of vacuum flasks. The Chinese make a point of assuring visitors that they stay in complete safety from theft and other crimes. Misplaced articles have followed guests to their next location with proverbial efficiency. There is crime in China, but you are unlikely to encounter it in your hotel room.

(It is almost impossible to obtain cold drinking water. The Chinese provide hot water in a vacuum flask, mainly for making tea.)

Time Change

Hongkong is eight hours ahead of GMT. Thirteen hours ahead of Eastern Standard Time. Hongkong adjusts local time back one hour after the twenty-first of October. Kunming is one hour behind Hongkong time.

ISTIC -
(The Institute of Scientific and Technical Information of China)

Under the umbrella of the Academy of Sciences, the ISTIC was established in 1956. It is now the principal information processing center in China. Starting with a staff of 200 in 1956, it now has more than 1 000 in Beijing. An additional office in Chongqing was established in 1960 and now boasts a staff of 400.

The main functions of ISTIC are: (1) the collection of scientific and technological information both in China and from a wide range of international sources; (2) the compilation and editing of reference materials, indexes and relevant bibliographic items; and (3) the dissemination of scientific and technological information.

ISTIC is headed by a Director and Deputy Director. The ISTIC Directorate is advised by two principal committees: (1) the ISTIC Study Committee, and (2) the ISTIC Editorial and Publications Committee. Seven operational offices report to the Directorate: (1) General Services, (2) the Academic Division, (3) the International Division, (4) Office Management (secretarial/clerical), (5) Personnel, (6) Logistics, and (7) New Building Construction.

Additionally there are 17 programmatic offices which divide up the work of ISTIC. It may be of special interest to list these to better describe the ISTIC program. Thirteen are directly program-related:

1. Information Acquisition and Collection
2. Foreign Documents
3. Chinese Documents
4. Patent Information
5. Standards' Information (Terminology, Coding Measurement)
6. Specimens and Models (includes inventions and models)
7. Audio-Visual Materials
8. Research on Information Science
9. Information Services (in response to inquiries)
10. Domestic Information Exchange
11. Information Research Methodology
12. Office of Computing
13. Office of Graduate Students

The remaining four offices include:

14. The Affilitating Co. for Science and Technological Documentation (basically a service center which may supply needs of agencies other than ISTIC)
15. Publishing Co. for Science and Technology (may also supply needs of agencies other than ISTIC)
16. Printing Plant
17. Chongqing Branch Office

The international interests of ISTIC are considerable and the following are worth reporting as acquisitions for 1978:

	Items
Research reports	35 000
Conference proceedings	1 400
Science and technology journals	7 200
Information descriptions on patents	760 000
Information on standards	28 000
Manufactured items (samples) (equipment, instrumentation, hardware)	120 000
Science and Technology Films	203

Total domestic and international collections may be summed up:

1. Journals (domestic and international)	9 700
2. International documents (research reports, conference proceedings, dissertations)	600 000
3. Patent descriptions, abstracts	6 000 000-plus
4. Materials on standards	300 000
5. Manufactured items (samples)	300 000

ISTIC invites and maintains information exchanges with 63 countries, 53 international organizations and 2 000 individual institutions.

Information cataloguing operations divide in the following way:

1. General catalogue cards
2. Western language cards by title
3. Japanese language cards by title
4. Russian language cards by title
5. Western organizations with brief descriptions
6. Western conference proceedings

The Committee on Science and Technology compiled and published (for 1978) more than 10 000 000 items. Reference indices (i.e. literature searches) in some 90 subject areas totalled over 1 420 000 items. Translation services were rendered for 1 880 000 items across 50 subject categories. Research reports for nine subject areas totalled 6 730 000 items.

General documentary services include: (1) Patents searches; (2) Microfilm services; and (3) Circulation of journals.

ISTIC responded to 11 000 mail inquiries in 1978. Special bibliographies, abstracts were published in selected categories. Translation services were made in the following languages: English, Japanese, French, German, Russian, Polish, Czech, Roumanian, Swedish and Italian.

Additionally, ISTIC sponsors conferences and exhibitions in various areas, a sampling of which would include: Laser applications, microbiology, isotope applications, environmental protection, desalination, heavy mtels' pollution, control of wild oats, and Chinese character encoding.

In the most recent year for which there is data (1978) ISTIC supplied its research constituencies with 3 500 000 research document copies and over 4 400 000 microfilm page copies.

ISTIC is seriously concerned with computer technology and appropriate applications.

中国科学技术情报研究所

INSTITUTE OF SCIENTIFIC AND TECHNICAL INFORMATION OF CHINA
(ISTIC)

Telegrams: ISTIC　　中华人民共和国　　P. O. Box 640, Beijing
Telephone: 46 47 46　　北京六四〇信箱　　PEOPLE'S REPUBLIC OF CHINA

CHINA'S SCIENTIFIC AND TECHNICAL INFORMATION WORK AND APPLICATION OF NEW INFORMATION TECHNOLOGY

—— Lin Zixin, Director, ISTIC, China

It is a great pleasure for the Chinese delegation to attend the FID 41st Congress and to discuss problems with other participants in information technology, and I wish to avail myself of this opportunity to express my thanks to Mr Barry Burton for allowing me to give an account before the meeting on China's scientific and technical information work.

China is a developing country, still backward in economy, culture, science and technology. As there exists in the field of science and technology a wide gap between China and the developed countries, and as the development of science and technology in different regions and specialized institutions in China is quite uneven, technology transfer is of major significance to the economic, scientific and technological development of China, including technology transfer from abroad to home, from domestic advanced regions to backward regions, from laboratories to factories and, from military industries to civil industries. Therefore, our government pays great attention to scientific and technical information work, and considers it a strategic measure for economic construction, but our information service is still

far from meeting the requirements of the development of national economy. In view of this, we would like to strengthen the international exchange and to learn advanced experiences from all other countries in order to improve information service in our country. And at the same time, we are ready to do our bit for international cooperation in information service.

I. General Situation of China's Scientific and Technical Information Work

It is during the last twenty-odd years that the scientific and technical information work of China has undergone considerable expansion. In 1949, when the People's Republic of China was founded, there was practically no specialized scientific and technical information organization in China. The collection and utilization of documents were carried out separately by the research units and production units themselves.

In 1956, while formulating the long term national plan for the development of science and technology, the government pointed out that a service system of S & T information should be set up, and ranked it among the major items in the national S & T development plan. In 1956, China set about, in a planned and orderly way, scientific and technical information organizations throughout the country. After 26 years' development, the infrastructure of information service was steadily strengthened and improved, and a rather complete nation-wide information service system was gradually formed, which has played an important role in economic construction and social development.

At present, besides the national information center, i.e. the Institute of Scientific and Technical Information of China (ISTIC), there are 43 specialized information institutes, 28 provincial information institutes and 219 information units dispersed in different cities and counties. The national information center, under the leadership of the State Science and Technology Commission of the People's Republic of China, is responsible of programming and coordinating the information

work throughout the country, whereas the specialized information institutes and provincial information institutes serve the special departments and different provinces respectively. The information units carry out their services under the guidance of provincial information institutes.

Besides, most of the universities, the key research units and large plants and enterprises have their own S & T information units. Since 1958, we have also set up a lot of information clearing houses to carry on various information exchange activities in special fields. By 1981, the number of this kind of clearing houses amounts over 2,000 in total.

With the expansion of the information organization, the number of information professional has increased greatly. According to incomplete statistics in 1981, the number increased by 7.5 times for the specialized information institutes and 6 times for the provincial information institutes over 1961. The information professionals are mainly graduates from technology or language departments of universities. Since the education of information science is not well developed in our country, the graduates in this speciality are still very few at present. In 1959, informatics course was offered for the first time, as a pilot scheme, in one of the universities. Since then, 14 universities have successively offered courses on library and information science, undergraduates major in them being more than 1,100. From 1977, ISTIC and Wuhan University began to enroll postgraduates of information speciality.

Most of S & T information institutes in China are multi-functional, having a considerable collection of literature. In 1981, the scientific and technical periodicals and the information retrieval periodicals published in China amounted to 1,300 and 134 titles respectively. We imported from foreign countries 16,000 scientific and technical periodicals, 10 million patent descriptions from 15 countries and 2

international organizations, 350,000 standard materials from 56 countries and also a great number of conference proceedings, research reports, special subject materials and products specifications. We have set up exchange relations of documents and materials with more than 60 countries. Besides, we collect micro materials, S & T films, video magnetic tapes, and small-sized samples from other countries as tangible information to facilitate dissemination of technological know-how to relevant production units.

According to the tradition of our country, library work and information work are not quite the same, each has its particular focal points in collection, service and function. There are more than 1,700 public libraries at different levels in our country, and besides, universities, large enterprises and key research organizations have their own research and special libraries.

II. Application of New Information Technology in China

While constructing the infrastructure of information work, we have paid great attention to the application of new information technology. At the beginning of 1960s, major information institutes started to render microform information service and most of the information institutes were furnished with document duplicating equipment. In the late 1970s, all information institutes began to provide users with audiovisual information service, and it was around the same time that computerized retrieval system has since become one of the important tasks of the state. Application of new information technology provides us favourable conditions for expanding information service and it has broad prospects for its development in our country.

However, the development of new information technology must be considered in light of the users' needs and the objective conditions of a nation.

Judged by the needs of users in our country, it can be classified into three types as follows:

(1) Information Needs for Decision-making, Planning and Management

China is a socialist country with a population of one billion, where a planned economy is consistantly practised. The decision, planning and management play a dominant role in developing the national economy in proportion and in coordination of such a big country. So decision-making, planning and managing in right ways need a vast of information. Especially in the present economy-adjusting period in our country, information of this kind is needed not only by national leading departments, but by the grassroot production units, increasingly in amount and scope, supply of which constitutes an important aspect of our information work. As most users in this field are leaders and managers at different levels, although they do not make up a large percentage of the total number of users in our country, their demand on the quality of information service is rather high. Information must be supplied with which helps them in grasping the status quo of development and in making predictions for the future, along with an analysis of it from strategical and political viewpoint.

(2) Information Needs of Scientific Research

Scientific research work in our country lays its stress on applied research and development, centering on national economic construction, while advancing basic research steadily in a planned way. Colleges and universities, combining teaching with research, can not dispense with scientific information. Therefore, information service should aim at training qualified personnel, as well as accelerating scientific discovery and technical innovation. Thus it is of major significance to devote to promoting this work. Most users of this type are from research institutes, designing units and universities,

accounting for less than 10 percent of the users in total. Generally speaking, they are most capable of utilizing information, better acquainted with the way of systematic searching literature and documentation and accumulating the necessary information for them. The language barrier is comparatively small for them in reading literature in foreign languages.

(3) Information Needs of Technicians, Workers and Peasants

This type of information users work on the fore fronts of industrial and agricultural production, playing a significant role in economic development of our country. They need the technical and experienced information which is mainly closely related to their production work and fits in with the production level and their acceptability, not necessarily the newest, latest or all-inclusive. Most of them are restricted by low cultural level and in the face of serious language barrier. Consequently, they are not in a position to read materials in foreign languages and make use of information retrieval tools. But this type of users makes a large number, amounting 80% to the whole information users in our country. How to serve them well is still a complicated problem to be resolved. Since they constitute the overwhelming majority and keep in fore fronts of production, to meet their information needs will have a direct bearing on growth of production.

Thus it can be seen that the users of information service in our country are multitudinous and varied, and there is a great disparity between the percentages of the three types, their information needs and habits and methods of using information are also varied. For these reasons, we must adapt our information service to different needs of different users, studying various types of service and information-disseminating channels, and rationally adopting appropriate new information technologies.

For instance, our agricultural technicians and peasants have not much time to consult literature and find it quite

difficult to make use of information because of the above-mentioned constraints. We have taken some measures to disseminate new knowledge and techniques in rural areas with some success. However, we think that television, as a means of disseminating information widely and regularly, has great potentialities. It conveys knowledge with the aid of images, thus surmounting obstacles of language and cultural level, and making knowledge easy to assimilate. Television technology in our country has developed considerably. Television broadcasting might become an invisible school for spreading knowledge and developing intellect. It is a good form to serve the agricultural technicians and peasants.

The prospects for utilizing microform literature are also good, particularly in our country. We plan to bring microforms into full play to solve the information-using problems for middle and small cities. The information resources of our country are mostly concentrated in the large cities. If the microform literature can be distributed in a planned way, where reading and magnifying facilities for microforms are provided, the role of information can certainly be brought into full play, and the information needs of middle and small cities be met effectively. Of course, it is necessary to make an investigation of the respective users from an economic evaluation of this type of information service so that a realistic plan for its development may be worked out.

Introduction of computers is an important aspect of adopting new information technology in the information work. In order to lay a sound foundation for the establishment of a computerized retrieval system in our country, the development of the 'Chinese Character Information Processing' laid down in 1979 is one of our country's priority research projects. Centering on this task, some institutions have done a lot of work and made good progress. For example, 150 draft schemes of Chinese character coding for computer in-put have since been put forward; 'The Chinese Thesaurus' in general and some

other specialized thesaurus (e.g. metallurgical, mechanical and electronic vocabularies) were published in 1980. Beijing University has recently developed a phototype machine for computer-laser editing and composition of Chinese texts; China Printing House in Shanghai has, in cooperation with other units, manufactured an automatic composing machine for Chinese texts, which is now in operation; ISTIC has conducted in small scale, some experiments on computer retrieval of Chinese documents and machine translation; and in more than 10 information institutes, the SDI services are carrying out on the basis of 20-odd kinds of magnetic tapes introduced from abroad. Some teletype terminals have been set up, through which we gain access to the foreign databases.

In short, we hold that the introduction of new information technologies must take into account the characteristics and special conditions of a nation, as well as its economic capability, technical level and the requirements of users. Both the prospects for their application and the objective factors restricting their development should be recognized, experiences of other countries ought not be used indiscriminately, and the latest information technologies ought not to be sought after with a lopsided view. We shall, on our own feet, adopt the policy to develop new information technology with more consideration on our actual situations. What is more important for us, while not losing sight of the new information technology, is still to strengthen the basic work of document processing, recognizing the role and potentialities of traditional information-processing methods.

III. Preliminary Views on Formulating China's Scientific and Technical Information Policy

In order to improve S & T information service, China is now formulating the information policy of present stage, based on historical experiences. It should, of course, fit in with China's specific conditions. The following are some view points held by

people in our information circles.

(1) To orientate information work to the above-mentioned three types of users so as to serve the national economic construction

As you all know, China is now carrying out its economy readjustment. The government has put forward the new economic development strategy. New assignments have been laid on all economic departments and S & T institutions. Therefore, the information work serving for the national economic construction should be placed in the first place, meeting the urgent needs of the three types of users to the best of our ability.

For instance, according to the national economic policy, the reproduction extension should mainly rely on technical transformation of the existing enterprises. Therefore, technological information occupies a prominent position, to counter this, developing this kind of service should correspondingly be emphasized. While providing the technical information service with definite orientation, we should, of course, keep an eye on the world's new trends and new developments on the frontiers of science and technoloy across the world and report these to our users, so that they can have an all-round view of the world's new developments and use the experiences of other countries for reference.

(2) To offer better information service mainly through traditional ways

Considering the characteristics of our users and the conditions and capabilities of the existing information service, the traditional information service through printed documents will continue to be the basic form of information service in China for a rather long time to come. If the referral and consultant services are effectively enhanced, and the guidance

and instructions provided for readers to use foreign literatures improved, the traditional service can meet needs of those users who make up the large proportion of the whole. This kind of service is the principal means of our information service at the present.

To achieve a better traditional service, we should further strengthen our national information infrastructure, improve the functions of all information institutions, raise the level of documentation management and documentation processing and, set up a more effecient document-supplying system.

Now the retrieval publications published in China are not many, nor are the reporting items. It is of necessity to establish a complete system of retrieval publications.

(3) To carry out the policy of 'walking on two legs' and to develop computerized retrieval system by steps

The application of computers comes off as a result of objective necessity in combination with feasibility. This holds true either for the developed countries or for the developing countries. China is, of course, no exception. On one hand, China opens vast fields for the application of computerized system; on the other, its application is limited by its specific conditions at present. The computerized system will not be developed in China overnight, but step by step through overall planning in view of the actual situation.

To establish China's computerized retrieval system, the policy of 'walking on two legs' should be implemented, i.e. while introducing foreign data bases, it is imperative to set up Chinese document retrieval system and the stress should be put on the latter.

By using foreign data bases, the result of 'immediate gains with small input' can be achieved, therefore, foreign magnetic tapes have been imported and a few terminals with on-line

connections to foreign data bases have been set up.

But to fulfil the task of setting up Chinese-document retrieval system requires enormous funds and manpower, and also takes long time. The reasons of taking establishment of Chinese document retrieval system as a priority item stem from the following facts: first, all specialized fields in our country have made many achievements in scientific research, yielding complete technical data, which have more direct value for application and need to be exchanged and extended and, second, Chinese document system will own more users, as they have no language barriers. Depending on its development in the future, the Chinese translations of foreign literatures may also be stored in this system.

The establishment of computerized retrieval system will begin first in the national information center and a few other key specialized institutes, and then gradually extend to the rest. The objective of the computerized system in the national information center is to realize computerization of documentation management, processing and retrieval, and gradually on-line connection with other internal information institutes and major international network, in the end to form a national information retrieval center.

(4) To strengthen the standardization of documentation and to promote the application of new information technology

Standardization of documentation will facilitate the processing of separate documents of the same category by applying same principles and norms. Thus, a sound processing procedure of documents applicable throughout the country may be formed. Being an important measure to develop the computerized system and realize the objective of sharing the information resources, it would not only benefit the traditional service, but also promote the application of new information technologies. As a matter of fact, in 1978, CNTC/Standardization of Documentation was set up in our country to start the work

of formulating the standards of documentation. It is anticipated that by the year of 1983, 10-odd national standards in relation with documentation processing, documentation management and the establishment of computerized system will be worked out.

(5) To make full use of all means to develop multiple information service

Ours is a large area country over which spread innumerable small and medium-sized industries. Information users scatter here and there and their ability in reading and digesting foreign literatures varies. In order to satisfy the different requirements of all types of users, we should provide service and effect information exchange through multiple channels and in different ways. For example, for national major projects, subject-oriented information should be supplied in the main; for special topics, subject index and data compilation should be published and; in line with the practices of research and production in different regions, exhibitions of foreign literatures and samples and cataloges of foreign trade should be held.

At the same time, we should greatly strengthen the popularization and extention of the achievements in scientific research, with special attention paid to small and medium-sized industries. For example, there are over 96,000 factories under the Ministry of Light Industry, in which the overwhelming majority are small and medium-sized industries. Exchange of technical information between them on small inventions and innovations should be organized. If a minor but valuable invention is identified and popularized, great economic results could be achieved.

In addition, we should further explore the potentiality of the information service of audio-visual, TV, duplicating and

copying, microfiche and microfilm facilities which should be developed more quickly and they should have played more important role in the information dissemination in China.

(6) To attach importance to the training of information personnel and users

To train competent S & T information personnel and users, especially those who are familiar with the new information technology, is a significant measure for developing information cause. Although at the moment, we have a fairly large team of information personnel with comparatively good professional knowledge and experience, there still leaves great room for improvement both in experience and mastery of new information technologies. In order to meet the new development of information work, we must pay attention to the training work. In the past, information institutes and academic associations have opened a number of training courses on information and new technologies with good results. In the future, we should continue to do so, making improvements on training policy and on selection of teaching materials, providing elementary and intermediate information personnel more opportunities to enhance their professional capability so they can do their work better.

Higher Education in China: Key Institutions

Comprehensive Universities: (Science and Liberal Arts)

Beijing University
Fudan University, Shanghai
Kirin University, Changchun
Nankai University, Tianjin (Tsentsin)
Nanjing University
Wuhan University
Zhongshan University, Guangzhou (Canton)

(The following are believed to be run by provincial level governments)

Sichuan University, Chengdu
Shandong University, Jinan (Tsinan)
Lanzhou University, Lanzhou
Xiamen (Amoy) University
Yunnan University, Kunming
Northwest University, Xi'an
Xiangtan University, Xiangtan, Hunan
Xinjiang (Sinkiang) University, Urumqi
Nei Mongol (Inner Mongolia) University, Hohhot

Polytechnic Universities

(The following are administered by the Ministry of Education)

Qinghua (Tsinghua) University, Beijing
Xi'an Jiatong (Chiao-t'ung) University
Tianjin (Tientsin) University
Dalian (Talien) Engineering College
Nanjing Engineering College
Beijing Engineering College
South China Engineering College, Guangzhou
Central China Engineering College, Wuhan
Chongjing (Chungking) University
Tonji (Tung-chi) University, Shanghai

(The following institutions are of uncertain affiliation)

Changsha Engineering College (Seventh Ministry of Machine-building)
Northwest Industrial University, Xi'an (Fourth Ministry of Machine-building)
East China Engineering College, Shanghai (Fourth Ministry of Machine-building)
Harbin Industrial University (not known)
Chongjing (Chungking) Construction Engineering College

Science Universities (Under the Chinese Academy of Sciences)

Zhejiang (Chekiang University), Hangzhou
Chinese University of Science and Technology, Hefei

Machine-building Colleges (First Ministry of Machine-building)

(With the creation in 1979 of a separate Ministry of Agricultural Machinery, the agricultural machinery colleges may be under the administration of that new ministry)

Kirin Industrial University, Changchun
Northeast Heavy Machinery College, Shenyang
Hunan University, Changsha
Zhenjiang Agricultural Machinery College
Hefei Industrial University, Hefei
North China Agricultural Mechanization College, Beijing

Shipbuilding Colleges (Sixth Ministry of Machine-building)

Shanghai Jiaotong (Chiao-t'ung) University
Harbin Shipbuilding College

Aeronautics Colleges (Seventh Ministry of Machine-building)

Beijing Aeronautical Engineering College
Nanjing Aeronautical Engineering College

Electronics and Telecommunications

(Fourth Ministry of Machine-building)

Chengdu Telecommunications Engineering College
Northwest Telecommunications Engineering College, Xi'an

(Ministry of Post and Telecommunications)

Beijing Post and Telecommunications College

Light Industry (Ministry of Light Industry)

Shanghai Textile Engineering College
Northwest Light Industry College, Xi'an (?)
Hubei Construction Industry College, Wuhan

Transportation (Ministry of Communications)

Dalien Maritime College
Northern Jiaotong (Chiao-t'ung) University, Beijing
Southwest Jiaotong (Chiao-t'ung) University, Chengdu

Mining and Metallurgy

(Ministry of Metallurgy)

Beijing Iron and Steel College
Northeast Engineering College, Shenyang
Central South Mining and Metallurgical College, Changsha

(Ministry of Coal Industry)

Sichuan Mining College, Chengdu
Fuxin Coal Mining College (Liaoning Province)

Chemical and Petroleum Engineering Colleges

(Ministry of Petroleum Industry)

East China Petroleum College, Shanghai
Beijing Chemical Engineering College
Daqing (Ta-ch'ing) Petroleum College

(Ministry of Chemical Industry)

Guangdong Chemical Engineering College, Guangzhou
Shanghai Chemical Engineering College

Electric Power (now separate Ministries of Water Conservancy and of Electric Power)

East China Water Conservancy College (Shanghai)
Wuhan Hydroelectric Power College
Hebei Electric Power College, Shijiazhuang

Geology (State Bureau of Geology)

Wuhan Geological College
Changchun Geological College

Meteorology (State Bureau of Meteorology)

Nanjing Meteorological College

Oceanography (State Bureau of Oceanography)

Shandong Oceanographic College, Qingdao

Agricultural and Forestry Colleges (Now separate ministries of Agriculture and of Forestry)

North China Agricultural University, Zhuoxian (Hebei Province)
Yunnan Forestry College, Kunming
(Kiangsi) Jiangsi Communist Labor University
Dazhai (Ta-Chai) Agricultural College

Normal Colleges

Beijing Normal College
Shanghai Normal College

Medical Colleges (Ministry of Public Health)

Beijing College of Chinese Medicine
Beijing Medical College
Shanghai No. 1 Medical College
Zhongshan (Chungshan) Medical College, Guangzhou
Sichuan Medical College, Chengdu

Miscellaneous

Beijing Foreign Languages Institute
Wuhan Surveying and Cartography College
Shanghai Foreign Languages Institute
Southwest Political and Law College, Chongqing
Beijing Foreign Trade College
Central Music College, Beijing
Beijing Physical Culture College
Central Nationalities College, Beijing

The list indicates the city in which the institution is located if it is not part of its name. We have standardized the term xueyuan *as college and* daxue *as university with the exception of the two foreign languages institutions* (xueyuan) *which have long been known in English as "institutes."*

Fudan University, Shanghai

Fudan is a comprehensive university which was founded in 1905. The university's president is mathematician Su Buqing, who is also Chairman of the Shanghai branch of the Scientific and Technical Association. Professors Tan Jiazhen, Cai Shangsi, Xie Xide, Liu Boquan, Cai Zuquan, and Zheng Ziwen are the university's vice presidents.

Faculty:	Fudan's teaching staff currently numbers around 2,100. Of these, 200 have full or associate professor status; 850 are lecturers.
Students:	Total enrollment for the 1979-80 academic year is 3,848.
Library:	Library holdings include approximately 1,650,000 books. Total holdings including newspapers and periodicals are around 2,000,000 volumes.
Departments:	The university has two faculties, liberal arts with seven departments and sciences having six departments.
Liberal Arts:	Chinese Language and Literature Foreign Languages and Literature History Philosophy Journalism Political Economy International Politics
Sciences:	Mathematics Physics Chemistry Biology Nuclear Physics Computer Science
Research Institutes:	Mathematics Genetics Modern Physics Electric Light Sources World Economics

Nanjing University

Nanjing University (Nanjing Daxue or Nanda) is a comprehensive university of arts and sciences dating from 1902. Kuang Yaming is Nanda's president; university vice presidents include Zhang De, Gao Jiyu, Zhong Shiqin, Fan Cunzhong, and Xu Fuji.

Faculty:	Nanjing's teaching staff numbers 1,651. There are 83 full professors, 69 associate professors, 839 lecturers, 44 instructors and 616 assistants.
Students:	In 1978, Nanjing had 4,115 students enrolled, including 3,683 undergraduates, 156 post graduates, 228 younger teachers, and 45 foreign students.
Library:	The library holds a total of 2,700,000 volumes. Of the 1,300,000 books in Chinese, 300,000 are rare, ancient volumes. An additional 550,000 are books in foreign languages and there are 850,000 newspapers and periodicals. Approximately 800,000 volumes are held in departmental libraries.
Departments:	Nanjing University has 14 departments, 5 in liberal arts and 9 in natural sciences.
Liberal Arts:	Chinese Language and Literature History and Archeology Philosophy Economics Foreign Languages and Literatures
Sciences:	Mathematics Computer Science Physics Chemistry Astronomy Meteorology Geology Geography Biology
Research Institutes:	Acoustics Chemistry of Complex Compounds Theory and Origin of Granite and Volcanic Rocks Environmental Science

Nankai University, Tianjin

Nankai University, alma mater of late Premier Zhou Enlai, is a comprehensive university which was established in 1919. Yang Shixian is currently Nankai's president; Cui Ximo is the university's vice president.

Faculty:	Nankai's faculty totals 1,465, including 44 professors, 72 associate professors and 654 lecturers.
Students:	There are currently 3,600 students and 200 "research students" enrolled.
Library:	Library holdings total 1,100,000 volumes.
Departments:	The University has nine academic departments of which four are on the sciences and five in liberal arts.
Sciences:	Physics Chemistry Biology Mathematics
Liberal Arts:	History Philosophy Economics Foreign Languages Chinese
Research Institutes:	Elemento-Organic Chemistry Molecular Biology Economics Mathematics

Qinghua (Tsinghua) University, Beijing

Qinghua was founded in 1911 and is considered the foremost technical and engineering college in China, corresponding roughly with M.I.T. or a large version of Cal Tech. Liu Da is the university president, followed by vice presidents He Dongchang, Hu Jili, Zhang Guangdou, Zhang Wei and Zhang Jian.

Faculty:	There are now 180 full and associate professors. Total teaching staff, including lecturers and assistants is near 2,800.
Students:	6,200 undergraduate students are currently enrolled. Graduate students now number 600, a figure which will gradually increase.
Library:	The university library contains 1,900,000 books and subscribes to 3,000 Chinese and foreign periodicals.
Departments:	The university has 12 departments in science and engineering.
	Civil Engineering and Architecture Hydraulic Engineering Mechanical Engineering Precision Instruments Thermal Energy Engineering Electrical Engineering Radio Electronics Computer Science and Engineering Automation Engineering Physics Chemical Engineering Mechanical Engineering
Research Institutes:	Qinghua has restored and established nine research institutes and laboratories and is preparing to expand this number.

Zhejiang (Chekiang) University, Hangzhou

Founded in 1897, Zhejiang University is a major engineering college which has recently come under the leadership of the Chinese Academy of Sciences (CAS), a distinction shared with the Universities of Science and Technology in Hofei, Haerbin and Chengdu. Qian Sanqiang, one of the vice presidents of the CAS, is president of the university. Since Qian's duties keep him in Beijing most of the time, the university's administration is primarily in the hands of Vice President Yang Shilin.

Faculty:	Total faculty members, including full and associate professors, lecturers and assistants, number 1,819.
Students:	Enrollment for the 1979-80 academic year is 6.549. Of this total, 6,128 are undergraduate students and 421 are graduate students.
Library:	The library contains 750,000 books and about 10,000 kinds of current journal and newspapers in Chinese and other languages.
Departments:	There are currently 15 departments within the university. Mathematics Physics Chemistry Geology Mechanics Mechanical Engineering Electrical Engineering Thermal Engineering Optical Instruments Scientific Instruments Materials Science and Engineering Computer Science and Engineering Chemical Engineering Civil Engineering Electronic Engineering
Research Institutes:	Optical Instruments Chemical Engineering Electrical Engineering Materials Engineering

Education comes back into fashion in China

In the late 1950s and early 60s, China began to set up special selective schools to train the nation's top technicians and administrators. During the Cultural Revolution, these were denounced as "little treasure pagodas" and abolished. Now, as China forges ahead with plans for modernization, highly selective schools have been reintroduced under the name of "key" schools.

In no area can the almost full circle undergone by China in the years straddling the Cultural Revolution be seen more clearly than in education. The elitist tendencies of the 50s, which gave way to the egalitarian excesses of the mid-60s and 70s, have now been revived with greater fervour and conviction, though the Chinese themselves resist the term "elitist".

Academics and other intellectuals are back in favour. For 20 years between 1957, when Mao launched his anti-rightist purge, and 1977, when the Gang of Four was finally "smashed", they suffered terrible indignities and tribulations. Reviled as the "stinking ninth category" of the enemies of the people, they were humiliated, banished to work in the fields, tortured, imprisoned and murdered.

Those who survived have now been reunited with their families, their jobs have been returned, their universities reopened, and their reputations officially restored when Vice-Premier Deng Xiaoping hailed them in 1978 as the "brain workers" who serve socialism "as a part of the working class".

Universities are again able to select their own students. The competitive examination, abolished during the Cultural Revolution, was reintroduced two years ago. Previously, only peasants and workers who had been nominated by their colleagues were eligible for entry to university. No academic qualifications were required. The quality of university intake was often very poor, and the output not much better.

Now, universities are fiercely selective, particularly the "key" universities which, like "key" schools, are allocated extra resources and the best teachers. Less than one per cent of young people in China go on to higher education, compared with 12.5 per cent in Britain, and about 40 per cent in the United States and Japan.

Only one in 20 of the 5,000,000 students who applied to university last year was awarded a place. By and large, only the very brightest get in, though the health and political attitudes of candidates may be taken into consideration together with their examination marks. And strings can sometimes be pulled.

Last September, 400 students marched through the streets of Peking in protest against the alleged admission of candidates through political connexions. It was doubtless to allay such fears that Chairman Hua announced that his own daughter had failed to get a university place.

Most of the students who now get into university come from the favoured key schools, and most of the pupils in such schools are the children of professionals and white collar workers. Key schools account for less than 1 per cent of primary schools and only 5 per cent of secondary schools. They are thus far more selective, and in that sense "elitist", than grammar schools in Britain, which catered on average for the top 20 per cent of the ability range.

Selection for key schools is by examination. Some schools are more key than others. Among 140,000 secondary schools, just 20 have been singled out for extra special treatment directly under the Ministry of Education. (Other key schools come under the provincial or municipal government.

A few are further favoured by being "attached" to the best key universities. This greatly increases the pupils' chances of success of being admitted to those universities. Of the 60 pupils in the final class of the secondary school attached to Peking University, for example, 58 have been offered places this year.

When the university entrance examinations were first brought back, it was agreed that some 20-30 per cent of students should be allowed to enter university direct from secondary school without first having to serve time in the army, in factories, or on the land. Last year, only two years after that decision was taken, two-thirds of the successful applicants came straight from school. That proportion seems likely to continue to grow.

The gulf between the intellectual and the worker, which the Cultural Revolution sought to close, is once again yawning wide. The long nail on the little finger, the traditional mark of the Chinese intellectual, is creeping back into fashion. Titles for university degrees are to be awarded next year for the first time since the Communists came to power in 1949. The Government has just decided to increase the salary differentials between academics and workers.

It was strange for some of us who arrived earlier this month in China, full of naive preconceptions about socialist egalitarianism, to hear Professor Ni Meng Hsuing, a deputy director of Peking University, speak of the "problem" of miners earning more than some senior academics.

A miner might earn 100-150 yuan a month, he said. That was double the average wage of a graduate secondary school teacher or the starting salary of a university lecturer. A lecturer required more education than a miner, and his work was more difficult and of greater value to society. So he should be paid more than a miner in accordance with the good socalist principle of "to each according to his work", he explained.

Top professors may earn up to 340 yuan a month, however, the same as Chairman Hua himself—another token of the high status accorded to academics. There is no income tax in China, so gross and take-home pay are the same. The difference in real salary levels in China is much greater than in Britain.

The social and economic gulf between the intellectual and the worker or peasant is exacerbated by the huge disparity in educational opportunities in the country, where 80 per cent of the population lives, and in the towns.

Ten years of schooling is usually provided in urban areas, while in the rural areas five years is the norm, and even that is not yet universal. Very few children in rural areas ever reach university.

China has so far shied away from the creation of elite academic schools on the Russian model. Boarding schools are provided only for children gifted in the arts, music, dance and sport; the academic key schools have to select pupils from those who live within travelling distance. There are no highly selective specialist schools in mathematics or the sciences as in Russia though there are a few foreign language schools.

Within key schools, cooperation rather than competition is stressed. Children are awarded marks for the frequent tests they are given, but their rank order is not normally paraded in public. Bright children are deliberately placed with slower learners for working in small groups. Pupils are not "streamed" or otherwise separated into classes according to their ability.

Nevertheless, China does appear to be fostering an "elitist" education system which, it would seem, must lead to the creation of a new intellectual elite. How does this square with socialist egalitarian principles? And is there not a danger that present policies could lead to conditions similar to those which helped to spark off the Cultural Revolution?

Professor Ni explained that China needed its intellectuals to help to build socialism. "We recognize the danger of a split between intellectuals and workers, but we feel that the split is one of attitude, and not one arising from a physical separation. So long as intellectuals have the right attitude and are working to build up socialism, that is all right", he said.

Mr Jiang Nanxiang, the Minister of Education, in an interview with British education correspondents in Peking earlier this month, denied that China was creating an elitist education system. The decision to establish key schools and universities arose out of a study of the economic realities in China, he said.

The 11 years of the Cultural Revolution had taken a heavy toll in education. Buildings, books and equipment had been destroyed; teachers had not been trained; academics had had to abandon their studies and research. China was a long way behind developed nations, and was anxious to catch up. Yet resources were severely restricted.

That was why the Government decided to concentrate the available resources on a small percentage of schools, so as to run at least those well. But key schools were not intended to be a permanent feature of the Chinese education system, he claimed. The Government intended to raise every school to the level of a key school. It would, however, be a long process.

Diana Geddes
Education Correspondent

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for International Economic Cooperation"

English Name/Chinese Name	Activities	Comments
Documentation Centre of the Chinese Mechanical Engineering Society/ 中国机械工程学会资料中心	Collect, lend, search, copy, and print books and materials concerned with mechanical engineering; train information workers (approx. 3000) from mechanical engineering institutes and enterprises nationwide in the application of computers in the information field; edit and publish mechanical engineering abstracts and indices	Site of large-scale minicomputer
Scientific and Technical Information Institute, Ministry of Communication/ 交通部科学技术情报所	Collect and research documents concerned with the economics and management of traffic and transportation, highway and bridge engineering, road construction, truck repair and service, and traffic engineering	Previous UNDP documents referred to this user as the Ministry of Transportation for ease of understanding
Information Institute, Ministry of Geology/ 地质部情报所	Management and information retrieval of books and materials concerned with geological resources	Formerly called the State Bureau of Geology
Information Institute, Ministry of Water Conservancy and Power/ 水利电力部情报所	Collect, analyze, and retrieve documents and materials concerned with water conservancy, power production, power facility construction and management	Ministry has recently been divided into two parts; therefore, the name of the institute will be soon changed and it will also be divided

English Name/Chinese Name	Activities	Comments
Production Management Bureau, First Ministry of Machine Building/ 第一机械工业部生产管理局	Responsible for the production, organization, distribution, and the technical and economic analysis of civilian machinery products for China; main products include: mineral mining installations, metallurgic facilities, power generating devices, automobiles, machine	Applications are limited to technical and economic analysis and statistical analysis
Ministry of Electric Power/ 电力工业部		Formerly part of the Ministry of Water Conservancy and Power
a. Beijing Electric Administration Bureau/ 北京电业管理局	Responsible for the sale, management, generation, operation, and dispatch of power in the Beijing district network	
b. Computer Application Department of the Electric Power Research Institute/ 电力科学研究院计算机应用研究所	Power system calculations and data processing	
c. Central Bureau of Electric Power Construction / 电力建设总局	Planning, design, and construction of power stations, hydropower station, and transmission-distribution engineering	
Ministry for Economic Relations with Foreign Countries / 对外经济联络部	Responsible for the provision of economic and technical assistance to other developing countries; develops economic and technical cooperation programs with foreign countries and United Nations' agencies	Site of large-scale minicomputer

English Name/Chinese Name	Activities	Comments
Storage Centre of Geological Documents, Ministry of Geology/ 地质部地质资料馆	Collect, store, search, and print geological documents and maps; analysis and simulation of the geological evaluation process; plot geological maps; analysis and correlation of stratigraphy	Formerly called State Bureau of Geology
Ministry of Commerce / 商业部	Responsible for the management of supply, transportation, allocation, storage, financial, and statistical analysis of domestic goods (e.g., canned food, clothes, household and domestic products) in daily use, on a nationwide basis	
Beijing Municipal Bureau of Food/ 北京市粮食局	Responsible for the distribution and supply of food and edible oils in the Beijing district; including purchase, sale, transfer, storage, and processing activities	
Beijing Municipal First Bureau of Commerce/ 北京市第一商业局	Responsible for the wholesale and retail of domestic goods in the Beijing district	
Beijing Municipal Capital Construction Commission/ 北京市基本建设委员会	Responsible for the planning and supervision of construction in the Beijing district including homes and buildings, water supply, waste disposal, gas supply, district heating, and the maintenance and construction of roads	

English Name/Chinese Name	Activities	Comments
Beijing Municipal Bureau of Transportation/ 北京市交通管理局	Scheduling and dispatch of bulk carriers in the Beijing district; transportation dispatch of long distance passenger vehicles; management of truck spare parts	
Beijing Municipal Bureau of Statistics/ 北京市统计局	Analysis and collection of information statistics of all departments of the national economy in the Beijing district; includes such areas as agriculture, capital construction, industry, commercial sales, and transportation	
Beijing Municipal Bureau of Health/ 北京市卫生局	Responsible for hospital management, medical treatment, health care, medical teaching, and research in the Beijing district	
Chinese People's University/ 中国人民大学	Primary orientation in the economic information management area is mathematics, programming, economics, management, accounting, statistics, and planning; graduates to be employed by the State Planning Commission, large enterprises, and ministries of agriculture, machine building, and textiles; faculty in the economic information management department now total 60 with 90 students; plan to add 50 students per year to 1982 and then 200 new each year	Site of a medium-scale minicomputer to be used by the Economic Information Management Department

English Name/Chinese Name	Activities	Comments
Beijing Institute of Computing Technology/ 北京计算技术学院	New 4-year institute is directly responsible for educating students to work on the staff of end-users involved in UNDP project; students are to be educated in computer sciences, software engineering, and computer technology; present enrollment is 506 and staff totals 92; peak year will be 1983 when enrollment will level off to 400 new students per year with 400 teacher faculty	Site of a medium-scale minicomputer; new address, Institute campus presently under construction
Beijing Municipal Computing Centre/ 北京市计算中心	Provides computing for enterprises in the Beijing district (e.g., wage calculations, weather forecasting, data analysis)	Use will be limited to training and research
Chinese Academy of Social Sciences, Institute of Industrial Economics/ 中国社会科学院工业经济研究所	Nationwide responsibility for work in industrial economics; research includes correlation analysis among industrial sectors and assessment of policies for development; performs evaluations of effects of industrial investments, demand versus industrial output, energy conservation proposals, and feasibility studies of industrial construction; provides consultant services in industrial economics; performs financial analysis and management for industrial enterprises	Will share large-scale minicomputer at the Documentation Centre of the Chinese Mechanical Engineering Society as well as be a user of the mainframe system

English Name/Chinese Name	Activities	Comments
Chinese Academy of Medical Sciences/ 中国医学科学院 Beijing Medical College/ 北京医学院 Beijing Hospital/ 北京医院 Academy of Traditional Chinese Medicine/ 中医研究院 Beijing College of Traditional Chinese Medicine/ 北京中医学院	These medical organizations are involved in the retrieval of medical information, hospital management, fundamental research, and training	
Institute of Information on Chemical Engineering Science and Technology, Ministry of Chemical Engineering/ 化学工业部化工科学技术情报研究所	Responsible for information retrieval, management of the chemical engineering library, publication of indices, and the translation of abstracts to Chinese	
Office of Environment Protection Leading Group of State Council [illegible]	Involved in information retrieval of environmental data bases and impact assessments	Acts as focal point in China for the UNEP Infoterra program

SEP 2 1 1

APPROVAL OF UNDP ASSISTANCE TO A PROJECT OF THE GOVERNMENT OF THE PEOPLE'S REPUBLIC OF CHINA

Information Processing and Training Centre for International Economic Co-operation (CPR/79/002)

Report of the Administrator*

Date of present approval:	August 1979
Starting date of project activities:	March 1979 (including previous assistance)
Planned completion date:	February 1984
To be executed by:	United Nations Development Programme
Government implementing agency:	Ministry for Economic Relations with Foreign Countries
Estimated cost of assistance planned under present approval:	$6 068 000
Source of UNDP financing:	Indicative Planning Figure (IPF)

I. Background

1. The Chinese Government as a matter of established policy conducts economic co-operative programmes with foreign countries proceeding from the principle of equality and mutual benefit and making up for each other's needs, and carries out projects in accordance with priorities agreed upon with the other parties concerned. Once undertaken, a mechanism should be established for monitoring continually the status and evaluating the progress of implemented projects. At present, the Government urgently needs to develop a capacity to evaluate and manage effectively a large number of complex domestic and international projects which involve numerous and diverse components. The effective and efficient way by which these projects could be controlled to ensure the optimal use of available resources is through the utilization of a management information system maintained on a modern computer system. Also there is a need to assess large amounts of economic and technological

*In accordance with General Assembly resolution 2688 (XXV) and subsequent authorizations of the UNDP Governing Council, reports are issued seriatim on the approval of UNDP assistance of $250,000 or more (including, if any, assistance financed by Government or by third-party cost sharing).

information which is normally available through computerized data bases. Such data bases include statistical information and references to the key literature in areas including agriculture, energy, industry, engineering, education, transportation, medicine and communications. The use of such informational resources will expedite the transfer of knowledge to China, and also facilitate the rapid dissemination of technological information which should be of potential value and use to other countries.

2. At present, a computer system of the scale necessary to process and analyse the magnitude of information to be maintained does not exist in China. Basic infrastructure in the fields of information processing, computer science, and mathematical modeling needs to be developed nationally through the use of such a modern computer system. It is for this reason that the Government requested UNDP assistance which was approved under the present project.

II. Objectives and activities

3. The immediate objectives of the project are to: (a) initiate a multifaceted training programme in the areas of information processing, computer science and mathematical modelling; (b) establish the Centre for the operation of the information processing system to be acquired; (c) specify, acquire, install and start up a computer system and related equipment; (d) acquire information and data bases and search programme and begin servicing users; and (e) initiate and conduct detailed systems analyses for various application areas and user organizations. To this end, the project will undertake the following activities: (a) surveys of information and data needs of potential users of the computer system; (b) construction of/building for the computer centre and acquisition and installation of a computer system; (c) identification of training needs and placement of trainees and fellows; (d) specification of information and data bases; (e) acquisition of economic and technological data bases; and (f) formulation of an economic and technology information transfer system.

III. Inputs

4. UNDP will provide for the services of experts for seminars and lectures; subcontract technical advisory services; fellowships in information processing, computer science and mathematical modelling; provision of information/data bases and relevant information resources; and the computer system and related equipment.

5. To carry out the activities for which assistance is now approved, the Government will provide adequate manpower for training, and a building and ancillary sites to house the proposed computer system.

IV. Financial Data

6. The expenditure components of the planned assistance are as follows:

	$
Personnel	200 000
Subcontracts	4 888 000
Training	380 000
Equipment	580 000
Miscellaneous	20 000
Total	6 068 000

7. The estimated total value, expressed in US dollars, of inputs provided directly by the Government to the project is $1 587 100 in kind.

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Une expérience de formation aux systèmes conversationnels en Chine

CADRE DU COURS

Un accord général de coopération scientifique et technique franco-chinois ayant été signé à Pékin en janvier 1978, une mission française, conduite par le président du BNIST, rencontrait en janvier 1979, les responsables de l'Institut d'Information Scientifique et Technique de Chine (ISTIC*) à Pékin, et signait avec eux un accord sectoriel de coopération en matière d'information scientifique et technique dans lequel la formation tenait une place importante.

Des négociations étant déjà en cours entre l'ISTIC et le Programme Général d'Information (PGI) de l'UNESCO en vue d'organiser en Chine, un cours d'été de quatre semaines destiné à initier des spécialistes de l'information aux techniques de l'information automatisée, il fut décidé de conjuguer les efforts de l'UNESCO, de l'ISTIC et du BNIST** pour organiser le cours projeté.

Ce cours a été axé sur le thème : **L'Automatisation de l'information et l'accès en conversationnel.** Il s'est tenu à Pékin du 3 au 28 septembre 1979.

PARTICIPANTS

Quarante participants (29 hommes et 11 femmes) avaient été sévèrement sélectionnés par les soins de l'ISTIC. De formation scientifique et universitaire (mathématique, physique, informatique, télécommunications...), tous avaient eu une expérience pratique en matière de traitement de l'information, mais leurs niveaux et leurs compétences étaient très différents : technicien, chercheur, professeur d'université, ainsi que leur âge (de 24 à 60 ans).

Trente organismes étaient représentés, instituts d'information scientifique et technique pour la plupart, unités de recherches, bibliothèques, universités, localisés à Pékin, Shanghai, Nankin, Wu-Han, etc.

PROGRAMME

Le programme des cours a été ordonné en trois parties.

Première semaine :

— aspects théoriques de l'information scientifique et technique automatisée ;

— étude des technologies nouvelles ;

— impact des systèmes conversationnels :
- sur les utilisateurs,
- sur la société,
- sur les professions de l'information,
- sur l'organisation de l'information aux niveaux national et international.

Deuxième et troisième semaines :

— étude des caractéristiques de la documentation automatisée ;

— possibilités et contraintes pour l'indexation, la recherche et la diffusion sélective de l'information ;

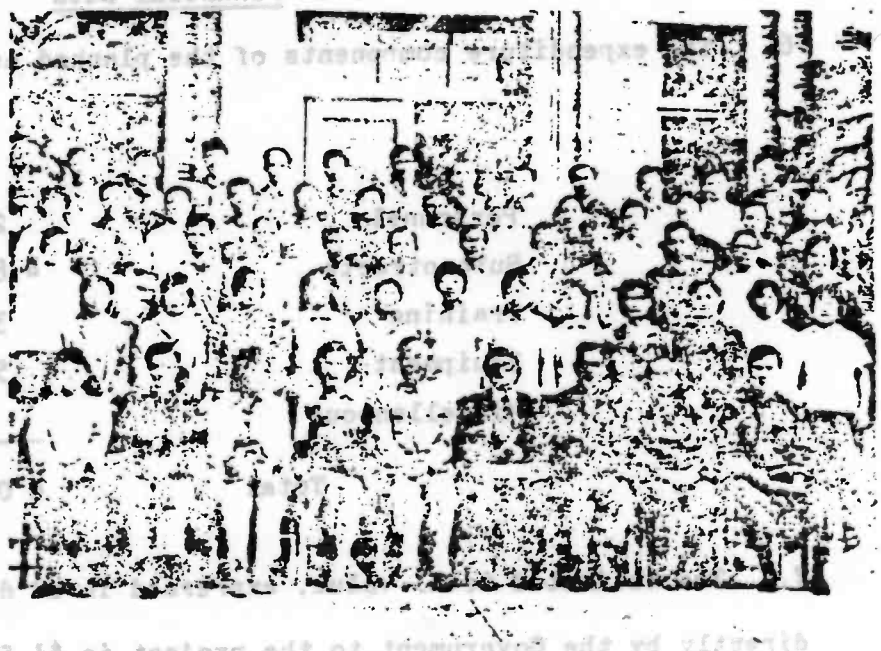
— la recherche et la diffusion sélective de l'information ;

— travaux pratiques de construction d'un thésaurus, mise au point de stratégies de recherches, conditions d'organisation d'un service de DSI au niveau national.

INTERROGATION EN LIGNE

Dès la deuxième semaine du cours, une liaison téléphonique directe a été établie entre Pékin et Valbonne où est implanté le serveur national d'information scientifique et technique QUESTEL. La liaison en direct n'était pas la première réalisée dans ces conditions : en effet, en juillet 1979, les PTT français avaient fait fonctionner entre la Chine et la France, une liaison téléphonique expérimentale pour présenter les possibilités du réseau de transmission de données Transpac.

Ce qui a particulièrement intéressé les spécialistes chinois de l'information réunis pendant ce cours, c'est de pouvoir interroger eux-mêmes, en conversationnel, sous la conduite d'experts français, les bases de données disponibles sur Questel à l'aide du logiciel documentaire MISTRAL et de son langage d'interrogation bilingue, français-anglais.



Les participants à la session de formation aux systèmes conversationnels organisée à Pékin du 3 au 28 septembre 1979 par l'UNESCO, l'ISTIC et le BNIST.

Au premier plan, de part et d'autre du directeur de l'ISTIC : Mmes Moureau (IFF) et Rozenstroch (BNIST) et M. Dutheuil (CNIC).

Quatrième semaine

— problèmes spécifiques à la création, au développement et au fonctionnement des banques de données avec application à la chimie.

Les stagiaires se sont également familiarisés avec d'autres logiciels donnant accès à des serveurs étrangers grâce à des interrogations préenregistrées sur cassettes qu'ils ont pu manipuler à leur aise sur un matériel

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* ISTIC : Institute of Scientific and Technical Information of China.

** Le BNIST (Bureau National de l'Information Scientifique et Technique) est remplacé depuis le 19 septembre 1979, par la Mission Interministérielle de l'Information Scientifique et Technique (MIDIST).

d'utilisation très aisée développé par la firme SECAPA à Lyon.

Pour l'interrogation des banques de données chimiques, un terminal graphique avait été acheminé sur place.

ENSEIGNEMENT

Chaque semaine, les cours ont été assurés par deux enseignants, théoriciens et praticiens de l'information, ayant, de plus, une grande expérience de l'enseignement. Leurs interventions se complétaient et s'éclairaient les unes par les autres et la méthode s'est révélée très enrichissante pour tous.

RESULTAT

Le succès du cours est dû initialement à la très bonne coopération entre le Service formation du Programme Général d'Information de l'UNESCO, le BNIST et l'ISTIC. Avec la participation de tous les organismes concernés, ils ont réussi à mettre sur pied en quelques mois une action multilatérale qui exige en général une préparation beaucoup plus longue.

Sur le plan technique, la réussite a été totale : il faut noter que pour la première fois un terminal situé à Pékin, a été branché sur un ordinateur localisé en Europe pour interroger en conversationnel des bases de données scientifiques et techniques.

Pour la première fois également, des contacts inter-associations ont été noués entre l'ADBS et l'Association Nationale Chinoise qui regroupe les spécialistes de l'information, par l'intermédiaire de Mme MOUREAU, chargée à l'ADBS des relations internationales, qui a assuré une partie de l'enseignement.

Ce cours a fourni aux organisateurs chinois de l'ISTIC et aux stagiaires, l'occasion de faire le point des problèmes posés par l'automatisation de l'information. Mais ces problèmes sont eux-mêmes liés à des options tout à fait fondamentales et encore fluctuantes en matière de constitution de réseaux nationaux d'information scientifique et technique et de choix de systèmes à développer.

L'ISTIC qui relève de la Commission d'Etat pour la Science et la Technologie, organisme interministériel, est particulièrement concerné par ces choix. En effet, cet Institut doit assurer une tâche de coordination de l'information scientifique et technique à l'échelle nationale. Pour réaliser sa mission, il considère que la formation des cadres est une nécessité prioritaire et a démontré, à l'occasion de la tenue de ce cours, l'importance extrême qu'il y attache.

C. ROZENSZTROCH
MIDIST

China and its Research Libraries

One of the significant recent events in world science has been the People's Republic of China's new drive towards modernisation. China has decided to cast aside ideology and political discord, instituted by the Cultural Revolution and the 'Gang of Four' during the decade 1966–1976, and to give top priority to the development of science, technology and science education.

The cultural policies of the past ten years produced a hiatus in education at all levels and in basic scientific research. Intellectuals and scientists were treated as "enemies of the people" and for decades the Chinese have been taught that it is unjust to have a small intellectual elite. As a result the Chinese now estimate that they are 20 years behind the scientific capabilities of the advanced nations, but claim that by the year 2000 they intend to achieve comparable world standards in science.

China has outlined four areas, known as the 'Four Modernisations', as objectives for immediate advancement:

i Advancement of ***Science and Technology***
ii Mechanisation of ***Agriculture***
iii Advancement of ***Industry***
iv Building of a strong ***National Defence***

To achieve such a renaissance, China has adopted a National eight-year Science Development Plan which encompasses 108 "key" projects in 27 spheres of which the following scientific and technological areas are to receive top priority

Agricultures
Energy resources
Space science and technology
Materials
Lasers
Electronic components and computers
High-energy physics
Genetic engineering

To lay a solid foundation for this, China has adopted a 12-point national programme to reconstruct and develop all the basic branches of science and technology. Research strengths will be built up by a force of 800,000 research workers in existing and newly established research institutes. The most relevant points from this programme are:

- the re-establishment of the State Commission for Science and Technology to take charge of science policy and to give greater recognition for academic merit
- to increase greatly state funding for research and science education
- the promotion of greater international scientific cooperation and exchange of information
- that scientists should be encouraged to spend five-sixths of their working time on STI (scientific and technological information) and research, instead of on political issues as hitherto.
- to compile new science and education textbooks to replace dated works.

China has strongly emphasised the rehabilitation of intellect which implies the reconstruction of their education system. Higher education in particular is to get special attention. In a population of almost one thousand million, there are fewer than half a million students above secondary school level in the 400 institutes. With the establishment of new colleges and universities, new curriculae, increased graduate training, there is need for new education materials and books. However, to put these aims in context: the present hope is that there will be 1,000 graduate students annualiy in all disciplines by 1979.

In the acquisition of STI, the Chinese authorities are showing an enthusiasm generated by ten years of denied access to world literature and research

publications. In China today there is a much-reported spirit of reverence for science. However, the research library systems are inadequate to cope with the overwhelming demand for such information: to organise and document all the data currently being obtained will require a radical change in existing library management.

For a population of almost 1,000 million there are only 30 general libraries, and although most institutions and universities seem to have extensive libraries, their collections have suffered during past political upheavals.

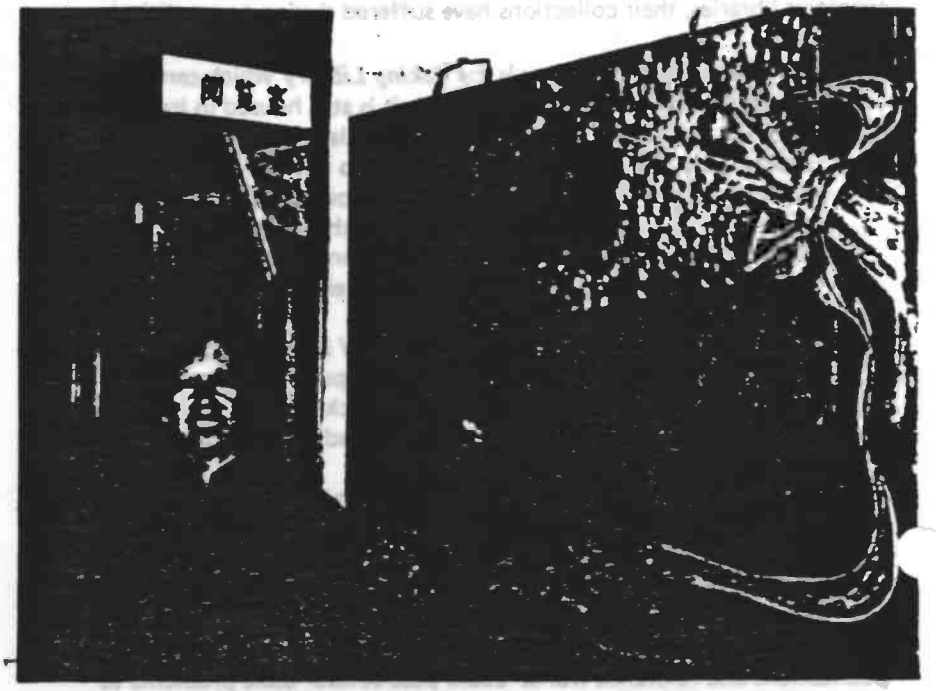
- The largest national library is the ***Peking Library*** which can be considered the National Library. Though it is still housed in its 1931 buildings, it is hoped that its relocation to larger premises will be completed by 1983. This is essential due to the fact that its book stock has increased from 1.4m in 1949 to over 9.5m in 1978. English, Japanese, Russian and Arabic are the predominant languages and of the 10,000 periodicals which the library receives, 8,000 are in English. It is, however, a deposit and reference library providing no public lending services.
- China's second largest library, the ***Shanghai Library***, made up of a collection of smaller libraries, is more of a public library, though access is restricted to ticketholders. Its stock of 6.5m books has a broader subject coverage than Peking, including social sciences and politics as well as science and technology.
- Many of the 70 or so research institutes run by the ***Chinese Academy of Sciences*** were badly affected during the decade of neglect and consequently their affiliated libraries.

With the strong emphasis on research, the establishment of new research institutes and academic facilities, the demand for backup STI will inevitably increase. However, the acquisition and use of foreign scientific and technical publications and reference works could pose several basic problems to Chinese libraries. There are problems relating to copyright and payment, as well as translation and reproduction. As China has no copyright tradition, these matters will have to be clarified. Overtures concerning the copyright issue are currently being made by various foreign publishing companies.

It is apparent that the full potential of scientific and technical developments in China has not yet been achieved and this offers considerable scope for developments in the area of research libraries. It is assumed in the current climate of change that Chinese authorities may wish to benefit from the experiences of other research librarians in the Western World in building up their library infrastructure and systems from the present low base.

CAB visit to China

In March a visit to the People's Republic of China was made to establish contact with organisations responsible for information services. The delegation comprised Dr J. R. Metcalfe (Editorial Director, CAB), Mr E. J. Mann (Director, CBDST, Joint Managing Director, IFIS) and Dr U. Schützsack (Joint Managing Director, IFIS). Their main aims were to improve CAB/IFIS coverage of Chinese literature, to assess the potential for CAB/IFIS services in China and to explore the possibility of collaboration between CAB/IFIS and Chinese information services. The visit lasted five days (23-28 March) and during that time useful discussions were held with staff of the Chinese Academy of Agricultural Sciences (CAAS), the Institute of Scientific & Technical Information of China (ISTIC), and the China National Publications Import Corporation. In addition, there was a meeting with the Head of the Scientific Technology Bureau of the Ministry of Agriculture. The main contact was the Scientific & Technical Institute of the CAAS, which is the national centre for agricultural information; they agreed to discuss with their colleagues the practicalities of scanning/abstracting/translating material for CAB, and were very interested in the potential for exchange visits with CAB, having the use of CAB tapes and filling broken runs of CAB journals in the CAAS library. A tape carrying CAB data has been sent to them for test purposes. At ISTIC, where the main emphasis is on industry, interest was expressed in receiving both IFIS and CAB test tapes. The potential for the future distribution of CAB books and journals in China was discussed at the China National Publications Import Corporation.



Miss Shin Zhen-yi, Deputy Director, Office of Library, CAAS

Information Services in China

During the recent CAB visit to the People's Republic of China, contact was made with two important information services: the CAAS, and its Scientific & Technical Information Institute, and the Institute of Scientific and Technical Information of China (ISTIC).

The CAAS, in Peking, is the national centre for agricultural research; two sections, the Library and the Scientific & Technical Information Institute, are concerned broadly with agricultural information. The CAAS is a government organisation on the same level as the Ministry of Agriculture and the Chinese Academy of Sciences; funds are allocated by the Planning Commission for Science & Technology.

Established in 1957, the library, with a staff of 35, serves research scientists and teachers throughout China. Its holdings comprise 300 000 books and 1500 journals (700 English, 200 Russian, 200 Japanese, 100 German, 100 Chinese, 70 French). The aim is to have a comprehensive collection of Chinese and a selection of foreign material; almost all CAB journals are taken, as are *Chemical Abstracts, Biological Abstracts,* AGRINDEX and other secondary services. An accessions list (book titles and journal contents) is published monthly; users may borrow books by post and a photocopy service for journal articles (for which payment is required) has recently been started. The library works closely with the 60 agricultural libraries located in the Chinese provinces and also with those of the International Maize & Wheat Improvement Center (Mexico).

Established in the late 1950s, the Institute is the national centre for agricultural information. Although government funded, its publications are charged for. Services expanded up to 1966; work ceased during the Cultural Revolution (i.e. until 1976) and is only now approaching 1966 levels. With its staff of 141 (including 40 translators) the Institute functions as an information analysis centre, collating and consolidating information from many sources and disseminating it to scientists, teachers, policy makers etc., throughout China. This is done in the following ways:

Abstracts (in Chinese) are prepared from Chinese and foreign literature in five areas (plant pathology, animal health, pesticides, animal husbandry, agronomy) and published in abstract journals; the total number of records pre-1966 was 20 000 per year, but is currently still below that level. The journals on plant pathology contained many (ca 50%) acknowledged translations of abstracts originally published in *Review of Plant Pathology*. Circulation of journals 5000-10 000, price £1-£2/year. The *Agricultural Science Index*, formerly containing 50 000 citations per year, has not been restarted since the Cultural Revolution. The possibility of Chinese participation in AGRIS is being considered. The *Agricultural Research Newsletter* (in Chinese) contains about 40 digests on a range of agricultural topics, written for the non-specialist. It has a circulation of 400 000 (5p/copy). Short reviews are

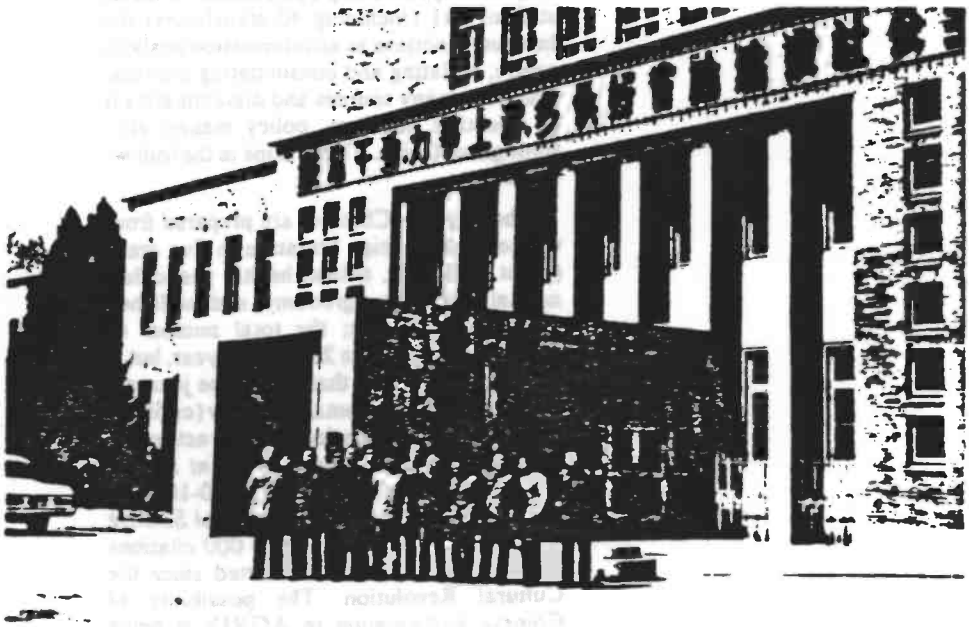
included in the abstract journals, but large reviews are published separately on topics such as 'Statistical data on animal husbandry in foreign countries', 'The management and organisation of agricultural research in foreign countries', 'Levels of agricultural production in foreign countries'. Such reviews take ½-1 year to compile, and their circulation is 5000-10 000 within China. A primary scientific journal (*Scientia Agricultura Sinica*), (in Chinese) was launched recently (CAB is now on the mailing list) and its circulation is said to be 60 000.

ISTIC was founded in 1956; it has branches in Peking and Chungking and its present Director is Mr Lin Zhi Shin.

The main functions of ISTIC are (a) to collect Chinese and foreign literature (including about 7000 foreign journals, patents, standards from 50 countries, industrial brochures and catalogues etc.); (b) to process and catalogue the literature; (c) to review and analyse trends. The main emphasis is on industry while agriculture is left to CAAS. Reading rooms are visited by 400-500 persons from all parts of China each day. A photocopy service is available and 3000-4000 pages are copied daily. While the Peking branch (1200 staff) is mainly concerned with indexing of literature, the Chungking branch (500 staff) does abstracting as well.

The Institute has established good contacts with West Germany (*Gesellschaft für Information and Dokumentationswesen*), and the UK (British Library).

A computer facility was introduced in 1978. The computer is the Japanese TK 70, with a total storage capacity of 12.5 megabytes on disk. Tapes are 9 track and density is 800 b.p.i. Peripheral equipment includes card punches and paper and magnetic tape input. A keyboarding unit, key-tape holding 3072 Chinese characters, is available, and work is in progress to convert these into English characters via an intermediary code. The facility is being used only for experimental purposes.



Mr Kung Shi-tung (Deputy Director, CAAS), Mr Wang Shen-fu (Deputy Director, STII) together with other members of the STII staff

INTERNATIONAL CONFERENCE OF DIRECTORS OF NATIONAL LIBRARIES ON RESOURCE SHARING IN ASIA AND OCEANIA, CANBERRA, 1979

(1) Towards a Wider Library Resource Sharing

DING ZHI GANG *

The Director of our library, Mr Liu Ji Ping, was honoured to receive the invitation extended by Dr Chandler, the Director-General of the National Library of Australia, to participate as one of the co-sponsors in the International Conference of Directors of National Libraries on Resource Sharing in Asia and Oceania. Unfortunately, as his state of health is not good, he is unable to attend, and I have been entrusted with the job of replacing him. I am the deputy director of the library. Please allow me, first of all, in the name of the National Library of Peking, to wish the Conference great success, and to convey to our colleagues good wishes and warm greetings. Also, I would like to take this opportunity to express my respect and sincere gratitude to the whole staff of the Australian National Library as well as all who have undertaken the heavy task of preparation and convocation of this Conference.

This is the first time that the National Library of Peking has attended an international conference of national library directors. It is a great pleasure to be able to get together with librarians of Asia and Oceania to exchange recent developments and views on common problems of immediate concern. Through frank discussion and consultation, I believe the Conference is bound to be helpful and fruitful.

I should like to present now our views and ways with regard to the universal availability and interflow of library resource.

As is well known to all, with the rapid progress of science and technology, the number and forms of world publications have greatly proliferated, especially in the last two decades. Current scientific

* Deputy Director, National Library of Peking, China.

literature is not only diverse in type and stupendous in quantity, but the time needed for publishing has been shortened, and it can be estimated that the multiplying cycle for the issuing of scientific literature will be further shortened. In addition to the traditional forms of publications, various types of audio-visual materials have developed with far greater speed in recent years. It is our opinion that any type of library in the world would find it impossible to acquire all these materials in its own collection; therefore, library co-operation is indispensable in order to be able to comply with the different requests of users. Moreover, in view of the extremely speedy development of modern science and technology, it is absolutely necessary for every library to be aware of the experience and latest achievements of other countries, thus to promote the development of its own science and technology as well as productive forces.

For these and other reasons, those large public libraries and special libraries entrusted with the heavy task of providing readers with the latest materials, apart from improving their inter-library loan service, should take a number of wide-scale measures to improve and reinforce international co-operation in the area of exchange of publications and international lending service. Only in this way can national libraries satisfy most of the urgent needs of their users.

In recent years, major types of libraries in the world have made remarkable progress, accumulated valuable experiences and created many efficient and effective forms in respect to universal availability and interflow of publications. In addition to traditional methods such as international exchange, inter-library borrowing and lending, photoreproduction, new acquisition display, etc., they have pushed forward the dissemination of information and exchange of materials by adopting some new techniques and setting up new facilities, for instance: (1) the electronic means of speedy and precise signal storing, data processing and literature retrieval has made the computer a most powerful tool for dissemination of information; so, nowadays, computers are being used extensively by libraries in many countries to fulfil their daily routines; (2) the use of communication satellites and cable television has made it possible not only to search through the information stored in the data bases within their own countries, but also providing access to large data centres all over the world, thus breaking through the barriers between libraries and boundaries between countries and establishing a world-wide network of information services; (3) the constant improvement and development of techniques in microfilming and photocopying has greatly raised the output rate and efficiency of reproduction, and at the same time tremendously lowered

the cost of photo-duplicates. This obviously has made it possible to disseminate library resource in large quantities; (4) the rapid development of audio-visual materials has been an innovation in library services greatly raising their efficiency as well as the speed of availability of library materials.

In the sphere of international library lending service, many national libraries, in line with the principle of resource sharing and more collaboration between libraries and information organs, have spared no pains in the acquisition and bibliographical control of their own collections as well as in the provision of every convenience for the speedy fulfilment of what is required by their foreign counterparts. They are not only able to fill the gaps of their stocks through international exchange but also to meet their domestic needs through international loan services.

Facts have proved time and again that the practice of "each supplies what the other needs" has contributed much to international resource sharing and exchange of publications. It promotes scientific and technical developments in the respective countries and at the same time improves mutual understanding and friendship among the peoples of the world.

But we ought to see on the other hand that because of differences in national and library conditions, differences in the tasks set, the level of development of resource sharing achieved by different national libraries will necessarily be uneven. There are still many urgent issues that remain to be settled, and it is only through sincere co-operation and patient consultation among us that they can be solved step by step.

With regard to the universal availability and interflow of publications, the National Library of Peking has for a long time placed special emphasis on the following library activities:

1. *International exchange of publications*

Since the founding of the People's Republic of China in 1949 up to the year 1978, the Library has entered into exchange and gift arrangements with over 1700 libraries, scientific institutions and learned societies in 120 countries and localities. Through international exchange, the Library receives every year a large number of publications from abroad, and reciprocates by sending Chinese publications on the basis of equity and mutual benefit. The publications received in 1978 from its exchange partners amounted to 54 785 copies, during the same year, a total number of 111 575 copies were offered. The Library has gradually established exchange relationships with various types of

libraries and societies in most countries of Asia and Oceania, of which, Japan, Australia, New Zealand, India, the Philippines, Singapore, Sri Lanka, Thailand and Papua New Guinea have maintained close ties with the Library. Evidently this not only enriches the collections of libraries and institutions concerned, but also promotes the cultural interflow as well as mutual understanding and friendship among nations. I'm certain that the exchange of publications between our Library and other libraries in the world will surely be strengthened and extended in the years to come.

2. *International Lending Services*

Apart from paying particular attention to the domestic inter-library loan service, the Library has entered into international lending agreements with national libraries and university libraries in 23 countries since the beginning of 1956. Among these countries, Great Britain, Australia, Canada, Finland, Denmark and the Federal Republic of Germany have become the main inter-library lending partners of our Library.

The Chinese people, under the leadership of the Chinese Communist Party, have started again a new long march. They are determined to transfer China into a powerful socialist country with modern agriculture, industry, national defence and science and technology by the end of the century. The people of all nationalities in our country, united as one and with a common purpose, are striving against every difficulty on the road forward to bring about the four modernizations in China.

Following the rapid development of socialist revolution and construction, the libraries in our country have shouldered increasingly heavy loads. There goes a Chinese popular saying: "Food and fodder should go before troops and horses", implying that proper preparations should be made in advance. A variety of library resources are playing an important role in the march towards the realization of the four modernizations in China. Our Party Central Committee and government have attached great concern to the development of library activities, and a plan for setting up a large-scale library with modern facilities is now being prepared. We shall work still harder to make our contribution in turning China into a modern, powerful socialist country by the end of the century, and we shall do everything we can to promote the universal availability and interflow of publications in the future. Before I conclude my speech, I would like to thank once again the Conference organizers for the opportunity to meet together and lay a foundation for further co-operation.

Libraries in the People's Republic of China: A Report of a Visit, June 1976

D. T. Richnell and Howard Nelson

The state of development and the organization of the public and university library service of the People's Republic of China, as seen in June 1976 by a party of British librarians, are described. Particular emphasis is laid on the fact that libraries are not treated as in any way separate from the rest of socialist Chinese society; on the educational and political activities of librarians; and on the efforts which have been made since about 1973 to extend the library service to the grass-roots level. Access to the libraries, the amount of publication, and the tools of bibliographic control are considered, as is the training of librarians. Finally, some of the major libraries are described in more detail, and an impression of the libraries' conservation work is given.

Descriptive accounts of the organization, administration and operation of libraries in foreign countries made by British librarians on the basis of short visits following a pre-arranged itinerary are at present out of fashion. Whether this is right or wrong, it is considered that the present attempt to give some idea of the state of development of libraries in the People's Republic of China in June 1976 is justified, in view of the relatively scant information on the subject in British library literature (but see the list of References) and the particular circumstances of the visit made by the delegation, of which the authors of this article were "leader" and "secretary". The circumstances were succinctly described in a news item from the English-language version of the Hsinhua News Agency's News Bulletin, Friday, 11 June 1976:

D. T. RICHNELL

Director General, British Library Reference Division since 1974. Previously Deputy Librarian, University of London Library; Librarian, University of Reading; Director and Goldsmiths' Librarian, University of London. President of Library Association, 1970. Formerly Hon. Secretary of Aslib.

HOWARD NELSON

Assistant Keeper with responsibility for the collection of Chinese manuscripts and printed books in the British Library's Reference Division. A graduate in Chinese from Cambridge, he has a London M.A. in Social Anthropology, and has done a period of fieldwork in a village in the New Territories of Hong Kong.

Peking, June 9, 1976. Wang Yeh-chiu, Director of the State Administrative Bureau of Museums and Archaeological Data, met and fêted all members of the British Libraries Delegation here this evening. They had a cordial and friendly conversation. The Delegation was led by D. T. Richnell, Director-General of the Reference Division of the British Library, and its members included E. B. Ceadel (Librarian, Cambridge University Library), H. G. H. Nelson (British Library), D. Arrandale (Leeds University Library), A. D. S. Roberts (Bodleian Library), W. H. Liu (Edinburgh University Library) and J. Lust (School of Oriental and African Studies Library, London University).

British Ambassador to China, E. Youde and his wife were present at the banquet. Present were leading members of the Peking Library (the National Library), the Library of Peking University and the Library under the Chinese Academy of Sciences.

The Delegation arrived here on June 7. It will visit southern China before going home (on June 27).

This news item gives some indication of the official nature of the visit, which had been arranged through the Great Britain-China Centre in Britain, and of the composition of the delegation. It does not, however, make clear that with the exception of the "leader" and the "deputy leader", Mr. Ceadel, a Japanologist, all the other members are responsible for the Chinese collections in their libraries and are familiar with some form of the Chinese language and with Chinese library materials. No members, however, were well-equipped to deal with Chinese libraries and information systems in science and technology—a report on the details of these must await a further suitably composed delegation. The itinerary followed was: Peking, Tsientsin and Paoti County, Sian (Shensi Province), Shanghai, Hangchow (Chekiang Province), Changsha (Hunan Province) and Canton (Kuangtung Province), and included visits to important archaeological sites and museums, as well as libraries of many different kinds at different levels.

Two further observations are necessary. The first is that the Chinese nation has had so different a history and recent development from that with which we are familiar in western Europe that to look at it with western eyes and report on it in western terms is fraught with difficulty, without a long excursus into the political and economic development of the country. We have, therefore, thought it best to report what we were told and shown by Chinese colleagues with only a minimum of personal interpretation, rather than attempting an evaluation by western standards, which can lead to perplexity and misunderstanding, without a much fuller study than we can attempt here. In particular, as was stressed to us in the course of our visit, libraries are not separate from the rest of society; they have to play their part in socialist construction, as do all other institutions. It is not very useful to see Chinese libraries in the context of their western counterparts, since by and large they have very different objectives. It is much more helpful to see them in terms of their own recent past, and in the context of Chinese society as a whole. That society, of course, is in constant change; all its

institutions are under continuous questioning. What is true of the library service now is only recently so, and no-one in China would pretend that no further changes are imminent.

The second point is that our discussions on library matters were conducted through interpreters. Without in any way impugning the quality of the interpretation, which was of a high order, it is difficult for us, even after careful cross-checking with our own and Chinese colleagues, to be certain that we are giving an accurate account of what we were told, particularly as much summary is necessary. The authors of this article, therefore, must accept entire responsibility for any mistakes—and for the emphases; our colleagues have not been consulted further.

When the British Libraries Delegation was mooted in 1975 it was readily accepted by the Chinese side. We believe that this was not without a special reason. The Great Proletarian Cultural Revolution, which began in 1966, had involved fundamental issues affecting the role of institutions of an educational, cultural, and research nature, and this included libraries of all kinds. A period of intensive discussion and re-examination ensued, and all our discussions led us to the conclusion that 1975 was an important year in the re-development of the library services of the country. It was, therefore, understandable that after a further two years this re-development should have reached the point where display and discussion with foreign colleagues might lead to a better understanding and the possibility of closer co-operation.

LIBRARY SERVICES AS A WHOLE

We were met on our arrival by Pao Cheng-ku, Deputy Director of the National Library, who visited Britain in 1973, and the first week of our stay was spent in Peking. In three long sessions at the National Library we had the most important exposition and discussions of our visit. At our first session discussion was led on the Chinese side by Director Liu Chi-p'ing, the Chairman of the Revolutionary Committee of the Library, who made an authoritative statement on the library services of the country as a whole.

Here a brief definition and explanation is desirable. Every important organization in China has been, since the Cultural Revolution, governed by a Revolutionary Committee. This Committee is selected after consultations with the mass organizations of workers, peasants and soldiers at the levels appropriate to the levels of the committees; with the personnel of the organization concerned; and with the Party. The Revolutionary Committee is the highest administrative body in each institution, but it is stressed that it works under the leadership of the Party. The local Party committee is elected by all Party members in the institution, and this is the body which is then responsible for laying down broad lines

of policy. The Revolutionary Committee interprets that policy in day-to-day administrative terms; and it is within this frame of reference that local initiative ("the positive factors") is exploited. The Chairman of the Revolutionary Committee, in the case of libraries, may or may not be one of the cadres (professional staff) of the library. If he or she is not, the professional librarians or scholars constituting the senior management are designated Deputy Directors, and are normally members of the Revolutionary Committee. The remainder of the Committee will be composed of representatives of the workers, peasants and soldiers, and other cadres of the library. Two important principles govern the composition of these committees: firstly the "three in one" principle, i.e. that there shall be a balance in the membership between the "older, the middle-aged and the young"; and secondly there shall be an adequate balance between men and women.

Director Liu Chi-p'ing gave a full introduction, which we will do our best to summarize. He said that there were three periods in the development of Chinese libraries. The first was a long period of "accumulating stocks" under feudalism. This we took to mean the formation and development of the great collections of manuscripts and printed books under the imperial dynasties, where the collections were made for the benefit of the emperors, the court and the officials, but were available only to a very limited and privileged minority.

The second was "the semi-feudal, semi-colonial period of libraries under western influence", which dated from the later part of the Ching dynasty (1840) and lasted up to the Liberation of 1949. Director Liu stated that there were some progressive and revolutionary elements in the second period, and he instanced particularly the years 1924–1927. Although he did not say so, our observations suggested that a progressive feature of this period was also the establishment from 1903 onwards of a number of Provincial Libraries in the provincial capitals, to serve the growing needs of the increasing number of the educated intelligentsia. These Provincial Librarirs, and their equivalents in some cities, have survived to the present and are a central feature in the library structure of the country.

The third period was that of "the library services in the period of socialist construction". Some of the influences of feudalism and capitalism had survived into the socialist period. The traces of revisionism are still present.

REVISIONISM

Since any discussion of Chinese libraries in June 1976, or indeed any other topic, is bound to introduce reference to "revisionism", it is necessary for us to offer some interpretation, however inadequate, of what this seemed to mean—at least so far as libraries are concerned.

Isabel Hilton, a British Council scholarship student at Peking and Shanghai

universities, writing of present higher education in the *Sunday Times Weekly Review* for 25 January 1976, says: "Before the Cultural Revolution students were recruited to university direct from middle school, with a heavy emphasis on proven academic ability. In China, where facilites vary enormously from the well-endowed urban areas to the remote rural regions, this helped emphasize the gap in opportunity between town and country. Within the cities it discriminated against the children of workers and encouraged those of cadres . . . The Chinese now regard the idea of inborn gifts as Confucian and reactionary." The policies resulting from the Cultural Revolution were designed to combat the ideas of Confucianism and to ensure both equality of opportunity to workers and peasants and that those achieving positions of influence in society shall keep constantly in touch with, and understand the needs of the workers, peasants and soldiers. Revisionism, therefore, in one aspect meant the adoption of policies leading to the development of a new élite, whether intellectual or any other, arising from a concentration on a high-level scientific and cultural development for a minority to the detriment of the development of the masses of the people. This is our interpretation of the significance of the "campaign to criticize Confucius and Lin Piao", who were taken to represent élitist policies in education. The point was repeatedly made to us that the great extension of library services at the grass-roots level, which began in 1973, was the direct result of this campaign.

A retired, but still very active, professor of English Literature in Tientsin, driving through the countryside with us pointed to a slogan across the road: "Communization before mechanization, not mechanization before communization." That, he said, was the heart of the struggle against revisionism. Not that the Chinese are against mechanization—on the contrary, they are constantly seeking it, but it had to be a mechanization subservient to the needs of the workers and peasants, and one which they understand. And they had to be self-reliant in the introduction of innovation. They had to learn from foreign technology, but they must not become reliant on imported foreign technology and influences, whether scientific, economic or cultural. Of course, there were many other facets to "the struggle against revisionism", but these are some that have had an important bearing on the present state of library development.

Director Liu said:

> The struggle against revisionism continues. The present library system is based on revolutionary principles developed in this struggle. Under the unified leadership of the Party Central Committee, the initiative of people is being released to serve their needs at different levels and in different localities and situations. In general, change and development is rapid, but there have been fluctuations, especially before and after the Cultural Revolution. Some years before libraries were affected by revisionist tendencies. The development of library staff was influenced and there were set-backs. We have put libraries on the path of socialist construction through socialist struggle and criticism.

We interpreted this to mean that during the Cultural Revolution libraries of all kinds were criticized for élitist and revisionist tendencies, and that a new course was set in 1973.

"As a result of the past," continued Director Liu, "some libraries have an historical burden." "Burden" was the translation, though perhaps "weight" would have been better. If "burden" was an accurate translation, it was certainly intended to mean that older books were the bearers of ideologically incorrect views. It was certainly not intended to mean that old manuscripts and books were disregarded. On the contrary, as artefacts the same great care is lavished on their conservation as on the preservation of the archaeological treasures and the great cultural monuments of the past. They are also required for purposes of study and criticism, "so that the present may learn from the past".

> We also have the burden of the semi-feudal and semi-colonial period. The predecessor of the present National Library of Peking was organised in this period. In the early years after liberation (1949), changes were made, but libraries were still greatly influenced by revisionism. That is why this kind of library needed thorough remoulding. Even libraries newly constituted since the liberation needed it.
>
> In the present phase of library development four points must be noted:
>
> 1. Libraries must exist to serve workers, peasants and soldiers. Libraries must assert proletarian politics, they must serve production, they must promote revolution. Of course they must also serve the cadres and those intellectuals who are keen to serve the workers, peasants and soldiers.
>
> 2. Libraries must propagandise Marxism, Leninism and the thoughts of Mao Tse-tung. The staff should study, research and propagandise these. That does not mean that libraries only collect such books - the staff also collect, for reference and for criticism, e.g. books on idealism, superstition and so on, in order to learn the opposite. Staff must develop book criticism, e.g. of Confucius. Libraries collect Confucian material as a target for criticism.
>
> 3. Libraries must serve the three major features of the revolution—class struggle, scientific experiment and production. Old books are collected in order to make the old serve the new. Likewise, importance is placed on collecting foreign books with a similar purpose—to make the foreign serve China's needs.
>
> 4. The make-up of library staff is inseparable from these purposes. Under the leadership of the Party, professional library personnel are combined with personnel from the masses, i.e. library workers drawn from the workers, peasants and soldiers. Such people engage not only in productive labour, they also join the management of libraries. A large number hold important positions in library management.

Director Liu concluded:

> In the Chinese library service we should adopt mechanisation for better development, as in agriculture and industry. We need mechanisation. Mechanisation in Chinese libraries lags behind many countries, though some new techniques are being adopted; but we are now at the beginning of planning such development.

This crude summary of Director Liu's exposition in June 1976 is necessarily incomplete. We hope, however, that it does not misrepresent his statements. In

the course of discussion we said that many of the ideas put forward were strange and unfamiliar to us. He seemed to be saying that librarians in China should be propagandists of particular political ideas, as well as professional experts: whereas in Britain we considered that the role of the librarian should be, as a professional expert, to collect material of all kinds, to organize it and to make it available to readers who used the library. Director Lin confirmed that this was so, but he added that the librarian, in going to the masses to propagate political ideas, was not doing so to *tell* them, but equally and perhaps even more to *learn* from them —to discover their real needs and problems, and to help them through the provision of the right kind of services in improving their work and improving production, as well as their political consciousness.

ORGANIZATION

Against this theoretical and general background, the organization of Chinese libraries can be considered, and the practical operations as we saw them described. There are six types of library, each type being under a separate central authority.

1 Public libraries. This includes the National Library of Peking, but in the main comprises the municipal, provincial and county libraries, down to the district, neighbourhood and street libraries in municipalities, and commune and brigade libraries in rural areas. The central authority for these is the State Administrative Bureau of Museums and Archaeological Data. It is emphasized, however, that in this and other cases, the libraries are not centrally controlled, but are largely self-governed and self-financed through Revolutionary Committees at the appropriate level (See Fig. 1, over page.)

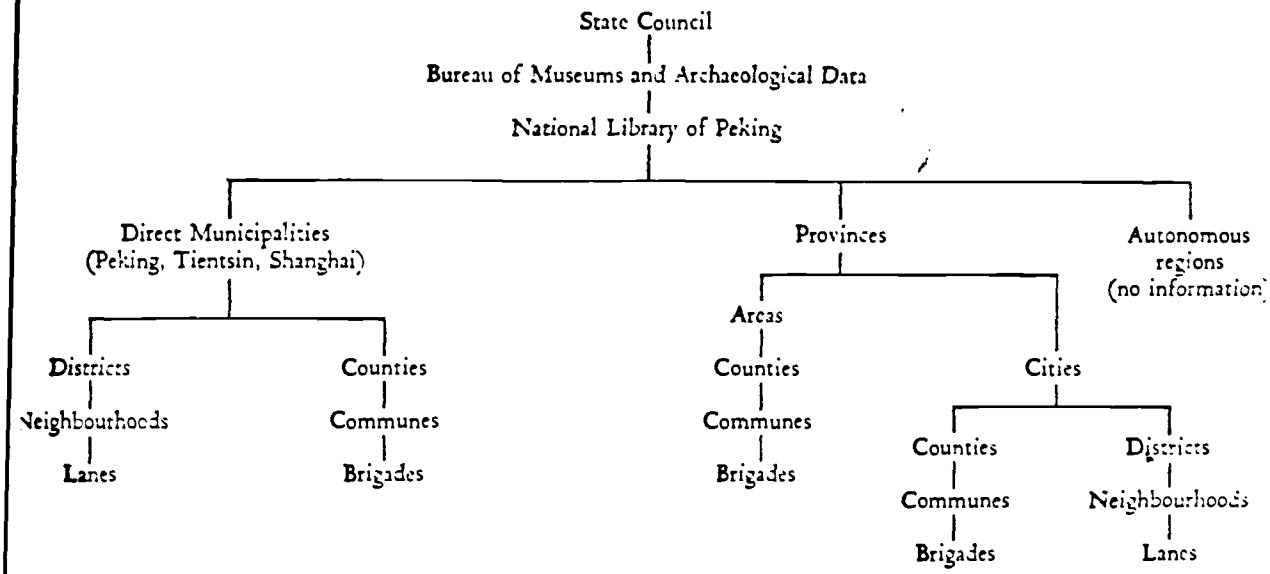
2 Educational libraries. This includes universities, colleges, middle schools and, as yet, some primary schools. The central authority for these is the Ministry of Education. Their funds are received as part of the general funds of the institutions they serve. There is provision of children's books also in some levels of public libraries.

3 Science and research libraries. This includes the Library of the Academy of Sciences and a large number of libraries attached to research institutes throughout the country.

4 Trade union and factory libraries. These are factory and workshop libraries organized by the trade unions within the factory. There are an "enormous" number of these and they make extensive use of the public, educational and science libraries through "group borrowing". Their purposes are not merely technological—they even include books for young children which their parents can borrow for home use.

5 Libraries of central and local administrative organs. These correspond to

FIG. 1—STRUCTURE OF THE PUBLIC LIBRARY SERVICE



N.B. 1. This represents an ideal system, which has not yet been fully realized in practice.
2. There are no libraries at Area level. All other levels are served by libraries (in theory).

what in Britain would be designated Government Department Libraries, but they are also provided for provincial and local government.

6 Army libraries. These are presumably under the control of the Ministry of Defence and are provided down to company-level.

"All these," we were told, "are under the leadership of the Party, while using their own initiative to develop ways of meeting their own needs. There is no formal machinery for overall planning of all library services, each of the six types coming under a separate authority. Formal machinery for inter-library co-operation was previously established, but mistakes were made, so it was removed following the Cultural Revolution. At present there is co-operation in accordance with practical needs. It is not a question of one library exercising jurisdiction over another. Within each of the six types there is wide variety, e.g. in the public libraries, the National Library of Peking is very different from the grass-roots libraries."

Our experience, confined to types 1-4, and largely to types 1-2, indicated that, whilst there was in different parts of China a general conformity to a common pattern, there were considerable variations that bore out the claim to local initiative. There are some other observations that can be made with reference to libraries of nearly all kinds that we saw.

Every library of any size has a reading room specifically devoted to Marxism, Leninism and Mao Tse-tung Thought. The stock consists of collections of the works of Marx, Lenin and Mao Tse-tung, together with works of other writers, so far as we could tell, both Chinese and foreign, when works are considered consonant with them. The librarians in these collections do not perform a passive role, and their work is not thus narrowly confined. The Marxism, Leninism, Mao Tse-tung Thought reading rooms are also the focus of all the day-to-day propaganda work of the libraries. The staff compile news-clippings collections relating to current issues and problems, involving the individual readers and specially organized groups in this. They encourage the writing of articles by readers, selected specimens of which are displayed in the reading rooms. They organize discussion groups both inside and outside the libraries, and arrange mass lectures, at the level appropriate to the library, whether national, provincial and municipal or at street and brigade level. In the smaller libraries there is no separate reading room, but the activity figures prominently.

In all the larger libraries there are reading rooms for science and technology with a reasonably large display of current periodicals—quite a few in foreign languages, and open-access to a range of science and technology material—reference books, abstract journals and so on; and a general reading room with few books on open access. There are general catalogues for the collections, but it was stated that not all titles in the libraries were included. Application can be made

for items both for reference and for loan, but there are some that are not available.

Admission policy was not easy to determine with precision. In libraries serving institutions with a limited clientele, universities and schools for example, membership with borrowing rights is available to all members of the institution. Outside readers will be admitted for reference use on the production of a suitable recommendation. In the public libraries at the lowest levels, street or brigade, all the population is eligible for full use. In the case of larger libraries—national, municipal and provincial for example—membership with borrowing rights clearly has to be limited. This appears in some cases to be done on a "first come, first served" principle, but in most cases it is done by issuing a certain number of cards to each factory or other work place, and leaving the selection of readers with borrowing rights to the appropriate committees in the factories, etc. A letter of recommendation is usually required, even for reference use.

There is, however, an extensive system of "group" borrowing from the larger libraries, carried out by representatives from factories and other places. This seems to be the commonest form of inter-library lending. There is also postal inter-library lending, but there are no union catalogues, either at the national or the provincial and municipal level. There is, however, a flow of communication between the large libraries and those at lower echelons, resulting from the "coaching" role of the staff of these libraries. Although it is constantly emphasized that the lower units develop on the principle of self-reliance, it is also emphasized that the higher units have a duty to help in the development, by encouraging their organization, training their staff, advising, and even, in some cases, providing an initial stock on loan.

Because of the great increase, particularly since 1973, in the number of libraries, there is a great shortage of what we should call qualified librarians. There are only two universities with Departments of Library Studies running two-year full-time courses—the University of Peking and the University of Wuhan. These are for methodological studies, and those qualifying are obviously required for the major libraries. Most professional training is, therefore, carried out on the job, by recruiting suitable people with experience in other work, factory, farm or office, and giving them training on a part-time basis in a library at a higher level, by correspondence courses (run by the University Departments) and short courses. The full-time library staff are supported by large numbers of volunteer workers. This is all in line with the policy of preventing the development of narrow specialism and keeping close contact with, and knowledge of, the needs of the masses. Those who go to full-time library schools will have done two years work in farm or factory before they start and will spend two months of each year in the countryside. And the experienced cadres of all ages, except the old and the unwell, are required to attend Cadre Schools for recurrent periods of six months to a year, at which they will study Marxism, Leninism and Mao

Tse-tung Thought, work on the farm, and conduct investigations into the conditions and needs of the peasants.

PUBLISHING ACTIVITIES

One last general point of great importance needs to be made. Large-scale library development can only take place if there is a matching development of a large-scale publishing programme. Publishing in China was interrupted, along with so many other activities, by the Cultural Revolution and has not yet reached a high enough level. The stocks of newly established libraries appear to comprise too few titles—naturally of recent date. The supply of books for the needs of industry, technology and agriculture may be adequate, but in other areas it seems to lag behind the needs. There is little published translation from other languages and relatively little reprinting of older works. There are some excellent research publications, e.g. in archaeology, but the supply of current creative writing is small. Libraries are encouraged to promote the writing of literature. At one brigade library we were entertained to the recitation of poems written by peasants and librarians on the farm. At a municipal library we visited a session of a group convened to discuss and criticize a writer's novel—with the writer. It seems that as yet only a relatively small proportion of such works achieve publication.

Since 1973 emphasis in library work has been placed on the development of a network of libraries for the masses, with less emphasis on the development of research libraries, other than those concerned with science and technology. This does not mean that the latter are starved of resources in the financial sense, but there is less material appropriate to them being published, and their staff are heavily engaged in activities connected with the development of the mass libraries.

The National Bibliography, *Ch'üan-kuo hsin shu-mu*, was published regularly by the Ministry of Culture up to 1966, and it was resumed, under the sponsorship of the National Library, in June 1972. It continued for about a year, and disappeared again. As far as we could gather, no such list is now published (it is not, apparently, a matter of a published list which is not available for export); but a list of current publications is maintained by the Ministry of Culture, and is presumably available, at least to the major libraries, for their selection work. The list itself is restricted, however, and our hosts were rather unwilling to discuss it. We urged upon them the importance, for the work of foreign librarians, of a published National Bibliography to improve the flow of literature and information.

In what follows we shall attempt to fill out the previous general statement of the purpose and position of libraries in the People's Republic of China by des-

cribing in more detail some of the libraries we actually visited. We should repeat our earlier warning: our visit was brief, and our information was gained through the necessarily imperfect medium of interpretation. While we seem to have discerned the overall pattern described by Liu Chi-p'ing, we are also sure that there is considerable regional variation; and we do not know, therefore, to what extent many details may be taken as typical.

NATIONAL LIBRARY OF PEKING

The National Library of Peking, above all, deserves special description. (And we shall make reference to other major libraries where what we saw qualifies and extends the account of the work of the National Library.) Although not in itself very long-established—it dates from 1909, and has been in its present building since 1938—it is now the country's largest library, with a stock of 9·1 million volumes* and 700 staff. Its foundation collections include imperial libraries from the Ming and Ch'ing dynasties (most notably one of the three and a half surviving manuscript sets of the eighteenth-century *Ssu-ku ch'üan-shu*, the imperial collection prepared under the auspices of Ch'ien-lung), private collections going back as far as the Southern Sung (1127–1206), T'ang and Sung manuscripts from Tunhuang, and the Cabinet Library (*Nei-ke ta-ku*) of the late Ch'ing. It has a large stock of foreign books, accumulated in part in the years before Liberation. It is this part of the Library's holding which Liu Chi-ping described as "the burden of the past".

Through the rather formal language now used to describe the events of the Great Proletarian Cultural Revolution, one can sense that from 1966 onwards the library went through a period of intense discussion and bitter self-examination. Here, as throughout the country, a major re-evaluation of the institution's function in the development of a socialist society took place, leading eventually to the formulation of the four main tasks listed by Director Lin. How does the National Library now put these policies into practical effect?

A "Study Office for Marxism Leninism Mao Tse-tung Thought" at Departmental level, with its own reading room, was opened, and now in addition to providing on open access the works of these writers, maintains a large newspaper-cuttings collection arranged by topic, assembles and makes available material for the pursuit of current campaigns, and provides books of current importance (a shelf of the works of Lu Hsun, supported by a small exhibition in the entrance hall). The Department's extra-mural activities include the organization of study classes for the masses, reports, and lectures: the larger of these are given in the

* The figure is not directly comparable with western statistics, since each fascicule in a traditionally cased set counts as one volume. It does, however, provide a measure of the library's growth since Liberation in 1949, when the stock was 1.4 million volumes.

capital stadium, with audiences of up to 18 000. Here, and elsewhere, it seems that the libraries are directing this propaganda work especially to the service and education of the "theoretical ranks of the workers, peasants and soldiers", described as a "newly emerged thing of the Cultural Revolution": we were not able to get a clearer definition of the "theoretical ranks" than this, but suppose them to be, if not the Party members, certainly the politically active members of working units at all levels.

Exhibitions recently held at the National Library include one on ancient Chinese science and technology, as representing the struggle between Confucius and the Legalists; one on the achievements of the model commune, Ta Chai; and one on environmental pollution. Similarly, the Shanghai Municipal Library was holding a major exhibition to mark the 10th anniversary of the beginning of the Cultural Revolution.

Both at the Shanghai Municipal Library and at the Tientsin People's Library we were told of (and at the latter saw in action) the book review classes held under the libraries' auspices. At Tientsin we saw a class of about 20 people who were discussing, with the author, a recently published novel. At Shanghai we were told that the Municipal Library has organized 38 such groups so far, with a membership of more than 300 people. Books are evaluated, in these classes, in the light of Marxism Leninism Mao Tse-tung Thought, and then introduced to other readers by means of articles (350 have been produced at the Shanghai Municipal Library already) written by class participants. Such articles are prominently displayed in library entrance halls and reading rooms.

During the Cultural Revolution more than 30 units assembled at the National Library to establish a new classification scheme. Before 1966 more than ten different schemes had been in use in the National Library alone (an instance of the adverse effects of the period of semi-feudalism and semi-colonialism during which the Library had developed). The full, socialist, scheme now includes some 40 000 headings, and it has been distributed, in suitably simplified form, to libraries at all levels throughout the country. We saw evidence of the new scheme in use in all the libraries we visited, and it is now applied to all new cataloguing, although we gathered that in most of the major libraries there has not been time yet to re-classify more than the Marxism Leninism Mao Tse-tung Thought books. The scheme is still regarded as being in a preparatory stage, and we were not able to see or bring away a copy.

A further service provided by the National Library is the distribution of printed catalogue cards. It is not clear to us how many publications are thus covered, since the Municipal and Provincial Libraries do the same for the libraries in their own areas. The cards prepared and distributed by the National Library have, in addition to the Chinese characters, the title in Pinyin romanization printed across the top. In most of the catalogues we saw filing was by stroke-count; but

Peking University Library had gone over to Pinyin order (whether or not the actual Pinyin form was included on the card), and the current inclusion of Pinyin on the National Library's cards suggests the beginning of a movement towards this much more efficient filing system. Centrally produced catalogue cards are also displayed in cases in many libraries as a means of introducing readers to newly published books.

ACADEMIA SINICA

The library of Academia Sinica is at the centre of the country's research activities; there are at present no graduate students doing research in the universities. Academia Sinica itself is highly decentralized, with branches and special institutes, each of which has its own library, scattered over China. The branch and institute libraries collect only in their own fields; the central library collects comprehensively, and supports the others through loan and limited photocopying facilities. We visited one part of the central library which concentrates on the Natural Sciences. A single processing Department serves both this and the other, Social Science, section. In purchasing, the institutes co-operate with, but are not subservient to, the central library. There is an old union catalogue, though no modern one; a union list of new books is now kept.

Since the Cultural Revolution, the library has been opened more widely than before to workers in universities, colleges, factories and mines: the fact that workers, peasants and soldiers were excluded during the period before the Cultural Revolution is now seen as a failing. The library does its share of propaganda and criticism work, and its extension services are directed towards discovering and satisfying the needs of scientific and technical workers.

It is clear that the library's internal services are also well developed. All staff members of Academia Sinica have a borrowing card, and the library staff advise readers on searching for literature in their fields. They also prepare indexes. With a holding of 4 020 000 volumes, the library seemed to us to be well placed to support research in science and technology, with its collections easily accessible to those needing them.

Much of the holding is, of course, in European languages, and the library has some difficulty in maintaining a staff with expertise in library science, a scientific discipline, and a foreign language. At present the staff includes experts in each area in approximately equal numbers.

An unavoidable delay in our programme prevented us from seeing Fudan University Library, so that in the end, the only two universities we visited were Peking University and Chung-shan University at Canton. University libraries work at present entirely towards the service of undergraduate teaching (which itself is radically changed since 1966, by the shortening of courses and changes in the curriculum). Nevertheless, we were impressed by the new building which

houses the library of Peking University, built in two years and opened on 1 May 1975. The building has 31 reading rooms, with 2400 seats. It has a stock of three million volumes, 800,000 of which are in foreign languages. At both Peking and Canton we were struck by the quality of the reference collection available on open access, and by the number of western-language periodicals taken.

We had sent in advance a list of rare books in the National Library of Peking which we wanted to see, and on our third visit were given a tour of the rare book stack and shown most of the individual items we had asked for. We had chosen them to illustrate various techniques in the history of Chinese book production, but as well as being a lesson in Chinese bibliography, the session provided us with an illustration of the loving care which is being devoted to the rare book collections. Here, and in Shanghai and at Hangchou, where we were given similar displays, we could see that the conservation and careful storage of the old collections is continuing unaffected by changes outside.

Although no member of our delegation was an expert in the public library field, the writers were impressed by the apparent development of "mass libraries" in factories (providing both technical, literary and children's material) and more particularly in residential areas, both urban and rural. The latter have received a considerable impetus since 1973, and although the network was acknowledged to be far from complete and varies from province to province in its degree of development, the best of these libraries (at street, or "lane" level, as the Chinese say, in towns, and brigade level in the countryside) are impressive. The lowest level appears to cater for a population ranging from 1–2000. It is to be hoped that this development continues, whatever the political changes that have ensued since our visit. Illiteracy has now been largely overcome—for the younger generation at least, and the existence of grass-root libraries can only be an encouragement to reading and to the development of a much wider spectrum of publications in the future.

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INFORMATION TECHNOLOGY IN CHINA

John H. Maier

THE PRESENT AGE is accurately characterized as the age of information, and the United States as a post-industrialized, service and information-oriented economy and society. Information technology encompasses an entire spectrum of activity, from the capability of multinational corporations to monitor the daily activities of field offices, to the opportunity for scientists and academicians to learn about the most recent research activities in laboratories around the world. Essentially, it is the modern technology of high volume data storage and high speed message transmission, now measured in megabits (millions of binary digits) and nanoseconds (billionths of a second).

A model case occurs when a country launches a satellite and thereby establishes immediate communication over a wide geographic region, thus obviating the more laborious method of establishing terrestrial land lines or microwave circuits to areas where communications are desired. The revolutionary impact of geocentric satellite digital communications is the immediate establishment of a point (the satellite) to multi-point (the ground stations) network, oblivious of land distance, or mountains and other troublesome terrain features. Communications hook-up requires only an earth station for total network access, and it is possible for this to be accomplished with simple off-the-shelf technology.[1]

The specific technological capability required lies in the fields of data storage, processing, and high-speed message switching. Underlying all of these is the power of the computer, essential to today's volume of

[1] In the case of satellite voice communications an on-going project at the University of Hawaii, PEACESAT (Pan Pacific Educational Experiment by Satellite), with which the author has experience, utilized the ALOHA satellite and, literally, off-the-shelf, low cost, HF communications equipment for a multi-nation village level Pacific Islands network.

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information processing. Computers are the technology of advanced societies—a technology that developing countries most desire. Thus, computers are an important threshold symbol of a country's modernization image and capability.

Technological Overview

If the heart of today's information technology is computers, then the nerve system is telecommunications, which allows computers to talk to one another, both domestically and internationally. Indeed, as a result, the whole has become greater than the sum of the parts. Present technology in this field is digitizing everything (making it subject to computer storage, processing, and transmission)—e.g., voice communications, television signals, facsimiles, and, most importantly, storage and retrieval of information. Present and planned geocentric satellite communications networks are wrapping the globe in a beehive of electronic, digitized, multi-million data parts and speed-of-light transfer of information, all controlled, and generally solely participated in, by the industrialized countries, dominated by the United States.

This technology is young but nevertheless has mushroomed exponentially, and the U.S. has a vast headstart.[2] Today computer wealth in the U.S. is measured as much in the billions of lines of applications and operating systems software[3] and hundreds of thousands of programmers, analysts, and systems designers, as it is in the IBM's, CDC's, Amdahl's, and other data crunchers that have been manufactured and installed.

For planners, software and people now rank considerably above computer time as the most significant budget item. No longer is the CPU (central processing unit) second a precious commodity. The United States, with its trained computer work force, hundreds of thousands of installed hardware facilities, established and growing networks, and its dominant position in international sales, is clearly the leader at the

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[2] A nascent global information technology policy was recently debated by over 75 nations, including a delegation from China, at the Intergovernmental Conference on Strategies and Policies (SPIN) held in Spain in August 1978, and sponsored by UNESCO and the Intergovernmental Bureau for Informatics (IBI). This little-reported conference evidenced a now-familiar coalition of developing nations seeking greater participation in influencing the role of what they now perceive as critical information technology. The U.S. maintained a low profile, but its international role was implicitly attacked in several resolutions as protecting the interests of IBM, which sells over 50% of its products internationally, and which has been accused of pursuing policies designed to make client nations IBM-dependent. There has been at least one major international information policy conference held in the United States since the SPIN conference. See *Computerworld* (hereafter *CW*), September 11, 1978.

[3] Thus it is understandable that when the Soviet Union undertook large-scale design and production of their RYAD series of computers in the late 1960s, they chose to design an IBM software compatible mainframe architecture, hoping to pirate already available U.S. software, and saving millions in software development costs.

leading edge of the technology.[4] While other advanced nations (Japan, the United Kingdom, Germany) market computers that match those produced by the United States, generally their computers have appeared on the market some two to five years later.

In the Soviet Union and Eastern Bloc countries computer technology is judged to be several years behind the U.S. and "highly imitative" of American products. Further:

> A large percentage of the Socialist countries' installed computer base is second generation, and even first generation equipment. Computer applications in these countries have differed from usage in the West. Many computers in the U.S.S.R. and Eastern Europe are employed in scientific and technical applications with limited usage to date [1976] in business and general applications.[5]

Lesser developed countries (LDCs), including the People's Republic of China (PRC), realize the position they are in in this rapidly changing technology, and they are anxious to "catch up."[6] The decision China faces in defining its national role in the world is to make or to buy or a variant thereof. Qualified scientists and other observers who

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[4] "The number of computers in the United States, approximately 169,000 in 1974, accounted for over 65% of the total computers in use in the world. The value of the American computer base, approximately $34 billion, was 62% of the world computer value, estimated at $54 billion." It is estimated that the number of computers built by U.S.-based companies will exceed 1,000,000 by 1980. The principal American mainframe manufacturers (Burroughs, Control Data Corporation, Honeywell, IBM, NCR, and Sperry Univac) derive approximately half of their revenues from sales to foreign countries. *The American Computer Industry and Its International Competitive Environment*, U.S. Department of Commerce (DIBA). 1976. pp. 9 and 2.

[5] Following is a short explanation of computer generations. The short history of computer technology has been exponential in its accomplishments. In 1951 an American company, Remington Rand, produced the world's first commercially available, large-scale electronic computer, the UNIVAC I. During the 1950s large American businesses acquired first generation vacuum tube computers to handle accounting and payroll functions and the U.S. Government installed a computer at the Bureau of the Census. In the late 1950s transistorized, second-generation computers appeared on the market in the U.S. They were characterized by their use of transistors, advances in logic, and introduction of core memories. Data entry was on punched cards, and output was through line printers. Systems software and compilers came into use. These computers, which operated in a batch mode, were utilized in a broader range of applications than first generation machines. In the mid-1960s, third generation computers were introduced. Technological advances in electronic components were central in the development of this generation, which featured integrated circuit technology, larger and faster memories, modularity in design, and a time-sharing capability. Computing costs were reduced by an order of magnitude. Today's computers systems are considered to be 3.75 or fourth generation, though specific characteristics are more difficult to pinpoint. In general, though, features include large-scale integrated circuitry in logic and memory components, standardized communication systems, networking remote diagnostics, mass storage, data base orientation, and distributed processing, all accompanied by a decline in the cost of calculations coupled with increased computing speed and power. *Ibid.*, p. 2.

[6] Computer scientists in the United States say that some sub-specialties, such as micro-processors, are changing in toto as rapidly as every two or three years.

have visited the PRC and seen computers have described them as early third generation, perhaps 15 years behind current American technology.

All indications are that the Chinese are embarking on a sustained emergence from the extreme isolation—both imposed and self-enforced —of the recent past. China is now buying technology, but buying selectively, while embarking on a massive effort to develop its own indigenous design, manufacturing, and applications capabilities. At the September 1978 Strategies and Policies for Informatics Conference in Spain, the Chief of the Chinese Delegation, Bei Linyan (who was reported as heading the PRC Bureau of Basic Sciences in the National Commission of Science and Technology), was quoted as saying that China is taking "urgent measures" to develop its computer industry as part of the "Four Modernization Program." At the same time that Bei Linyan was stressing computer technology at the U.N.-sponsored SPIN conference. the official China News Agency announced that foreign technical experts would be invited to teach and lecture in China in the future. Lecture programs in the PRC are now being scheduled by the Committee on Scholarly Communication with the PRC under the auspices of the United States National Academy of Sciences. In addition, direct U.S. corporate agreements are presently being made.

China has borrowed from the West in the past, most recently during the brief technical cooperation period with the Soviet Union in the 1950s. Now China is turning to the West again, but overtly away from the Soviet Union, which China perceives as attempting to establish "world hegemony." China's framework for advancing technologically was substantially announced at the Chinese National Conference on Science and Technology, held in Beijing in March 1978.

China's National Plan

The "Outline National Plan for the Development of Science and Technology, Relevant Policies and Measures,"[7] and the personalities involved, is of sufficient importance for the world to take note. The Plan launched a momentous program—comparable in ambition to the post-Sputnik national science program in the U.S.—that within a few short months was already being implemented at the lowest organizational levels throughout the Chinese provinces.[8]

A prominent figure at the 1978 Conference was Fang Yi, Member of the Political Bureau of the Central Committee of the Chinese Communist Party, Vice-Premier of the State Council, and concurrently Minister-in-Charge of the State Scientific and Technological Commis-

[7] *Peking Review*, No. 14, April 7, 1978, pp. 6–17.

[8] See, for example, "Hopei Science Meeting," *FBIS* (PRC), July 28, 1978, p. K3; "Kuangming Daily Introduces New Science Page," *FBIS* (PRC), July 24, 1978, p. E7, and "Kiangsu Implements Guidelines for National Science Conference," *FBIS* (PRC), July 20, 1978, p. G3.

sion, and also a key member of Deng's visiting delegation to the United States in January 1979. The "Plan" is comprehensive, and sets as its goal to "approach or reach the advanced world levels of the 1970's in a number of important branches of science and technology." Now familiar to attentive international policy makers, the areas that were identified by Fang Yi are agriculture, energy, materials, electronic computers, lasers, space, high energy physics, and genetic engineering. The tone was a willingness to "break with conventional practices," and the resources to be marshalled included the Chinese Academy of Sciences, the various departments under the State Council, and the key universities and colleges. China, stated Fang Yi, will have a solid core of 800,000 professional and scientific researchers by 1985.

It would be difficult to overstate the importance of the new direction to which China's massive labor force is being committed. Implicit in this marriage to modern science and technology is an understanding of the requirement for an adequate computer technology base, a concomitant for all of the areas that have been targeted by the "National Plan."

Fang Yi, in his address, pointedly demonstrated the time compression benefits of borrowing technology by stating, "we took semi-conductor technology, which was an advanced branch of science at the time, as our starting point for studying and developing electronic computers. As a result, we soon passed the stage of the electron tube and gained time." China, Fang Yi continued, now intends to "solve the scientific and technical problems in the industrial production of large-scale integrated circuits, and make a breakthrough in this technology of ultra-large-scale integrated circuits. . . . We aim to acquire by 1985 a comparatively advanced force in research in computer science and build a fair-sized modern computer industry. Micro computers will be popularized and giant ultra-high-speed computers put into operation. We will also establish a number of computer networks and databases." He reemphasized this last point by stating, "It is essential to equip information institutions with modern facilities in the shortest possible time. In eight years we will set up a number of documentation retrieval centres and databases and build a preliminary nationwide computer network of scientific and technical information and documentation retrieval centres."[9]

[9] *Peking Review*, April 7, 1978. The technical information and documentation retrieval centers that China desperately needs are a prime ingredient of the information era. The U.S. has a very useful national information clearinghouse, the National Technical Information Service, administered by the Department of Commerce. NTIS has over a half a million scientific reports that are automated for keyword search. NTIS also currently has international cooperative agreements with a number of LDC's, Europe, Japan, and the Soviet Union. The U.S. Library of Congress has another computerized data base containing over half a million titles. Each is growing at the rate of 50,000–100,000 titles a year. China very much needs the ability to store and retrieve information in this fashion. Whether it is technically possible is a complex problem that involves more than acquiring the technology currently available in the United States. China has a language specific problem that

China: Domestic Computer Capability—Hardware and Software

For some time China has had a domestic computer design and production capability that originated in the "technology transfers" from the USSR in the 1950s. There is no indication, however, that the Chinese have attempted to design for IBM compatibility, as have the Soviets with their more recent RYAD series. However, the Chinese have accomplished the notable feat of developing a completely indigenous computer production capability, having already advanced through several hardware series.[10]

Recently we have made "on-site" observations. An early U.S. delegation (1972) reported that the Chinese had "been manufacturing integrated circuits, at least in limited quantities, since 1968—reportedly the same year in which integrated circuit production began in the Soviet Union." The delegation noted that the Chinese were concentrating on computer architecture, with varied success.[11] The Chinese, as early as this 1972 exchange, expressed a strong interest in a "super computer" such as the CDC Star or Burrough's 6700.

The extensive sectoral report of "Electronics in China" also surveyed Chinese computer capabilities. The report claimed that "China has already become a major electronics manufacturer, placing herself among the top ten electronic producing countries in the world . . . with a production estimated at U.S. $2 billion in 1976."[12] This basic electronics industry was practically nonexistent in China until the early 1950s. Then the first transistors were made in 1958, but it is generally agreed that integrated circuits did not appear in China until the late 1960s. Since Soviet semiconductor technology is considered several years behind that of Japan and the United States, the Chinese switch to Western sources of supply has probably saved several years in bridging that technology gap.

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will be particularly vexing in developing word processing and information retrieval systems. Chinese characters, highly complex, and numbering in the thousands for a basic vocabulary, pose difficulties, particularly in the input/output phases of computer applications, though several approaches to the problem have been tested. China's alternatives are few and all troublesome; China can rely solely on foreign languages, most likely English, for computer applications; China can romanize the Chinese language, but this causes problems of uniqueness in the monosyllabic vocabulary, and also problems of reversability; China can resort to the presently used cumbersome and unsatisfactory telecodes for input/output or China can attempt to make or buy necessary technological breakthroughs for cost effective automation of the Chinese character set. Internal storage poses no particular problem except that a larger amount of storage and processing will be utilized, particularly since vector description of the characters consumes considerable resources. What the Chinese need is an easy to use, low-cost, efficient input device sufficient for widespread usage by relatively untrained persons. Additionally, China needs a rapid, low-cost, reliable output device that can handle a large character set with acceptable quality. The author is aware of research in the U.S. and in China that is attempting to solve this problem.

10 "Electronics in China," *China Business Review*, May–June 1976, p. 33.

11 Thomas E. Cheatham, Jr., "Computing in China: A Travel Report," in *Science*, Vol. 182, October 1973, pp. 124–140.

12 "Electronics in China," p. 42.

The author of the sectoral report cautioned that "use of computers in developing countries is limited by development of industries in which they can be shown to increase productivity."[13] Counting production plants and research activities, he estimated the Chinese potential need in 1976 to be about 2,000 to 2,500 large computer systems, sufficient to make it worthwhile to develop a domestic computer industry. Regular production of Chinese computers reportedly did not begin until 1962, and by 1973 the output of the Chinese industry was estimated at about 100 units per year. It is difficult to judge, but most likely at least half are in military related applications.

In a 1977 U.S. Department of Commerce report it was estimated that by 1971 China had the capacity to produce "several hundred million transistors and diodes and a few million integrated circuits annually." Large-Scale-Integrated (LSI) circuit technology is the critical key to today's modern computers, and the Department of Commerce report notes:

> The Chinese clearly are test manufacturing large-scale-integrated (LSI) circuits. Foreign visitors, such as the President of Japan's Nippon Electric Company, have been shown LSI circuits that approach the world's highest performance standards. He observed an LSI circuit manufacturing capability of 10,000 transistor elements. However, the production technology for such components is still very underdeveloped. The American representatives of the Electronics Industries Association were shown Medium-Scale-Integrated (MSI) circuits in an elaborate photographic setup. Using a numerically controlled positioning system, and a master mask of 27 separate modules, the MSI mask was created one module at a time by photographing the appropriate element on the module mask. A computer with a speed of 100,000 operations per second with 8 K words of 24 bit memory produced the tapes to run the operation. The setup was ingenious and effective but was appreciably less productive than machinery used for this purpose in the United States.[14]

In September and October 1977, an American Institute of Electrical and Electronics Engineers (IEEE) delegation to the PRC, although primarily telecommunications oriented, also observed Chinese computers extensively. Their report summary is worth quoting at length:

> Although the main subject of our visit was communications, we did see enough of contemporary Chinese computer technology to make a few comments about it.
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> The high end machines, of which we saw two, the 013 and the TQ-6 are all 48-bit scientific machines. The 013 is new and is rated at 2 million instructions per second (MIPS). The TQ-6 at 1 MIPS has been around

[13] *Ibid.*, p. 29.

[14] David Denny, *Telecommunications Equipment: A Market Assessment for The People's Republic of China*, U.S. Department of Commerce, DIBA, February 1977, p. 25.

since 1973, "several tens" having been produced, according to our hosts.

The 013 is particularly interesting for its peripherals, which include tape, line printers, "selectric typewriter", matrix line/graphics printer, and a pair of 10 megabyte movable head disk drives. The software is not particularly advanced. The TQ–6 is being fitted with a multiprogrammed operating system which will allow, among other things, I/O spooling.

In spite of progress in the two traditionally weak areas for Socialist-bloc computers, namely software and peripherals, the rate of progress has to be judged as quite slow. Operating systems are still in their infancy. Programmers work with paper tape rather than punched cards. User languages are still predominately the Chinese variant of ALGOL–60, although FORTRAN/4 and BASIC are beginning to be used. . . .

We were told that, given the option of developing their own software or making machines (like the 360-compatible RYAD Soviet machines) that use software already generated by others, the former approach had been specifically chosen. As a rough estimate, one would call both high end machines we saw "third generation" (transistorized, with operating systems and I/O channels) and would equate them roughly with U.S. machines of 1965. . . .

We were told that DJS–130 and 131 were equivalent and that the 131 is an updated TQ–15. The MTJ–16, used to control four work stations for IC testing may not be a computer, but a hard-wired special-purpose logic tester; *there was some difficulty in translation.*

The striking thing about these minis is the same thing that struck us and other visitors about high end machines, namely that there seems to be some duplication and overlap of function. There seem to be too many machine models and not enough flexible adaptation of a few general purpose models to a wide variety of applications. One might program the same 16-bit mini to do the weather radar control function (as with the Weather–2), or the industrial control repertoire of functions (as with the DJC–1 and MTJ–16) or many others, rather than build a different mini for each task.

Several of our hosts agreed with our point that some sort of national coordination program is required in computer development, so that larger scale serial production of a few models may be carried out.

Regarding integrated circuit technology, the delegation reported:

Both discussion and the plant inspection would support the hypothesis that the Chinese have the expertise to do almost anything at the production prototype level; but that *this expertise is thinly spread.* Research Institute level people seemed fully aware of the most sophisticated techniques. But the execution of this know-how was of mixed quality, resulting in 25% yield on standard I.C.'s; and less than 10% yield on simple LSI.[15]

[15] "Report of the First IEEE Delegation to The People's Republic of China under the Sponsorship of the Chinese Electronics Society to the IEEE, September 17, 1977 to October 26, 1977" (hereinafter "IEEE Report"), pp. 17–18, 27.

In addition to China's domestic hardware capability, we can also comment more about Chinese efforts in software development. As already mentioned, software inventory is a major design and planning consideration, and a sizable resource and technological item of wealth. It is important in computer technology to consider mass production of applications software, and to attempt to retain "transportability" of expensive software (which requires many man-years to develop) as machines are "upgraded" and new machines are put into production. Although the Chinese are only beginning to confront this problem (which already in the United States involves hundreds of millions of dollars in making "new system decisions"), there is evidence of Chinese sensitivity to the problem. Software and hardware "user groups" are being formed, and we know that discussion of applications software is being conducted in Chinese technical journals.

From the IEEE visit to the Peking Research Institute of Computer Technology, we have the following report:

> *Software*: Currently they have written a FORTRAN IV compiler and BCY (Chinese variant of ALGOL-60) compiler, both compiled onto DJ-013's assembly language. Their current work is on a uniprocessing operating system, to embody job scheduling, file management, and virtual storage. (Later they hope to return their attention to a multiprogrammed operating system, but did not seem particularly interested in time-sharing or TP terminal support in general.) With this next system they will do their I/O by spooling. The operating system on which 20 programmers are at work is expected to occupy 32K words, partly on ROM, and the rest pageable from disk.[16]

Later, at the Shanghai Radio (Computer) Factory No. 13, the same IEEE group reported on a TQ-6 operating system:

> The TQ-6 operating system was the only example of an attempt at multiprogramming that we encountered on our travels. We were told that "several tens" of people from various locations had worked for "several years" on it, that it would handle up to 2-4 jobstreams concurrently, that one of these was for I/O spooling, and that it occupies 20K words of main memory. No virtual storage management of memory is employed.
>
> We were asked where we would place this machine in the chronological history of U.S. machines and gave the answer "1967 or so", since this was about the era of 1 million instructions/second third generation U.S. machines, although the latter have more extensive operating systems and included business orientation in the instruction sets.[17]

In I/O software technology the Chinese seem to be still largely

[16] "IEEE Report," p. 14.
[17] *Ibid.*, p. 81.

limited to the Arabic character set, although in telegraphic applications attempts are being made, albeit cumbersome, to come to grips with the formidable Chinese written language:

> The complex nature of the Chinese language has limited the use of telegraphic communication. In recent years, however, a number of improvements have been introduced that allow Chinese characters to be *mechanically* [emphasis added] decoded into a 4-digit numerical code. One machine, an electrostatic telegraph printer, is equipped with a memory storage device and is able to convert a 4-digit telegraphic code punched tape directly into Chinese character text. The machine operates at a speed of 1,500 characters a minute, 75 times the speed of manual decoding.[18]

Although the Chinese have repeatedly expressed no interest in time-sharing, it is this author's opinion that remote utilization of large mainframes, perhaps even networked, would be the most cost-effective way for China to expand availability of computer power rapidly.

China: Domestic Telecommunications Capability

To implement time-sharing successfully, at least over long distances, or "a preliminary nationwide computer network of scientific and technical information and documentation retrieval centers," as Fang Yi mentioned in the "National Plan," it is necessary that China have a (data) telecommunications capability of sufficient quality to ensure the low error rate usually expected in a data communications environment. This could involve considerable national investment, and Chinese scientists will soon have to make hard decisions, such as whether satellites might be the most cost-effective solution, in order to meet the goals that have been established. Certainly, China does not presently have the requisite capability, with its heavy dependence on open wire lines.

The U.S. Department of Commerce Telecommunications Market Assessment summarized China's general capability up until a decade ago as follows: "Prior to the 1970s, long distance communication in China primarily utilized high frequency point-to-point radio transmission and a network of 4 million kilometers of long distance open wire lines."[19] The more recent IEEE delegation summarized China's digital telecommunications capability as follows:

> *Data Communications*: There is not much to say about this, since remote computing has not arrived yet in China. In fact, in the view of some members of the delegation, it may never arrive there in quite the pattern that we have seen it evolve in the West. With the micro- and

[18] David Denny, *Telecommunications Equipment*, p. 21.
[19] *Ibid.*, p. 17.

> mini-computer as far advanced in the developed countries, the Chinese have the option of exploiting this experience to do a large fraction of their application processing in many small local machines instead of a few large ones located remotely from the end users.
>
> We saw no terminal specifically intended to operate into remote central computers, no modems, one acoustic coupler, and no communications controllers. Even the graphics terminal (which we saw) was envisioned to be locally (in-plant) attached to the CPU.
>
> On the other hand, there is a high level of awareness and interest in even very advanced notions of computer network system architectures and new "public" networks. For the last several years, the PRC has been represented at CCITT plenary sessions and at CCITT study groups on new data networks, text communications and data transmission technique modems.[20]

During their visit the same IEEE group gave a "Presentation and Discussion . . . on Computer Networks and Microprocessors," meeting for almost three hours with officials from the Beijing Institute of Computer Technology. The lengthy presentation covered three subjects: data processing needs for system interconnection, public data interconnection networks, and commercial computer network solutions. Several of the Chinese in attendance were "very familiar" with the appropriate literature, having read the "forbidding" IBM SNA (System Network Architecture) articles, and they were familiar with the U.S. Defense Department's ARPA (Advanced Research Projects Agency) Net and its terminals. The IEEE report comments: "Our hosts were extremely interested in our viewpoint as to the effect of microprocessors on communications and questioned us on that topic. We discussed probable directions for applications, as logic and memory costs decrease and more powerful processors are built, such as more data processing at terminals to reduce transmission costs and the like."[21] An alternative for Chinese long-haul data communications is utilization of its expanding satellite capability.

China: Domestic Satellite Capability

China presently has at least four major satellite earth stations (see Table 1). In August 1977, China became the 98th member of Intelsat (International Telecommunications Satellite Organization), although China had already been using Intelsat satellites since 1972 on a non-membership lease basis. Intelsat owns and operates the global space segment transmitting communications signals among earth terminals in 84 countries. In September 1977, a Chinese delegation went on a "shopping tour" of Western European countries hosted by the Euro-

[20] "IEEE Report," p. 16.
[21] *Ibid.*, p. 36–39.

TABLE 1: Satellite Earth Stations in the PRC

Company	Location	Description	Contract	Installed	($millions)
RCA	Peking	Standard; linked to Pacific Ocean satellite; 132 telephone channels (capacity of 240) plus TV	Jan. 72	June 73	3.7
Western Union International General Telephone & Electronics	Peking	Standard; linked to Indian Ocean satellite; 60 telephone channels plus TV	Oct. 72	Feb. 74	3.8
Nippon Electric Co.	Peking	Nonstandard; 24 telephone channels plus TV	Sept. 72 (replaced by present stations)	–	1
RCA	Shanghai	Standard; 60 telephone channels (120 capacity) plus TV, replaced nonstandard RCA station	Aug. 72	Aug. 73	5

SOURCE: David Denny, *Telecommunications Equipment: A Market Assessment for The People's Republic of China*, U.S. Department of Commerce, DIBA, February 1977.

pean Space Agency (ESA). Several subsequent tours followed, and in May 1978 it was announced that China was developing its own communications satellite for launch around 1981 or 1982 and had signed an agreement with West Germany for the use of the Franco-German Symphonie satellite to test and qualify Chinese ground stations prior to launch.[22] The Chinese, it was reported, had built several ground stations themselves (not reflected in Table 1) that appeared to be performing well, although they were eight to ten years behind Western technology.

Thus, China is now well linked into international communications. And, concurrent with Deng's visit in January 1979, the U.S. has contracted to launch a satellite for the PRC. China is ready for international data communications, and is in position to reach an agreement for sharing of technological and scientific information via communications such as was recently concluded between the U.S. and Singapore. In addition, the U.S. has a number of international timesharing commercial companies that could make available to China via satellite the whole cornucopia of software modelling, information, engineering, and other packages, which the Chinese could utilize on a pay as you go

[22] *Aviation Week and Space Technology*, May 8, 1978, p. 17.

basis, perhaps as a training tool in their research and educational institutions.[23]

In 1978, China sent representatives from China Post and Telecommunications to visit various U.S. companies involved in domestic satellite communications. The Chinese "discussed technical specifications for a network of *200 to 300* [emphasis added] earth stations that would be used as part of (China's) first domestic satellite system." It was reported that "in addition to having seen demonstrations of Comtech's latest satellite communication and troposcatter systems and equipment, the delegation visited Western Union International and RCA Global Communications.[24]

Selling Technology to China: Computers

Until recently there were stringent high technology export controls under the U.S. Export Administration Act, and through COCOM, for national security reasons.[25] In addition, U.S. private claims against China, the question of frozen PRC assets within the United States, and the fact that the United States had not granted most-favored-nation (MFN) tariff treatment to China, hindered commercial activity. This scenario, however, has changed since normalization, and trade with China is rapidly becoming quite different from what it was a short while ago.

The first U.S.-manufactured computer-based system sold to the PRC was installed in the Institute of Physics in Beijing in 1973. Since then the Chinese have pursued a "prototype buying" strategy, generally spreading their sales among the major large mainframe vendors. In 1976 the PRC contracted for two CDC Cyber 172's through France for installation in seismic and oil research facilities. Chinese computer technicians were trained in France on the American-made computer. In the spring of 1978 China ordered an IBM 370 to be installed in an air compressor factory in Shenyang. At the same time China was also negotiating for medium-sized Univac mainframes. These computers are a good cross-section of U.S. medium-sized general-purpose computers but they do not reflect computer systems imbedded in turn-key plants already sold to the PRC, nor do they begin to fill the need for 2,000–2,500 major systems that one commentator has estimated for China. And they are paltry compared to the massive U.S.-installed inventory.

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[23] Since this article was first written China has concluded an additional information technology related protocol with the U.S. Department of Commerce that includes an agreement to share information on the U.S. National Technical Information Service, and it is likely that the Chinese Ministry of Posts and Telecommunications will soon be signing an additional protocol with the U.S. National Telecommunications and Information Administration.

[24] *Telecommunications Equipment*, p. 27.

[25] For a good discussion, see Donald Henry, "Export Controls, National Security and China: A Commentary and a Proposal," in *The China Business Review*, March–April 1977, pp. 3–7.

By all barometers, and according to the "Plan" enunciated by Fang Yi, computers will likely be big business with China in the foreseeable future. Here again the U.S. will be competing with Japanese and European products.

China: Social Impact of Technological Advances

Today's American shopper goes to the local automated supermarket where a computerized IBM checkout with Optical Character Reader (OCR) scans the National Bureau of Standards Universal Product Code on each item, keeps a running total, computes appropriate taxes, displays and prints item names, unit of measurement and cost, simultaneously updates the store's inventory, and finally prints the total and computes the change for the customer. This is called point-of-sale automation. If the local computer is tied into a network, then the weekly stock order is automatically maintained back at the central warehouse. We take all of this for granted.

In China, with a population approaching one billion, with 85% of the work force involved in agrarian labor (compared to 3.3% in the United States), and with almost a decade lost in making revolution rather than in training engineers, there is no "automation" as we know it. Technical education, even at the expense of developing an elite, has top priority in the "National Plan." As of January 1979, Chinese students are studying in U.S. universities. China cannot begin to implement its drive for "modernization" without first training the youthful technicians who will become the implementers, and this training must be obtained from other countries—this time from the U.S. rather than the Soviet Union. By 1985 China hopes to "increase the number of professional scientific researchers to 800,000":

> We must strengthen scientific and technical cooperation and academic exchanges with other countries and keep abreast of the results, trends, policies and measures of their scientific and technological research as well as their experience in organization and management. We should actively and systematically enlarge the scope of sending scientific and technical personnel, returned students and postgraduates abroad to study, receive advanced training, make study tours and take part in international academic conferences and other academic activities. Meanwhile, we will also invite foreign scientists, engineering and technical experts to China to give lectures, serve as advisers or join in scientific research.[26]

The dangers inherent in this policy are great. Already informed American commentators are talking about these "overseas students" becoming "tainted." The very talents that China hopes will take it into

[26] *Peking Review*, No. 14, April 7, 1978, pp. 6–17.

the next century might well be the force the present system will find most threatening as overseas students return to the realities of China. The syndrome is characteristic throughout developing countries. This tiny elite, less than .2% of the population, will become the key to China's fate. Other potential major problems that attempted modernization must confront include worker unrest, lack of experienced management, shortage of resources, poor quality and lack of standardization of machined products, and finally, problems with financing the developmental plan.

In China the average yearly industrial wage is $400. It takes four months earnings to purchase a bicycle, and there is less than one television set per 100 people. There are only about 2,000 computers in the entire country. One researcher has estimated that the average American might come into contact with a computer in one way or another at least several times a day; in the Soviet Union the average citizen might encounter a computer once in several months; in China the average Chinese will probably never encounter a computer in his lifetime.

There is no doubt that the students being trained abroad will be a very select and special elite. Those in U.S. universities will encounter the IBM, CDC, UNIVAC, and other American examples of the latest information technology machines. There is, from the viewpoint of the United States, a very real benefit to be gained. As any computer manager knows, an insidious disease called "machine dependency" will occur—that is, once a person is locked into (or trained) in the ways of one machine, it is often extremely difficult to break the dependency on that machine. Further, similar machines installed in China will require that old IBM catch—maintenance and update. The U.S. thus is forging the technical links of future ties with China by teaching IBM JCL (Job Control Language) to the Chinese students now studying at U.S. universities.

Post-Normalization

Since normalization, trading activities with China, government to government agreements, scholarly exchanges, and other advances have proceeded at a very rapid pace. U.S. companies have been heatedly courting China business with proposals and exchanges of delegations. The new joint venture law of China promulgated by the National People's Congress in the spring of 1979 has given promise of business agreements never even considered a year earlier. Much of this activity will likely result in even more "follow-on" agreements, though within the constraints of China's trading capacity, which according to the National Council for U.S.-China Trade is expected to range between $3.5 and $8 billion between now and 1985.

The level and extent of Sino-American contact has advanced rapidly on all fronts and at all levels. It is now possible for U.S. companies to

advertise in Chinese media, and there is now a new trade publication in China, *China Computer Monthly*, published in Hong Kong but aimed at over 7,000 recipients throughout China. The first issue contained an extensive survey to determine what readers most wanted to know about computers. China's new joint venture law means that for the first time in 30 years foreign corporations may invest directly in Chinese enterprises. China is also forming indigenous corporations where end users are making direct purchases. All of this is placing a heavy burden on Chinese management unacquainted with business practices in the West.

The 120 capital projects that China has identified for its present Ten-Year Plan are sorely taxing China's fiscal capabilities. In the spring of 1979 we saw a readjustment, but not a retrenchment. Capital financing will remain a real concern. China will have to compete with other lesser developed countries in the production of marketable goods and services, or else raise foreign loans to support its ambitious goals. As of August 1979, China had negotiated loans with the following: Japan, $12 billion; France, $7 billion; UK., $6 billion; Canada, $2 billion; and Italy, $1 billion.

All of this means that China is not only carving out a substantial future, but also is building long-term international commitments. In a world of information technology, China is becoming a member—late, but in a big way. The world of information technology is in a new era now that China is becoming a full and active participant. There is no doubt that it is still a "developing country." Nevertheless, with China actively seeking state-of-the-art satellite communications equipment and thereby hoping to leapfrog painful growing stages that the U.S. had to go through, it will be changing perceptively as the present ambitious plan unfolds. We will get to see it.

JOHN H. MAIER is an employee of the U.S. Agency for International Development, Washington, D.C., and has served as a consultant to the National Telecommunications and Information Administration in recent negotiations with the PRC.

WORKSHOP ON INFORMATION SCIENCE, DOCUMENTATION AND INFORMATION STORAGE AND RETRIEVAL

(Wasserman)

The workshop is organized in 20 sessions of lectures, case studies, and seminar discussion, to cover 5 days. The daytime sessions will run in parallel sequence: 1-10 in the mornings and 11-20 in the afternoons. In addition there will be self-instructional audio-visual material available outside formal daytime sessions, and a series of evening assignments of a practical nature.

1. The information explosion

   The information explosion; the quantitative increase in knowledge production (and information storage) 1876-1976; the qualitative changes in the generation of information and the growth of areas of knowledge; the problems of information transfer.

2. Information flow

   How scientists and social scientists communicate; information retrieval seen as a communications problem; the nature of index languages and their importance in information storage and retrieval.

3. The document as an information unit

   Kinds and forms of documents: monographs, serials, semipublished material, non-book forms (e.g. microforms, machine readable forms); the value and problems of primary information sources (e.g. research reports), of secondary sources (e.g. abstracting and indexing services), of tertiary sources (e.g. state-of-the-art reviews).

4. Conventional catalogs and indexes

   Methods of organization and construction; the use and abuse; limitations and how to overcome them.

5. The systematic approach

   Classification - conventional and modern approaches: Library of Congress, Universal Decimal, modern systems; classification for information retrieval; the construction of classified indexes and their alphabetical keys.

6. Natural language indexing

   The alphabetico-specific index. The Library of Congress subject headings and their problems; the British Technology index and its approach.

7. Postcoordinate indexing

The nature and kinds of system: term entry and item entry; the thesaurus of descriptors; the construction of post-coordinate indexing systems; manual versus mechanised; when and how to use a computer.

8. Post-coordinate plus pre-coordinate

Combinations of different systems for different uses; representative special systems: MEDLARS, BNB/PRECIS, etc.

9. Searching

Search strategy and search statements; how to improve searches: weighting, specificity and exhaustivity, use of role indicators.

10. System construction and evaluation

Choosing the index language, the method of document storage, the form of index, the information product. Measures of recall and precision of information retrieval; use of performance measures.

11. The computer as a documentation tool

The index entry as unit record; inventories, catalogs and indexes; selective dissemination of information; information retrieval on demand.

12. Computer hardware

The origin of the computer; the central processing unit; input and output devices; computer configurations and capabilities.

13. Computer software

Machine language; binary arithmetic; bits, bytes and words; repetitive instructions; assembly language.

14. High level programming languages

Development of high level languages; compilers; source languages and object languages; examples of high level languages, e.g. FORTRAN, ALGOL; development of program packages; examples of packages systems, e.g. FAMULUS, MIMI IV, BASIS.

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15. Bibliographic information systems

MARC (Machine Readable Cataloguing); the MARC format; fixed length and variable length fields; the record directory; variations on the MARC format.

16. MARC applications

OCLC (Ohio Colleges Library Center); services and products; organisation and costs; use of the MARC data base and format.

17. Non MARC systems

Format construction; text-editing processes; numeric data base systems.

18. Automatic indexing and abstracting

Statistical analysis of text; Luhn and KWIC indexing; derivative indexing; factor analysis; semantic mapping; clustering and clumping.

19. Economics of computer applications

Costs and benefits: on-line and off-line, main frame and mini computer, in-house and cooperative systems, commercial services; cost, value and price of information.

20. Networks

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JUNE 21-25, 1976

OUTLINE

I. INTRODUCTION

A. Workshop Outline

The outline will be handed out. The plan for the week will be reviewed and discussed briefly. It is recognized that the needs and desires of the participants, known so inadequately at this stage by the workshop leader, can affect and change the outline. The workshop will attempt to be responsive to the needs of the participants as they are revealed. The workshop will be an interactive seminar and not a lecture.

B. Introduction to and Background of the Workshop Leader

The objective of this session will be to inform the participants about the workshop leader, who he is, what he has done, what he is doing now, his areas of expertise, the context in which he operates, etc. Participants should come away with a good idea of what they can expect from the leader.

C. Introduction of Each of the Participants

Just as the workshop leader has introduced himself, each of the participants should similarly introduce themselves, both to the leader and to each other. Each one should describe his or her training, background, and present responsibilities. Each should state what they would like to get out of the workshop. The objective of this session is: (1) for the leader to become aware of the needs and expectations of the group, including the background and level of sophistication of each in the topic being discussed; (2) for the participants to become aware of the characteristics of each other in order to develop improved interaction throughout the workshop.

D. Introduction to the ERIC System

The ERIC system is the workshop leader's present environment. Most of his examples will necessarily come from ERIC. The intent of this session will be to ground the participants thoroughly in the ERIC system so that they will better understand what the leader says throughout the workshop. It will be necessary to cover the structure of ERIC, the operational flow, and the products.

After the basic description of ERIC, it will be possible to get into how ERIC originally went about arriving at standards, how ERIC currently gets involved in standards, and what ERIC has done or intends to do about new and developing standards.

DAY 1 (CONT.)

1. ERIC - Its Structure, History, Operational Flow, and Products

2. Functions of ERIC Involving Standards

   - Decentralized document processing for centralized abstract journal/data base construction
   - Document selection
   - Descriptive cataloging
   - Institutional names
   - Indexing vocabulary
     - Identifiers
   - Report Number/Contract Number formats
   - Pagination
   - Document Legibility/Reproducibility
   - Abstract type and format
   - Tape formats (exchange formats)
   - Retrieval programs

3. ERIC Processing Manual

   (as the embodiment of ERIC standards)

4. ERIC's Attitude Toward Standards in the Future

DAY 1 (CONT.) II. STANDARDS AND STANDARDIZATION

A. Definitions

What are standards? What is standardization? Some of the definitions to be found in the literature will be examined. A very broad outlook will be maintained as far as the workshop is concerned. Standards will not refer solely to formal standards with massive institutional backing, but rather, to anything that saves you from re-inventing the wheel, to any accredited solution to a recurrent problem.

Exercise: Ask each participant to write a definition of "standard" on a 3 x 5 card. Read and discuss each one.

B. Types of Standards

- o Formal standards
- o Rules, guidelines, specifications, instructions, conventions, recommended practices
- o Manuals, handbooks, dictionaries, encyclopedias, textbooks, reference works
- o Authority lists, thesauri, source directories
- o De facto standards (e.g., LC cards in the U.S.)
- o Voluntary vs. Mandatory standards (e.g., ANSI vs. FIPS) Standards can cause great controversy if they are developed in secrecy and groups expected to participate are not brought into their development.

C. Need/Value/Purpose of Standards

Why are standards needed? How can they help and what do they accomplish? In any given application, such as ERIC, it is easy to see how chaos would reign without standards. (Give example of 3x5 cards.) It is more difficult to summarize the value of standards in terms that apply to all situations. Sanders has done this best in his "The Aim of Standardization" (p. 5-11).

Exercise: Ask each participant to provide an example of a situation (not necessarily bibliographic) that would be untenable without standardization of some kind of another. Discuss each example.

DAY 1
(CONT.)

The complexity of the standards picture, particularly on the conventional library side, is very great and few follow it in any detail. However, several trends seem apparent.

- o Willingness to cooperate is much increased.
- o International activity is very great.
- o Simplicity is in and theoretical complexity is out.
- o Adjustment to machine constraints has largely been accomplished.
- o Cataloging from the piece (with a consequent de-emphasis on outside research) is in the ascendant.
- o Reliance on national solutions to their own problems (rather than solutions imposed from "outside") is in ascendant.
- o Universal Bibliographic Control (UBC) is running very strong.
- o Recognition that choice of entry and headings is idiosyncratic, local, and virtually insoluble from a standards point of view.
- o There isn't enough money to do the job without utmost use of both cooperation and standards.

AY 2
IRNING

III. STANDARDS ORGANIZATIONS

The purpose of this section is two-fold: (1) to outline the structure of the information community in the United States and how the component parts interact with respect to standards; (2) to outline the structure of the standards development process and the standards-setting institutions at the various levels.

A. U. S. Information Community

- o Libraries (Academic, public, special) e.g., LC,
- o Abstracting and Indexing Services (Professional Associations) e.g., Chemical Abstracts, BIOSIS.
- o Government Information Centers, e.g., NTIS, DDC, ERIC, NASA
- o Information Industry, e.g., Pollution Abstracts

Standards activity in the library/information science field has been concentrated in the realm of the conventional libraries. The Government Information Centers developed procedures centered around the technical report literature, a form almost totally neglected by the regular libraries: The A&I services have concentrated on journal articles, also a form not handled by libraries. The Information Industry companies have been very eclectic. They tend to do what is efficient and what will sell. They have very little commitment to theoretical considerations. They have no commitment to continuity should profitability suffer. Traditionally, these four groups have had little interaction. This is just beginning to change as the climate for standardization, national and universal bibliographic control, international cooperation, economy, ISBN, ISSN, etc., improves. Organizations such as the National Commission on Libraries and Information Science (NCLIS) and the Advisory Group on National Bibliographic Control are attempting to remove the traditional barriers between these communities.

B. Levels of Standardization Activity

1. International Level

a. International Organization for Standardization (ISO)

(1) Technical Committee 46 on Documentation (TC46)

(2) Technical Committee 37 on Terminology: Principles and Coordination

(3) Technical Committee 97 on Computers and Information Processing

DAY 2 (CONT.)

b. United National Educational, Scientific, and Cultural Organization (UNESCO)

(1) UNISIST (World Science Information System)

- Working Group on Bibliographic Descriptions (with ICSU-AB)

(2) International Information Centre for Terminology (INFOTERM)

(3) International Information Centre on Standards in Informati and Documentation (ISODOC) - see News about TC46,1:2

2. Regional/Multinational Level

Comision Panamericana de Normalisation (Pan American Standards Coordinating Committee) - COPANT

3. National Level (See also list in UNISIST Manual)

American National Standards Institute (ANSI).

a. Committee Z39 on Standardization in the Field of Library Work, Documentation, and Related Publishing Practices.

b. Committee X3 on Computers and Information Processing.

c. Committee PH5 on Photographic Reproduction of Documents.

d. Committee PH7 on Photographic Audiovisual Standards.

e. Committee Z85 on Standardization of Library Supplies and Equipment.

4. Federal Level

National Bureau of Standards (NBS)
Federal Information Processing Standards (FIPS)

5. Professional and Trade Association Level

a. American Society for Information Science (ASIS)
Standards Committee

b. Special Libraries Association (SLA)
Standards Committee

c. Committee on Scientific and Technical Information (COSATI) - (now defunct)

d. Advisory Group on National Bibliographic Control (sponsored by NSF, CLR, and NCLIS)

DAY 2
AFTERNOON

c. American Library Association

(1) Committee on Standards

(2) Information Science and Automation Division.
Committee on Technical Standards for Library Automation (TESLA)

(3) Committee on Representation in Machine-Readable Form of Bibliographic Information (MARBI) - an interdivisional committee of RTSD/ISAD/RASD

(a) MARC Advisory Committee

(4) Catalog Code Revision Committee

d. Association of College and Research Libraries (ACRL).

(1) Ad Hoc Committee to Revise Standards for College Libraries.

(2) Guidelines for Branch Libraries in Colleges and Universities

(3) Guidelines for Two-Year College Learning Resources Programs

e. Association of Research Libraries (ARL).
Committee on University Library Standards.

f. National Microform Association (NMA)

g. International Council of Scientific Unions (ICSU).
Abstracting Board (ICSU-AB).
Working Group on Bibliographic Descriptions (with UNISIST)

h. International Federation for Documentation (FID).

i. International Federation of Library Associations (IFLA).
Working Group on Content Designators

6. Company, Individual Organization, and Mixed Level

a. Library of Congress (LC)

(1) Information Systems Office (ISO)
(2) MARC Development Office (MDO)
(c) Technical Processes Research Office

b. Government Printing Office (GPO)

DAY 2
(CONT.)

The various levels of standardization activity create a virtual maze. Very few people are conversant with the maze and even fewer keep abreast of all of the intertwined activities all of the time. It is important, therefore, to zero in on the particular activity that applies to your own application.

The objective of this session will be to introduce the participants to each organization, to give them the addresses, some idea of the structure of each, and how each gets involved in standardization. There will be a heavy dependence on the documentation that each organization produces, for example:

ISO

Memento
Catalog
News about TC46
TC46 Annual Report
Bulletin
Press Service

and on descriptive writer-ups such as the Blum article on ISO TC46 and the Sanders book on ISO.

Exercise: o ISO Film
o ANSI Slides

2 III. STANDARDS ORGANIZATION (CONTINUED)
NT.)

C. How a Standard Develops (in context of above organizations)

Z39 (Blum, p. 27; Readings p. 139)
TC46 (Blum, p. 323; Readings p. 133)
ISO (Sanders, p. 71)
X3 (Flow Chart)
TESLA (Initiative Standard Proposal; Readings p. 133)

The points that will be made here are how an idea for a standard (which may start with an individual) can germinate by becoming a recommendation or proposal of one of the bodies feeding into a national standards-setting body such as ANSI. The idea gets assigned to a Committee, such as Z39. The chairman of Z39, if he agrees, selects a chairman for a new subcommittee or working group. The membership of the subcommittee is very much up to the chairman selected. The recommendation or proposal going to ANSI may be merely an idea or it may be fairly well elaborated upon. For example, the results of the Advisory Group Working Parties will probably go to ANSI, but will represent a substantial amount of the total work required.

The draft process, the review process, the attempts to resolve negative votes, will be described.

The "piggybacking" process by which an ANSI standard can become an ISO or FIPS standard will also be touched upon.

Exercise: List and describe the three bibliographic standards that you would most like to have in order to make your own job easier.

A composite list of the standards selected by the participants will be made and together the group will determine for how many of those needs listed acceptable standards may already exist.

DAY 2 (CONT.)

IV. BIBLIOGRAPHIC STANDARDS

A. Some Existing Bibliographic Standards

The group would be given actual copies of the ANSI/Z39 and ISO/TC46 standards to study. (Refer to Schmierer letter.)

Exercise: Each participant will take an individual ANSI or ISO standard and will describe how it might be used in their particular operation. If the standard cannot be used, some explanation of why it cannot should be provided.

B. Current Bibliographic Standards Activities and Initiatives in Progress

- International Standard Book Number (ISBN)
- International Standard Serial Number (ISSN)
- International Standard Bibliographic Description (ISBD)
- International Serials Data System (ISDS)
- Anglo-American Cataloging Rules (AACR) - Revision
- Universal Bibliographic Control (UBC)
- National Commission on Libraries and Information Science (NCLIS
- Advisory Group on National Bibliographic Control (NSF/CLR/NCLIS
- UNISIST Manuals (will get into in day 3)
- MARC International Format

  Supermarc → MIF → UNIMARC

- Z39 Committees in Progress (See News About Z39 and Blum p. 28; Readings p. 140)
  - Refereeing Journal Articles
  - Synoptics
  - Serial Holdings Data (for CONSER)
  - Book Spine Layout

AY 2
CONT.)

- Newspaper and Journal Publishing Statistics
- Serial Claims Form
- Scientific and Technical Translations

- TC46 Committees in Progress (See News About TC46 and Blum, p. 133; Readings, p. 134)
  - Bibliographic Descriptions (ISBD(M))
  - Documentary Reproduction
  - Country Name Codes
  - Multilingual Thesauri

DAY 3 MORNING

V. BASIC STANDARDS FOR THE PROCESSING OF BIBLIOGRAPHIC ENTITIES - STEPS TOWARD A GENERAL MANUAL OF COMMONLY ACCEPTABLE STANDARDS

A. Some Existing Manuals That Can Serve as Models

- o ERIC Processing Manual
- o INIS Reference Series
- o Anglo-American Cataloging Rules
- o NASA Manual
- o COSATI Standard for the Descriptive Cataloging of Technical Repo
- o CEC Manuals
- o DDC Manual

Exercise: Take a document and develop a bibliographic description according to the following "standards":

- o ERIC
- o INIS
- o COSATI (DD Form 1473)
- o ANSI (Draft Standard for Bibliographic References)
- o ISBD(M)

3
ERNOON

B. Manuals That Specify Machine-Readable Record Layouts - Their Difference From Processing Manuals

- o UNISIST Reference Manual
- o MARC Manuals
- o UNIMARC Draft

The difference between an exchange format and an operating format will be demonstrated. The ERIC operating format will be contrasted with ERIC in MARC II format. Some of the key concepts of the UNISIST Reference Manual will be discussed, e.g., Bibliographic Level, Literature Type, etc.

C. UNISIST Manuals in Progress

- o Handbook for Managers of Information Systems and Services (Draft)

The draft status of this item will be stressed (Tocatlian letter). Nevertheless, the content of Chapter 6 "Standardization" will be gone over in detail.

- o Manual for Information Handling Procedures (Outline)

The outline will be gone over in detail and the prospective value of the item to the group, when it is published, will be discussed.

4
NING

D. Data Element Approach

1. Author(s)
2. Title and Title Supplement
3. Institutional Source(s)
4. Sponsoring Institution(s)
5. Publication Date
6. Pagination
7. Report Number(s)
8. Contract/Grant Numbers
9. Project Number
10. Publication Type
11. Journal Article Citation
12. Descriptive Note
13. Subject Indexing
14. Abstract/Annotation

The properties of these data elements will be discussed and the variability that can be expected in each of them made clear.

AY 4
TERNOON

VI. PUTTING IT ALL TOGETHER

What do the participants need right now and to what extent can this meeting help achieve these ends? Can we agree on various ways of doing things that achieve the local objectives, make good use of existing standards to achieve efficiency, and yet are compatible with what may be going on nationally and internationally (for longer range purposes)?

AY 5

VII. OPEN TO PARTICIPANT SUGGESTIONS

It might be appropriate for the group to examine each participant's individual situation and to advise on the possible application of standards - a kind of standards "clinic".

BIBLIOGRAPHIC STANDARDS

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BIBLIOGRAPHIC STANDARDS
A READING LIST

PREPARED FOR USE AT A WORKSHOP ON BIBLIOGRAPHIC STANDARDS

SPONSORED BY THE ORGANIZATION OF AMERICAN STATES (OAS)
IN LIMA, PERU

JUNE 21-25, 1976

By
TED BRANDHORST
(ERIC Processing & Reference Facility)

CONTENTS

WORKSHOP ON

BIBLIOGRAPHIC STANDARDS

SPONSORED BY THE ORGANIZATION OF AMERICAN STATES (OAS)

IN LIMA, PERU

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by

TED BRANDHORST

(ERIC PROCESSING AND REFERENCE FACILITY)

CONTENTS

Standards Committee
1155 Sixteenth Street, Suite 210, N.W.
Washington, D.C. 20036

Chairperson: Margaret L. Pflueger
Energy Research & Development Administration
P. O. Box 62
Oak Ridge, Tennessee 37830

7. Comision Panamerican de Normas Tecnicos (COPANT
Pan American Standards Commission
Secretaria General
Avenida Presidente Roque Saenz Pena 501
Buenos Aires, Argentina

8. International Federation of Library Associations (IFLA)
International Office for Universal Bibliographic Control (UBC)
c/o The British Library
Great Russell Street
London SC1B 3DG
Great Britain

9. International Information Centre for Terminology (INFOTERM)
Austrian Standards Institute
Postfach 130
A-1021 Vienna 2
Austria

10. International Organization for Standardization (ISO)
1 rue de Varembe
Case Postale 56
1211 Geneva 20
Switzerland

11. International Organization for Standardization (ISO)
Technical Committee 46: Documentation (TC 46)
Deutscher Normenausschuss
1 Berlin 30
Postfach 1107
West Germany

12. International Serials Data System (ISDS)
ISDS International Centre
20, rue Bachaumont
75002 Paris
France

1. Committee on Representation in Machine-Readable Form of Bibliographic Information (MARBI)
50 East Huron Street
Chicago, Illinois 60611

Chairperson: Charles T. Payne
University of Chicago Library
Chicago, Illinois 60637

2. American Library Association (ALA)
Committee on Standards
50 East Huron Street
Chicago, Illinois 60611

Chairperson: Patricia A. Woodrum
Tulsa City-County Library System
400 Civic Center
Tulsa, Oklahoma 74103
(plus six members)

3. American Library Association (ALA)
Information Science and Automation Division (ISAD)
Technical Standards for Library Automation Committee (TESLA)
50 East Huron Street
Chicago, Illinois 60611

Chairperson: John C. Kountz
Office of the Chancellor
California State University & Colleges
5670 Wilshire Blvd., Suite 900
Los Angeles, California 90036

4. American National Standards Institute (ANSI)
1430 Broadway
New York, N.Y. 10018

5. American National Standards Institute (ANSI)
Committee Z39 on Library Work, Documentation, and Related Publishing Practices
c/o School of Library Science
University of North Carolina
Chapel Hill, North Carolina 27514

Chairman: Jerrold Orne
Secretary: Deborah Bodner

DEFINITIONS

BIBLIOGRAPHIC DATA

Any descriptive information about a book, or other library material.

BIBLIOGRAPHIC DESCRIPTION

A collection of information which is intended to provide a unique and unambiguous reference, such as will enable a librarian to identify and retrieve the document, or an intending purchaser to order it from the publisher or other source.
(Martin, #16)

BIBLIOGRAPHIC RECORD

A collection of information which pertains to a single document, and which is stored in machine-readable form as a self-contained and unique logical structure. A bibliographic record is likely to include a bibliographic description of the document in question; some form of classification and/or indexing applied to the subject content of the document; an abstract or summary; and other information.
(Martin, #16)

BIBLIOGRAPHIC STANDARDS

Prescriptive statements that specify the content and/or representation of bibliographic data.
(Schmierer)

BIBLIOGRAPHY

The art or science of the description of books. Current custom has developed a broadened usage in which the word "books" is now used to circumscribe all library materials. According to this fashion, "book" means not only physical volumes (monographs or serials), microforms, and audiovisual materials (commonly called "non-book materials"), but also other items found in library collections.

CONVENTION

An agreement or compact. General acceptance of certain practices or attitudes. A practice or procedure widely observed in a group. A widely used and accepted device or technique.
(American Heritage Dictionary)

DOCUMENT

Any published item which is to be described in a bibliographic record.
(Martin, #16)

13. ISBN Agency
c/o The Bowker Co.
1180 Avenue of the Americas
New York, N.Y. 10036

14. National Bureau of Standards
Federal Information Processing Standards (FIPS)
Office of ADP Standards Management
Technology Building, Room B-226
Washington, D.C. 20234

16. National Microfilm Association
8728 Colesville Road, Suite 1101
Silver Spring, Maryland 20910

17. NTIS Report Number Clearinghouse
National Technical Information Service
Springfield, Virginia 22161

Coordinator: Jaffray Aronson

18. Special Libraries Association
Standards Committee
235 Park Avenue South
New York, N.Y. 10003

Chairperson: Zoe Cosgrove
3M Company, Tape Division Library
3M Center, 230-1-13
St. Paul, Minnesota 55101

SPECIFICATION

1. A detailed and exact statement of particulars; especially a statement prescribing materials, dimensions, and workmanship for something to be built, installed, or manufactured.
(American Heritage Dictionary)

2. A document which lays down characteristics of a product or a service such as levels of quality, performance, safety, dimension. It may include terminology, symbols, testing and test methods, packaging, marking or labelling requirements; technical specification may also take the form of a code of practice.
(Atherton)

3. A specification is a concise statement of a set of requirements to be satisfied by a product, a material, or a process, indicating, whenever appropriate, the procedure by means of which it may be determined whether the requirements given are satisfied. Note: a specification may be a standard, a part of a standard, or independent of a standard.
(ISO)

4. Documents, usually used in connection with procurement, that define a product, material, or process in terms of a set of requirements to be satisfied and whenever appropriate the procedure by which it may be determined whether the requriements given are satisfied. Specifications are the solution to individual situations. They are usually written by one person or a small group of persons for a limited audience. A specification becomes effective as soon as it is written, whereas a standard is a more formal document which is usually evolved through some sort of process of approval and acceptance by consensus.
(Avedon/Weil)

STANDARD

1. An acknowledged measure of comparison for quantitative or qualitative value; criterion; norm.
(American Heritage Dictionary)

2. A degree or level of requirement, excellence, or attainment.
(American Heritage Dictionary)

3. The result of a particular standardization effort, which, after approval by a recognized authority, takes the form of a document containing a set of conditions to be fulfilled.
(Schmierer)

4. Any measure by which one judges a thing as authentic, good, or adequate. Any authoritative rule, principle, or measure used to determine the value, quality, level, or degree of a thing.
(Webster)

DEFINITIONS

GUIDELINE

A statement of policy by a person or group having authority over an activity.
(American Heritage Dictionary)

INSTRUCTION

A direction, order, lesson. An imparted item of knowledge.
(American Heritage Dictionary)

LIBRARY STANDARDS

Criteria by which library services may be measured and assessed. They are determined by professional librarians in order to attain and maintain the objectives they have set themselves. Library standards may be interpreted variously as the pattern of an ideal, or model procedure, a measure for appraisal, a stimulus for future development and improvement and as an instrument to assist decision and action not only by librarians themselves but by laymen concerned indirectly with the institution, planning, and administration of library services.
(South African Library Association)

NORM

An Authoritative rule or standard. An ideal standard binding upon the members of a group and serving to guide, control, or regulate proper and acceptable behavior.

REGULATION

1. A binding document which contains legislative, regulatory or administrative rules and which is adopted and published by an authority legally vested with the necessary power.
(Atherton)

2. A principle, rule, or law designed to control or govern behavior. A governmental order having the force of law.
(American Heritage Dictionary)

3. Authoritative rules or orders having the force of law issued by an executive authority of a Government.
(Webster)

RULE

An authoritative direction for conduct or procedure. A principle of conduct observed by the members of a group. An established habit of

DEFINITIONS

5. Standards developed by ANSI and ISO are essentially guidelines---orderly approaches---solutions to recurring situations. They are developed for the benefit and with the cooperation of those concerned, and they usually become established voluntarily by authority, custom, or general consent."
(Orne and Weil, BASIS "Standards" column)

6. For the purpose of this Directory, the term "standards" encompasses the following words: specifications, tests and test methods, analyses, assays, reference samples, recommended practices, guides to good practice, nomenclature, symbols, grading rules, codes, forms and contracts, criteria, methods and codes of practice.
(Directory of United States Standardization Activities)

7. A technical specification or other document available to the public, drawn up with the cooperation and consensus or general approval of all interests affected by it based on the consolidated results of science, technology and experience, aimed at the promotion of optimum community benefits and approved by a body recognized on the national, regional, or international level.

8. Standards are technical specifications or other documents containing a set of conditions to be fulfilled. They may be issued by companies, associations or groups, government departments, national standards organizations, or by regional or international standards bodies. Standards are different from regulations, guidelines or statements which provide details of the requirements for materials, components or processes.
(Atherton)

9. The result of a particular standardization effort, approved by a recognized authority. It may take the form of: (1) a document containing a set of conditions to be fulfilled; (2) a fundamental unit or physical constant - examples; ampere, absolute zero; (3) an object for physical comparison - examples: metre.
(ISO)

STANDARDIZATION

1. The mediated process of formulating and applying rules for an orderly and consistent approach to a specific activity for the benefit of all concerned and, in particular, for the promotion of overall economy taking due account of functional conditions.
(ISO/Schmierer)

DEFINITIONS

2. The process by which systems and values are established in individual, group, and social life by natural evolution, custom, authority or common consent which, by remaining invariable over a period of time in a changing environment of unlimited modality, provide the stable basis essential for the growth and attainment of: (a) social or group identity and survival; (b) communication, understanding, and exchange of ideas, goods, and services between individuals and groups; (c) knowledge and experience for further development; (d) consolidation of social economic, and technological attainments at any point in time so as to release creative energy for the search of higher and better values and systems.
(Sen)

3. Standardization is the setting up, by authority or common consent, of a quantity, quality, pattern, or method or a unit of measurement of an example for imitation. Related to standardization is the provision for guiding principles such as those prescribed for the presentation of the text of a book or an article or the design of library buildings.
(Atherton)

4. The process of formulating and applying rules for an orderly approach to a specific activity for the benefit and with the cooperation of all concerned and in particular for the promotion of optimum overall economy taking due account of functional conditions and safety requirements.

   It is based on the consolidated results of science, technique and experience.

   It determines not only the basis for the present but also for future development and it should keep pace with progress.

   Some particular applications are:

   (1) units of measurement;

   (2) terminology and symbolic representation;

   (3) products and processes (definition and selection of characteristics of products, testing and measuring methods, specification of characteristics of products for defining their quality, regulation of variety, interchangeability, etc.);

   (4) safety of persons and goods.
   (Sanders)

DEFINITIONS

UNIVERSAL BIBLIOGRAPHIC CONTROL (UBC)

The guiding principle for UBC should be as follows: the information on a book should be produced as completely and correctly as possible at the earliest possible date. In the interest of speed, accuracy, and simplicity, this should be done in the country of origin by the national bibliographies. The data should be made available in machine-readable form.
(Kaltwasser)

Background to the Course

In 1978, K.P. Broadbent visited China as part of a non-centre delegation. He took advantage of the opportunity to examine the state of information sciences in China and have exploratory talks with officials of the Chinese Academy of Sciences (CAS) and the Institute of Scientific and Technical Information of China (ISTIC). At this time, the training needs and the question of possible IDRC support were first raised. The report of Broadbent's visit has been published by IDRC under the title "Dissemination of Scientific Information in the People's Republic of China. (148e) (This has been distributed.)

The proposal for the course was formally presented to IDRC as part of a package of projects in the area of Information Sciences during the visit to China by Centre officers, September 8-17, 1980. It was also included in the package of projects accepted for development during the return visit of the Chinese authorities to Ottawa in June 1981.

The Chinese have placed a high priority on the provision of information services to their scientists as part of their overall modernization plans. They see this course as a means of updating senior administrators in modern methods of dealing with the ever growing complexity of information in the broad area of science and technology.

The ISTIC has been given overall responsibility for providing information in science and technology in China. It is placed directly under the State Scientific and Technological Commission (SSTC) and is functionally, if not administratively, at the top of a hierarchy which includes six regional and 29 provincial information and documentation centres of varying size and responsibility. Its origins go back to 1956, when its forerunner was founded by the Chinese Academy of Science (CAS), and in 1958 it was given its present name and status by the government.

The ISTIC now has a staff of some 1,200 at its headquarters in Beijing and about 500 other employees at its branch in Chongqing, Sichuan Province. (See earlier section on ISTIC - Page 29)

By its unique position in relation to the SSTC, ISTIC can play a key role in the development of information in China. This is emphasized by the fact that the secretariats of the Chinese Society of Scientific & Technical Information (CSSTI) and the Chinese National Technical Committee on Standardization in Documentation (corresponding to ISO TC 46, the technical committee dealing with documentation of the International Organization for Standardization) are placed in ISTIC's Division of Methodology.

Political events during the mid-sixties, generally referred to as the Cultural Revolution, and the general esoteric position in which information services have traditionally been held in China, have placed a serious constraint on institutuions like ISTIC. Unlike similar institutions in other countries (e.g. INSDOC in India), ISTIC in this general cultural climate did not attempt to develop services to users, particularly services based on foreign material. It was only very recently that China slowly began to acknowledge that ready access to information from all sources is a basic pre-requisite for development of a modern R & D network.

Even though ISTIC, as one of the world's major information institutions, is fairly well endowed in local terms, its staff has been effectively cut off from the type of rapid development that has taken place in the rest of the world information community. The basic needs at this time are for training and upgrading of information staffs, and from an examination of these basic needs, the Chinese have identified practical management as the most important priority.

Objectives of the Course

The main objective of this course will be to strengthen China's capacity to provide improved information services by instructing senior personnel in practical information management methods. Specifically, it will:

- provide participants with enough fundamental knowledge of modern information procedures to help improve their work and pass the experience on to others;
- increase the ability of participants to grasp the principles of scientific management;
- provide greater awareness of developments outside China in the sphere of information management;
- improve decision-making;
- provide the basis for further training.

Course Content and Delivery

The delivery will be by formal lectures of major topics followed by group sessions and tutorials. Both Chinese and English will be used. One day will be set aside for a case study to be determined in consultation with ISTIC. All materials will be available in Chinese and a great deal of use will be made of audio-visuals.

Until we meet the participants it will be difficult to target our audience effectively. This will mean the need for some flexibility on our part and adjustment as we go along. We can expect some hasty changes, but on the whole, juding by the pre-course information given us, acceptance by the Chinese authorities of our synopses, changes might be kept to a minimum. We do have the capability of re-writing lecture notes, but given the need to get translations made, the time element will be crucial. Some changes as we go along are, however, inevitable and provision will be made for a great deal of up-dating, as, for instance, with the list of acronyms, and glossaries. In order to meet ISTIC's deadline, compilation went ahead before all lectures were completed. Amendments, additions, will be made during the course.

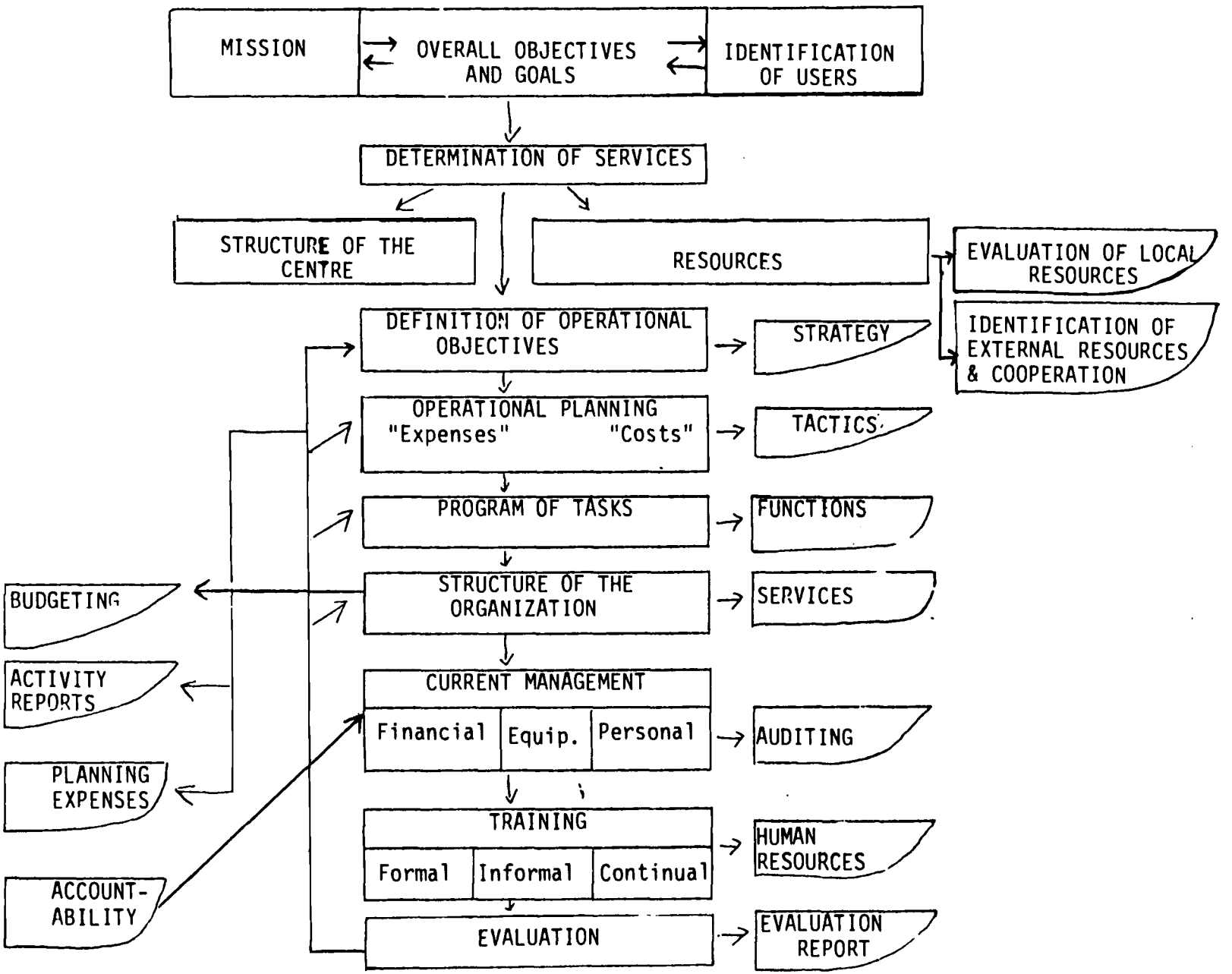
Please keep written lectures and presentations simple and straightforward. Expect the participants to have had only minimal exposure to foreign information services. We do have a good language capability on the Course. Two lecturers are native speakers and one lecturer has language training. Nevertheless, we expect use to be made of interpreters and translations. Please bear in mind the needs of both interpreters and translators in preparation and actual presentation. An overt theoretical approach to the subject matter is, in any case, to be avoided. ISTIC have made their wishes known at a very early stage, that they wish the Course to focus on *practical* management. The approach should also be problem-orientated. Hence, the curriculum emphasis on certain identifiable aspects of information work and omission of others.

After analysis of the working timetable, first drawn up in 1981, we have opted for use of modules. Each module contains a series of related topics designed to assist those involved in practical management of information services. A series of discussion papers and exercises are included in some of the modules to animate the participants and get them to talk about their problems. Each module should contain leads to further examination and self-instruction in the subject matter to enable participants to build up a consistent body of experience.

We should also aim to help participants take a critical look at their own services, help them share experiences and generally work for the betterment of their own group of users.

SCHEMATIC OUTLINE

MANAGEMENT OF INFORMATION CENTERS - CHINA



FIRST ISTIC REQUEST FOR

THE ADVANCED TRAINING COURSE

ON

MANAGEMENT OF INFORMATION CENTER AND INFORMATION POLICY

A. Sponsorship of the Course

The Asvanced Training Course will be held in Beijing, China from to , , which will be organized by the Institute of Scientific and Technical Information of China(ISTIC) and International development Research Centre of Canada(IDRC), with the financial suppot of IDRC.

B. Subject and Tittle of the Course

According to the practical situation and real need of china in the field of scientific and technical information work, ISTIC suggests to organize this course still following the principles put out in the "Memorandum on the Establishmentof the Friendly Cooperation between ISTIC and IDRC in the Field of Information Sciences" from Director Lin Zixin to Director I. D. Head.

The subject of this course should be on the management of information center and information policy. Considering the fact that most participants in the course will be managers of all main information institutes and centers of our country, major emphasis should be placed on the scientific management of information center. The Tittle of the course is suggested as "Asvanced Trainning Course on management of Information center and Information Policy"

C. Aims of the Course

The course will be designed:

To give participants enough fundamental knowledge

on the information science and guidence to allow them to carry out well the work of scientific and technical information;

To increase ability to manage information center and institute and to make information policy scientifically.

The management level of our information centers or institutes should be, through this effort, raised, and the efficiency of information service should also be improved.

The participants hope lectures who should instruct the critical knowledge and analyze the practical examples, to make them informed concretely on the following points:

1. Management of information center in developed countries, especially the main contents and principle of the documentation management.

2. Experiences of some developed and developing countries in the respect of management of information center, especially of national information center.

3. The fundamental principles and factors of information policy making.

D. Curriculum

It should be avoided that lectures only instruct general or unfathomable theory and those most advanced information systems which can only be seen, but cann't be cought up by us now. So we suggest lecturers to decide the contents of instruction fully considering the practical situation and needs of our country. We suggest the contents of the course as follows:

1. General introduction of scientific and technical information work and information science(area, objectives, tasks, process and trends of development, etc.)

2. Main types of information centers and their functions and roles in the development of society, economy, science and technology.

3. function, planning and management of a national information center

4. management and trainning of information workers and staff members of an information center, including the personel structure, tittles, trainning and examination, etc.

5. Ways to improve information service to users and readers, to raise the efficiency of usage of literatures and to manage an information center from the point of view of information economics or cost account.

(the five points above mentioned are better to be introduced in the way of combination of theory and practical examples)

6. Following the five points mentioned above, analyzing specially the methods and examples of managements in several national information centers .

7. The fundamental contents or factors of ~~national~~ information policy, and the principles, methord and procedure of it's making.

8. ~~Introducing and analyzing the national information policies of such countries as USA, USSR, Japan, India and Brazil.~~ System Analysis and design.

E. Duration, timing and place of the course

The course is suggested to be held in December 1981 or later in March, 1982 in Beijing. It's duration may be five weeks among which one week is for lecturers' tour programes in China. If in this case, there will be 40 sections equaling to 120 hours approximately.

40 sections may be divided in the following way:

20 sections(60 hours) for points 1-5 listed in D;

10 sections(30 hours) for point 6 listed in D;

10 sections(30 hours) for points 7 and 8 listed in D.

F. Size of the course and qualification of participants

60 participants will be selected from the candidates to attend this course. They will be from the main scientific and technical information institutes of provinces, municipals and specialized ministries, some large public libraries and library and information departments of universities, as well as scientific and technical information agencies concerned. Most of them are directors, deputy directors and other managers of scientific and technical information institutes. They are engaged in scientific and technical information work for many years with plenty more experiences of practical information work in our country.

G. Lecturers

We suggest that the course will be conducted by a Team of 5-6 lecturers, better with hight theory level and considerable experiences in information practice. While selecting lecturers, we should consider requirements we have put out to the course. We hope the lecturers not only to be professors in the information science, but also information-center-managers and information policy maker to be included.

For the best effectiveness of instruction, we hope to have lecturers who can speak Chinese.

If possible and convenient, we would like to have lecturers' biographies and publication lists before the course.

H. Preparation of materials

It should be better to lecture with teaching materials and references. All materials should be in English or Chinese, and sent directly to ISTIC 2 months before the opening of the course.

NOTE FROM COURSE ADMINISTRATOR:

Please note the arrangement of the curriculum into modules. Please peruse the timetable carefully and see if your lectures fit into the modular form without difficulty. The timetable is not final and is still open to changes. When all synopses/lectures are received, the timetable will be issued in final form. Any comments, omissions or errors should be reported as soon as possible.

K. P. Broadbent

Suggested reorganization of the present CHINA COURSE into a module programme.

INTRODUCTION TO INFORMATION SCIENCE

Module 1 SOURCES AND TYPES OF INFORMATION TO SATISFY USERS' NEEDS

(24, 26, 27, 18)

Module 2 ORGANIZATION, FUNCTIONS, AND MANAGEMENT OF INFORMATION CENTRES

(10, 29, 11, 12, 13, 17, 20, 16, 14, 30, 32(?))

AGE(AIT), Bell, Canada, Specialized Information Centres

Module 3 INFORMATION SYSTEMS, DATA BASES AND INFORMATION TECHNOLOGY

(23, 6(?), 8(?), 22(?), 21, 7, 9, 25, 35)
On-line circulation, OCLC, CODOC, AGRIS, ALAS, CUSS, ULSS, CAN/OLE, CISTI

Module 4 MANPOWER DEVELOPMENT

(31, 33, 34, 32(?))

CASE STUDY - ISTIC

OL

PREVIOUS PROFESSIONAL VISITS

Date	Institution/Individual/Group	Report	Comments
1974	Josephine Riss-Fang	Chinese Libraries carry out Mao's dictum 'Serve the people' - Wilson Library Bulletin - 1975 49(10) 744-749	Results of a five-week study tour. The author visited Kunming but information sparse.
1975	Frances Wood	Peking University Library Focus on International and Comparative Librarianship - 1976 7(3) 27-28	The results of a UK visit by a private group of Librarians is presented. Politically orientated.
1976 (June)	British Museum Richnell D.T. & Howard Nelson	Libraries in the People's Republic of China. A report of a visit. - June 1976 - Journal of Librarianship 1977 9(1) 1-16	This is probably the best trip report of that period and one of the first by a group of Librarians. Howard Nelson himself being an orientalist gives as good an account as was possible at that time. The training of Chinese Librarians is briefly described.
1976	China-Australia Friendship Society Tour	China : 'Libraries serve the people'. Library Journal 1978 - 27(4) 54-63	Very politically orientated. However, it points out the lack of access to foreign literature.

PREVIOUS PROFESSIONAL VISITS contd (1)

Date	Institution/Individual/Group	Report	Comments
1978	Swedish Mission	Several reports - (1) Tell, B. Libraries, Documentation and Computers. Tidskift Dokumentation - 1979 35(2) 34-37 (2) Tell, M. A note about China's scientific and technological Information System. (Paper) Stockholm Royal Institute of Technology Library - 1980	
1979 (July)	US Librarians Visit	Porch, M.E. A Librarian visits mainland China. Top of the News - 1980 36(3) 293-295	
1979 (July)	China English Translation Assistance Group	Mathias, J., Kennedy, T.L. Computers, Language Reform - Lexicography in China. Report by CETA delegation - 1980 - Washington State University Press	Broadbent and Ting members of delegation. The report on computer application and information services contained in this Report is essentially the same as that set out in Broadbent's publication IDRC-148e.

PREVIOUS PROFESSIONAL VISITS contd (2)

Date	Institution/Individual/Group	Report	Comments
1979	National Library of Australia Delegation	(1) Wang, S.W. National Library of Australia Delegation's visit to China - East Asian Libraries Group of Australian Newsletter - 1980 (4) 2-3 (2) Baskin, S. NLA visit to China - Australian Academic Research Libraries - 1981 12(1) 35-40	
1980 (June)	British Library Lending Division	Line, M.B. Visit to China, June 1980 - Focus on International and Comparative Librarianship - 1980 11(2) 15-17	
1980 (March)	Commonwealth Agricultural Bureaux (CAB)		No report as such - See CAB NEWS

OTHER VISITS

After the 41st Congress of the International Federation for Documentation, to be held in Hongkong September 12-16, 1982, NFAIS President-Elect Inez L. Sperr, M. Lynne Neufeld, NFAIS Executive Director, Everett H. Brenner, American Petroleum Institute, and Herbert B. Landau, Engineering Information, Inc. will participate in a work-study tour of the People's Republic of China. They will visit A&I and information services, primarily in technical, engineering, and social science areas with the intent of later developing an overview report about Chinese A&I producers and activities, and the transfer of scholarly information from primary to secondary services in China.

The Chinese are currently embarked upon a program to upgrade and modernize their information storage and dissemination. Organizations on the tour include the Institute of Scientific and Technical Information of China (ISTIC), the Beijing Institute of Computer Technology, the Chinese Academy of Social Science, Nanjing University, and the Shanghai Municipal Library.

ISTIC has also invited M. Lynn Neufeld to give a talk in Beijing on the recent developments in the information scene in North America.

THE INFORMATION SCIENCES IN CHINA

John Woolston

Director, Information Sciences Division, IDRC

I

Institute for Scientific and Technical Information in China (ISTIC)

First meeting - September 10, 1980

Present: Director: Lin Zi Xin

Deputy Directors: Wang Wei

Liu Zhaodong

(about 6 other persons from ISTIC staff were also present)

IDRC: John Woolston

Jingjai Hanchanlash

There was a long description of the work of ISTIC, but this is covered in a document (Appendix I) that was given to us. We also obtained sample copies of ISTIC publications. These have been given to Kerry Broadbent and, if not of particular value to IDRC, will probably be offered to the Canada Institute for Scientific and Technical Information.

.../2

The ISTIC Director spoke about the plans for a large new building (50 000 m^2) whose construction has been approved by the Government. This will not be ready until 1983 at the earliest. The plans have recently been modified in the light of suggestions made by two UNESCO consultants.

The Information Sciences program of IDRC was described. Although ISTIC has "policy" and "coordinating" roles over all information activities in China, the ISTIC staff preferred not to discuss Chinese activities related to information in "agriculture" and "public health". They felt that they could do so only if representatives of the appropriate institutions were present. Indeed an offer was made - and warmly accepted - to organize a second meeting to which representatives of these institutions would be invited. In fact, this other meeting never took place. It was cancelled by ISTIC, and we learned that even our first meeting had been difficult to fit into the schedule of the ISTIC staff. Apparently, concurrent with the IDRC mission, ISTIC was also responsible for a group of 87 (!) persons who had been brought in by Scientific American in connection with the Chinese edition of this magazine.

There was explanatory discussion of possible IDRC-ISTIC cooperation.

.../3

Second meeting - September 16, 1980

Present: Deputy Directors: Wang Wei

Liu Zhaodong

IDRC: John Woolston

The ISTIC representatives presented their formal request for IDRC cooperation in six project items (see Appendix J). Three of these had been discussed in a more preliminary fashion during Woolston's visit to ISTIC on 10 September; however, at that time, our response had been tentative and conditioned upon the signing of an ISTIC/IDRC Agreement. With the Agreement now signed, the ISTIC representatives were seeking more definite assurances.

The following summarizes Woolston's reactions to the six items identified by ISTIC.

i) ISTIC was assured that IDRC would contact TECHNONET Asia to find out whether it would be interested in the proposed exchange of visits. Subject to TECHNONET's response, IDRC would likely be able to find a way to finance the item. ISTIC would be expected, however, to make contact with the appropriate Chinese institutions providing industrial extension services

.../4

and to ensure that the TECHNONET party would have an opportunity to visit Chinese industries representing the sectors of priority interest to the TECHNONET participants.

ii) ISTIC was assured that, if it obtained an HP 3000, IDRC would negotiate a direct MINISIS licensing agreement (ISTIC is not participating in the UNDP project). To avoid extensive travel, however, Woolston proposed the ISTIC should not insist on separate MINISIS training, but make an arrangement so that its people could participate in the training to be organized under the UNDP project.

iii) Woolston promised to consult UNESCO and to give serious consideration to the possibility of having IDRC organize a seminar in Beijing for managers of Chinese information centres.

iv) Woolston cautioned the ISTIC representatives about the costs involved in searching foreign (largely American) data bases by satellite connection from Beijing. He felt that it was unlikely that IDRC would be able to respond positively to this request. Since Mr. Liu was about to go to Bangkok for a UNESCO meeting at which Indian representatives would be present, Woolston advised Liu to get information about the UNESCO/India experience with

this type of exercise (UNESCO did arrange a major demonstration of computer searching by a satellite in India and, while the Indian scientists liked it, the Indian authorities found that the costs would be prohibitive).

v) Woolston said that it would not be possible for IDRC to provide equipment for a conference and training centre to be established in the new ISTIC building. However, on a selective basis, it might be possible for IDRC to support the travel costs of particular foreign teachers and Asian students according to the subjects to be covered and their relationship to IDRC programs.

vi) Woolston expressed interest in ISTIC's research project on the computer processing of Chinese characters. Since one of the IDRC staff who would be going to China would be a computer specialist with the knowledge of the Chinese language, the opportunity could be taken for an exchange of views on the future development of the project.

Woolston took the opportunity to again express regret that ISTIC had been unable to arrange for him to meet the Chinese information specialists in the fields of agriculture and public health. The ISTIC representatives expressed their regrets as well, and promised to deliver information and publications about the IDRC work: the deficiency would be remedied on the next occasion that I.S. staff

would be in China.

II

Computation Centre, Academica Sinica

September 13, 1980

Present: IDRC: John Woolston

Jingjai Hanchanlash

We were shown round the computer installation by one of the technicians. The machine had been made in China by the Institute for Computer Technology. It is operated for the benefit of the Academy's scientists. It was unfortunate that we could not visit the Institute itself - which was in the process of moving to new premises.

Entering the computer room was like entering a time-machine and going back to the very early 1960's. For the computer represents the state-of-the-art of the era. Nevertheless, a lot of credit must go to the Institute for having built such a machine without an appropriate industrial base. The machine works (well, at least it works part of the time - maintenance is a big problem).

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But of course, in today's terms, it is not very powerful: it has a core capacity of about one-tenth of that of IDRC's minicomputer. And yet the installation requires 40kW of electrical power supply!

The lady who showed us round said that the Institute was continuing to develop more modern machines. She was not certain whether her Centre would in future be equipped with these or imported computers.

III

UNDP

September 11, 1980

Present: UNDP: Resident Representative Mr. H. Shallon
Assistant Resident Representative Dr. K. Leitner
IDRC: John Woolston
Nihal Kappagoda

Under project CPR/79/002, the UNDP is providing China with one large computer and five minicomputers (Hewlett Packard) for

.../8

information and data processing and for training. We wanted to find out more about the status of the project and, in particular, about the status of the UNDP request for a MINISIS licence and associated installation and training services.

The only thing holding up the shipment of the HP computers is the US export licence. However, this is expected now that a licence has been issued for the big computer. The HP's could be installed as early as the end of November 1980.

The Beijing office of the UNDP has received a Telex from New York asking for agreement on IDRC's draft of the MINISIS licence. However, they do not have this draft licence on file. They thought it might have been sent directly from New York to the Ministry for Economic Relations with Foreign Countries and promised to follow up.

The UNDP officials gave us a list (Appendix K) of the Chinese institutions participating in the project. However, they did not have exact information on where the HP's would be installed.

IV

Ministry for Economic Relations with Foreign Countries

Fifth Bureau (Computer)

September 15, 1980

Present: Bureau Chief: Rong Xing Qan

IDRC: John Woolston

Jingjai Hanchanlash

Mr. Rong is the principal Chinese counterpart for the UNDP project CPR/79/002. After several modifications, this project is now costed at $6.7 million. The central facility, for which civil engineering is now complete, will be known as the "International Economic Cooperation Information Centre". It will be equipped with one large computer (Burroughs 6810) and one Hewlett Packard 3000. The other four Hewlett Packard 3000 machines will be located with:

- The Ministry for Economic Relations with Foreign Countries (Mr. Rong's own shop)
- The Documentation Centre of the Mechanical Engineering Society
- The People's University of Beijing
- The Beijing Institute for Computer Technology

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It is interesting to note that, in the political organization of China, Beijing is a "Municipality" with a status equivalent to that of a "Province". The big new centre, the People's University, and the Institute for Computer Technology are all, in fact, agencies under the administration of the Beijing Municipality.

Intelligent terminals (PARTEC Corporation) are already on site; the U.S. export licence for the Burroughs machine has already been granted and it will arrive soon; the export licences for the Hewlett Packard 3000 machines are expected soon.

In July 1980, a group of Chinese completed eight months training in California on the Burroughs system; a second group has almost finished its training in California on the Hewlett Packard system.

Although there are other peripheral objectives, the central objective of the UNDP project is to help China to become more effective in international economic cooperation. Hence, Mr. Rong's Ministry will be the largest user of the new facilities. The Ministry has 20 years of experience in aiding particular developing countries in Africa, Asia and Latin America. Its aid is offered in five sectors which, in

priority order are: industry, agriculture, health, culture, education.

The Chinese aid program was considerably set back during the Cultural Revolution and the authorities recognize that many mistakes have been made. However, they believe that their past experience can be seen as a resource from which to learn and on which to base better programs for the future. In this context hard information is important, because planning is still bedevilled by controversy over methods. The information handling and information retrieval capabilities to be provided under the UNDP project are seen as an important tool.

Eventually, it is hoped that many departments of the Chinese Government will benefit from the new facilities. Mr. Rong recognizes, however, that the value of computers is not generally recognized in the Chinese power structure. He attributes the lack of confidence largely to the fact that, in the past, computers have been used almost entirely for scientific calculations and that China has not yet seen how they can be applied for information retrieval, economic management and production control. A lot must be done in the next few years if these other applications of computers are to gain acceptance, and

.../12

Mr. Rong freely recognizes that this can be done only if he gets help from friendly countries - particularly in relation to experience and software.

Mr. Rong had not seen our draft MINISIS licence (since it also could not be found in the UNDP office, we still do not know where in Beijing it is sitting!). However, he is keen to get MINISIS and indicated he would be talking to the UNDP office to sort out the response to be sent to New York. We explained the general objectives of the licence, and Mr. Rong had no quarrel with these. One of his concerns was that he get some assurance that IDRC would continue to make MINISIS available after the end of 1983 when the ownership of the computer would pass from UNDP to the Chinese Government.

On the assumption that a licence agreement would be signed with the UNDP, we discussed how MINISIS training might be organized, Mr. Rong believed that he would be able to organize this for a date early in 1981, and that about 30 people would require training from the Chinese institutions. He promised to write to us by the middle of October to suggest particular dates and to indicate the spectrum of individuals that would be proposed for the training sessions. He pointed out that, while some of these should be computer specialists, our training was also directed for documentalists who would be using

the MINISIS facilities.

Mr. Rong was certain that MINISIS would be needed on the Hewlett Packard machines to be installed in the Ministry and in the Mechanical Engineering Society; he thought it was likely that it would also be needed at the People's University and at the Beijing Institute for Computer Technology but, in these cases, primarily for teaching purposes.

中国科学技术情报研究所

INSTITUTE OF SCIENTIFIC AND TECHNICAL INFORMATION OF CHINA
(ISTIC)

Telegrams: ISTIC　　中华人民共和国　　P. O. Box 640, Beijing
Telephone: 46 47 46　　北京六四〇信箱　　PEOPLE'S REPUBLIC OF CHINA

MEMORANDUM ON THE ESTABLISHMENT OF THE FRIENDLY COOPERATION BETWEEN THE INSTITUTE OF SCIENTIFIC AND TECHNICAL INFORMATION OF CHINA (ISTIC) AND THE INTERNATIONAL DEVELOPMENT RESEARCH CENTER (IDRC) IN THE FIELD OF INFORMATION SCIENCES

To: Mr. IVAN L. HEAD, Director of IDRC
cc Mr. J.E. WOOLSTON, Director of the Division of Information Science, IDRC
FROM: Mr. LIN ZIAIN, Director of ISTIC
DATE: SEPTEMBER 16, 1980
PLACE: BEIJING, PEOPLE'S REPUBLIC OF CHINA

In accordance with:

- the joint wishes of cooperation expressed during the visit of Mr. Kieran P. Broadbent from the Information Sciences Division in IDRC to ISTIC in 1979,

- the contents of the correspondence between Mr. John E. Woolston, Director of the Information Sciences Division in IDRC, and Mr. Wang Wei, Deputy Director of ISTIC,

- the contents of the correspondence between Mr. T.A.G. Gavin, Coordinator of the Computer Resources in IDRC, and Mr.Yao Weifan, Director of the Division of Information Methodology in ISTIC, and

- the results of the friendly discussion between Mr. J.Woolston and me during his visit to ISTIC on September 10, 1980, I would like to represent herewith the items of projects, either having discussed or for further consideration, to which we wish to receive financial support and cooperation from IDRC:

1. China is interested in the program of TECHNONET ASIA which is supported by IDRC, and we arpreciate greatly the proposal from Mr. J.Woolston of a TECHNONET survey group of information specialists from the related countries to visit China, the Philippines, Malaysia, Indonesia and Hong Kong region.Financially supported by IDRC, the group consists of 12 members, 6 from China and the rest from other countries. It may be considered to implement this item in 1981.ISTIC would like to be the coordinator on the Chinese side for this project.

2. ISTIC wishes IDRC to provide the MINISIS information retrieval software for it free of charge. ISTIC would like to send its related personnel to attend the training course on the operation of MINISIS held in China which is supported by UNDP and lectured by IDRC specialists.

3. ISTIC wishes to organize, under the financial support of IDRC, a training program for leaders of various S and T information centers of China on the topics of information policy and information center management. This project may be carried out with the cooperation of UNESCO. Both Chinese and English could be employed as the working language. However, the information specialists in this field who can speak Chinese would be better prefered. This program may also be realized in another form of a simenar.

(In my discussion with Mr. J.Woolston, we reached an initial agreement on the three items above. Each side would report to IDRC and the State Scientific and Technological Commission of P.R.C. respectively for consideration in their discussion of cooperation projects.)

4. In order to enforce the connections between ISTIC, China's national information center for science and technology, and international information systems and data bases, ISTIC wishes IDRC to support it in setting up an information retrieval terminal with the provision of terminal equipment and supporting equipment for telecommunication line.

5. The Chinese government has approved of the establishment by ISTIC of a new national scientific and technical information center building with a construction area

of 50,000 square metres, in which a space is included for international information exchange and training. ISTIC wishes IDRC to consider the possibility to provide exchange and training facilities for it. The realization of this project would enhance the capability of the new center in its contribution to internation information exchange and, especially, to the information training activities in Asia.

6. Now ISTIC is carrying out the reseach project on the Chinese charactor processing and the machine translation with Chinese and English vis-a-vis. Therefore, a support from IDRC to these research projects are desirable.

(Items from the 4th to 6th did not discussed during my meeting with Mr. J. Woolston because of the time limitation. They are appeared here for your consideration.

The six items above are for your reference in your selection of projects that IDRC will support to China in the field of information science. This memorandum is presented simultaneously to Mr. Ivan L. Head, Director of IDRC, and the State Scientific and Technological Commission of the People's Republic of China.

LIN ZIXIN

林自新

Director, ISTIC

SUMMARY OF TALKS BETWEEN
THE SCIENTIFIC AND TECHNOLOGICAL COOPERATION DELEGATION
OF THE STATE SCIENTIFIC AND TECHNOLOGICAL COMMISSION OF
THE PEOPLE'S REPUBLIC OF CHINA AND
THE INTERNATIONAL DEVELOPMENT RESEARCH CENTRE

MAY 23, 1981

A Delegation of the State Scientific and Technological Commission of the People's Republic of China (SSTC), led by Mr. Wu Yikang, Deputy Director, Foreign Affairs Bureau, met with representatives of the International Development Research Centre (IDRC), led by Mr. Ivan L. Head, President, in Ottawa, Canada, from May 18 to May 23, 1981, for discussions on scientific and technological research development cooperation between SSTC and IDRC. These discussions were carried out in the spirit of candour and friendship which characterized the Memorandum of Understanding between SSTC and IDRC signed at Beijing, China, on September 16, 1980.

Pursuant to the Memorandum of Understanding, IDRC reiterated that subject to funds being made available to IDRC by the Parliament of Canada, the IDRC Board of Governors had approved the expenditure of up to $2 million (Canadian) in calendar years 1981 and 1982 in support of research projects of the People's Republic of China.

Several research project proposals submitted by SSTC to IDRC in the fields of agriculture, health, and information sciences were discussed in detail.

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The projects which IDRC undertook to support in principle, subject to the satisfactory development of the project proposals in final form, are identified in Appendix "A" to this Minute.

The projects falling outside the area of activities of the Program Divisions of IDRC for which IDRC is unable to commit direct support but in respect of which IDRC undertook to facilitate contacts and discussions of SSTC with pertinent Canadian Government Departments, agencies and institutions, are identified in Appendix "B" to this Minute.

IDRC reiterated that after the submission by SSTC of detailed research project proposals to IDRC, the final approval of IDRC's Board of Governors is required for each project in accordance with standard IDRC practice.

Both SSTC and IDRC agree to work towards a growing, effective and fruitful research collaboration between IDRC and Chinese research institutions for the benefit of the People's Republic of China and of other developing nations.

SIGNED at OTTAWA, CANADA, this 23rd day of May, 1981.

Wu Yikang

For the Scientific and Technological Cooperation Delegation of the State Scientific and Technological Commission

Ivan L. Head

For the International Development Research Centre

APPENDIX "A"

PROJECTS WHICH IDRC UNDERTOOK TO SUPPORT IN PRINCIPLE
SUBJECT TO
THE SATISFACTORY DEVELOPMENT OF THE PROJECT PROPOSALS IN FINAL FORM

1. Bamboo Research

In response to an invitation from the Chinese Academy of Forestry, IDRC undertook to send its Associate Director responsible for Forest Science to visit China in June 1981 for the purpose of discussing the details of the project with China's bamboo scientists at the Academy of Forestry and for visiting the bamboo research facilities and projects.

2. Paulownia

It was agreed that during the visit of IDRC's Associate Director for Forest Science to China in June 1981 in connection with the Bamboo Research proposal, he would visit the Paulownia forest in Honan and will discuss the objectives and methodologies of a proposed Paulownia research project which might be supported by IDRC at a later date.

3. Rapeseed Breeding

IDRC undertook to send a small mission from Canada to visit China to assist in formulating an appropriate proposal that will enable the Chinese scientists to use Canadian rapeseed varieties with low erucic acid and glucosynilates in the Chinese rapeseed breeding programs.

4. Freshwater Fish-Farming (Guyana)

IDRC indicated that it was open to a request from the Guyanese Government that short-term Chinese consultants be engaged on this project within the IDRC funds budgeted for the project.

5. Method of Wastes Treatment and its Assessment in Rural Areas

Subject to submission of further and better particulars by SSTC to IDRC on this project, IDRC undertook to consider the proposal in depth as a project falling within the area of activity of its Health Sciences Division.

..../2

6. Training in Epidemiology

IDRC indicated that Canadian academic institutions have developed a substantial expertise in epidemiology which is regarded as a primary tool for the identification and evaluation of health-related problems.

Canadian universities have expressed their willingness to participate in this project.

SSTC undertook to provide a formal response on this proposal by the middle of June 1981. If the response is favorable, appropriate arrangements will be made for the selection of up to 30 duly qualified Chinese physicians in accordance with mutually agreed criteria to undergo the training envisaged under this project.

7. Sulphide Particle Board Glue

IDRC undertook to provide travel funds for a Canadian scientist to visit China and to report on the feasibility of a collaborative research project in particle board technology between IDRC and the Chinese Academy of Forestry through IDRC's newly-created Cooperative Program Unit.

8. Male Reproductive Physiology and Cranial Nerve Hormone

It was agreed that SSTC would forward a request to IDRC's Fellowship Program for two suitably qualified Chinese scientists to undertake advanced research studies in male reproductive physiology at a Canadian institution or institutions for a period of one year.

9. Joint Survey by the Information Specialists of China and TECHNONET (Asia)

The joint group will study the industrial extension network supporting medium and small scale enterprises in Singapore, the Philippines, Thailand, Malaysia and Hong Kong, preferably between July 21 and August 8, 1981, and in China, preferably during the period September 21 to October 4, 1981.

It was agreed that IDRC would cover international airfares and living expenses outside China for the Chinese and TECHNONET groups and inter-city fares within China for the TECHNONET group.

SSTC would cover the living expenses and local transportation costs for the members of the group within China.

SSTC and IDRC agreed to facilitate the tasks of the joint group by attending expeditiously to any technical or administrative problems that may arise.

..../3

10. Training of Senior Personnel involved in the Management of Information Centres

The training course includes policy aspects of information at an institutional level. SSTC proposed nine subjects for inclusion in its curriculum.

IDRC indicated that it had already identified four Chinese-speaking instructors and that the curriculum, duration and dates of this course will be agreed at the time of the visit to Ottawa of Mr. Liu Zhaodong in June 1981.

11. MINISIS Information Retreival Software

IDRC indicated its plans to install in September 1981 MINISIS and training staff at the five institutions in Beijing that are receiving H.P. computers under the auspices of the United Nations for which ISTIC staff would be welcome as observers.

IDRC stated that it was ready to offer MINISIS software and training directly to ISTIC as soon as ISTIC itself acquired an H.P. computer.

12. Documentation Retrieval Systems in the Chinese Language

IDRC indicated that this proposal was within the area of concern of its Information Sciences Division.

SSTC and IDRC agreed that the whole matter could be explored further when Mr. Liu Zhaodong visited IDRC in June 1981.

SSTC agreed that the Chinese-speaking IDRC specialists charged with implementing MINISIS in Beijing in September 1981 could visit ISTIC at that time to investigate whether cooperation on specific matters such as the processing of Chinese script on computers could be developed.

MINISIS installations in China

There are five MINISIS sites in Beijing, China. Under their project number CPR/79/002, the United Nations Development Programme put Hewlett-Packard 3000 systems in the following organizations:

1. The Ministry of Foreign Economic Relations and Trade (the Ministry for Economic Relations with Foreign Countries)

2. The Documentation Centre of the Mechanical Engineering Society

3. The Beijing Centre for International Economic Information (also referred to as the International Information Centre)

4. The People's University (Data Processing Department)

5. The Beijing Institute of Computing Technology

Site 3 also has a Burroughs 6810 machine under the same project.

IDRC installed MINISIS and organized a 3-week training course in September 1981. The course took place on the premises of Site 1. (the Ministry) but visits were made to all of the sites, especially sites 2. and 3., in order to write programs to enable them to process tapes of international data bases into MINISIS format so that they could be searched.

The staff from each site who attended the course are listed below. Most are systems people rather than documentalists, but we might expect one or two to appear on our Course.

Site 1

Cai Shitao (head of the Computer Section)
Hao Yongjiang
Zhou Junqing
Rong Shingchuan
Chen Chihchih
Deng Deshou
Chu Jaunmin
Wang Zhenhua
Hu Chanping (Systems Manager)

Site 2

Wu Shixiang
Jiang Xiangdong
Hua Ailan
Dong Yipeng
Lao Yongwu (systems manager)

Site 3

Qi Zhifeng
Wang Xiaoqing
Zhang Xiaoqing (Systems Manager)

Site 4

Feng Nianzhen

Site 5

Guan Yiyang
Wang Daozhong (Systems Manager)
Wang Taifeng
Hu Chenggao (he is actually a member of the faculty rather than the Computer Group)

In addition, Ms. Lee Zhongxing and Ms. Wang Shuguang of ISTIC attended the course, but as far as we know, ISTIC as yet has neither an HP 3000 of their own, nor access to one of the other sites' machines. However, ISTIC's overall interest in information systems is well-known.

Ms. Liu Xiaoching spent the month of June at IDRC learning MINISIS and its application in the IDRC Library - she is a member of the Documentation Centre (Site 2) staff who was in the United States at the time of the MINISIS course in China.

According to Mr. Qi, from Site 3, twenty other end-users have been trained in MINISIS in the past year, but we have no further information.

We have been in touch over the past year with Sites 2 and 3 which, as we expected, seem to be the most serious and active users. Mr. Qi presented a report to the MINISIS Users' Group meeting in Rabat this month.

MINISIS applications in China at present are:

Site 1
- inventory data base of spare parts for their HP 3000
- personnel files
- data base of correspondence on foreign affairs
- cataloguing of books and reference materials

Site 2

- query of various international data bases, i.e.
  - WORLD TABLE
  - WORLD DEBT
  - NATIONAL ACCOUNT
  - INTERNATIONAL PRICE COMPARISON
  - INTERNATIONAL INDEX OF INDUSTRY
- some applications similar to Site 1

Site 3

- query of international data bases, i.e.
  - ISMEC
  - INSPEC
  - METADEX
  - COMPENDEX
  - GEOREF
- apparently their ISMEC data base alone has 130,000 records, and they plan to purchase additional disc drives

Sites 4 and 5

- they are actually teaching MINISIS in class, as part of their computer theory programmes
- they are also both using MINISIS to automate their libraries

According to reports sent to IDRC everything is going well and there are no serious problems. The most pressing concern is for some way to accommodate Chinese character processing in MINISIS. Mr. Qi from Site 3 in particular has been investigating various possibilities and had discussions on the subject with Richard Lee of our computer section in Rabat in September, 1982.

(For Site details please see list Page 57 et seq)

SELECTED BIBLIOGRAPHY

ON GENERAL TOPICS OF INTEREST

As a Chinese historian recently pointed out in a witty essay on the historical antecedents of China-watching*, if it is accepted that at the end of the eighteenth century more books were published in China than in the rest of the world put together, it is probable that more books are being published today on China than on any other country in the world. If Mao didn't always succeed in producing bumper harvests in his own country he did at least manage to raise a lush harvest of rhetorical blooms outside. Anybody who believes that they have something to relate tries to get into print about China. Even the most minor anecdotes are dutifully recorded. What is worse, formally reputable scholars, desperate to record their findings, have prematurely gone into print, only living to regret the day they did. Chiang Ching had hardly come into prominence before Roxanne Witke burst into prose about the chairman's wife. Small wonder then that the bona fide reader is deluged by a tidal wave of dubious literature about a country which seemingly fascinates us all. How difficult it is then to provide a reading list that is not full of sycophantic outburst, dated material or dubious statistics. At the risk of falling into these traps a select list is set out below:

General

Two books stand out in this category:

1. Simon Leys "Chinese Shadows" published by Penguin Books, U.K. originally published in French under the title "Ombres Chinoise". Leys has also written a good account of the period of the Cultural Revolution entitled "The Emperor's New Clothes" also in Penguin Books.

2. Claude Roy, well known amongst China scholars, and who first wrote "Keys to China" several years ago has just published another very good book simply entitled "Sur la Chine" and published by Gallinard, Paris.

History

For those with the time, inclination and interest, Joseph Needhams life work "Science & Civilization in China" will provide answers to many questions. As a resource it is second to none. Vols. are in the Centre's Libaray. For a general historical overview there is Eberhards "A History of China". Modern history is probably covered best in C.P. Fitzgerald's "A History of Communist China", published by Penguin Books as is Lucien Branco's "Origin of the Chinese Revolution Palo Alto, Stanford University Press, 1971.

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* Lo Hui-min, 'The Tradition and prototypes of the China-watcher', Canberra: ANU Press, 1978.

History (contd.)

Tuchman, Barbara — Stilwell and the American Experience in China - 1911-1945.
New York : MacMillan : 1979
(Gives a good account of the Burma Road supply route in World War II. Kunming is mentioned).

Roy, K.K. — Earliest forms of Libraries in China.
Library History Review 1(2) : 1974 : 43-83

Current Scene

Bonavia, D. — The Chinese - London : MacMillan : 1980
Former 'Times' correspondent and staff member of the Far Eastern Economic Review. Fluent in Chinese, he gives a balanced account of his experiences that cover a broad spectrum of modern Chinese society.

Fraser, S. — The Chinese: Portrait of a People

Former Toronto Globe & Mail correspondent to China. This anecdotal approach to his tour in Beijing gives a generalized view of China. This, however, places the Chinese in a "them and us" category. A far better account is given in the above (Bonavia, D.) selection.

Libraries and Information Science

This is an unchartered area because of the previous lack of exposure of the subject to foreigners. The Chinese language has provided more of a barrier in this subject than in any other area. There are many good accounts of pre-1949 classical holdings, largely because of the large following Chinese "orientalia" has had in Western scholars, but public and academic libraries and information services have received scant attention, though may have felt the influence of North American librarianship, pre-1945.

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China Quarterly : 1980-83 : 510-534

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