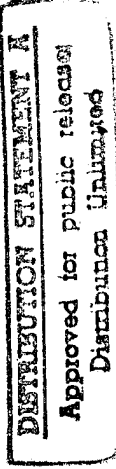


CHINA'S IMPORT OF FOREIGN TECHNOLOGY, SURVEY AND CHRONOLOGY:
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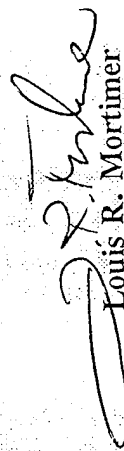
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PREFACE

This selective compilation of significant transfers of technology to China in 1984 concentrates on technology with basic industrial or potential military applications. Consulting services and training in generalized skills such as management and computer programming are also included. The study is based on a variety of sources, including US and foreign newspapers, trade journals, newsletters, and wire services.

The basic unit recorded is the transaction. The record for each transaction includes the item of technology, the foreign and Chinese parties involved, the terms and value of the agreement, and additional information that may indicate its significance. Transactions are grouped in broad categories such as electronics or transportation equipment. Depending on user requirements, further subsets of transactions, such as those involving a particular item or foreign country or end-user, may be produced.

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SUMMARY

Importing foreign technology plays a central role in China's modernization strategy. While the training of Chinese students abroad and the improvement of Chinese science through exchange and cooperation with many foreign countries will have a major long-term effect, more immediate, short-term gains are the result of such commercial transactions as purchases, joint ventures, coproduction, and consulting and industrial training agreements with foreign corporations.

Chinese policy is to import only what it cannot produce for itself and to limit imports to advanced technology and key equipment. The reluctance of foreign corporations to share their advanced technology and foreign governments' restrictions on the export of technology have impeded China's efforts to modernize its industrial structure. An equal if not greater impediment is China's limited ability to assimilate the technology it imports.

Shortages of skilled manpower, poor enterprise management, an economic structure marked by a high degree of compartmentalization and duplication, and a low degree of exchange between enterprises all limit the use of imported technology. The resulting variability and unevenness characteristic of Chinese industry and technology make generalizations about Chinese capabilities in the abstract or aggregate both difficult and misleading. Consequently, the assessment of the effects of the transfer of any technology to China depends on the specific end user within China.

1. SURVEY OF TECHNOLOGY TRANSFER

a. Technology and Modernization

Importing foreign technology plays a central role in China's modernization strategy. The October 1984 "Decision of the Central Committee of the Communist Party of China on Reform of the Economic Structure" reiterated the points made earlier on many occasions by such national leaders as Premier Zhao Ziyang, who said: "... national seclusion cannot lead to modernization. Since the Third Plenary Session of the 11th Central Committee [1978], we have taken opening to the outside world to be our long-term, basic state policy, a strategic measure for accelerating socialist modernization."¹ In February 1985 an official of the Ministry of Foreign Economic Relations and Trade told Beijing Review that the funds set aside to import technology in the first half of 1985 would equal or exceed the total amount allocated in all of 1984.²

b. Modes of Transfer

Foreign scientific knowledge and technology are being pursued through a variety of means. In long-range planning, the most significant method is to dispatch thousands of Chinese students of science and engineering to universities in the United States and other Western countries. This, along with programs of scientific exchange and cooperation such as those covered under the renewed 1984 Sino-US Agreement on Cooperation in Science and Technology, will increase China's research and development capabilities within 5 to 10 years. It will also enhance China's ability to assimilate advanced foreign technology.

Other modes of transfer such as the purchase of computers, offshore oil drilling equipment, or sophisticated machine tools have a more direct, short-term impact. These purchases, however, are limited both by China's shortage of foreign exchange and reluctance to borrow and by its policy of trying, whenever possible, to purchase manufacturing technology rather than finished products. Hence, China has attempted to promote joint-venture and coproduction arrangements with foreign corporations. Chinese efforts to acquire some types of technology have been hampered by the reluctance of foreign corporations to divulge their most advanced technology and by foreign governments' restrictions on the export of technology.

c. Technology in US-China Relations

The Chinese Government has been sensitive to attempts to impede or limit the flow of technology to China because of the importance of technology transfer to China's modernization and economic development. In 1982 and 1983 the level of technology the United States was willing to permit China to acquire as well as the need to clear exports through the Coordinating Committee for Multinational Export Control (COCOM) have been major issues in US-China relations. The 1983 US decision to place China in the "V Category" of friendly nations under the Export Administration Act of 1979 and so liberalize export restrictions has

reduced Chinese dissatisfaction and contributed to improved relations. The issue remains, however, and will probably continue to be a point of disagreement and negotiation in the future. Restrictions are still placed on sales of certain products and technology which are viewed as national security concerns by the US Government. Nuclear weapons, electronic warfare, antisubmarine warfare, and intelligence gathering have been cited as technologies which will continue to be subject to export bans.³ It is not clear what the Chinese will attempt to purchase or what items will receive export permits.

Since technology transfer is so important to the current state of US-China relations, and since questions of military applications of technology are at the root of US restrictions on technology export, some notion of what the Chinese desire, of what is in fact being transferred to China, and to what use it is likely to be put is necessary.

d. China's Technology Import Policy

(1) Buying Know-How Rather Than Products

China's present policy is to maximize the flow of foreign technology in order to achieve rapid economic growth. China tries to import only what it cannot produce for itself and to limit imports to advanced technology and key equipment.⁴ In general, the plan is to import technology that is as advanced as possible, yet still suitable to Chinese conditions. Under the Sixth Five Year Plan (1981-85), the emphasis is on raising the technical level of existing enterprises rather than importing complete plants or equipment for showcase projects. Many of China's existing factories are using outmoded or obsolete equipment and techniques and, partly for this reason, are very inefficient, requiring large quantities of energy and materials to produce mediocre or outmoded goods. Whenever possible, the Chinese will attempt to acquire technology and know-how rather than finished products.

(2) Policy Alternatives

Within these policy guidelines, there is room for considerable disagreement regarding what level of technology is "appropriate" or "applicable" to Chinese circumstances. Issues involved in the policy debate are self-reliance versus dependence on the international system, short-term versus long-term planning, basic research versus applied technology, and agriculture versus heavy industry. Questions on the scope, pace, and content of technology import have been and may well continue to be major issues in China's internal politics. Modifications of the current policy are almost certain and major changes are not unlikely.

Questions of what and how much foreign technology to import have been major issues in Chinese politics since the mid-19th century. China has had a great deal of experience importing foreign knowledge and expertise, and this experience presumably influences present policies and policy debates.

(3) Historical Experience

Throughout the 19th and early 20th centuries a great deal of money was spent importing foreign artillery, warships, and even aircraft. Chinese forces equipped with imported weaponry were defeated regularly by foreign armies, and the possession of modern foreign arms did not preserve the Nationalist government from defeat at the hands of less well-equipped Communist armies. In many cases from the 1850s through the 1940s, Chinese authorities purchased foreign weapons which were either overpriced, out-of-date, or inappropriate to Chinese conditions. Consequently, the wary attitude the Chinese authorities have taken recently toward the purchase of foreign arms is understandable.

(4) Soviet Aid in the 1950s

Thus far the single most comprehensive attempt at importing and assimilating foreign technology occurred in the 1950s. As part of the First Five Year Plan (1953-57) China was the recipient of "what was undoubtedly the most comprehensive technology transfer in modern industrial history."⁵ The Soviet Union provided aid for 156 major industrial projects concentrated in mining, power generation, and heavy industries. Following the Soviet "Big Push" model of economic development, these were large-scale, capital-intensive projects. Between 1950 and 1960 some 11,000 Soviet specialists and scientists worked in China, and 38,000 Chinese (20,000 workers, 8,000 technicians, 7,500 students, 1,300 scientists, and 1,200 instructors) were trained in the Soviet Union.⁶ Furthermore, China's industrial, educational, and scientific systems were reorganized along Soviet lines. During this era, China made substantial progress in fields such as steel, machine building, basic chemicals, and the production of military goods such as artillery, tanks, and jet aircraft.

(5) Long-Term Costs

Soviet assistance, however, had some less than ideal consequences. The cost of dependence on a single foreign source was brought home when Moscow suddenly cancelled its aid and technology transfer programs in August 1960, leaving many projects unfinished and terminating the supply of essential goods. This experience doubtless encouraged some Chinese leaders to advocate increased or extreme self-reliance. Other consequences have since become apparent. The primary goal of the 1950s program was rapid industrial growth, and the development of China's science and technology was distinctly secondary. Most of the Soviet experts in China were engineers and technicians, and most of the training the Chinese received was narrowly focused and directed at immediate application. As a consequence, the Chinese were able to operate the Soviet

factories, but their capacity for independent design and development remained very limited. China also adopted Soviet-style economic and industrial systems. Such systems produce rapid growth in a few key sectors, but growth slows down as the effects of unbalanced development are felt. In addition, Soviet organization of science in which scientists work in academies separated from universities and industries, makes the translation of scientific knowledge into new products and processes both difficult and lengthy. One of the unintended legacies of the 1950s program of technology transfer and training has been an industrial system capable of reproducing large quantities of products designed in the Soviet Union, Czechoslovakia, Hungary, and Romania in the 1940s and 1950s, but with very limited capabilities for innovation or product development. Hence, the need in the 1980s for another round of wholesale technology transfer and for policies that avoid the errors of the 1950s.

e. Transferring Technology To China

(1) Limits to China's Assimilation of Technology

The most effective mechanisms of technology transfer are those that permit long-term relationships and extensive consulting and trouble-shooting between donor and recipient, as was done with some of the Soviet technical aid programs to China.⁷

China's ability to assimilate technology is limited by such factors as shortage of skilled manpower, inadequate management, an economic structure marked by a high degree of compartmentalization and duplication, and a low degree of exchange between enterprises. As in the Soviet Union, China's enterprises attempt to maximize self-sufficiency through stockpiling and building their own spare parts, instruments, machines, and other items that are difficult to obtain. Movement of personnel and diffusion of knowledge between enterprises is very rare. The absence of standardization within and between enterprises hinders the integration of up-to-date imported technology.

The effective assimilation of imported technology depends to a large degree on the recipient's technical skills. Even the superficially simple process of copying or reverse engineering demands skills approaching those of the original producer. Chinese engineers and technicians, many with only limited formal education, have learned to work successfully in circumstances where they have little contact with their peers in other enterprises, cannot buy equipment or materials in the market, and use assemblages of obsolete, imported, and homemade equipment. According to one Western observer:

China has developed a cadre of versatile technical personnel capable of trouble-shooting and overcoming a variety of technical problems. One shortcoming of this group, however, is that it tends to be more in the mold of the 'artisan-craftsman'

and therefore lacks the technical training and depth of understanding that is characteristic of its Western counterparts.⁸

Another analyst noted:

What the Chinese lack is not the ability to manufacture. They manufacture quite well with custom building, hand-machining, and small-scale batch-type production. What they have not mastered are the techniques of modern, continuous-flow production processes, precise automation technology, and other organizational aspects of management technology.⁹

(2) Variation and Variability Within China

A consequence of the self-sufficient and compartmentalized nature of Chinese enterprises is considerable variation and unevenness in the level of technical skill. Knowledgeable travelers to China often report that of the factories or laboratories they visited, one or two looked well run while others were 10 to 20 years behind world standards. Similarly, some scientific or technical fields are reported to be well developed, while others are backward or hardly exist at all. Making generalizations about Chinese capabilities is both difficult and unwise. The assessment of the effects of the transfer of any technology to China depends on precisely where the item is going--its end user. Some enterprises are able to make good use of an item of foreign technology, while others in the same field probably lack the skill to assimilate it. Compartmentalization and restricted communication between enterprises means that diffusion of technology within China is as great a problem as assimilating advanced foreign technology.

f. The Example of The Electronics and Computer Industry

The electronics industry demonstrates with exceptional clarity the achievements and costs of China's policies of self-reliance and bureaucratic organization of production. It is a priority industry, serving both to provide such popular consumer goods as televisions and tape recorders and to serve military modernization. Furthermore, electronics represents classic dual-use technology, with military as well as civilian applications. Hence, much electronic technology is subject to export controls by the United States and COMCOM.

Electronics has been selected as a priority sector for development in the next decade. In 1984 the State Council established a special Electronics Industry Investigation Leading Group, whose policy report was approved and distributed in January 1985. It identifies the electronics and information industries as "new industries that constitute modernized social productive forces," and calls for "doing away with the practice

of relying only on ourselves and doing everything from scratch" and urges "importing, digesting, developing and pioneering" advanced technology.¹⁰

On the one hand, Chinese achievements in electronics have been quite impressive. Beginning with a few electronic component factories imported from the Soviet Union in the late 1950s, China's electronics industry survived the cutoff of Soviet aid in 1960, and, by a combination of domestic development and import of key technology from Japan and Western Europe, was able to manufacture integrated circuits by the early 1970s. During the 1970s China made fairly rapid progress in the manufacture of semiconductor devices and small integrated circuits. Most visitors to laboratories and research institutes have been favorably impressed by the level of the work. Many sophisticated experimental and prototype devices have been produced. China's electronics industry has grown rapidly and now employs about 1.3 million workers in approximately 2,400 enterprises. Since 1980 the production of consumer goods such as televisions and tape recorders has increased many times, and the quality of consumer goods has been significantly increased.¹¹ (In 1982 10 times as many television sets were produced as in 1978.) Pride in these achievements is balanced by recognition of deficiencies, and calls to improve quality, in part by importing more advanced technology, are common.

On the other hand, progress in research has not been matched by progress in manufacturing. Electronics technology has made very rapid progress in the United States and Japan in the past decade, and China remains at least 10 years behind current capabilities. Many Chinese semiconductor devices are copies of Western ones, but the Chinese components are less reliable and more costly.¹² This is a consequence of problems in manufacturing and quality control. Much electronics production is carried out in small plants, with great variation in the quality of the devices produced.

Quality control and production of components in large volume, rather than small batches, are pervasive problems. These problems are caused in part because production of semiconductors and integrated circuits demands inputs of very pure ingredients in a carefully controlled environment, and in part because careful testing of all components is necessary. Foreign engineers and electronics specialists see automation as the only solution to problems of poor quality and low rates of production. Differences between Chinese standards and world standards also cause incompatibility with imported equipment. For example, under Chinese standards (originally based on Soviet standards) the distance between integrated circuit sockets is 1.25 millimeters, while under international standards it is 1.27 millimeters. It is also a common practice for factories to produce their own meters and test equipment, resulting in nonstandard meters and in nonstandard and incompatible components.¹³

A delegation of US specialists in telecommunications trade and electronics visiting China in May and June 1984 reported wide variation in technical skills from one enterprise to another. The Jiangnan Radio Factory in Wuxi, Jiangsu Province, is described as "head and shoulders above any other facility which we

visited in China" and as "comparable to semiconductor facilities in the U.S." However, for reasons that were not clear to the visitors, the plant was not yet in operation and some of the advanced foreign equipment had yet to be unpacked. At the same time, two semiconductor factories in Beijing and Shanghai were doing good work although they were still not up to current international standards; the other factories lagged far behind. Methods and equipment were characterized as approximately "US vintage late 1960s," and environmental controls were inadequate. Most testing, which in US or Japanese factories is automated, was done manually using simple benchtop instruments. Manual resources were used in preference to automation, even where some automated equipment was available. The delegation members saw little evidence of engineering design work in the factories.¹⁴

On the other hand, the US specialists found Qinghua University in Beijing to be "at least one generation ahead of the factories in terms of equipment and facilities. This is in striking contrast to the US, where industry equipment and facilities are more advanced than those of the universities." The Nanjing Solid State Devices Research Institute was found to be producing microwave devices at a technical level above the current level of export licensing for China. The extreme difficulty of moving technology from the laboratory to the shop floor was noted and attributed in part to the great shortages of qualified engineers and technical personnel for the factories.¹⁵

The very rapid growth of the electronics and computer sector has itself caused some problems. China's computer inventory, for example, has doubled every year since 1980 (when it was estimated at 5,900), reaching about 61,000 in 1984, and is projected to total 117,000 by the end of 1985. Nearly half of the computers have been domestically produced.¹⁶ The application of computers has been vigorously promoted, and an increasing number of enterprises, educational institutions, and government offices are reported to be successfully using them.

China has been unable to produce enough computers to meet domestic demand, and the high cost and low reliability of Chinese-made computers have been impediments to their wide use. Over 150 computer models have been turned out, but the large number of models indicates problems rather than achievements. Chinese planners have decided to concentrate on production of 8-bit and 16-bit microcomputers rather than larger types, but Chinese microcomputers suffer from a lack of standardization which severely inhibits wide use and the development of peripherals.¹⁷ Few domestic computers are produced in large numbers, and accounts of manufacturing make it clear that many could almost be considered artisan products, made with a lot of careful hand labor. In consequence they tend to be both expensive and of low reliability. Spare parts and service are great problems. Most Chinese-made microcomputers are based on the Intel Corporation's 8080 model, but do not have an 8080 integrated circuit. They have a wired board equivalent and the error rate in hand-wiring the board contributes to the Chinese machine's cost and low reliability.

An American delegation of computer experts has concluded that for the next 20 years the Chinese will be able to import microcomputers more cheaply than they can build them domestically.¹⁸ Thousands of foreign computers have in fact been imported in the past few years, and many Chinese manufacturers have prospered by importing foreign components and assembling them into "domestic" machines. There is also a thriving market for foreign computers purchased through Hong Kong intermediaries in contravention of export controls. A "gray market" IBM personal computer sells in Beijing for about eight times its US list price, and the purchaser receives no training or service.¹⁹ In response to this problem, Chinese authorities have moved in the past year to license production of foreign computers by Chinese manufacturers, hoping thus to achieve the high volume and standardization necessary for widespread adoption of computers. Each such arrangement has begun with an announcement of the large numbers of computers to be produced within a year or two, but none has been in operation long enough to evaluate the quantity or quality of the product.

Efforts to promote the use of computers have also been hindered by problems with peripherals, software, and technical support. Research and production has concentrated on computers rather than on peripherals, and on hardware rather than software. One foreign estimate places China's computer technology at about 10 years behind the US in hardware (produced as research or prototype models), 20 years behind in software, and 25 years behind in fabrication and testing.²⁰ Application of computers has thus lagged considerably behind their development, and progress in research institutes has not been matched by progress in factories or offices. Data is commonly entered with paper or magnetic tape, and until recently, the purchaser of a computer was expected to program it. The cost of Chinese-made peripherals has been summed up as "astronomical," and until recently little attention was paid to development of software.²¹ Chinese scientists for the most part use ALGOL-60 or FORTRAN programming languages, but widespread use of computers by nonspecialists depends on users being able to employ ordinary Chinese characters. The problem of matching computers and characters has attracted widespread attention in Japan, Taiwan, and Hong Kong, and in the past year indigenous Chinese efforts have been supplemented by agreements with Japanese or Hong Kong companies.

The problem of insufficient attention to software has been widely recognized in China. Various efforts made to correct this problem range from establishing training schools and software development institutes to joint venture and licensing agreements with foreign firms to administrative efforts to protect the rights of software designers.²² Still many Chinese users have been very reluctant to pay for software or training, although they are often willing to purchase expensive high-performance foreign equipment, the capabilities of which far exceed their needs. Foreign software companies have been reluctant to enter the Chinese market, since they fear piracy of programs and see slim prospects of making a profit.²³ The lack of attention to software needs in China, the reluctance to recognize intellectual property, and the reluctance of foreign vendors to deal with China have resulted in underutilization of computers.

The utilization of computers is also hindered by administrative barriers. In June 1984 a deputy mayor of Shanghai wrote about the necessity for reform in Shanghai's computer industry, claiming that the 300 units employing microcomputers belong to different systems of the State Economic Commission, the State Scientific and Technological Commission, and the higher education authorities.

Each of them does things in its own way, and there is a lack of unified planning and coordination. Consequently, there is the phenomenon of being 'full of brilliant stars in the sky' in appearance, but 'nothing great has been achieved' in practice. The 27 units directly engaged in scientific research, production, application and service of computers cannot coordinate their efforts because they are administered by different grannies (perhaps mothers-in-law), and have different sources and channels in terms of capital and funds.²⁴

He called for efforts by the central authorities to resolve, to unify, and to coordinate these scattered resources, as it cannot be done at the local level.

The problems of duplication and lack of coordination impede the acquisition and assimilation of foreign technology and also hinder the transfer of information and technology within Chinese industry. Furthermore, none of the problems of China's computer and electronics industries are unique to that sector. All of them--the difficulty in translating research and prototype into mass production, the high costs and low reliability of domestic products, the overconcentration on hardware and neglect of software, the overconcentration on production and neglect of exchange, the underutilization of expensive capital goods, and the administrative barriers to efficient utilization and exchange--can be found to a greater or lesser degree throughout Chinese industry and affect all attempts to introduce foreign technology.

All these problems are recognized by Chinese leaders and discussed in the Chinese press, where various solutions have been proposed. Some step-by-step progress in improving quality and expanding the range of products made in China is being made, and imported technology has a clear role to play in this process. But, many of the problems centering around effective assimilation of technology or utilization of computers (or, in the final analysis, capital goods in general) are systemic, and hence not susceptible to quick solutions. To the extent that the recently proposed economic reforms are carried out, both successful absorption of foreign technology and diffusion of that technology within China will benefit.

NOTES

¹Beijing Review, 29 October 1984, p. XIII.

²Beijing Review, 4 February 1985, p. 30.

³Richard Nations, "Raising the Barriers," Far Eastern Economic Review (Hong Kong), 16 June 1983, pp. 16-18; Xinhua, 22 June 1983, in Foreign Broadcast Information Service, Daily Report, China (hereafter FBIS/China), 22 June 1983, p. B1.

⁴Zheng Hongqing, "Opening to the Outside World and Self-Reliance," Beijing Review, 14 March 1983, p. 18.

⁵US, Congress, Joint Economic Committee, Hans Heymann Jr., "Acquisition and Diffusion of Technology in China" in China: A Reassessment of the Economy, 94th Cong., 1st sess., 1975, p. 686.

⁶Cheng Chu-yuan, Scientific and Engineering Manpower in Communist China, 1949-1963 (Washington, D.C.: National Science Foundation, 1965). p. 196.

⁷Heymann, "Acquisition and Diffusion of Technology in China," p. 686.

⁸US, Congress, Joint Economic Committee, Lenis Fred Simon, "China's Capacity to Assimilate Foreign Technology: An Assessment" in China Under the Four Modernizations: Part I, 97th Cong., 2d sess., 13 August 1982, p. 544.

⁹Heymann, "Acquisition and Diffusion of Technology in China," p. 703.

¹⁰Xinhua, 11 January 1985, in FBIS/China, 15 January 1985, p. K25.

¹¹"The Development of China's Electronics Industry and Its Prospects," in FBIS/China, 11 September 1984, pp. K15-16; US, Congress, Special Subcommittee on US Trade with China, Telecommunications Trade with China, 98th Cong., 2d sess., 1984, p. 21.

- ¹²Lu Dong, "Technical Modernization in China's Machinery and Electronics Industry," China's Foreign Trade (Beijing), January 1984, pp. 12-14.; "Do a Good Job in Readjustment, Develop the Electronics Industry," Renmin Ribao, 14 May 1981, in JPRS 78257, China Report: Economic Affairs, 9 June 1981, pp. 24-27; "Development of Semiconductor Integrated Circuits in Our Nation," Dianzi Shijie [Electronics World] (Beijing), December 1981, in JPRS 80888, China Report: Science and Technology, 25 May 1982, pp. 16-20.
- ¹³Erik Baark, "Coming Up to Par," China Trade Review (Hong Kong), November 1982, p. 12; James B. Stepanek, "Microcomputers in China," China Business Review (Washington), May/June 1984, pp. 26-37.
- ¹⁴US, Congress, Telecommunications Trade with China, p. 27.
- ¹⁵US, Congress, Telecommunications Trade with China, pp. 29-31.
- ¹⁶Stepanek, "Microcomputers in China," p. 29.
- ¹⁷Stepanek, "Microcomputers in China," p. 36; Wang Xinggang, "Some Views on Computer Development in China," Ziran Bianzhengfa Tongxun (Journal of Dialectics of Nature), December 1982, in JPRS 83733, China Report: Science and Technology, 22 June 1983, pp. 15-19.
- ¹⁸Vaughn Mantor, "Can the People's Republic Catch Up?" Computerworld (Framingham, Massachusetts), 14 November 1983, pp. 21-22.
- ¹⁹John F. Burns, "China's Passion for the Computer," New York Times, 6 January 1985, p. F1, F8-9.
- ²⁰Chris Brown, "Computer Sales," China Business Review (Washington), March/April 1983, p. 36.
- ²¹Stepanek, "Microcomputers in China," pp. 26-37; Wang Xinggang, "Some Views on Computer Development in China," pp. 15-19.
- ²²"Computer Training, PLA Schools Open," China Daily (Beijing), 3 February, p. 3; "Company to Design Computer System," China Daily (Beijing), 20 December 1984, p. 2; "Software Industry Association Established," Xinhua, 6 September 1984, in FBIS/China, 11 September 1984, p. K18.
- ²³Stepanek, "Microcomputers in China," pp. 27-28; Rene Moore, "Letter from Tianjin," Far Eastern Economic Review (Hong Kong), 18 October 1984, p. 110.

²⁴Liu Zhenyuan, "Shattering the Fetters of Old Ideology, Blazing a New Trail in Making Reforms," Renmin Ribao, 29 June 1984, in FBIS/China, 11 July 1984, pp. 02-04.

2. INTRODUCTION TO CHRONOLOGY

The record of each transaction listed in the following chronology, covering the period 1 January - 31 December 1984, has nine fields: category, date, foreign firm, country, Chinese firm, Chinese end-user, item, comment, and source. Their purpose is to permit extensive cross-tabulation and the creation of particular sets of transactions (for example, all imports of nuclear power technology for a specific period of time, or all electronics technology from France, or all foreign firms selling technology to the Number 2 Machine Tool Factory in Wuhan) as may be needed to address various questions.

Fourteen technology transfer categories have been tabulated: chemicals, computers, electronics, energy, heavy industry, instruments, machinery, management, metallurgy, military, miscellaneous, nuclear, telecommunications, and transportation. This is a selective rather than an exhaustive list. It is most complete in the categories of computers, electronics (excluding consumer electronics such as televisions or tape recorders), and telecommunications. Nuclear refers to nuclear power rather than weapons, and the military category is reserved for the transfer of weapons technology or new weapons or materiel to the Chinese Armed Forces. The focus throughout is on the transfer of production technology rather than finished goods.

The category for Chinese firms refers to the central ministry or national import and export corporation which functions as a purchasing agent. The category for end-user refers to the factory or other unit for whom the item is purchased. As the online file grows, it will be possible to select specific Chinese factories and to list all their recent imports of foreign technology, or to select a single foreign firm and to identify where its products are going.

The chronology lists 183 transactions, involving 15 foreign countries. The preponderance of the United States (71 transactions) and Japan (42 transactions) reflects both the major sources of technology and the focus on computers and electronics. The following table sets out the categories and foreign countries in a comprehensive fashion.

Trends in Technology Transfer, 1984

Most transfer of technology to China takes place within commercial transactions between foreign corporations and Chinese enterprises. The duration of the contact and ease and frequency of consultation are more significant for effective technology transfer than the exact form of the contract (license, assembly, joint-venture, and so forth). The extent to which Chinese factories or other end-users have been able to deal directly with foreign technology suppliers has varied in recent years, but the trend is for increased enterprise autonomy and more direct contact between Chinese end-users and foreign suppliers. A major policy question has been the proper degree of centralization for technology acquisition.

Centralization often leads to delay and purchase of inappropriate equipment, while decentralization commonly results in duplication, overspending, and purchase of foreign technology in less favorable terms than could be achieved by a specialized central body.

Several trends that began in the late 1970s continued and intensified in 1984. An increasing proportion of technology imports were specific items to be used for more effective utilization of existing facilities. Under both the Soviet technical aid program of the 1950s and the purchases of the early 1970s the primary form of technology transfer was the purchase of whole plants. Typically, a central ministry arranged to import and set up a complete facility, which usually produced a single item in large volume, such as steel, tanks or fertilizer. In such circumstances the technology was embodied in the machinery, plant layout, and operating instructions, and the role of Chinese managers and workers was restricted to operating the factory. Since the late 1970s, however, the emphasis has shifted to improving the efficiency and productivity of existing but now obsolescent or obsolete facilities.

The type case here would be the industrial controller. These electronic devices represent the most current form of industrial automation. They automatically monitor and control the operation of entire factories. Though the earliest applications were to such continuous-flow operations as chemical plants or refineries, the most recent types can be applied to batch-production processes as well. In every case they provide great gains in productivity, product quality, and the efficient use of materials and fuel. It is extremely significant that China, which has been importing such systems since the mid-1970s, has recently entered into several agreements with Japanese and US manufacturers for the production of controllers and of computer-controlled machine tools.

China's efforts to diversify its sources of foreign technology are evident, with small but technically advanced countries such as Canada, Sweden or Norway serving as alternate suppliers of high technology items such as satellite ground stations. The several joint institutes for management training also illustrate this trend, with Chinese managers being trained by specialists from many countries including the United States, Canada, Japan, the Federal Republic of Germany, and Norway.

Joint ventures, which entail continuous close interaction between the Chinese enterprise and its foreign partner, should be conducive to effective technology transfer. But, although China has been trying to attract foreign partners for joint ventures since 1979, until recently most joint ventures consisted of hotels, food-processing, or low-skill assembly operations for Hong Kong firms. In 1984, however, a number of joint ventures were set up with major multinational firms for the production of such items as computer terminals and programmable machine tools.

Partly as a result of the relaxation of US export controls in 1983 and 1984, China is importing increasingly sophisticated technology, especially in electronics and computers. China also signed several agreements in 1984 to mass produce foreign minicomputers. This should speed the adoption of computers in China's factories and offices, which should in turn promote more effective operation of Chinese industry.

In 1984 China demonstrated an increased willingness to enter into contracts for consulting services, training, and feasibility studies. This reflects an enhanced sophistication about the purchase of foreign goods and services, as well as an increased appreciation for the significance of software--plans, programs, information gathering, and processing. China's discovery of the advantages of leasing provides further evidence of increasing commercial sophistication.

What may become a significant new mode of technology transfer was demonstrated by China's late 1984 purchases (perhaps with the help of Hong Kong intermediaries) of several bankrupt foreign companies along with their proprietary technology. These purchases further demonstrate commercial sophistication and awareness of the possibilities provided by the international market. The Municipality of Tianjin purchased a German motorcycle firm, and a refrigerator factory was to be shipped from France to the vicinity of Beijing. The most significant deal was the November purchase of a Long Island numerically-controlled machine tool corporation by the Beijing Number 1 Machine Tool Plant and a Hong Kong partner. In this purchase (reported by Xinhua to be the first purchase of a foreign company by a Chinese one), the Beijing factory acquired all patents and technology of Auto Numericals and is to send managers to run the new corporation in New York.

The potential importance of a late December agreement between the Governments of China and the Soviet Union for cooperation in technology, including building and transformation of industrial enterprises, lies in China's extensive inventory of Soviet factories and machines, which date back to the period of Soviet technical aid in the 1950s. These facilities are now obsolete, but it might well be easier or cheaper to bring them up to present Soviet standards than to try to update them by installing possibly incompatible technology from Western countries.

A major new trend is the purchase of US military technology. Although there has been more speculation about purchases than actual signing of contracts, China did purchase Sikorsky helicopters for use as high-altitude military transports. Further sales of such items as antitank missiles and jet engines are considered possible.

Technology transfer to China during 1984 was not only more sophisticated and diverse, but it went to an increasing number of end-users, who sometimes made direct contact with foreign suppliers from an increasing number of foreign corporations and countries. To an increasing degree foreign technology is becoming a commodity, imported by Chinese enterprises with access to foreign exchange on the basis of their own estimate of their needs.

CHINA TECHNOLOGY TRANSFER
CHEMICALS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
01/00/84	Furamite Engineering (United Kingdom)	China National Chemical Construction Company		Licensing of a leak-sealing process	Furamite's process seals leaks in flanges, valve glands, pipe welds and pressure vessels in continuous-process plants without shutting down the plant. China Trade and Economic Newsletter (London), February 1984
03/10/84	OMI International Corp; Asia OMI International (USA)	Ministry of the Electronics Industry	Hua-Mei Electroplating Technology Co.	Joint Venture to produce electroplating chemicals	China Business and Trade (Washington), 31 March 1984, p.2
06/00/84	Aena Chimica Organaca, Montedison (Italy)	China National Chemical Construction Corp.	Dyestuffs factory, Jilin	Technology and equipment for a dyestuffs plant	Sino-British Trade Review (London), August 1984, p.13
07/00/84	Continental Carbon Co. (USA)	- - -	Carbon-black Plant, Tianjin	Technology and process design for new carbon-black plant	Continental Carbon Co., a unit of a subsidiary of DuPont, will provide the technology and process design for a 15,000-ton-a-year carbon-black plant to be built near Tianjin. Plant construction will be done by Japan's Toyo Engineering. China Trade Report (Hong Kong), July 1984, p.3
07/09/84	Engineering Science Inc., Parsons Corp. (USA)	Yanshan United Foreign Trade Co.	Yanshan Petrochemical Corp., Beijing	Design of pollution control facilities	\$15 million contract China Business Review (Washington), November/December 1984 p.60
08/00/84	Bone Markham Co. (United Kingdom)	China National Technology Import and Export Corp.	No.1 Film Factory, Baoding, Hebei	Magnetic tape coating production line	The facility will produce audio and video tape, as well as computer tapes and floppy discs. Sino-British Trade Review (London), September 1984, p.10
08/08/84	Sun Refining and Marketing Corp. (USA)	China National Petrochemical Corp.	New lubricant plant in Shekou, Shenzhen Special Economic Zone	Joint venture lubricant blending and packaging plant	China Business Review (Washington), November/December 1984, p.64

CHINA TECHNOLOGY TRANSFER
CHEMICALS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
08/16/84	Toyo Engineering Corp. (Japan)	China National Chemical Construction Corp.	Polystyrene plant, Jilin	Joint construction of polystyrene plant	The factory to produce high-impact polystyrene in Jilin City. This will be the second such plant in China. The first, in Lanzhou, was also constructed by Toyo. China Daily (Beijing), 16 August 1984, p.2
08/20/84	Asahi Chemical Industry Co. (Japan)	- - -	New electrolyzer plant in Beijing	Production technology for electrolyzers	Asahi Chemical Industry Co. agrees to export production technology for electrolyzers to produce caustic soda through an ion-exchange diaphragm method. Asahi is now constructing two caustic soda plants in Gansu and Heilongjiang provinces, but this will be its first export of engineering technology. It will be used in a new electrolyzer plant in Beijing, which is to be completed in June 1984. Kyodo, 20 August 1984, in BBC Survey of World Broadcasts, Weekly Economic Report, 29 August 1984, p.A29
09/00/84	Bechtel Petroleum Inc.; Texaco Development Corp. (USA)	- - -	Lunan Ammonia Complex, Shandong	License of technology for new coal gasification plant	Texaco Development Corp., which has developed a new continuous operation coal-gasification plant, will license its process design to the Lunan Ammonia Complex in Shandong. The 200-ton-per-day facility will replace a coal gasifier that is between 40 and 50 years old. Bechtel Petroleum will provide complete consulting services for the project, including design and detail engineering and operator training. China Business and Trade (Washington), 9 September 1984, p.1
09/04/84	Asahi Chemical Industry Co; Chori Co. (Japan)	China National Chemical Construction Corp.	Beijing Chemical Machinery Factory	License for production of bipolar electrolyzers for chlor-alkali production through	China Business Review (Washington), November/December 1984, p.65

CHINA TECHNOLOGY TRANSFER COMPUTERS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
01/23/84	International Software Systems Inc. and World Information Systems Enterprises (USA)	China Software Technology Development Center	- - -	US firms to establish a software development training school and to act as exclusive agent for computer hardware	China Business Review (Washington), May-June 1984, p.66
03/00/84	Wang Laboratories Inc. (USA)	China National Instruments Import-Export Corp.	Hubei Radio Factory, Wuhan	Two computer service centers	The Beijing Service Center will be run by the China National Instruments Import-Export Corp., and supplied by Wang's Hong Kong office. It is to provide maintenance services to 80 Chinese enterprises using Wang systems. The second, in Wuhan, is to be run in cooperation with the Hubei Radio Factory. It will offer plans for office automation, consultations on technology and policy, and technical guidance on program control, applied software development and training. China Business and Trade (Washington), 31 March 1984, p.2
03/29/84	Wang Computer Corp. (USA)	China Metallurgical Import-Export Corporation	Shoudu Iron and Steel Company, Beijing	Electronics technical exchange meeting	At the meeting held at Beijing's Shoudu Iron and Steel Company, Wang Corporation exhibits various types of computers. This is the first time US information network technology has ever been displayed in China. Xinhua in FBIS/China, 3 April 1984, p.B4
04/02/84	Altos Computer Systems Inc. (USA)	Alhua Electronic Co., Ltd.	Shaoguan Radio Factory, Guangdong	Microcomputer production lines	Altos Computer Systems of the USA sells production lines for 16-bit microcomputers to be used at the Shaoguan Radio Factory in Guangdong Province. China Business Review (Washington), July/August 1984, p.50
04/06/84	Fuji Electric Corp. (Japan)	Tianjin City	- - -	Training in use of computers	Training will be on computers which Fuji hopes to market in China. New York Times, 7 April 1984, p.A39

CHINA TECHNOLOGY TRANSFER COMPUTERS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
04/20/84	Hewlett-Packard Corp. (USA)	China National Electronics Import and Export Corp.	- - -	Agreement on joint venture in computer manufacture	The agreement in principle for a joint venture to manufacture computers and measuring instruments represents the first advanced joint venture in electronics between China and the United States. With the approval of the application by the governments of both countries, the headquarters will be established in Beijing. Xinhua, 20 April 1984, in FBIS/China, 3 May 1984, p.B9
05/00/84	Burroughs Corp. (USA)	Everbright Corp. (Hong Kong)	- - -	Joint manufacture of microcomputers	Everbright, a Chinese-owned corporation in Hong Kong specializing in technology acquisition, signs a contract for joint manufacture of Burroughs' B28 and B25 microcomputers in Hong Kong and in Kunming, Yunnan. Sino-British Trade Review (London), May 1984, p.11
05/00/84	Aily-Lityan Microcomputer Corp. (Singapore)	- - -	Guangzhou Audio and Electric Appliance Factory, Guangzhou	Microcomputer manufacture	Singapore's Aily-Lityan Microcomputer Corporation enters into a 50-50 joint venture with Guangzhou's Audio and Electric Appliance Factory to manufacture about \$40-million worth of microcomputers within 5 years. Sino-British Trade Review (London), June 1984, p.14
05/08/84	General Robotics Corp. (USA)	China National Electronics Import and Export Corp.	- - -	Minicomputer systems production technology	General Robotics of the USA agrees to provide finished units, kits and technology for a factory to produce DEC (Digital Equipment Corporation)-compatible minicomputer systems. The contract is worth \$4 million. China Business Review (Washington), July/August 1984, p.50
06/00/84	Sage Computer Technology;	- - -	Baoding Computer Industries Corp.,	Microcomputer systems	Contract worth \$1.5 million for 100 Sage IV and 200 Basis Medfly

CHINA TECHNOLOGY TRANSFER COMPUTERS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
	Datamedia (USA; Hong Kong)		Hebei		microcomputer systems plus letter of intent for another 150 Sage and 200 Medfly units. China Business Review (Washington), September/October 1984, p.63
06/01/84	Control Data Corp. (USA)	China Administration of Computer Industry	- - -	Contract for long-term research and development	Two sides agree to exchange technical information and to cooperate in planning, manufacturing and sales of data- processing equipment. China Business Review (Washington), September/October 1984, p.63
07/31/84	K.C. Ltd. (Japan)	China Computer Technical Service Corp.	International Computer Software Company	Joint venture to develop Chinese character software	The joint venture, International Computer Software, will develop applications software to use Chinese characters on mini and microcomputers. China Business Review (Washington), November/December 1984, p.64
08/00/84	Cullinet Software Inc. (USA)	Ministry of the Electronics Industry	China Computer Technical Service Corp.	IBM-compatible software	Cullinet Software is to be the first US software company to have distributed rights in China. It secured a US export license in August 1984. China Computer Technical Service Corp. will act as exclusive service organization for the software. Products will include the IDMS/R single database management system; the Information Database mainframe computer link; GOLDENGATE management and decision support software; the Cullinet Manufacturing System; the Cullinet Financial System, an online accounting package; and TRENDSPOTTER, a decision support system. China Business and Trade (Washington), 9 September 1984, p.2
08/04/84	Compac Corp. (USA)	- - -	Beijing Electronic Display Factory	Production Line for Computer Terminals	Production line goes into operation in Beijing. It is a joint venture

CHINA TECHNOLOGY TRANSFER COMPUTERS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
08/23/84	Corporate Data Sciences Corp. (USA)	Amalgamated Computer Companies, Guangdong		High-resolution video scroller terminals for Chinese character word-processing	with the key equipment, instruments and technology provided by the American side. The line has an annual capacity of 20,000 terminals. Xinhua, in China Daily (Beijing), 7 August 1984, p.3
09/09/84	Altos Computer Systems (USA)	Ministry of the Electronics Industry		Several hundred multi-function minicomputers	Letters of intent for a \$56 million contract to provide, among other items, the HEX computer along with a Video Scroller Terminal. This contains a high-resolution Chinese character full editing and processing system. The terminal is connected to a 29116 microcomputer, and carries out word-processing tasks in Chinese. China Business and Trade (Washington), 23 August 1984, p.2
09/17/84	Shanghai Software Consortium (USA)		10 computer institutes in China	Software development	US Department of Commerce must approve the sale. Altos will provide its 586 five-user and 986 nine-user models to various educational, scientific, industrial and commercial facilities in China. The contract is worth over \$3 million, and calls for Altos to ship most of the computers in kit form. China Business and Trade (Washington), 9 September 1984, p.1
					Shanghai Software Consortium, a US company of San Jose, California, has been granted an export license by the Commerce Department for software service in China. The consortium will offer the services of Chinese computer scientists to US computer companies. It has a staff in Shanghai of 30 leading computer scientists from 10 institutes in China, and can provide as many as 200 senior programmers and professors if demand is high. The Chinese programmers will offer

CHINA TECHNOLOGY TRANSFER COMPUTERS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
09/25/84	Eastern Computers Inc. (USA)	China Henan International Economic-Technical Cooperation Corp.	- - -	Technology and software for Chinese character input coding method	software design, programming, testing and writing original software at rates which will be considerably lower than those charged by US specialists. Computerworld (Framingham, MA), 17 September 1984, p.17
09/26/84	IBS Comsery Corp. (Japan)	China Shipbuilding Corp.	- - -	Agreement to develop software to handle Chinese characters	China Business Review (Washington), November/December 1984, p.64
10/09/84	Sperry Corp. (USA)	China National Technical Import Corporation; China Computer Technical Services Corporation	Wuxi Computer Factory	Agreement in principle to produce and market in China Sperry's MAPPER software system	China Business Review (Washington), January/February 1985, p.67
10/28/84	Intel Corp. (USA)	Computer Bureau, Ministry of Electronics	- - -	Training Center for microcomputer engineers, technicians, and teachers	Intel and the Ministry of Electronics' Computer Bureau agree to set up a training center to train microcomputer engineers and teachers who will conduct microcomputer classes. Senior technicians will be trained in software and applications. It is to begin classes in November 1984, training between 500 and 700 persons a year. Xinhua, 28 October 1984, in FBIS/China, 31 October 1984, p.B2
11/00/84	Genisco Computer Corp. (USA)	- - -	Hunan Computer Company, Changsha	Joint venture to produce computer graphics terminals	The joint venture, Genisco-China Computer Graphics Terminals Corp., will be established in Changsha as soon as the US and Chinese governments approve. Genisco will provide equipment, technology and training. Output is expected to

CHINA TECHNOLOGY TRANSFER COMPUTERS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
11/00/84	Sun Associates (USA)	Sino-American New Star Computer International Inc.	Number 8 Radio Plant, Shijiazhuang, Hebei	Joint venture to import computers and provide technical services	reach 500-1000 terminals a year. China Business and Trade (Washington), 23 November 1984, p.1
11/00/84	Xidex Corp. (USA)	Shanxi Provincial Electronics Industry Corp.	- - -	Technology for floppy disc production	The joint venture, Sino-American New Star Computer, will import and sell computers and other electronic products, provide technical and repair services, and develop new technology. It also plans to open a computer technology school. China Business and Trade (Washington), 9 November 1984, p.4
11/00/84	General Electric Corp. (USA)	- - -	Wuxi Electrical Apparatus Corp., Jiangsu	Production of programmable computers for use in factories	Three-year agreement under which Xidex will provide hardware, raw materials and technical support for a complete floppy disc production facility with an annual output of one million discs. China Trade Report (Hong Kong), December 1984, p.3
11/19/84	Computer Resources Inc. (USA)	China National Machinery and Equipment Import and Export Corp.	Unspecified factory in Zhengzhou, Henan	Technology and Equipment to produce floppy disks	China Business and Trade (Washington), 9 December 1984, p.4
11/29/84	Northgate Computer Services (United Kingdom)	Tianjin Computing Center; Tianjin Advanced Technology Development Corp.	Northgate China Computer Services, Tianjin	Joint venture to specialize in development of fourth-generation application techniques	China Business Review (Washington), March/April 1985, p.61
12/00/84	Wang Corp. (USA)	Xiamen Construction and Development Corp.	Joint venture, Xiamen-Wang Computer Co., Fujian	Joint venture to produce personal computers and to assemble and market other Wang products	Sino-British Trade (London), January 1985, p.13

CHINA TECHNOLOGY TRANSFER COMPUTERS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
12/17/84	Televideo Systems Inc. (USA)	China National Electronics Import and Export Corp.	Beijing No. 3 Computer Factory	Beijing factory to build subassemblies for TeleVideo computers, and sell microcomputers	China Business Review (Washington), March/April 1985, p.57
12/20/84	Corporate Data Sciences Inc. (USA)	Amalgamated Computer Corp., Guangdong	- - -	Agreement to produce CDS computer technology	Agreement to last 30 years, with a joint investment of \$45 million. China Business Review (Washington), March/April 1985, p.61
12/30/84	Burroughs Corp. (USA)	Yunnan Provincial Import and Export Corp.	Yunnan Electric Equipment Plant	Assembly lines for microcomputers	Yunnan plant to import Burroughs' B20 and B25 microcomputer production and assembly lines, software and technology. It is to produce 1,500 microcomputers in 1985. Xinhua, in FBIS/China, 31 December 1984, p.B2

CHINA TECHNOLOGY TRANSFER ELECTRONICS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
01/00/84	Dipix Systems (Canada)	Six Educational and Resource-Management Institutes	Qinghua University, and others	Digital-image Analysis Equipment	Dipix Systems signs \$3-million contract to supply digital- image analysis equipment to six educational and resource- management institutes in China, including Beijing's Qinghua University. Uses of the equipment include analysis of satellite data, robotics, simulation cartographics, pattern recognition and medicine. The contracts include service and maintenance of the equipment. Chinese technicians will study equipment service and maintenance in Canada. China Trade Report (Hong Kong), March 1984, p.3
01/00/84	Dorado Company and Data I/O Corp. (USA)	Shanghai Import-Export Corporation	Shanghai Instrument and Electronics Bureau	First sale of US microchip programmers to China.	Dorado Company, a representative firm for US high-tech manufacturers, signs a \$30,000 contract to sell programming equipment manufactured by Data I/O Corporation of the US to the Shanghai Instrument and Electronics Bureau. The universal programming systems, the 29A and Unipac II, can support up to 500 Eproms and other devices. Defense Electronics (Palo Alto), February 1984, p27
01/19/84	BTU (United Kingdom)	- - -	Beijing Powder Metal Research Institute	Powder metal sintering furnace for semiconductor manufacture	China Business Review (Washington), May-June 1984, p.66
01/23/84	Fuji Motor Corporation (Japan)	- - -	Wuxi Machine Tool Electric Equipment Plant	Technology for electronic time relays	China Business Review (Washington), May-June 1984, p.66
04/00/84	Unizon Corp. (Japan)	- - -	Factory in Shanghai	Production equipment for germanium diodes	Japan's Unizon Corp. signs \$.88 million contract for sale of equipment and raw materials for production of germanium diodes at a factory in Shanghai.

CHINA TECHNOLOGY TRANSFER ELECTRONICS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
04/17/84	Yaesu Musen (Japan)	- - -	unknown	Transceiver assembly	China Business Review (Washington), July/August 1984, p.50 Yaesu Musen of Japan has begun assembling transceivers in China on a knockdown basis. Production at four Chinese plants is to reach 25,000 units in 1984. Chinese workers will be trained in Japan. Japan Economic Journal (Tokyo), 17 April 1984, p.4
05/00/84	Racal Marine Radar (United Kingdom)	China National Electronics Import and Export Corp.	Shanghai No.4 Radio Factory	Assembly of advanced marine radars	Racal is to supply advanced ARPA (Automatic Radar Plotting Aid) systems and RM 1290 relative motion long-range ship radars. Initial shipments will be of complete systems, after which kits will be assembled at the Shanghai factory. Eventually radars produced at Shanghai will have a large proportion of locally made components. Sino-British Trade (London), May 1984, p.6
05/09/84	Energy Sciences Corp. (USA)	- - -	Shanghai Electrical Machinery Co.	Pilot electron beam processing system	This is China's first purchase of such equipment. It will be used to perform experiments and research on cross-linking polyolefin films, curing adhesives and coatings, and curing specially formulated polymers used to make wire and cable jackets. Chemical Week (New York), 9 May 1984, p.33
05/14/84	Pragmatic Designs (USA)	China National Development Corp.	Shaoxing Semiconductor Plant, Zhejiang	Digital test system and test heads	China Business Review (Washington), September/October 1984, p.63
06/00/84	Marconi Command and Control Systems Ltd. (United Kingdom)	China Communications Import and Export Service Corp.	- - -	Radar beacons and visibility measuring equipment	Marconi Sea Watch Accord radar beacons and MET-3 visibility equipment to be installed at the ports of Tianjin, Shanghai and

CHINA TECHNOLOGY TRANSFER ELECTRONICS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
					Guangzhou. Sino-British Trade Review (London), June 1984, p.6
06/28/84	Applied Materials Inc. (USA)	Ministry of Electronics	Applied Materials-China Service Center, Beijing	Joint operation of center to install and service semiconductor systems	China Business Review (Washington), September/October 1984, p.68
07/00/84	Toshiba Ltd. (Japan)	- - -	Wuhan Duplicator Factory, Hebei	Production line and technical data for desk-top copying machines	China Business Review (Washington), November/December 1984, p.60
07/02/84	Societe D'Applications Generales D'Electricite et de Mecanique (France)	China National Electronics Import and Export Corp.	Jiannan Machinery Plant, Hunan	Magnetic disc production line	China Business Review (Washington), September/October 1984, p.63
08/10/84	Hewlett-Packard Corp. (USA)	China Electronics Import and Export Corp.	China Hewlett-Packard Ltd.	Joint venture to develop and manufacture electronic products	A 50-50 joint venture with a capital fund of \$10 million to transfer advanced technology and management skills and build a research and development capability in China. Xinhua, 13 August 1984, in FBIS/China, 13 Aug 84, p.B5
09/00/84	John Fluke Manufacturing Co. (USA)	- - -	Qian Feng Radio Instrument Factory, Chengdu, Sichuan	Production technology for two models of synthesized signal generators	Fluke will train Chinese engineers at its US factory and assist in setting up an assembly operation in Chengdu. Qian Feng will sell the generators, used to test radio equipment, to other factories in China. The initial contract is for \$2.5 million, but Fluke expects to earn much more from later equipment and training sales. China Trade Report (Hong Kong), October 1984, p.3

CHINA TECHNOLOGY TRANSFER ELECTRONICS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
09/19/84	Mitsuta Industrial Corp. and Komei Trading Corp. (Japan)	- - -	Fujian Photoelectric Equipment Factory	Production line for electrostatic copiers	China Business Review (Washington), November/December 1984 p.61
11/00/84	Lingnan Microelectronics Investment Co. (United Kingdom)	- - -	Lingnan Microelectronic Industrial Co., Guangdong	Joint venture to produce large integrated circuits and microcomputers, with 70 percent of the products to be sold in China.	Sino-British Trade (London), December 1984, p.14
11/00/84	Spire Corp; Electronic Space Systems Corp. (USA)	China Electronics Import and Export Corporation; Ministry of the Electronics Industry	New factory in Nantong, Jiangsu	Technology and equipment for photovoltaic cells and modules	Part of the agreement is a \$3.9-million contract to supply three Spire production lines to a new photovoltaic module plant under construction in Nantong. The lines will make crystalline silicon wafers, solar cells and modules. China Business and Trade (Washington), 23 December 1984, p.1
11/00/84	Indesit Engineering Spa. (Italy)	China National Electronics Import and Export Corp.	A Beijing factory	Turnkey plant for production of passive electronic components	Sino-British Trade (London), January 1985, p.11
12/00/84	EG & G Princeton Applied Research Group (USA)	Oriental Scientific Instruments Import and Export Corp.	- - -	Memorandum of understanding on construction of a weak signal processing and detection laboratory in China, plus joint production of one of EG & G's lock-in amplifiers.	Sino-British Trade (London), January 1985, p.13
12/00/84	Hardy Development Corp. (Hong Kong)	Hainan District Development Corp; Guangzhou Branch of China National Electronics Import and Export Corp.	Joint venture, China Nanda Electronics Industry Corp.	The joint venture is to import foreign technology and equipment for the electronics industry in Hainan.	Sino-British Trade (London), January 1985, p.11

CHINA TECHNOLOGY TRANSFER ELECTRONICS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
12/00/84	Fuji Electric Machinery Plant Ltd. (Japan)	- - -	Tianjin No.3 Semiconductor Equipment Factory	High-pressure silicon pile production line	China Business Review (Washington), March/April 1985, p.57
12/17/84	Skipper Electronics Co. (Norway)	Huijiang Development Company, Ministry of Communications	Nanjing-Skipper Electronics Co., Ltd.	Joint venture to manufacture navigation instruments in Nanjing	China Daily (Beijing), 20 December 1984, p.2
12/20/84	Printrionics Pty. (Australia)	China Great Wall Industrial Corp.	- - -	Contract to build six printed circuit board factories	The \$40-million contract calls for duplication of Printronics' Sydney factory. Printronics, which has defense and communications contracts in Australia, is controlled by an Overseas Chinese businessman now a resident of Australia. China Great Wall Industrial Corporation has close links with China's missile industry. Far Eastern Economic Review (Hong Kong), 20 December 1984, p.8

**CHINA TECHNOLOGY TRANSFER
ENERGY**

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
02/00/84	Core Laboratories International (USA)	Scientific Research Institute of Petroleum Exploration and Development, China National Oil and Gas Exploration and Development Corp.; China Nanhai East Petroleum Corp.; China National Offshore Oil Corp.	China-Corelab Ltd.	Joint Venture for oil well core analysis	Joint Venture will provide well-core analysis and laboratory, engineering, consulting and field services. Affiliates will operate in Guangzhou, the Shekou industrial district of the Shenzhen Special Economic Zone, and Wanzhuang in Hebei. China Business and Trade (Washington), 6 March 1984, p.4
02/00/84	Alpine Corp. (Austria)	China National Coal Development Corp.	- - -	Contract to jointly produce Alpine's AM-50 tunnellers	China Business Review (Washington), May-June 1984, p.67
04/00/84	L'Union Industrielle et d'Entreprise (UIE) (France)	China Offshore Platform Engineering Corporation (COPEC)	China Guangzhou-UIE Offshore Engineering Corp.	Joint venture to manufacture offshore oil platforms	Joint venture to manufacture offshore oil platforms at Guangzhou's Huangpu Shipyard. The French side will train Chinese managerial and technical personnel in French shipyards and is to be responsible for design and manufacturing supervision, and for keeping the joint venture informed on new technology related to platform manufacture during the 10-year period of cooperation. The new corporation will take orders from China and the international market. China Trade News (Davenport IA), May 1984, p.16
06/00/84	TRW Inc. (USA)	China National Technology Import and Export Corp.	- - -	Electrical submersible pumps and manufacturing technology	The pumps are used in oil wells when production declines. The package includes 225 complete units and the license and technology for their manufacture. Sino-British Trade Review (London), July 1984, p.14
06/29/84	Ebasco Services, Inc., Enserch	Ministry of Coal Industry	Pilot Coal-Slurry Plant in Beijing	Engineering and support services for a	The \$1-million contract will determine the technical and economic

CHINA TECHNOLOGY TRANSFER ENERGY

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
	Corp. (USA)			pilot coal-slurry plant	feasibility of slurring Chinese coals, leading to commercial production of coal-water mixes. Asian Wall Street Journal (Hong Kong), 29 June 1984, p.6
07/06/84	Consulting Services Ltd., Canadian Pacific Railroad (Canada)	China National Coal Development Corp.	- - -	Feasibility study for improvement of coal storage, loading and transport	Contract signed with Canadian Pacific's Consulting Services for a feasibility study on improving coal storage, handling and transportation in Shanxi Province. China will try to use unit train technology for the first time. China Business and Trade (Washington), 23 July 1984, p.1
08/00/84	Technip (France)	China National Technical Import Corp.	Daqing Oilfield	Feasibility study of enhanced oilfield production	The \$4.4-million study is financed by the World Bank and will be carried out in close cooperation with IFP, the French Petroleum Institute, with technical backup from the ELF Aquitaine Group. It will define the processes best suited to enhance oil recovery at the Daqing oilfield. China Business and Trade (Washington), 9 August 1984, p.2
08/00/84	Combustion Engineering Simcon Inc. (USA)	Ministry of Foreign Economic Relations and Trade	North China Institute of Electric Power	Thermal power simulators for training	At the Thermal Power Operator Training Center the \$1- million simulators will be used to train 200 operators a year. China Business and Trade (Washington), 9 September 1984, p.2
08/20/84	International Bechtel Inc. (USA)	China National Coal Development Corporation	China America International Engineering Inc.	Joint venture to import engineering technology and managerial skills.	Bechtel and China National Coal Development Corporation formally establish a joint venture called China America International Engineering Inc. (CAIEI). It is to work on coal mines, pipelines, engineering, energy and communications projects. Its headquarters will be in Shenzhen with a liaison office in Beijing. It

CHINA TECHNOLOGY TRANSFER
ENERGY

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
					will offer a complete range of services including training and fund-raising for heavy engineering projects. Xinhua, 20 August 1984, in FBIS/China, 21 Aug 84, p.B3
09/02/84	Ferd Lentjes Dampfkessel und Maschinenbau (Federal Republic of Germany)	- - -	Shenyang Boiler Co.	Agreement to coproduce industrial boilers	China Business Review (Washington), November/December 1984, p.65
10/00/84	Allied Colloids Ltd. (United Kingdom)	China National Technical Import and Export Corp.	Daqing Oilfield	Design and implementation of advanced oil recovery program	Project will use the "Alcoflood" range of advanced oil recovery polymers Sino-British Trade (London), December 1984, p.14
11/00/84	Fluor Corp. (USA)	China National Technical Import and Export Corp.	- - -	Study of a prototype plant for separating oil-gas-water mixtures found in exploratory wells.	China Business and Trade (Washington), 23 November 1984, p.1
11/00/84	Vetco Offshore Corp. (USA)	- - -	Shanghai Dalong Machine Plant	Joint venture, Vetco-Dalong Offshore Equipment Co., to produce connectors and other facilities for the offshore oil industry	Sino-British Trade (London), December 1984, p.14
12/00/84	Brown Boveri (Switzerland)	Ministry of Water Resources and Electric Power	- - -	Contract for construction of a 500-kilovolt transmission line for yangtze gorges hydroelectric projects	Sino-British Trade (London), January 1985, p.13
12/00/84	Mather and Platt Rotating Machinery Division (United	- - -	Shanghai Pump Works	Technology for manufacture of Mather and Platt's 'PJ' range	Sino-British Trade (London), February 1985, p.14

CHINA TECHNOLOGY TRANSFER
ENERGY

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
	Kingdom)				
12/12/84	Solenergy Corp. (United Kingdom)		Tianjin No. 2 Semiconductor Manufacturing Plant	Letter of intent for manufacture of solar cells	China Business Review (Washington), March/April 1985, p.59
				of coalmining drainage pumps	

CHINA TECHNOLOGY TRANSFER
HEAVY INDUSTRY

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
01/00/84	Esab AB (Sweden)	- - -	A Shanghai welding electrode factory	Esab of Sweden is to supply electrode-processing equipment for use in a Shanghai welding electrode factory.	China Business and Trade (Washington), 7 February 1984, p.2
01/00/84	C-E Refractories, (USA)	China National Metals and Materials Import and Export Corp.	Beijing Refractory Plant	Technology for production of ceramic fiber and refractories	C-E Refractories, a unit of Combustion Engineering Inc., signs a contract with China National Metals and Materials Import and Export Corp. for the design of a new factory at the Beijing Refractory Plant to manufacture ceramic fiber products. Ceramic fiber is used as insulation in furnaces. The Beijing facility will be modelled after a C-E plant in Tennessee. C-E will provide equipment, training and consultations on improvements in C-E refractory fiber technology made during the first five years of the ten-year contract period. China Business and Trade (Washington), 21 January 1984, p.2
03/00/84	General Electric Corp. (USA)	Tianjin Machinery Import and Export Corp.	Tianjin Electrical Appliances Industrial Co.	Manufacturing techniques and equipment for production of deoxidation welding rods	General Electric signs a \$2.5-million contract for sale of equipment and technical patents for the manufacture of deoxidation welding rods. The equipment will be used at an enamel-insulated wire factory that operates under the Tianjin Electrical Appliances Industrial Company. China Trade News (Davenport, IA), May 1984, p.1
03/18/84	Minnesota Mining and Manufacturing Corp. (USA)	Shanghai Municipal Investment and Trust Corporation	New factory in Shanghai	Production of electrical tapes, insulating resins, and other products	Minnesota Mining and Manufacturing signs memorandum agreeing to operate a factory in Shanghai to produce electrical tapes, insulating resins and other of its broad range of products. This will be the first enterprise with exclusive foreign ownership (rather than a joint

CHINA TECHNOLOGY TRANSFER
HEAVY INDUSTRY

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
06/00/84	Westinghouse Corp. (USA)	- - -	Harbin Turbine Works, Heilongjiang	Technology for manufacture of 600-megawatt turbines	venture) in Shanghai. Xinhua, in FBIS/China, 19 March 1984, p.B2 The US corporation will be responsible for the design, technology and assembly of the first batch of turbines and will examine them to ensure that they meet the standards of the US Quality Assurance Program. The Harbin Turbine works also plans to purchase numerically controlled milling machines from the Federal Republic of Germany to produce rotors, boring machines from Italy and milling machines from the USA. China Daily (Beijing), 29 June 1984, p.2
08/00/84	Okura and Co; Sunflame Accumulators (Japan)	Heilongjiang International Technology Joint Venture Corp.	Harbin Boiler Factory	Heat accumulator technology	JETRO China Newsletter (Tokyo), November/December 1984, p.21
12/07/84	Foseco International Group Ltd.; Foseco Minsep (United Kingdom)	Ministry of Machine Building	Foundries in Shanghai and Shenyang	License for manufacture in China of a range of foundry products	Sino-British Trade (London), January 1985, p.6

CHINA TECHNOLOGY TRANSFER INSTRUMENTS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
02/00/84	Landis & GYR (Switzerland)	- - -	Harbin Electric Meter Plant, Heilongjiang	Technology for production of kilowatt-hour meters	China Business Review (Washington), May-June 1984, p.67
02/00/84	Yokugawa Hokushin Corp. (Japan)	Shanghai Instrumentation and Electronics Import and Export Corp.	Shanghai 9th Automation Instrumentation Factory	Manufacturing technology for vortex flow meters	Jiji Press (Tokyo), 16 February 1984
02/15/84	Yamatate-Honeywell (Japan)	China National Machinery and Equipment Import and Export Corp.	Steel mills, oil refineries, other industrial plants.	Technology for production of industrial controllers	Yamatate Honeywell has a 7-year contract to provide production technology for controllers, used to measure and control temperature, pressure, amount of liquid and other conditions in industrial plants. Production will start with Japanese kits, and is expected to reach 2,000 units per month within 4 years. Kyodo, in FBIS/EA, 16 February 1984, p.C7
02/28/84	Yokogawa Hokushin Electric Corp. (Japan)	- - -	Shanghai Ninth Automation Instrument Factory; Xi'an Instrument Factory; Beijing Electric Meter Works	Electronic control systems technology	China Business Review (Washington), May-June 1984, p.67
04/24/84	Shimazu Corp. (Japan)	- - -	No. 3 Analytical Measuring Instrument Factory, Shanghai	Production of spectrophotometers	Knock-down production of Shimazu's UV 240 spectrophotometers. Japan External Trade Organization, China Newsletter (Tokyo), No. 51, July/August 1984, p.22
05/15/84	Yamatate-Honeywell Co. (Japan)	China National Machinery and Equipment Import and Export Corp.	Instrumentation plants in Shanghai and Chongqing, Sichuan	License to produce microcomputer equipped process controllers	Yamatate-Honeywell licenses production of Honeywell's small single-loop digital process controllers equipped with a microcomputer. China will produce a total of 50,000 units of the "Digitronik Line" process controllers over 7 years. Yamatate

CHINA TECHNOLOGY TRANSFER INSTRUMENTS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
06/04/84	Keithley Instruments (USA)	- - -	Fuzhou Electronic Instruments Factory, Fujian	Fuzhou plant to assemble and calibrate digital multimeters	also opens a technical service center for marketing, maintenance, and system engineering of the total distributed control system "TDC 2000," which includes the Digitronik Line at the Chongqing plant. Kyodo, in FBIS/EA, 18 May 1984, p.C5
07/13/84	Gould Inc. (USA)	China National Machinery and Equipment Import and Export Corp.	Tianjin Automation Instrumentation Factory	Manufacture of programmable controllers	Ten year, more than \$10-million contract to manufacture and assemble programmable controllers at the Tianjin factory. Gould will supply technical training in testing operations, China Daily (Beijing), 13 July 1984, p.2; China Trade Report (Hong Kong), September 1984, p.5
08/21/84	Ono Sokki Co. (Japan)	Beijing Electronic Technology Import and Export Corp.	Beijing Instrumentation Corp.	Know-how and parts for production of fast Fourier transform analysis systems	China Business Review (Washington), November/December 1984 p.65
09/11/84	Hitachi Ltd. (Japan)	China National Machinery and Equipment Import and Export Corp.	Dalian Instrument Factory, Liaoning	Industrial controller technology	Hitachi signs a 5-year contract to provide technology for its one-loop controller. Hitachi is to provide parts worth \$1.2 million for knock-down production of 100 controllers a month at the Dalian Instrument Factory. The local content ratio is to be raised gradually. Jiji Press (Tokyo), 11 September 1984
11/00/84	John Fluke Manufacturing Co. (USA)	- - -	Beijing Radio Research Institute	Two contracts for precision measuring instruments	First contract calls for Fluke to supply 1000 8840A voltmeters in kit form to the Beijing Radio Research Institute. The second, worth \$1.2

CHINA TECHNOLOGY TRANSFER
INSTRUMENTS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
12/00/84	Dipix Systems Ltd. (Canada)	China National Instruments Import and Export Corp.; China National Technical Import Corp.	Research institutes and universities in Beijing, Shanghai, Guangzhou, Wuhan, Nanjing and Urumqi	Image processors for remote sensing, resource mapping and medical image analysis	Processors are known as applied resource image exploitation systems (ARIES), and are said to be especially useful for analyzing large amounts of data, such as images from oil exploration. CoCom approval is required. China Business and Trade (Washington), 9 December 1984, p.1
					million, is for ten finished sets of calibration instruments for electrical repair facilities throughout China. These, multimeters which measure volts, ohms and amperes, must go through CoCom review. China Business and Trade (Washington), 23 December 1984, p.1

CHINA TECHNOLOGY TRANSFER MACHINERY

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
01/00/84	Goetze AG. (Federal Republic of Germany)	- - -	Changsha Zhengyuan Power Plant, Hunan	Piston ring technology	China Business Review (Washington), May-June 1984, p.67
01/00/84	AEG Telefunken (Federal Republic of Germany)	- - -	Shenyang Low-pressure Switch Plant	Technology for manufacture of explosive-proof combined switches for mining	China Business Review (Washington), May-June 1984, p.67
01/23/84	Schiess (Federal Republic of Germany)	- - -	Wuhan Heavy Machine Tool Plant, Hubei	Technology for floor-type milling and boring machine tools	China Business Review (Washington), May-June 1984, p.66
01/23/84	Siemens (Federal Republic of Germany)	- - -	Xiangfan Machine Tool Electric Drive Plant, Hubei	Technology for manufacturing machine tool electric drive simulating static alternating installations	China Business Review (Washington), May-June 1984, p.66
01/23/84	Westinghouse Corp. (USA)	- - -	Shanghai Motor Factory; Harbin Motor Factory; Xiangtan Motor Factory	Technology and equipment for manufacturing large and medium box-type motors	China Business Review (Washington), May-June 1984, p.67
05/15/84	Fanuc Ltd. (Japan)	Ministry of Machine Building	- - -	Joint venture to produce factory automation equipment	Fanuc Ltd. of Japan, the world's largest manufacturer of machine tools, will set up a 50-50 joint venture in Beijing to produce factory automation equipment, including computerized numerically-controlled machines and precision motors. In the future the factory will produce industrial robots. Nihon Keizai, in Jiji Press, 15 May 1984
06/23/84	Pratt and Whitney Machine Tool Division, Colt	- - -	Shenyang No. 3 Machine Tool Plant, Liaoning	Joint manufacture of a digitally controlled lathe	A computerized, digitally controlled lathe, jointly manufactured by US and Chinese firms, passes its first

CHINA TECHNOLOGY TRANSFER MACHINERY

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
					tests. The Shenyang No. 3 Machine Tool Plant will make the main parts for the lathe, while Pratt and Whitney will provide the rest. China Daily(Beijing), 23 June 1984, p.2
07/24/84	Industries, Inc. (USA)	China Machinery and Equipment Import and Export Corp.	Beijing 2d Machine Tool Factory	Machine tools	Toyoda signs a 5-year contract to aid in assembly of machine tools in China. Kyodo (Tokyo), 24 July 1984, in FBIS/Asia and Pacific, 24 July 1984, p.C1.
08/16/84	STAMA Machine-building Corp. (Federal Republic of Germany)	China National Machinery and Equipment Import and Export Corp.	Changzhou Machine Tool Works, Jiangsu	Coproduction of Machine Tools	Stama agrees to the production of several of its machine tools (MC018, MC118, MC218 TWIN) by the Changzhou Machine Tool Works. The agreement will be in effect until 1990. China Daily (Beijing), 16 August 1984, p.2
09/00/84	Gerber Systems Technology Inc. (USA)	- - -	Shanghai Metallurgical and Mining Machine Manufacturing Co.	Computer-assisted design (CAD) system for machine tools	Letter of Intent for sale worth \$500,000. Equipment to be delivered by June 1985, and used to generate designs and specifications for machine tools and mining gear. China Business and Trade (Washington), 9 October 1984, p.2
10/25/84	Fanuc Ltd. (Japan)	China National Machinery and Equipment Import and Export Corp.	A Beijing factory	License for production of small-sized machining centers	Under a 5-year contract the Chinese corporation will assemble the "tape drill" model of the numerically controlled machines, which are used to manufacture components for radios and television sets. Kyodo (Tokyo), 25 October 1984, FBIS/ Asia-Pacific, 25 October 1984, p.C5
11/00/84	Sodick Co. (Japan)	- - -	Hanchuan Machine Tool Plant, Shaanxi	Technology for manufacture of numerically controlled electro- discharge	China Business and Trade (Washington), 9 December 1984, p.3

CHINA TECHNOLOGY TRANSFER MACHINERY

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
11/00/84	Waldrich Coburg Machine Tools Inc. (Federal Republic of Germany)	- - -	Beijing No. 1 Machine Tool Plant	Coproduction of heavy duty digital-control planer-type milling-boring machines	Sino-British Trade (London), December 1984, p.14
11/27/84	Auto Numericals Inc. (USA)	- - -	Beijing No. 1 Machine Tool Plant	Numerical Control Tools	Beijing Machine Tool Plant and the Susanto Group of Hong Kong form a joint venture to buy Auto Numericals Inc. of Long Island, with all its property including patents, trade marks and technology. Under its new management Auto Numericals will continue to design, develop and produce numerically controlled machine tools. It will also run an import-export business dealing in machine tools, computer numerical control systems and spare parts. This is the first time a Chinese company has bought a foreign one. China Daily (Beijing), 27 November 1984, p.2

CHINA TECHNOLOGY TRANSFER MANAGEMENT

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
01/00/84	Canadian International Development Agency (Canada)	State Economic Commission	China-Canada Industrial Enterprise Management Training Center, Chengdu	Joint venture management training center	The joint venture, intended to train factory managers, will offer courses in management, new product development, international marketing, and cost accounting. China Trade Report (Hong Kong), February 1984, p.3
02/15/84	Japanese International Cooperation Association (Japan)	China State Economic Commission	Tianjin Management Training Center	Joint Sino-Japanese management training center	In February 1984, the first class begins at the Tianjin Management Training Center, jointly run by Japan and China. Japanese are to train 25 Chinese teachers at Tianjin in the first 2 years. China will send 20 people to study in Japan. The teachers will then train factory managers. Xinhua, in FBIS/China, 16 February 1984, p.D3
03/08/84	European Economic Community (EEC) (Western Europe)	- - -	Beijing Business Administration Center	EEC grants funding to establish MBA program at Beijing Business Administration Center	European Economic Commission allocates 3.5 million European Currency Units to expand the Beijing Business Administration Center by launching an MBA program. European financing (about \$3 million) will cover the first two classes of MBA students in the 1985-89 period. The aim of the project is to examine conditions for application of European management methods in the Chinese context. Students who successfully complete the course will have the opportunity for further on-the-job training in Europe. China Daily (Beijing), 8 March 1984, p.1
04/02/84	Swedish Management College (Sweden)	Tianjin City	Tianjin Municipal Finance and Economic College	Class of Sino-Swedish business management school opens	Fifty Chinese students make up first class of the Sino-Swedish business management school. They are bureau chiefs, managers or plant directors from Tianjin's industrial and communications departments. Swedish lecturers will teach business

CHINA TECHNOLOGY TRANSFER MANAGEMENT

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
					management strategy, technological research and development, international economic cooperation, and modern management methods. Xinhua, FBIS/China, 11 April 1984, p.G3
07/00/84	Patent Office, Federal Republic of Germany (Federal Republic of Germany)	Patent Office, China	- - -	Aid in establishing China's Patent Office	The Patent Office of the Federal Republic of Germany is to provide aid to China's newly-established Patent Office. The aid package is worth \$5.25 million, and includes equipment and training. Electronic data processing equipment, word processors, telex terminals, a telephone system and printing equipment are included. 110 Chinese specialists will be trained in the Federal Republic of Germany in patent inspection, patent administration, documentation and electronic data processing. China Daily (Beijing), 29 July 1984, p.2
11/19/84	Oslo Management Institute (Norway)	- - -	New management training institute in Beijing	Norwegian financed institute to train teachers for Chinese management institutes	Oslo Management Institute will handle curriculum and Norwegian Computers Inc. will provide equipment. Twenty Chinese teachers will be trained in Norway, then return to Beijing to set up the institute, which will continue to relieve Norwegian assistance. Aftenposten (Oslo), 20 November 1984, in JPRS:China Report, Economic Affairs, 85-016 (13 February 1985) pp. 97-98

CHINA TECHNOLOGY TRANSFER
METALLURGY

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
01/00/84	Sumitomo Corporation (Japan)	- - -	Ningbo Metal Powder Plant, Zhejiang	Technology and equipment for manufacturing ferro-based irregular shaped structures	China Business Review (Washington), May-June 1984, p.66
02/00/84	Schloemann-Siemag AG (Federal Republic of Germany)	- - -	Ma'anshan Iron and Steel Co.	Rolling mill	Schleomann-Siemag is to supply the Ma'anshan Iron and Steel Co. with a Mergen rolling mill with an annual capacity of 400,000 tons of wire rod. China Business and Trade (Washington), 7 March 1984, p.1
02/22/84	Italimpianti (Italy)	- - -	Ma'anshan Iron and Steel Works	Four million dollar contract to design and construct a furnace for a steel plant.	China Business Review (Washington), May-June 1984, p.67
03/00/84	Ashlow Ltd. (United Kingdom)	China National Technical Import and Export Corp.	Handan Steelworks, Hebei	Modernization of wire rod mill	Contract worth \$3 million for modernization of the Handan Steelworks' wire rod mill. It will increase the mill's output to 200,000 tons a year, and extend the range of specifications to which the mill can produce. Ashlow will supply the major items of mechanical equipment as well as the electrical control installation. China Trade and Economic Newsletter (London), April 1984, p.2
04/10/84	Mitsubishi Light Metal Industries Ltd., Ryoka Light Metal Industries Ltd. (Japan)	- - -	Qingtong Smelter, Ningxia	Aluminum smelting technology	China Business Review (Washington), July/August 1984, p.50
05/00/84	Kobe Steel Co. (Japan)	China International Trust and Investment Corp.	Zhouxian Aluminum Fabrication Plant, Beijing	Indirect extrusion plant for aluminum alloys	An indirect-extrusion press for aluminum alloys worth \$1.8 million is ordered from Japan's Kobe Steel. The 2,300 ton press, China's first, will be installed at the Zhouxian Aluminum Fabrication Plant near

CHINA TECHNOLOGY TRANSFER METALLURGY

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
07/17/84	Kobe Steel Co.; Shinsho Corp. (Japan)	China National Nonferrous Industrial Corp.; China International Trust and Investment Corp.	Zhouxian Aluminum Plant, Beijing	Joint venture to produce equipment for forming aluminum and other nonferrous metals	Beijing in March 1985. The new equipment will permit the plant to double its annual extrusion capacity to 4,000 tons and to produce harder alloys, including parts for aircraft and industrial machinery. China Trade Report (Hong Kong), June 1984, p.3
08/00/84	Nisshin Steel Corp. (Japan)	- - -	Taiyuan Steel Corp., Shanxi	Integrated stainless steel manufacturing process	The new joint venture will design and manufacture complete sets of equipment including cold-rolling mills, aluminum foil rolling mills and finishing equipment. Kobe Steel and Shinsho Corporations' advanced technology and modern management systems will be introduced. China Daily (Beijing), 18 July 1984, p.2
09/09/84	Drever Corp. (USA)	- - -	Shanghai Iron and Steel Research Institute	Continuous strip bright annealing line	JETRO China Newsletter (Tokyo), November/December 1984, p.21 Contract worth \$1.5 million. China Business Review (Washington), November/December 1984 p.61
09/10/84	Kanthal Corp. (Sweden)	- - -	Shenyang Nonferrous Metal Processing Factory	Joint venture to produce thermal bi-metal strips	China Business Review (Washington), November/December 1984, p.64
09/10/84	Kanthal Corp. (Sweden)	- - -	Capital Iron and Steel Corp., Beijing	Joint venture to produce electrothermal alloy wire	China Business Review (Washington), November/December 1984, p.64
11/00/84	Schloemann-Siemag Corp. (Federal Republic of Germany)	China Machinery and Equipment Import and Export Corporation	Baoshan Steel Works, Shanghai	Hot-strip mill	\$240-million contract for a hot-strip mill for the second stage of the Baoshan project. China will produce equipment worth \$50 million with technology provided by Schloemann-Siemag. This is the key project of the second stage of the

CHINA TECHNOLOGY TRANSFER
METALLURGY

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
11/09/84	Outokumpu Oy (Finland)	China National Nonferrous Metals Import and Export Corp.	Jinchuan Nickel Smelter, Gansu	License for flash smelter design	Baoshan project. China Trade Report (Hong Kong), December 1984, p.3; China Daily (Beijing), 23 December 1984, p.2
11/15/84	Western Mining Corp. Holdings Ltd. (Australia)	China Nonferrous Metals Import and Export Corp.	Jinchuan Nickel Smelter, Gansu	Assistance in construction of nickel smelter	China Business Review (Washington), March/April 1985, p.63
12/00/84	Holton Machinery (United Kingdom)	China Metallurgical Import-Export Corporation	Aluminum Factory in Changsha, Hunan	Complete "Conform" cold extrusion line, which can produce 3,000 tons of specially shaped aluminum forms a year	China Business Review (Washington), March/April 1985, p.58
12/00/84	Wimpey Major Projects; Pechiney Aluminum Co. (United Kingdom; France)	China National Nonferrous Metals Corporation	- - -	Feasibility study for construction of the \$800 million aluminum plant at Pingguo in Guangxi.	Sino-British Trade (London), January 1985, p.12

CHINA TECHNOLOGY TRANSFER MILITARY

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
06/26/84	Sikorsky Aircraft Corp. (USA)	China National Machinery Import and Export Corp.; China Polytechnologies Corp.	Chinese Peoples Liberation Army	24 Sikorsky S-70-C-2 "Blackhawk" helicopters	Sikorsky Aircraft, a subsidiary of United Technologies Corp. of the USA, signs a contract for the sale of 24 helicopters, which are a commercial version of the H-60, a combat assault and transport helicopter commonly referred to as the Blackhawk. The contract is worth from \$140 to 165 million, and includes spare parts and training for Chinese pilots and technicians. The helicopters are described as having no offensive capability per se, though they have extra-powerful engines, as they are intended for use as transports at high altitudes in Tibet (Xizang). The same model helicopters were sold to Taiwan in 1983. New York Times, 27 July 1984, p.D8; China Business and Trade (Washington), 23 August 1984, p.2
09/00/84	Selenia Corp. (Italy)	China, unspecified military body	- - -	Several shelterized, land-mobile electronic warfare systems	NATO's Sixteen Nations (Brussels), Vol 29, No.4, 1984, p.136
10/03/84	John Brown Plastics Machinery (United Kingdom)	China Great Wall Industrial Corporation	- - -	Purchase of plastics injection molding equipment for \$3.3 million	China Great Wall Industrial Corporation is associated with the Ministry of Space Industry which produces missiles China Business Review (Washington), January/February 1985, p.63
10/09/84	General Electric Corp. (USA)	- - -	Chinese Navy	Gas turbine engines for naval vessels	A delegation of Chinese naval officials and technicians arrives in the United States in early October 1984. They are interested in buying a modern gas turbine engine, as well as various weapons and material. The engine is the General Electric LM2500 gas turbine, which powers US Spruance class destroyers. Washington Post, 9 October 1984, p.A26

CHINA TECHNOLOGY TRANSFER
MILITARY

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
10/30/84	Marconi Communications Systems (United Kingdom)	- - -	Chinese Navy	Advanced radio communications system	The \$8-million contract calls for Marconi to provide a high-frequency shipborne communications system, which is currently used by the British Navy. Defense and Foreign Affairs Daily (Washington), 30 October 1984, p.1; China Business and Trade (Washington), 9 November 1984, p.1

CHINA TECHNOLOGY TRANSFER
MISCELLANEOUS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
04/30/84	National Technical Information Service, Department of Commerce (USA)	State Scientific and Technological Commission	- - -	Protocol on Exchange of Technical Information	On 30 April 1984 a new protocol between the US Department of Commerce's National Technical Information Service (NTIS) and China's State Scientific and Technological Commission is signed in Beijing. It calls for continuing the technical information exchange activities begun under a previous protocol. It also provides a formal program through which US information specialists are invited to lecture in China. Other articles provide for continuation of the workstudy program for Chinese information specialists conducted for the past two years by NTIS. National Technical Information Service, News Line, (Springfield, VA), Summer 1984, p.1
07/25/84	Eastman Kodak Corp. (USA)	- - -	New Factory in Xiamen, Fujian	Production of Kodak photographic film and paper	Kodak signs contract to help establish a factory in Xiamen which will produce color photographic film and paper. This is the first time Kodak has agreed to sell its photographic expertise to outsiders. Kodak will sell the technology and equipment and train Chinese to operate the plant. New York Times, 25 July 1984, p.D4
08/15/84	Wormald International Ltd. (Australia)	China Shipbuilding Trading Co.	Shanghai Fire Equipment Factory; Zhendan Fire Equipment Factory	License for fire protection technology for ships and offshore oil rigs	China Business Review (Washington), November/December 1984, p.65
11/06/84	Matra Corp. (France)	- - -	Unknown	Technical exchange sends six Chinese engineers to study space technology	Under a technical exchange protocol with France, six Chinese engineers will spend 6 months at Matra in 1985, where they will participate in the design, production and testing of a satellite. China Business and Trade (Washington), 23 November 1984, p.4

CHINA TECHNOLOGY TRANSFER
MISCELLANEOUS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
12/29/84	Government, Soviet Union (Soviet Union)	Government, China		Agreements on technical and scientific cooperation	China and Soviet Union sign three agreements on economic, scientific and technological cooperation, one of which stipulates that the two countries will exchange production technologies and help design, build and transform industrial enterprises. China Daily (Beijing), 30 December 1984, p.1

CHINA TECHNOLOGY TRANSFER NUCLEAR

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
06/09/84	Framatome (France)	China Nuclear Energy Industry Corp.	Qinshan Nuclear Power Reactor, Zhejiang	In-core instrumentation	Framatome of France signs a \$1-to-1.5-million contract to supply in-core instrumentation to the 300 megawatt pressurized water reactor the Chinese are building at Qinshan, Zhejiang. Delivery is scheduled for mid-1986. Nucleonics Week (New York), 26 July 1984, p.4
08/09/84	Ansaldo Componentti (Italy)	- - -	Qinshan Nuclear Power Plant	Design review for steam generators	Ansaldo Componentti of Milan signs a contract to perform design reviews of two steam generators for the nuclear power station that is to be built at Qinshan in Zhejiang. Chinese technicians from the 728 Research and Design Institute in Shanghai will also be involved in the project. Nucleonics Week (New York), 9 August 1984, p.10
08/23/84	Kraftwerk Union (Federal Republic of Germany)	China Nuclear Energy Industry Corp.	- - -	Test stand for pressurized water reactor fuel elements	Order, scheduled for completion in 1986, includes assembly and startup of the test stand as well as training of Chinese personnel. The test stand is used for measuring specified geometric characteristics of fuel elements, and the measurements then serve for quality control in fuel element fabrication. Nucleonics Week (New York), 23 August 1984, p.7

CHINA TECHNOLOGY TRANSFER TELECOMMUNICATIONS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
01/00/84	Radio Holland (Netherlands)	Shanghai Marine Telecommunications and Navigation Aids Company	- - -	Contract for Dutch firm to service marine radios and electronic navigation equipment on Chinese ships.	Radio Holland will also train Chinese technicians. China Trade Report (Hong Kong) March 1984, p.3
01/23/84	Spar Aerospace (Canada)	Ministry of the Electronics Industry	- - -	Twenty-six satellite earth stations	Spar Aerospace of Canada receives contract to provide China with 26 earth stations and related equipment and technology. The contract is worth about \$16 million. Asian Wall Street Journal (Hong Kong), 23 January 1984, p.15
03/00/84	DCM International Corp. (USA)	- - -	Chengdu Telephone Cable Factory	Quality control equipment	China Business Review (Washington), July/August 1984, p.51
03/07/84	Ministry of Research and Technology, Federal Republic of Germany (Federal Republic of Germany)	Ministry of Space Industry	- - -	Assistance in development of satellite communications system	In Bonn on 7 March 1984 China's Minister of Space Industry signs an accord with the Federal Republic of Germany's Minister for Research and Technology. The accord, an appendix to a 1978 treaty of scientific and technical cooperation, provides for German help in research, development, and manufacture of telecommunications and weather satellites. China Daily (Beijing), 11 March 1984, p.2
04/00/84	International Development Cooperation Agency, US Government (USA)	Ministry of Post and Telecommunications	Optical fiber equipment plants in Wuhan, in Houma, Shanxi, and in Meishan, Sichuan	US financing for feasibility study for technical upgrading of three fiber-optical equipment production facilities	Under an agreement signed by the Chinese Vice-Minister of Post and Telecommunications and the US Undersecretary of Commerce, the Trade Development Program of the US International Development Cooperation Agency agrees to assist in financing a feasibility study of the technical transformation of the optical fiber waveguide manufacturing plant in Wuhan and the optical fiber cable manufacturing plant in Houma, Shanxi. A second

CHINA TECHNOLOGY TRANSFER TELECOMMUNICATIONS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
05/00/84	International Business Consulting Co. (Japan)	- - -	Acheng Relay Plant, Harbin, Heilongjiang	Consulting to upgrade technology at relay plant	agreement covers a similar project for the telephone equipment plant in Meishan, Sichuan. Xinhua, in China Daily (Beijing), 1 May 1984, p.3
06/04/84	International Telephone and Telegraph Corp. (ITT) (USA)	China National Aero-Technology Import and Export Corp.	- - -	Contract worth \$1.4 million for digital multiplexers, related equipment and support for the Guangdong area.	Five Japanese experts arrive at the Acheng Relay Plant in Harbin to help upgrade technology and boost production. The plant is China's largest producer of electric control apparatus for telegraph and telephone service. China Daily (Beijing), 4 July 1984, p.3
06/06/84	Standard Electric Corp. (USA)	Guangdong Posts and Telecommunications Appliances Corp.	- - -	Licensing of multiplexing equipment technology	China Business Review (Washington), September/October 1984, p.66
06/23/84	Systems and Applied Sciences Corp. (USA)	Chinese Academy of Sciences	Space and Technology Center, Academy of Sciences	Landsat ground station	China Business Review (Washington), September/October 1984, p.69
					Contract worth \$10 million for a Landsat ground station to be delivered to the Chinese Academy of Science's Space and Technology Center. It consists of a receiving station, built by Scientific Atlanta Inc., a processing and analysis facility, supplied by Digital Equipment Corp., and a film-processing facility from Eastman Kodak. Landsat services are used on a subscription basis. The Chinese will be subscribing to both a thematic mapping system (with a resolution of 30 meters) and a multispectral scanner system. China Business and Trade (Washington), 23 June 1984, p.1

CHINA TECHNOLOGY TRANSFER TELECOMMUNICATIONS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
07/00/84	Nippon Telegraph and Telephone Public Corp. (Japan)	- - -	Shenyang Crossbar Switching System Plant, Shenyang	Used crossbar switching systems	Nippon Telegraph and Telephone Public Corp.(NTT) has agreed to ship used Japanese crossbar telephone switching systems to China. NTT has also agreed to build an experimental crossbar system at the Shenyang crossbar switching system plant which will serve to check what circuits need to be changed to link the Japanese system with China's, and to act as a training center for the system. China Business and Trade (Washington), 9 August 1984, p.1
07/00/84	Philips Corp. (Netherlands)	- - -	Nanjing Radio Factory	Technology for mobile automatic telephone systems	Philips signs a \$5-million contract for cooperative manufacture of the systems with the Nanjing Radio Factory. Philips will supply the first 17 systems and 2,000 car telephones in kit form for assembly in Nanjing. Sino-British Trade Review (London), August 1984, p.15
07/28/84	Philips Electronics (Sweden)	Ministry of Posts and Telecommunications	A Shanghai Communications Equipment Plant	Microcomputer controlled teleprinters	Shanghai Telecommunications Equipment Plant signs a contract with Philips Electronics of Sweden for cooperative manufacture of microcomputer controlled teleprinters. The factory will import equipment and technology, and after 3 years will be able to produce 3,000 machines a year which are up to Philips' standards. By then most parts will be made in China. Xinhua, in FBIS/China, 1 August 1984, p.G1
09/00/84	Comsat General Corp. (USA)	Ministry of Radio and Television	China Broadcasting Satellite Corp.	Consulting on contracts for direct broadcast satellite equipment	Comsat General Corp. of the USA agrees to assist the China Broadcasting Satellite Corp. in obtaining satellite and ground control network equipment for China's planned satellite

CHINA TECHNOLOGY TRANSFER
TELECOMMUNICATIONS

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
10/18/84	Japan Radio Company (Japan)	China International Trust and Investment Corp.	Fushun Radio Factory, Liaoning	Production technology for ultra-high-frequency two-way radios	broadcasting system. Comsat will assist in preparing requests for proposal documents, advise on contract negotiations, and help select final vendors. The Chinese are reported to have also requested consulting services from Messerschmitt Bolkow Blohm of the Federal Republic of Germany and Sateil Conseil of France. China Business and Trade (Washington), 9 September 1984, p.2 The contract is worth \$850,000 and calls for the production line to go into operation in July 1985. Eventual production is targeted at 35,000 radios per year. The radios, with a maximum range of 50 kilometers, are widely used in geologic prospecting, transportation and civil aviation. Xinhua, 18 October 1984, in FBIS/China, 19 October 1984, p.D1; China Business and Trade (Washington), 9 November 1984, p.1
11/00/84	Telefonbau & Normalzeit (Federal Republic of Germany)	- - -	Shanghai Telecommunications Works	Telephone production equipment	With the new equipment, the Shanghai factory will boost output by 50 percent, to 750,000 telephones per year. China Business and Trade (Washington), 23 November 1984, p.4

CHINA TECHNOLOGY TRANSFER TRANSPORTATION

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
01/00/84	Perfex Inc. (USA)	- - -	Changchun No.1 Motor Vehicle Plant	Licensing of technology for motor vehicle radiators	China Business Review (Washington), May-June 1984, p.69
01/00/84	BASF Corp. (Federal Republic of Germany)	- - -	Changchun No.1 Motor Vehicle Plant; Shanghai Yanfeng Machinery Model Plant	Technology and equipment for production of polyurethane motor vehicle parts	China Business Review (Washington), May-June 1984, p.69
01/23/84	Mannesman Co. (Federal Republic of Germany)	- - -	Changchun No.1 Motor Vehicle Plant	Technology and equipment for manufacture of truck wheels	China Business Review (Washington), May-June 1984, p.68
02/00/84	Riken Corp. (Japan)	China National Automotive Industrial Import Corp.	Wuhan Municipal Automotive Spare Parts Plant	Production technology for piston rings	Japan External Trade Organization, China Newsletter (Tokyo), No.51, July/August 1984, p. 21
02/02/84	Johnson Controls Inc. (USA)	China National Machinery Import and Export Corp.	Shanghai Battery Works	Equipment and technology for automotive battery plant	The \$5-million contract for technology for a new battery plant also calls for training. China Business and Trade (Washington), 7 March 1984, p.1
03/03/84	Daihatsu Motor Co., Toyoda Kaisha Ltd. (Japan)	China National Automotive Industry Import and Export Corp.	Tianjin Automotive Company	Technology for minitrucks and engines	Daihatsu signs a 7-year contract to provide factories in Tianjin with technology and training to produce 20,000 minitrucks and 10,000 engines a year. Ta Kung Pao Weekly (Hong Kong), 8 March 1984, p.5
04/00/84	Wabco Construction and Mining Equipment Corp. (USA)	- - -	Shanghai Tractor and Automotive Co.	Technology for 32-ton mining trucks	Sino-British Trade Review (London), June 1984, p.14
05/00/84	Mitsui Busan Co.; Tokyo Shibaura Electric Co.	China National Technology Import and Export Corp.	Beijing to Qinhuangdao Rail Line	Contract worth \$13.7 million for automatic transformers and	China Business Review (Washington), September/October 1984, p.66

CHINA TECHNOLOGY TRANSFER TRANSPORTATION

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
	(Japan)			electric remote control equipment for electrified rail line	
06/00/84	John Deere Corp. (USA)	China National Technical Import and Export Corp.	Tractor factories in Tianjin, and Changchun, and Shenyang	Tractor design and manufacturing technology	John Deere Corp. of the USA agrees to license design and technology to produce six models of tractors, ranging from 44 to 160 horsepower. The US firm will train several hundred Chinese technicians and managers. Three factories, in Tianjin, Changchun and Shenyang, will be upgraded to produce the tractors. China Trade News (Davenport IA), July 1984, p.6
07/00/84	Suzuki Motor Co., Okaya and Co. (Japan)	China National Aero-Technology Import and Export Corp.	Automotive plants in Beijing and Jilin	Technology for small cars and trucks	Suzuki Motor Co. agrees to co-produce small cars and trucks. Suzuki will supply engines, transmissions and other vehicle parts, along with technicians who will provide technical data and training. Both cars and trucks will have an engine displacement of 800 cc., and the Chinese hope to produce 80,000 vans and trucks a year at plants in Beijing and Jilin by 1986-87. China Business and Trade (Washington), 9 August 1984, p.1
07/13/84	Aisan Industry Co., Toyota Motor Corp. (Japan)	China National Technical Equipment Corp.	Qishuyan Locomotive Works, Jiangsu	Diesel engine valve technology	Aisan signs a \$2.1 million contract for production tools, special metal materials and production and quality control know-how on engine valves for diesel locomotives. It will be used at the Qishuyan Locomotive Works, Xuzhou, Jiangsu Province. Kyodo, 13 July 1984
08/00/84	Ishikawajima-Harima Heavy Industries Co.; Hitachi Zosen Corp.; Mitsui	- - -	Four shipyards in Guangzhou, Dalian, and Shanghai	Modernization of shipyards	Four major Japanese shipbuilders agree to provide technological expertise to help modernize four Chinese shipyards.

CHINA TECHNOLOGY TRANSFER TRANSPORTATION

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
	Engineering and Shipbuilding Co.; Mitsubishi Heavy Industries Ltd. (Japan)				Ishikawajima-Harima Heavy Industries will provide the Guangzhou Shipyard with designs and guidance on construction of 15,000-ton multipurpose freighters. Hitachi will guide the Dalian Shipyard's modernization of its factories, as well as supplying the design for a 60,000-ton tanker. Mitsui E&S will aid the Hudong Shipyard and Mitsubishi the Shanghai Shipyard, both in Shanghai. Japan Economic Journal (Tokyo), 4 September 1984, p.11
11/00/84	Mitsubishi Motors Corp. (Japan)	China National Automobile Import and Export Corp.		License of technology for truck cab production	The \$121-million contract licenses Mitsubishi's technology for truck cabs, as well as the sale of 10,000 trucks. China Business and Trade (Washington), 9 November 1984, p.1
11/00/84	Zuendapp Corp. (Federal Republic of Germany)	Tianjin Municipality		Complete motorcycle factory	Tianjin purchases the bankrupt Zuendapp Motorcycle Corporation and will ship the factory, which can produce 100,000 small motorcycles (with 50-80 cc. engines) a year, to China. It will take 18 months to two years to start production. China Trade Report (Hong Kong), December 1984, p.12
11/06/84	Mitsubishi Heavy Industries (Japan)	China National Technology Import and Export Corp.	Dalian General Forklift Truck Factory, Liaoning	Forklift manufacturing expertise	China Business Review (Washington), January/February 1985, p.63
11/28/84	Pirelli Tires and Cables (Italy)	China National Chemical Construction Corp.	Hualin Rubber Plant, Mudanjiang, Heilongjiang	Equipment to produce all-steel radial truck tires	The \$10-million contract is for a new plant which will be the first large-scale producer of all-steel radial truck tires in China. Production will be 100,000 tires a year. China Daily (Beijing), 19 December 1984, p.2

CHINA TECHNOLOGY TRANSFER TRANSPORTATION

DATE	FOREIGN FIRM/COUNTRY	CHINESE FIRM	CHINESE END USER	ITEM	COMMENTS/SOURCE
12/00/84	Zahnradfabrik Friedrichshafen (Federal Republic of Germany)	China National Automotive Industries Import and Export Corp.; China North Industries Corporation	- - -	License for manufacture of heavy truck gears	China North Industries is associated with the Ministry of Ordnance, which produces various conventional weapons Sino-British Trade Review (London), January 1985, p.11
12/00/84	Honda Motor Co. (Japan)	- - -	Shanghai-Yichu Motorcycle Co.	Technology, production equipment and parts to manufacture four-stroke and two-stroke 125cc. motorcycle engines	Shanghai producer will pay royalties as well as purchase price. By third year production will be 60,000 units a year, with 100 percent local content Sino-British Trade (London), February 1985, p.13

STATISTICAL SUMMARY

	Chemicals	Computers	Electronics	Energy	Heavy Industry	Instruments	Machinery	Management	Metallurgy	Military	Miscellaneous	Nuclear	Telecommunications	Transportation	TOTAL
Total	11	31	24	16	7	12	14	6	16	5	5	3	15	18	183
Australia	--	--	1	--	--	--	--	--	1	--	--	--	--	--	3
Austria	--	--	--	1	--	--	--	--	--	--	--	--	--	--	1
Canada	--	--	1	1	--	1	--	1	--	--	--	--	1	--	5
EEC	--	--	--	--	--	--	--	1	--	--	--	--	--	--	1
FRG	--	--	--	1	--	--	6	1	2	--	--	1	2	4	17
Finland	--	--	--	--	--	--	--	--	1	--	--	--	--	--	1
France	--	--	1	2	--	--	--	--	--	--	1	1	--	--	5
Hong Kong	--	1	1	--	--	--	--	--	--	--	--	--	--	--	2
Italy	1	--	1	--	--	--	--	--	1	1	--	1	--	1	6
Japan	3	3	6	--	1	7	4	1	5	--	--	--	3	9	42
Netherlands	--	--	--	--	--	--	--	--	--	--	--	--	2	--	2
Norway	--	--	1	--	--	--	--	1	--	--	--	--	--	--	2
Singapore	--	1	--	--	--	--	--	--	--	--	--	--	--	--	1
Sweden	--	--	--	--	1	--	--	1	2	--	--	--	1	--	5
Switzerland	--	--	--	1	--	1	--	--	--	--	--	--	--	--	2
UK	2	1	4	3	1	--	--	--	3	2	--	--	--	--	16
USA	5	5	8	7	4	3	4	--	1	2	2	--	6	4	71
USSR	--	--	--	--	--	--	--	--	--	--	1	--	--	--	1
Total	11	31	24	16	7	12	14	6	16	5	5	3	15	18	183